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FUEL SUPPLY SYSTEM FOR INTERNAL COMBUSTION ENGINES.

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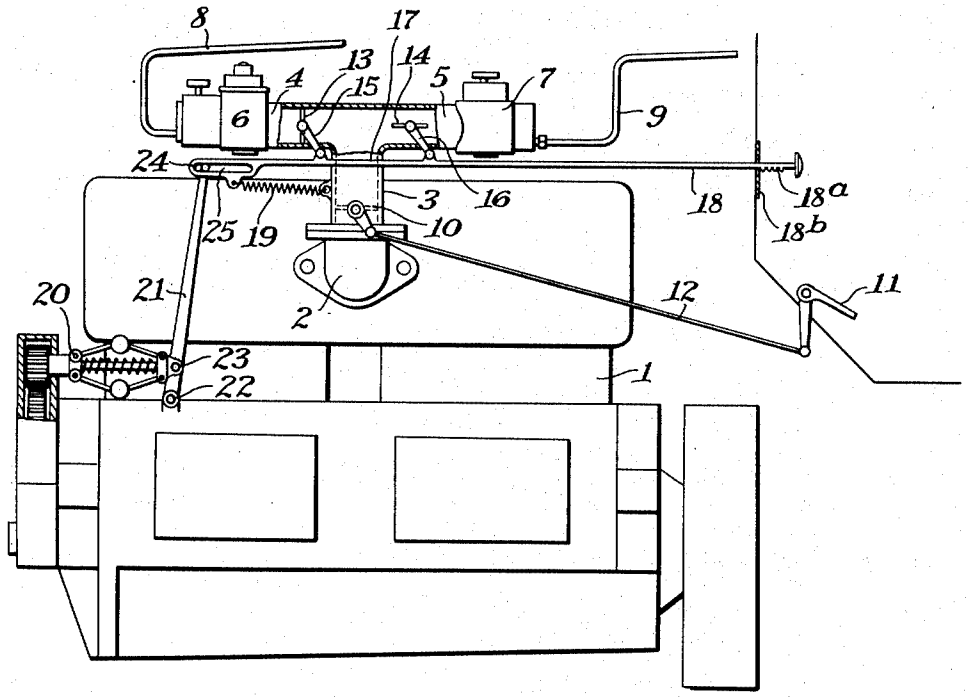

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UNITED STATES PATENT OFFICE.

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FUEL-SUPPLY SYSTEM FOR INTERNAL-COMBUSTION ENGINES.

1,334,491. Specification of Letters Patent. Patented Mar. 23, 1920.

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To all whom it may concern:

Be it known that I, GEORGE W. HENNER, a citizen of the United States, and resident of Rochester, in the county of Monroe and State of New York, have invented certain new and useful Improvements in Fuel-Supply Systems for Internal-Combustion Engines, of which the following is a specification.

The present invention relates to fuel supply systems for internal combustion engines, and more particularly to the type which employs kerosene, or some other low test hydrocarbon, as a fuel, an object of this invention being to provide a construction which will supply a second fuel such as gasolene, or other high test hydrocarbon, to the engine when the speed of the engine is reduced, or when starting the engine.

To this and other ends the invention consists of certain parts and combinations of parts all of which will be hereinafter described, the novel features being pointed out in the appended claims.

In the drawings, the single figure is a view in elevation of an internal explosion engine embodying the present system, parts being shown in section.

With the increased cost of gasolene the necessity of using some other fuel has become important. It has been suggested to use kerosene and, in fact, engines have been built with means for utilizing kerosene as the fuel, but it has been found that, after the speed of the engine lowers to a certain point, the engine becomes stalled, due to the fact that there is not sufficient suction for drawing the kerosene into the engine.

According to this invention, an auxiliary fuel supply is employed which may be utilized for driving the engine at low speeds, this auxiliary supply being preferably automatically controlled, so that it is not used on high speeds, provision also preferably being made for throwing the kerosene fuel supply into connection with the engine at will.

Referring more particularly to the drawings, 1 indicates an explosive engine and 2 the intake of the manifold of the engine, this intake opening preferably upwardly and having a conduit or passageway 3 connected thereto, said conduit having two branches 4 and 5, at its upper end leading, respectively, to the kerosene carbureter or fuel mixer 6 and a gasolene carbureter or fuel mixer 7. To the fuel mixer a supply pipe 8 is connected leading from the kerosene tank, and to the carbureter 7 a supply pipe 9 is connected leading from the gasolene tank, the two tanks not being shown. In the conduit 3, a throttle valve 10 is arranged, and this valve is connected to a treadle 11 on the vehicle by a link 12 or other suitable means. In the branch 4 a pivoted valve 13 is arranged to control the flow of the fuel from the fuel mixer 6, while in the branch 5 a pivoted valve 14 is arranged to control the supply of fuel from the carbureter 7. The valves 13 and 14 have, respectively, crank arms 15 and 16 which are pivotally connected to a rod 17, this rod in this instance having an extension 18 at one end projecting rearwardly, so as to be situated in a position where it may be controlled from the seat of the motor vehicle. The valves 13 and 14 are so arranged and connected to the operating rod 17 that when one valve is opened, the other will be closed, or vice versa, the movement of the rod effecting the opening of one valve with the closing of the other.

Normally the rod 17 may be held in one direction by a spring 19 which is connected at one end to the rod and at the other end to a fixed part. By this arrangement, the valve which controls the fuel from the gasolene supply is normally held open, while the valve which controls the fuel from the kerosene supply is normally held closed. Any suitable means may be provided for locking the rod 18 in variously shifted positions, so as to either reverse the position of the valves, or to hold both of them open, so as to obtain more gasolene fuel than kerosene fuel, or vice versa. In this instance, a rack 18^a is provided on the rod for engagement with a dog 18^b on a stationary part.

The automatic control of the valves may be effected by a centrifugal speed governor 20 of any suitable type geared to the engine so as to be driven thereby, and connected to the valve. In this instance, the connection embodies a lever 21 pivoted to a fixed part as at 22 and having the governor connected thereto as at 23, the upper end of this lever having a pin 24 operating in a slot 25 formed in the rod 17. This slot is provided in order that the rod may have a lost motion connection with the governor and in

this way may be shifted or moved independently of the governor, to provide for the manual control of the valve. The pin 24 may be spaced slightly from the outer end of the slot in order that the governor will not act upon the valves until the engine has attained a certain speed.

In the operation of the invention, the engine is started on the fuel from the gasolene supply, the parts being in the positions shown in the drawings. Up to a certain speed the engine will operate under the influence of fuel from the gasolene supply, but when the speed controller or governor shifts the lever 21, so that the pin engages the ball of the outer end of the slot 25, the rod 17 will be shifted to close the valve controlling the fuel from the gasolene supply and to open the valve controlling the fuel from the kerosene supply. The greater becomes the speed of the engine the more the gasolene supply will be cut off, and the more the kerosene supply will be opened, so that eventually the gasolene will be entirely cut off and the engine will travel solely under the influence of the fuel from the kerosene supply.

From the foregoing it will be seen that there has been provided a fuel supply system in which it is possible to use kerosene or similar low grade fuel on high speed, and to employ gasolene or high grade fuel on low speed and for starting purposes. In this way it is possible to reduce the fuel cost in running explosive engines while at the same making it possible to run such engine at slow as well as high speeds.

What I claim as my invention and desire to secure by Letters Patent is:—

1. In combination with an internal combustion engine, two fuel supplies each having its own carbureter, one of which is normally open to the engine and the other of which is normally closed, automatically operated means for cutting out the supply from the first named carbureter and cutting in the supply from the second named carbureter, and means under the control of the operator for rendering the automatic means inoperative.

2. In combination with an internal combustion engine, two fuel supplies each having its own cabureter, one of which is normally open to the engine and the other of which is normally closed, a speed governor for cutting out the supply from the first carbureter and cutting in the supply from the second carbureter, and means under the control of the operator for rendering said speed governor inoperative.

3. In combination with an internal combustion engine, two fuel supplies each having its own carbureter, one of which is normally open to the engine and the other of which is normally closed, automatically operated means for cutting out the fuel supply from the first carbureter and cutting in the fuel supply from the second carbureter, said automatically operated means having a lost motion connection therein permitting the control of the flow from the two carbureters independently of said automatically operated means, and means under the control of the operator for controlling the flow from the carbureters independently of the automatically operated means.

4. In combination with an internal combustion engine, a gasolene supply and a kerosene supply; a conduit leading from both supplies to the engine; two valves, one controlling the fuel from the gasolene supply and the other controlling the fuel from the kerosene supply; and a speed governor connected to the two valves for effecting the closing of the one controlling the fuel from the gasolene supply upon the opening of the one controlling the fuel from the kerosene supply and vice versa.

5. In combination with an internal combustion engine, a gasolene supply and a kerosene supply; a conduit leading from both supplies to the engine; two valves, one controlling the fuel from the gasolene supply and the other controlling the fuel from the kerosene supply; a speed governor connected to the two valves for effecting the closing of the one controlling the fuel from the gasolene supply upon the opening of the one controlling the fuel from the kerosene supply and vice versa; and a common controlling means under the control of the operative for controlling said valves independently of the speed governor.

6. In combination with an internal combustion engine, a gasolene supply and a kerosene supply; a conduit leading from both supplies to the engine; two valves, one controlling the fuel from the gasolene supply and the other controlling the fuel from the kerosene supply; a speed governor connected to the two valves for effecting the closing of the one controlling the fuel from the gasolene supply upon the opening of the one controlling the fuel from the kerosene supply and vice versa; and a common controlling means under the control of the operative for controlling said valves independently of the speed governor, said valves having a lost motion connection with the speed governor to permit the operation of the valves independently of the speed governor.

7. In combination with an internal combustion engine, two fuel supplies, two valves, one for controlling each fuel supply, automatic means connected to the two valves for effecting the closing of one upon the opening of the other, and a common means under the control of the operator for controlling said valves independently of the automatic means.

8. In combination with an internal combustion engine, two fuel supplies, two valves, one for controlling each fuel supply, automatic means connected to the two valves for effecting the closing of one upon the opening of the other, and a common means under the control of the operator for controlling said valves independently of the automatic means, said valves having a lost motion connection with the automatic means to permit the operation of the valves independently of said automatic means.

GEORGE W. HENNER.