C. F. GREEN.

FUEL FEEDING SYSTEM.

APPLICATION FILED NOV. 18, 1918.

1,348,406. Patented Aug. 3, 1920.

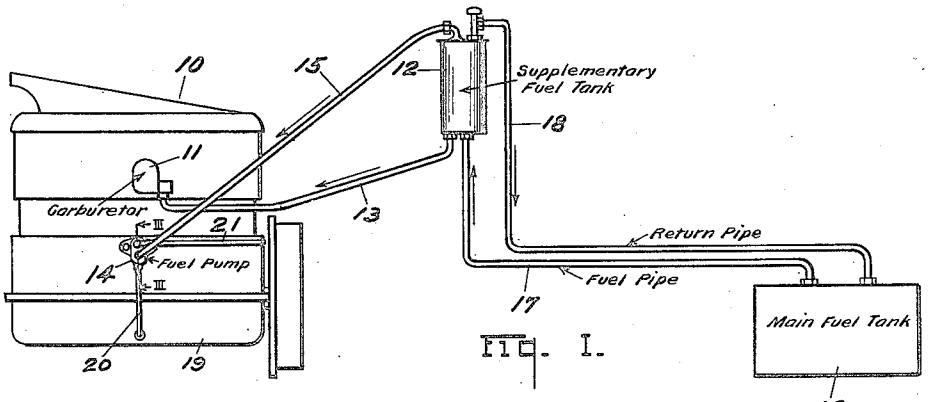



FIG. I.

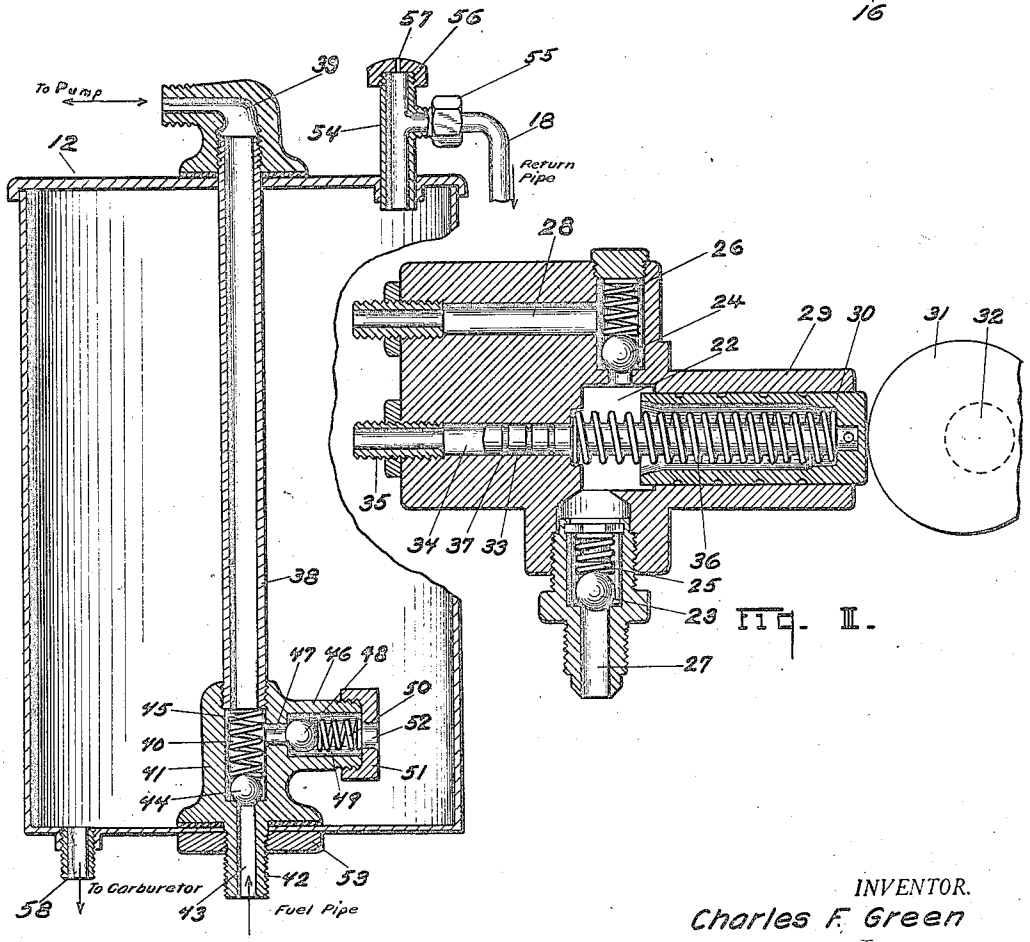



FIG. II.

FIG. I.

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## FUEL-FEEDING SYSTEM.

1,348,406. Specification of Letters Patent. Patented Aug. 3, 1920.

Application filed November 18, 1918. Serial No. 262,992.

*To all whom it may concern:*

Be it known that I, CHARLES F. GREEN, a citizen of the United States, residing at Defiance, county of Defiance, and State of Ohio, have invented certain new and useful Improvements in Fuel-Feeding Systems, of which I declare the following to be a full, clear, and exact description.

My invention relates to improvements in fuel feeding systems and has for its object to provide more particularly simple and inexpensive means by which the fuel is transferred from the main fuel supply source to the carbureter of the engine.

A further object of the invention is to provide a combined fuel and oil feeding pump adapted to be actuated through means driven by the engine or other power unit for supplying fuel and lubricating material thereto.

A still further object of the invention is to provide an improved gravity feed tank interposed between the pump and suction producing apparatus and the main fuel supply source.

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 in the specification and claims, it being understood that various changes in the detailed form of construction and arrangement of parts may be made without departing from the spirit of the invention.

A structure illustrating one embodiment of the present invention is shown in the accompanying drawings in which:

Figure I is a diagrammatic view illustrating the manner of connecting the engine with the fuel supply source.

Fig. II is an enlarged vertical section through the gravity feed tank and valve casing therein.

Fig. III is a vertical section through the pump taken on the line 3—3 of Fig. I.

Like reference characters indicate like parts in the several figures of the drawings.

Referring to the drawings, 10 represents an engine of any preferred type having a carbureter 11 connected with the bottom of a gravity feed tank 12 by means of a conduit 13, while the fuel pump 14 is connected with the top of said tank by means of the conduit 15. The main fuel supply tank 16 which is below the level of the carbureter is connected with the bottom of the gravity feed tank by means of the conduit 17 and there is an overflow conduit 18 leading from the top of the gravity feed tank back to the main supply tank as shown in Fig. I.

The pump is connected with the crank casing 19 of the engine by means of the conduit 20 and the discharge conduit from the pump to the engine is indicated at 21. The double purpose pump shown in section in Fig. III is provided with an oil receiving chamber 22 located between the inlet valve 23 and the outlet valve 24 which are normally held upon their seats by the springs 25 and 26 respectively. These valves control the oil inlet and outlet passageways 27 and 28, the former being connected with the bottom of the crank case of the engine by the conduit 20 and the latter with the engine casing by means of the conduit 21 as shown in Fig. I.

The pump is provided with an extended sleeve 29 forming a cylinder communicating with the oil receiving chamber 22 and reciprocally mounted in said cylinder is a hollow piston 30 extending slightly beyond the outer end of the cylinder in contact with the cam 31 of the cam shaft 32 which is preferably employed for actuating the piston in one direction, although the same may be actuated by any other moving part of the engine or separate power unit. The piston 30 is provided with a stem or rod 33 forming a second piston for producing suction and compression pulsations in the conduit 15 and tank 12, one end of said piston being seated in the outer end of the oil pumping piston and the other end in the bearing or recess 34 which communicates with the conduit 15 through the threaded connection 35 shown in Fig. III. The pistons are actuated outwardly by means of the spring 36 surrounding the piston rod as shown in Fig. III. The inner end of the piston 33 is provided with a series of oil retaining grooves 37 for supplying lubricating material to that portion of the small piston which reciprocates in the bearing or recess 34.

The tank 12 is provided with a vertically disposed tube 38 communicating with the suction conduit 15 through the L 39 at the

top of the tank while the bottom of said tube communicates with the valve chamber 40 of the valve casing 41 which has a threaded extension 42 projecting through the bottom of the gravity feed tank and communicating with the carbureter supply pipe 13. The extension 42 is provided with a recess 43 normally held closed by the ball valve 44 actuated by the spring 45 in the chamber 40.

The valve casing 41 is provided with a lateral extension 46 having a fuel inlet 47 normally closed by the ball valve 48 in the chamber 49 of the extension, said valve being held normally seated by the spring 50, the outer end of which is seated upon the screw cap 51 having the fuel discharge port 52, as shown in Fig. II. The valve casing 41 is retained in position upon the tank by means of the nut 53, on the threaded extension 42 of said casing, said extension being connected with the fuel supply conduit leading to the main tank 16.

At the top of the gravity feed tank 12 is a short pipe 54 connected with the overflow conduit 18 by means of the union or coupling 55, said pipe 54 being provided with a screw cap 56 having an air inlet port 57 therein in order that atmospheric pressure may be maintained in said tank to insure the discharge of the liquid through the outlet 58 and conduit 13 leading to the carbureter.

In the operation of my improved device the smaller piston 33, which is connected with and actuated by the larger oil pumping piston 30 is reciprocated in the passage 34 to produce suction and compression pulsations in the conduit 15 and gravity feed tank 12 for the purpose of lifting the fuel from the main supply tank 16 through the conduit 17 to be discharged past the ball valve 44 into the chamber 40 on the suction stroke and thence past the ball valve 48 into the gravity feed tank on the compression stroke of said piston.

Likewise the larger or oil pumping piston 30 draws oil from the bottom of the engine crank casing through the conduit 20, past the ball valve 23 and into a chamber 22 from whence it is forced past the ball valve 24 through the passage 28 and back to the engine through the conduit 21, both of said pistons being actuated simultaneously by means of the spring 36 and cam 31. Should the gravity feed tank be filled faster than the fuel can be consumed by the engine the excess will overflow into the conduit 18 and thence back to the main supply tank 16.

Having thus described my invention, I claim:

1. A device of the class described, comprising the combination of an engine, a fuel supply source for the engine, a source of lubricating material for said engine, and a double piston pump adapted to elevate said materials separately from a relatively low to a relatively high level from which they are adapted to flow to said engine.

2. A device of the class described, comprising the combination of an engine, a fuel supply source for the engine, a source of lubricating material for said engine, a pump having a two diameter piston adapted to elevate said materials separately from a relatively low to a relatively high level from which they are adapted to flow to said engine, and means actuated by the engine for operating said pump.

3. A device of the class described, comprising the combination of an engine, a fuel supply source for the engine, a source of lubricating material for the engine, an auxiliary tank interposed between said fuel supply source and said engine, and a double piston pump adapted to elevate said lubricating material to the engine and said fuel to the auxiliary tank.

4. A device of the class described, comprising the combination of an engine, a fuel supply source for the engine, a source of lubricating material, an auxiliary tank interposed between said fuel supply source and said engine, a double piston pump adapted to elevate said lubricating material to said engine, and said fuel to said auxiliary tank, and means actuated by the engine for operating said pump.

5. In a device of the class described, the combination of an engine, a fuel supply source for the engine, a source of lubricating material for the engine, and a pump having a two diameter piston connected with and adapted to be actuated by said engine for effecting the transfer of said materials from said sources to said engine.

6. A device of the class described, comprising the combination of an engine and the cam shaft thereof, a fuel supply source for the engine, a source of lubricating material for the engine, and a double piston pump connected with said sources and adapted to be actuated by said cam shaft to effect the transfer of said fuel and lubricating material to the engine.

7. A device of the class described, comprising the combination of an engine, a carbureter therefor, a source of lubricating material for the engine, a fuel supply source for the same, an auxiliary tank connected with said carbureter and fuel supply source, and a pump with a two diameter piston actuated by said engine and adapted to pump said lubricating material to said engine and said fuel to said gravity feed tank.

8. A device of the class described, comprising the combination of an engine, a carbureter therefor, a fuel supply source for the engine, an auxiliary tank connected with said fuel supply source and said carbureter, a source of lubricating material for the en-

gine having a connection leading to the same, a pump with a two diameter piston interposed in said connection, means connecting said pump with said tank, and means for actuating the pump.

9. In combination with an internal combustion engine, means for feeding liquid fuel and lubricant thereto, comprising a liquid fuel conduit and an oil conduit, a pump cylinder, a valve casing in said oil conduit communicating with one end of said cylinder, a pair of check valves in said casing, a second cylinder connected at one end with said casing, a pipe extending from the other end of said cylinder to the liquid fuel conduit, a piston for each of said cylinders, and a mechanical connection between said pistons.

10. In combination with an internal combustion engine, a liquid fuel conduit for conducting fuel from a low level tank to said engine, a lubricating oil conduit for conducting lubricant to said engine, a large pump cylinder, a valve casing in said oil conduit communicating with one end of said large cylinder, a pair of check valves in said casing, a small cylinder connected at one end with said casing, a pipe extending from the other end of said small cylinder to the liquid fuel conduit, a piston for each of said cylinders, and a mechanical connection between said pistons, whereby the actuation of the large piston will effect the actuation of the small piston, and whereby the small piston will be effectively lubricated.

11. In combination with an internal combustion engine, a liquid fuel conduit for conducting fuel from a low level tank to the engine, a lubricating oil conduit for conducting lubricant to said engine, a large pump cylinder, a valve casing in said oil conduit communicating with one end of said large cylinder, a pair of check valves in said casing, a small cylinder connected at one end to said casing, a pipe extending from the other end of said small cylinder to the liquid fuel conduit, a piston for each of said cylinders, the small piston having grooves for carrying lubricant, and a mechanical connection between said pistons whereby the actuation of the large piston will effect the actuation of the small piston, and whereby the small piston will be effectively lubricated.

In testimony whereof I affix my signature.

CHARLES F. GREEN