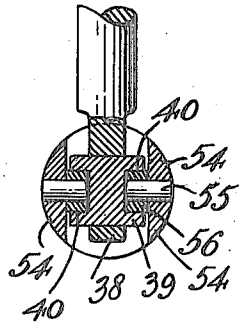
A. WINTON.

FUEL FEED FOR INTERNAL COMBUSTION MOTORS.

APPLICATION FILED JUNE 4, 1914.

1,208,259. Patented Dec. 12, 1916.

FIG. 2.



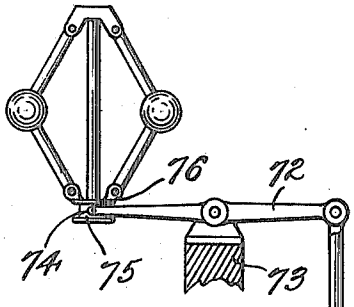


FIG. 1.

Witnesses:-

A. L. Lord.

C. H. Tesch

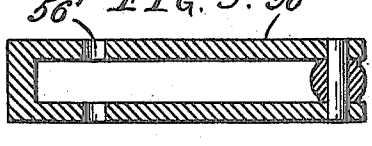


FIG. 3.

Inventor.

Alexander Winton

by B. W. Brockett.

Att'y.

UNITED STATES PATENT OFFICE.

ALEXANDER WINTON, OF LAKEWOOD, OHIO, ASSIGNOR TO THE WINTON GAS ENGINE & MANUFACTURING COMPANY, OF CLEVELAND, OHIO, A CORPORATION OF OHIO.

FUEL-FEED FOR INTERNAL-COMBUSTION MOTORS.

1,208,259. Specification of Letters Patent. Patented Dec. 12, 1916.

Application filed June 4, 1914. Serial No. 842,883.

To all whom it may concern:

Be it known that I, ALEXANDER WINTON, a citizen of the United States, residing at Lakewood, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Fuel-Feed for Internal-Combustion Motors, of which the following is a specification.

This invention relates generally to feeding mechanism for internal combustion motors and particularly to that class of such devices utilized for feeding crude oil under high pressure and for governing such supply.

More specifically the invention relates to feeding and controlling mechanism for the fuel supply for internal combustion motors, and it consists of a fuel pump, means actuated from the motor for operating said pump, and means under the control of the governor and actuated by fluid pressure for controlling the stroke of the pump.

The invention may be further briefly summarized as consisting in the construction and combination of parts hereinafter set forth in the following description, drawings and claims.

Referring to the drawings, Figure 1 is a sectional view of an apparatus constructed according to my invention; Fig. 2 is a sectional view of the connection of the pump plunger with the operating lever; and Fig. 3 is a detail view of the pump lever.

In carrying out the invention any preferred form and construction of parts may be employed so long as they possess the necessary characteristics, but I have shown one arrangement which is effective, and in such embodiment 1 represents a portion of the engine frame in which is mounted, in any suitable manner, a pump operating shaft 2 provided with an eccentric 3 cooperating with an eccentric strap 4 forming a part of a connecting rod 5. The engine frame is also provided with a fluid pressure pump support 6 supporting a fluid pressure cylinder 7 provided with a piston 8 having a connecting rod 9 operating in any suitable manner from the shaft 2. This fluid pressure cylinder 7 is provided with an inlet 9′ receiving oil from any suitable source and an outlet 10. This pump may be of any structure, it merely entering into the description by reason of the fact that it furnishes a means for supplying a fluid pressure utilized in the mechanism hereinafter described.

Secured to the engine frame 1 is a pump frame 11 having a fuel receiving chamber 12 containing a supply of fuel maintained by means of the pipes 13 and 14. Extending into this chamber is the fuel pump inlet valve structure comprising a plurality of inlet valve members 15, each provided with a valve seat 16 coöperating with a valve 17. Each of these members is provided with suitable openings for receiving securing bolts 18 passing up through a pump barrel head 19. This head is provided with a suitable port 20 extending through the head and communicating with a port 21 leading to a pump barrel 22 which passes through a suitable guide 23 in the pump frame 11. This barrel has a threaded extension 24 receiving a nut 25 coöperating with a gland 26 which engages packing 27 in the extension 24 and surrounding a pump plunger 28 operating in the barrel. This pump plunger is adapted to draw oil between the valves 17 and their seats and force it through the port 20. Secured above the barrel head 19 and in alinement with the port 20 is a plurality of fuel outlet valve members 29 similar to the valve members 15 and each provided with a valve seat 30 coöperating with a valve 31. These outlet valve members are held in place by the bolts 18 in a manner similar to the inlet valve members, and a plurality of these valves is provided to prevent the back flow of the fuel into the pump as it operates. Above the upper valve member 29 is a suitable connection member 32 held in place by the bolts 18 and provided with a pipe connection 33 connected to a pipe 34 leading to the inlet valve of the motor.

From the foregoing it will be seen that as the pump plunger 28 operates in the pump barrel, fuel will be drawn from the fuel chamber 12 into the pump barrel and the ports 20 and 21 and forced up through the valves 31 and the fuel supply pipe 34 leading to the engine.

The pump frame is provided to one side of the fuel chamber 12 with a pump plunger guideway 35 receiving a plunger guide 36 threaded onto the end of the pump plunger and held in place by a suitable check nut 37. This guide carries at its lower end a suitable strap 38 extending around a pivot pin 39

which extends beyond the sides of the strap and is provided on its ends with diametrically extending recesses 40 for a purpose to be described.

The pump frame is also provided with a controller support 41 preferably cylindrical in form and supporting the entire mechanism for regulating the stroke of the pump, as will later appear. Secured to the controller support 41 is a controller cylinder member 42 having a cross head guide 43 extending into the support 41, a cylinder 44 in alinement with this guide, and a valve chest 45 connected by ports 46 and 47 with the ends of the cylinder 44. Between the cross head guide 43 and the cylinder is a suitable opening for a piston rod 48 carrying a piston 49 and operating in the cylinder 44. Around the piston rod 48 is a suitable stuffing box structure 50 of any preferred type for preventing leakage at this point. Mounted upon a reduced portion 51 of the piston rod 48 is a cross head 52 held in place upon the reduced portion by a suitable nut 53 and this cross head carries a pair of spaced ears 54 each receiving a lever pivot pin 55 extending into the space between the ears, and each entering a suitable opening in the corresponding side arm of the U-shaped pump lever 56, the two side arms of this lever engaging in the recesses 40 and the extensions of the pin 39, as is shown in Fig. 2, and the outer ends of the side arms of this U-shaped lever receiving a pivot pin 57 passing through an eye in the end of the connecting rod 5. The arrangement of this lever 56, the pin 39, and the supporting of the lever in the ears 54 is such that when the cross head is in the position shown in Fig. 1 the pivot pins 55 of the lever are concentric with the pin 39 with the result that the rocking movement of the lever about its pivot pins in the ears 54 is concentric with the pin 39 so that no stroke is conveyed through the plunger 28. When the cross head 52 is moved to the left, however, the lever 56 is moved to the left and the pin 39 is moved somewhere between the pivot pins 55 of the lever 56 and the connection of the connecting rod to this lever, so that a stroke is given to the pump, the length of the stroke being dependent upon the position of the parts, as is obvious from the structure.

In order to control the operation of the piston 49 a suitable piston valve is arranged in the valve chest 45, and this structure will now be described. Slidably mounted in a stuffing box structure 58 at the forward end of the chest 45 is a piston valve stem 59 having two piston valve portions 60 and 61, the former coöperating with the port 47 and the latter with the port 46. These piston valve portions are spaced apart necessarily, and the valve chest is provided with a fluid inlet connection 62 connected to a pipe 63 leading to the fluid pump supply, the connections being later described. The chest 45 is also connected beyond the piston valve portion 60 by a pipe 64 with a return or exhaust pipe 65. In like manner the chest beyond the piston valve portion 61 or near the end is provided with a pipe 66 leading to the same discharge pipe 65. Connected to the piston valve stem 59 is one arm 67 of a bell crank lever mounted upon a pin 68 carried by a bracket 69 secured to the frame 11. The other arm 70 of this lever is connected by a link 71 pivotally connected to a lever 72 mounted upon any suitable support 73 and provided at its opposite end with a fork 74 arranged in a groove 75 of a governor member 76. This member forms a part of any preferred governor structure, the type shown being of the ball governor type, and the arrangement being such that the member 76 is moved upward as the speed of the governor increases.

It will be seen from the foregoing construction and from the arrangement as set forth in the drawings, assuming that fuel is supplied to the chamber 12, that motion is conveyed to the shaft 2, and that the fluid pressure pump piston 8 is reciprocating, that fluid pressure will pass through the pipe 63 between the piston valve portions 60 and 61, through the port 47 to the right of the piston 49 will cause this piston to move to the left to the limit of its stroke when the pump lever 56 will be moved to the left, thus conveying the fulcrum of the lever out of its concentric position with respect to the pin 39 and resulting in the maximum stroke being conveyed to the pump plunger. This causes the supply of fuel to be thrown to the engine with the result that it is set in operation at the maximum speed. The governor, however, as the result of this operation, causes the member 76 to be moved upward and the lever 72 to be rocked in a clockwise direction. This motion is conveyed through the bell crank lever to the piston valve stem 59 when the piston valve portions 60 and 61 will be moved across the ports 47 and 46 and the former will be open to exhaust to the right of the piston valve portion 60, and the latter will be open to the supply to the right of the piston valve portion 61, causing the fluid pressure to be admitted to the left of the piston head and resulting in the piston being moved back in the other direction. The operation of the governor, however, has only admitted a small portion of fluid pressure with the result that the piston 49 will be moved slowly to the right and the stroke of the fuel pump will be reduced, when the governor, however, will operate to cause the piston valve portions 60 and 61 to lap the ports 47 and 46 and stop the movement of the piston 49 at the proper point to give the proper stroke to the pump plunger 28.

The supply pipe 63 is connected to a relief casing 77 below a valve seat 78, and this space is connected by a pipe 79 with the outlet 10 of the fluid pump. The space above the valve 78 is connected by a pipe 80 with a check valve 81 in turn connected to the pipe 65. The pipe 80 is also connected to a return pipe 82 leading to the oil or other fluid reservoir from which oil is supplied to the inlet connection 9′ of the fluid pump. The opening of the valve 78 is resisted by a spring 83 of the proper tension to cause the pressure through the line 63 to be sufficient to actuate the controlling mechanism already described. From this arrangement it will be seen that the fluid pump will force fluid under pressure through the pipe 63 to the chest 45, but when the piston valve portions 60 and 61 lap the ports 46 and 47 the valve 78 will be raised and the oil or other fluid will pass back through the pipe 83 to the oil tank, the discharge of oil through the pipe 65 being prevented by reason of the check valve 81.

Having described my invention, I claim:—

1. In apparatus for feeding liquid fuel under pressure to internal combustion motors, a device for supplying fuel under pressure, means for controlling said device to vary the amount of fuel, fluid operated means for controlling said device, and means for governing said fluid operated controlling means.

2. In apparatus for feeding liquid fuel under pressure to internal combustion motors, a fuel pump, means for operating said pump, a device for varying the stroke of said pump, fluid actuated means for controlling said stroke varying device, and means for governing said controlling means.

3. In apparatus for feeding fuel under pressure, a fuel pump, means for actuating said pump, a device for varying the stroke of said pump, a fluid pressure cylinder and piston structure for acutating said stroke varying device, means for supplying fluid under pressure to said fluid pressure cylinder and piston structure, and means actuated by the motor for governing the feed of the fluid pressure to the fluid pressure cylinder.

4. In apparatus for feeding fuel under pressure to internal combustion motors, a fuel pump, means for actuating said pump, a device for varying the stroke of said pump, means for controlling said stroke varying device and comprising a cylinder, a piston, a controlling valve therefor, means for supplying fluid under pressure to the controlling valve, and means for governing said controlling valve.

5. In apparatus for feeding fuel under pressure to internal combustion motors, a fuel pump cylinder, a plunger mounted therein and coöperating therewith, a plunger operating lever pivotally connected to said plunger, means for rocking said lever, a cross head slidably mounted, pivotal connections between said cross head and said plunger operating lever, and means for shifting said cross head and comprising a fluid pressure cylinder and piston, a controlling valve therefor, means for supplying fluid pressure to said controlling valve, and means for governing the operation of said controlling valve.

In testimony whereof I affix my signature in presence of two witnesses.

ALEXANDER WINTON.

Witnesses:

HAROLD B. ANDERSON,

JOHN J. SAUNDERS.