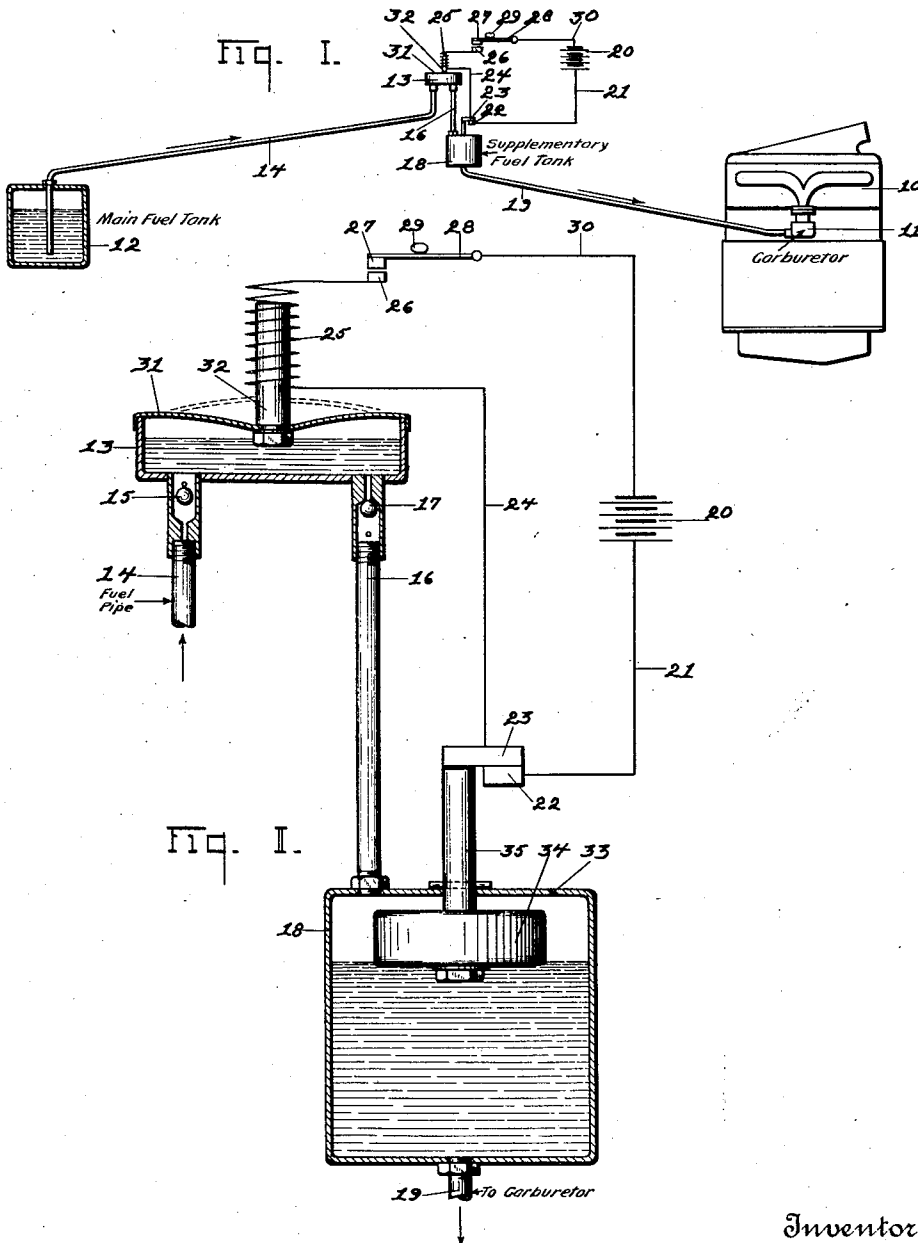


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APPLICATION FILED AUG. 8, 1917.

1,367,454.

Patented Feb. 1, 1921.

2 SHEETS—SHEET 1.



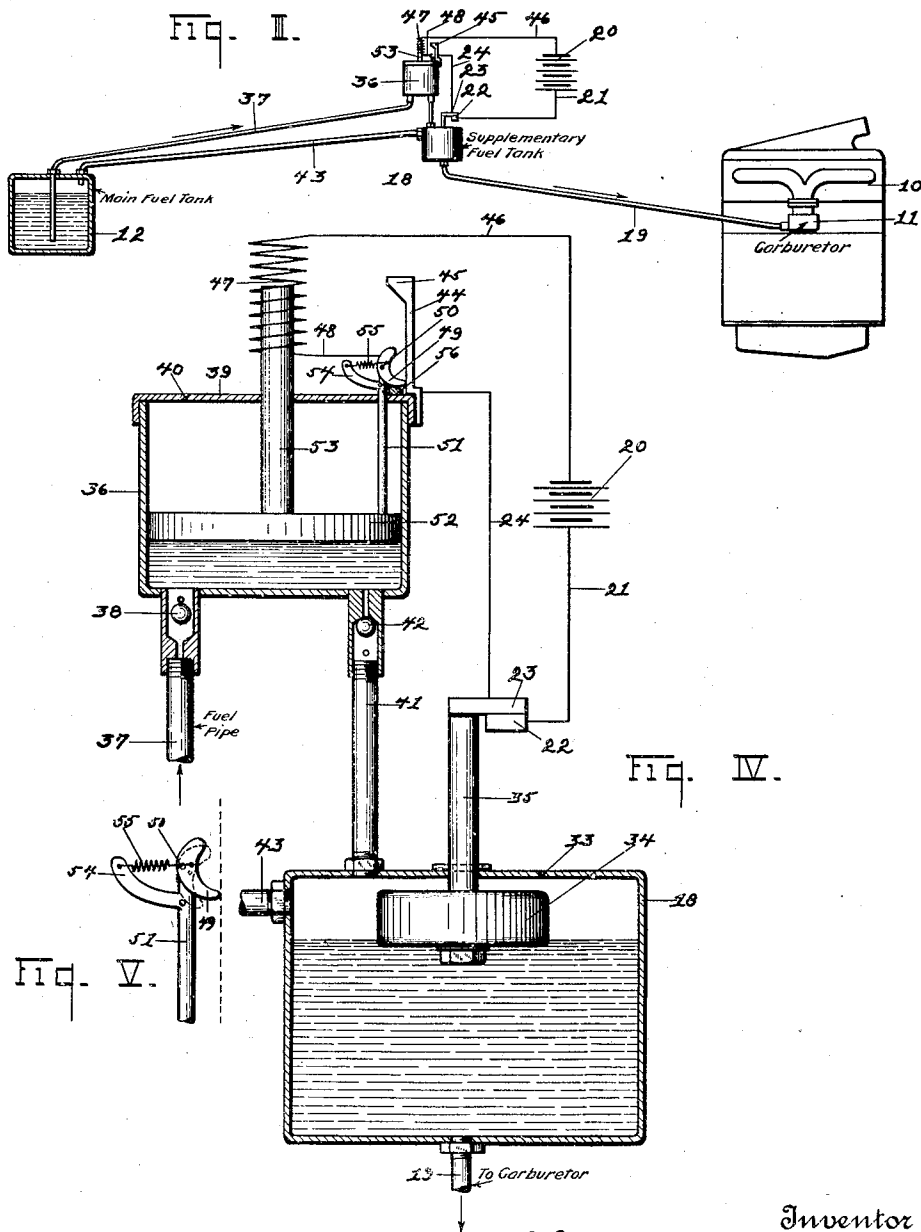
Inventor

Chester H. Braselton

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FUEL-FEEDING SYSTEM.

1,367,454.

Specification of Letters Patent.

Patented Feb. 1, 1921.

Application filed August 8, 1917. Serial No. 185,084.

To all whom it may concern:

Be it known that I, CHESTER H. BRASELTON, a citizen of the United States, residing at Toledo, in the county of Lucas and State of Ohio, have invented certain new Improvements in Fuel-Feeding Systems, of which I declare the following to be a full, clear, and exact description.

This invention relates to improvements in fuel feeding systems for motor vehicles.

The principal object of this invention is to provide an electrically operated fuel feeding system for motor vehicles. A further object of this invention is to provide a fuel feeding system for motor vehicles, in which fuel is lifted from a main low level fuel supply tank to a supplementary fuel tank, located above the plane of the carbureter, by means actuated by an electric circuit, which is automatically broken, when the fuel in the supplementary tank reaches a predetermined level. A further object of this invention is to provide means for lifting fuel from a main low level fuel supply tank to a supplementary tank, located in a plane above the carbureter, said means being operated by an electric circuit, which is made and broken by an interrupter actuated by any moving part of the motor vehicle. A further object of this invention is to provide a pump for lifting fuel from a main low level fuel supply tank to a supplementary tank, said pump being entirely automatic and actuated by a circuit, which is broken when the fuel in the supplementary fuel tank reaches a predetermined level.

Further objects, and objects relating to economies of manufacture and details, of construction, will definitely appear from the detailed description to follow.

I accomplish the objects of my invention by the devices and means described in the following specification. My invention is clearly defined and pointed out in the appended claims.

A structure constituting a preferred embodiment of my invention is illustrated in the accompanying drawings, forming a part of this specification, in which—

Figure I is a diagrammatic view of a system embodying my invention.

Fig. II is an enlarged, detail, sectional view through the pump and the supplementary fuel tank, the wiring of the electric circuit for operating the pump being shown diagrammatically.

Fig. III is a diagrammatic view showing a system embodying a modified form of my invention.

Fig. IV is a view, taken through the pump and the supplementary fuel tank, shown in Fig. III, in vertical section, the wiring of the electric circuit for actuating said pump being shown diagrammatically, and

Fig. V is a detail, fragmentary view, showing in detail the device for opening and closing the circuit at the ends of the piston stroke.

In the drawings, similar reference numerals refer to similar parts throughout the several views.

Considering the numbered parts of the drawing, I have shown an internal combustion engine 10, provided with a carbureter 11, which is supplied with fuel from a main fuel supply tank 12, which may be located in a plane lower than that of the carbureter. A pump chamber 13 is provided, which is connected with the main fuel supply tank 12, by means of the fuel pipe 14, having a non-return valve 15, between said pipe and the pump chamber 13. The pump chamber 13 is connected with a supplementary fuel tank 18, which is located in a plane above that of the carbureter 11, by means of a fuel pipe 16, having a non-return valve 17, between the pump chamber 13 and said pipe 16. The supplementary fuel tank 18 is connected with the bowl of the carbureter 11 by means of a fuel pipe 19, so that fuel may be fed by gravity from the supplementary tank 18 to the carbureter bowl. A source of current 20, which may well be a storage battery, is connected by the wire 21 with the fixed terminal 22, which co-acts with the movable terminal 23, connected by the wire 24 with one end of the solenoid 25, the other end of which is connected with a fixed contact 26. The fixed contact 26 coöperates with a contact 27, carried on the end of a vibrating interrupter lever 28. This lever is actuated by a cam 29, which may be driven from any suitable moving part of the machine. The interrupter lever 28 is connected by the wire 30 with the other terminal of the battery 20, or other source of current.

The pump chamber 13 has its open upper end covered by a flexible diaphragm 31, so that the pump chamber is made air tight. This flexible diaphragm 31 carries a central stem 32, which is made of soft iron or other suitable magnetic material and extends within and forms the core for the solenoid 25. A vent 33 is provided in the upper end of the supplementary fuel tank 18, so that said fuel tank is always under atmospheric pressure and fuel may feed therefrom by gravity to the carbureter bowl. A float 34 is disposed in the tank 18 and provided with an upwardly extending stem 35, which is adapted to engage the movable terminal 23, so as to move it out of engagement with the fixed terminal 22 to open the circuit.

In Figs. III, IV and V, I have shown a modified form of my invention in which the carbureter 11 attached to the engine 10 is supplied with fuel from the main fuel supply tank 12. The pump chamber 36 is connected with the main fuel supply tank by the fuel pipe 37, having the non-return valve 38 between said pipe and said pump chamber. The pump chamber 36 is also connected with the supplementary fuel tank 18, by means of the fuel pipe 41 having the non-return valve 42 between said pump chamber and the fuel pipe. A cover 39 is secured to the top of the pump chamber 36, and provided with a vent 40 by means of which the chamber is connected with the atmosphere. The supplementary fuel tank 18 is provided with a vent 33 connecting it with the atmosphere, so that the fuel therein is always under atmospheric pressure. The float 34 having the upwardly extending stem 35 which is adapted to engage the movable terminal 23 so as to move it out of engagement with the terminal 22, to open the circuit, is the same as in the form of my invention, shown in Figs. I and II. An upright member 44 is secured to the top 39 of the pump chamber 36 and provided with a head 45, having a lower inclined surface, as clearly shown in Fig. IV of the drawing. Battery 20 is connected by wire 21 with the fixed terminal 22 and the movable terminal 23 is connected by the wire 24 with the upright member 44. The other side of the battery 20 is connected by the wire 46 with the solenoid 47, the other terminal of which is connected by the wire 48 with the dog 49, which is pivotally mounted at 50 on the stem 51, carried by the piston 52, which moves within the pump chamber 36. The dog 49 is suitably insulated from the stem, 51, and the engagement of the dog 49 with the upright 44 closes the circuit through the solenoid 47. The piston 52 carries an upright stem 53, which is made of soft iron or other suitable magnetic material and forms the core for the solenoid 47. An arm 54 extends laterally from the upper end of the

stem 51, above the top 39 of the pump chamber, and a spring 55 is connected, at one end, to the end of the arm 54 and, at the other end, to the dog 49 above its pivot point 50. An inclined block 56 is fixed on the cover 39 in position to be engaged by the tail of the dog in its lower position to force the same into engagement with the upright 44.

From the description of the parts given above, the operation of my improved fuel feed system should be very readily understood. In the embodiment of my invention shown in Figs. I and II, the rotating cam 29 is driven from any suitable part of the machine so that it is caused to rotate so as to intermittently bring the contacts 26 and 27 into engagement with each other. With the parts in the position shown in Fig. II, in which the terminals 22 and 23 are in engagement with each other, the circuit from the battery 20 is closed and current passes from the battery 20 through the wire 21, terminals 22 and 23, wire 24, solenoid 25, contacts 26 and 27, interrupter lever 28 and wire 30 to the battery 20. It will be seen that the solenoid is thus energized and the core 32 thereof will be lifted, bringing the flexible diaphragm to the position shown by dotted lines in Fig. II. When the cam 29 has moved so as to allow the contacts 26 and 27 to separate, the circuit will be broken and the solenoid 25 deenergized so that the weight of the core 32 and the other parts carried by the diaphragm will cause the diaphragm to move to the position shown in full lines in Fig. II. When the circuit is closed, so as to energize the solenoid, fuel will be drawn from the main fuel supply tank into the pump chamber 13, and when the circuit is broken so as to deenergize the solenoid, fuel will be forced from the pump chamber 13 through the pipe 16 into the supplementary fuel tank 18. When the fuel in the supplementary tank 18 reaches a predetermined level, the stem 35 will engage the movable terminal 23 and lift it out of engagement with the terminal 22, so that the circuit through the solenoid 25 is open and said solenoid will be deenergized until the fuel in the supplementary tank has fallen to such a level that the terminal 23 is allowed to engage the terminal 22 once more. By the interrupter lever 28, which I have illustrated diagrammatically, I do not mean to refer to the interrupter lever, which is used in connection with the timing mechanism of the ignition circuit, but I refer to a cam actuated lever operated by a rotating part of the machine and used to open and close the circuit through the solenoid 25.

In the form of my invention shown in Figs. III, IV and V, the fuel is fed from the supplementary fuel tank 18 to the carbureter bowl through the fuel, pipe 19, in the

same manner as in the form of my invention shown in Figs. I and II and the circuit from the battery 20 is opened, when the fuel reaches a predetermined level, by means of the stem 35 carried by the float 34, in the same manner as in the form which I have just described. The pump chamber 36 is provided with a cover 39 having an opening 40 therein so that the pump chamber is under atmospheric pressure. The piston 52 is movable in said pump chamber and the stem 53 on said piston forms the core for the solenoid, which is included in the circuit from the battery 20. The parts as shown in Fig. IV are in such a position that the circuit is closed, and the solenoid 47 being energized, the piston 52 will be lifted due to the attraction of the solenoid for the core 53. This will carry the piston 52 upward and the stem 51 moves upwardly with it. When the dog 49 engages the inclined surface of the head 45 of the upright member 44, it is thrown and held by the spring 55 against the stop on the stem 51 in the position shown in dotted lines in Fig. V, in which the side of the upright member 44 is represented by dotted lines. Dog 49 will then be out of engagement with the upright member 44 and the circuit from the battery 20 through the solenoid 47 will be broken. When the circuit is opened and the solenoid deenergized, the weight of the piston and the stem 53, carried thereby, will cause the piston to fall in the pump chamber 36, forcing fuel from the pump chamber through the pipe 41 into the supplementary fuel tank 18. When the piston reaches its lower limit, the dog 49 will be engaged by the block 56, throwing it into engagement with the upright member 44, and closing the circuit through the solenoid 47, so that the solenoid will again lift the piston, causing fuel to be drawn into the pump chamber 36. A return pipe 43 is provided so that any excess fuel, which is fed from the chamber 36 to the supplementary fuel tank 18 when the magnet is deenergized, will flow back to the fuel tank 12.

I am aware that the particular embodiment of my invention, which I have here shown and described, is susceptible of considerable variation without departing from the spirit of my invention. I have found, however, that this particular embodiment is desirable from many standpoints and, therefore, I desire to claim my invention both specifically as well as broadly as indicated by the appended claims.

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

1. A fuel feeding system for motor vehicles, comprising the combination of a main fuel supply tank; a carbureter; a supplementary fuel tank located in a plane

above the carbureter; a pump for lifting fuel from said main tank to said supplementary tank; said pump comprising a pump chamber and a piston movable therein; an electric circuit including a solenoid for actuating said piston, and a source of current; and means actuated by said piston independently of said solenoid for intermittently making and breaking said circuit.

2. A fuel feeding system for motor vehicles, comprising the combination of a main fuel supply tank; a carbureter; a supplementary fuel tank located in a plane above the carbureter; a pump for lifting fuel from said main tank to said supplementary tank, comprising a pump chamber and a piston movable therein; a solenoid for actuating said piston; a circuit, including a source of current in which said solenoid is connected; means, controlled by said piston independently of said solenoid, for making and breaking said circuit; and means, controlled by the level of fuel in said supplementary tank, for opening and closing said circuit.

3. A fuel feeding system for motor vehicles, comprising the combination of a main fuel supply tank; a carbureter; a supplementary fuel tank located in a plane above the carbureter; a pump chamber; connections between said pump chamber and said main and supplementary fuel tanks, which connections include non-return valves; a piston movable in said pump chamber and provided with a stem; a solenoid; an electric circuit, including a source of current, in which said solenoid is connected, the stem of said piston forming the core of said solenoid; and means, controlled by said piston independently of said solenoid, for making and breaking said circuit.

4. A fuel feeding system for motor vehicles, comprising the combination of a main fuel supply tank; a carbureter; a supplementary fuel supply tank; a pump chamber; connections between said main and supplementary supply tanks and pump chamber, said connections including non-return valves; an overflow pipe connecting said supplementary fuel tank and said main fuel tank; a piston movable in said pump chamber, provided with an upwardly extending stem; a solenoid for which said stem acts as a core; an electric circuit in which said solenoid is connected, including a source of current; means for breaking said circuit, when the piston reaches substantially its limit of upward movement; and means for closing said circuit, when the piston reaches its limit of downward movement.

5. A fuel feeding system for motor vehicles, comprising the combination of a main fuel supply tank; a carbureter; a supplementary fuel supply tank located in a plane above the carbureter; a pump chamber;

connections between said main and supplementary tanks and said pump chamber; a piston movable in said pump chamber; a solenoid, a core for said solenoid, carried by and
 5 movable with said piston; an electric circuit including a source of current, in which said solenoid is connected; means controlled by said piston for breaking said circuit at the upper limit of movement of said piston;
 10 means for closing said circuit at the lower limit of movement of said piston; said circuit breaking and closing means being independent of said solenoid; and means controlled by the fuel level in said supplementary
 15 tank for making and breaking said circuit.

6. A fuel feeding system for internal combustion engines comprising the combination of a main fuel tank, a carbureter, a
 20 supplementary fuel tank connected with the carbureter, a pump including a piston, an electro-mechanical device including an electric circuit adapted to operate said piston independently of the engine for feeding fuel
 25 to said supplementary tank from a point above the same, a rod projecting from the piston at one side thereof, a switch for opening and closing said circuit controlled by said rod, and means controlled by a predetermined
 30 quantity of fuel in said supplementary tank for breaking said circuit.

7. A fuel feeding system for internal combustion engines comprising the combination of a main fuel supply tank, a carbureter,
 35 a supplementary fuel tank connected with the carbureter, a plunger for feeding fuel from said main to said supplementary tank, an electric circuit including a solenoid for actuating said plunger in one direction,
 40 means actuated by the plunger independently of the solenoid for opening said circuit when the plunger moves a predetermined distance in one direction, and means cooperating with the plunger to close said
 45 circuit when said plunger moves a predetermined distance in the opposite direction.

8. A fuel feeding system for motor vehicles, comprising the combination of a
 50 main fuel tank, a carbureter, a supplementary fuel tank located at a point above the carbureter, a pump chamber communicating with said main and supplementary fuel tanks, a member movable to elevate fuel
 55 from said main tank to said chamber, a core mounted upon said member, an electric circuit including a solenoid for actuating said core, means independent of said core for intermittently interrupting said circuit, and
 60 means for automatically breaking said circuit when the fuel in said supplementary tank reaches a predetermined height.

9. A fuel feed device comprising a plunger reciprocally mounted in a pump chamber,
 65 an electric circuit including a solenoid adapted to actuate said plunger, a movable

contact carried by said plunger, a relatively fixed contact, a spring normally holding said movable contact in engagement with the relatively fixed contact, means for shifting said movable contact out of engagement
 70 with the fixed contact when the plunger is moved a predetermined distance in one direction, and means for returning said movable contact into engagement with the fixed contact when said plunger moves a prede-
 75 termined distance in an opposite direction.

10. A fuel feed device comprising a plunger reciprocally mounted in a pump chamber, an electric circuit including a solenoid
 80 for actuating said plunger, a contact support connected with said plunger, a movable contact upon said support, a relatively fixed contact in the path of the movable contact, a spring connected with said movable contact and adapted to hold it in engagement
 85 with said relatively fixed contact during movement of the plunger in one direction and out of contact therewith when the plunger is moved in an opposite direction, and means for throwing said movable contact
 90 into and out of engagement with said relatively fixed contact at predetermined points during the movement of the plunger in opposite directions.

11. A fuel feed device comprising a plunger reciprocally mounted in a pump chamber, an electric circuit including a solenoid
 95 for actuating said plunger, a contact support connected with said plunger, a movable contact pivoted intermediate its ends upon said support, a relatively fixed contact in the path of the movable contact, a spring connected with said movable contact on one side of the pivotal point thereof and adapted to hold it in engagement with said relatively
 100 fixed contact during movement of the plunger in one direction and out of contact therewith when the plunger is moved in an opposite direction, and means for throwing said pivoted contact into and out of engagement
 105 with said relatively fixed contact at predetermined points during the movement of the plunger in opposite directions.

12. A fuel feed device comprising a plunger reciprocally mounted in a pump chamber, an electric circuit including a solenoid
 115 for actuating said plunger, a contact support connected with said plunger, a movable contact upon said support, a relatively fixed contact in the path of the movable contact, a spring connected with said movable contact and adapted to hold it in engagement
 120 with said relatively fixed contact during movement of the plunger in one direction and out of contact therewith when the plunger is moved in an opposite direction, means
 125 for throwing said movable contact into and out of engagement with said relatively fixed contact at predetermined points during the movement of the plunger in opposite direc-
 130

tions, a fuel receiving tank connected with said pump chamber, and means controlled by a predetermined quantity of fuel in said receiving tank for breaking said circuit.

- 5 13. A fuel feeding system for internal combustion engines comprising a main fuel tank, a carbureter, a supplementary fuel tank connected with the carbureter, a pump including a piston, an electro-mechanical device for operating said piston, including an
10 electric circuit and an automatic switch controlled by said piston for opening and closing said circuit, comprising a fixed contact and a movable contact pivoted intermediate
15 its ends, one of said ends being engaged by said fixed contact to open said circuit when the pump piston moves a predetermined distance in one direction and the other end engaging said contact to close said circuit

when the piston is moved a predetermined distance in the opposite direction. 20

14. A fuel feed system for internal combustion engine comprising a main fuel tank, a carbureter, a supplementary fuel tank connected with the carbureter, a pump including a piston interposed between said main
25 and supplementary fuel tanks, an electro-mechanical device including a circuit for actuating said piston and a switch for opening and closing said circuit comprising a
30 fixed contact and a spring control pivoted contact, said fixed contact having portions adapted to engage the opposite ends of said pivoted contact when the piston is moved in
opposite directions to automatically open
35 and close said circuit.

In testimony whereof I affix my signature.

CHESTER H. BRASELTON.