May 17, 1938. J. S. WALTERS 2,117,380

FUEL INJECTION SYSTEM

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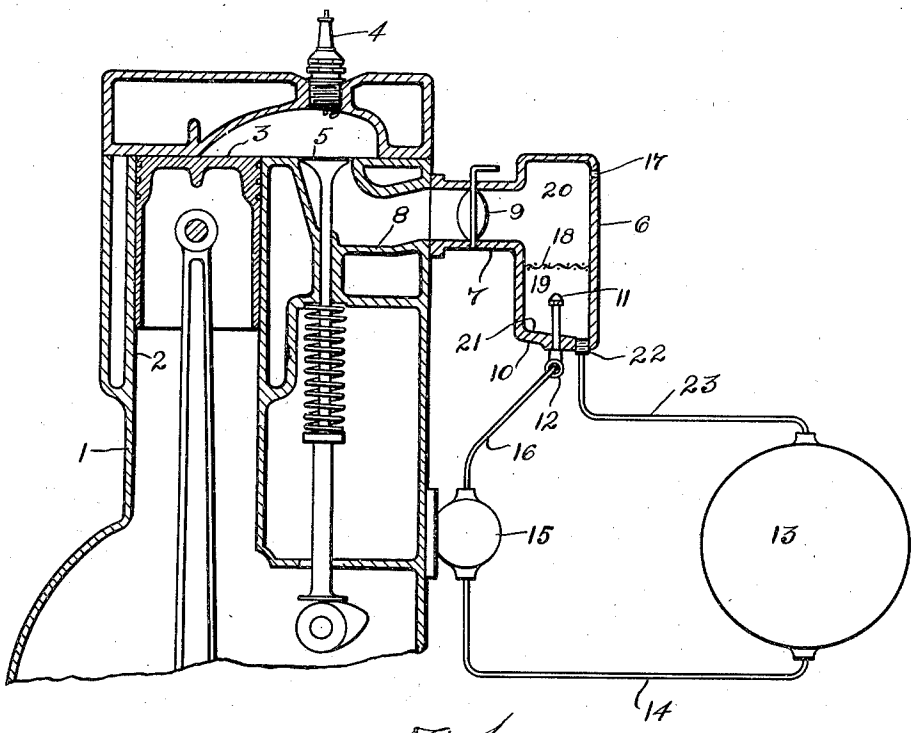

Fig. 1

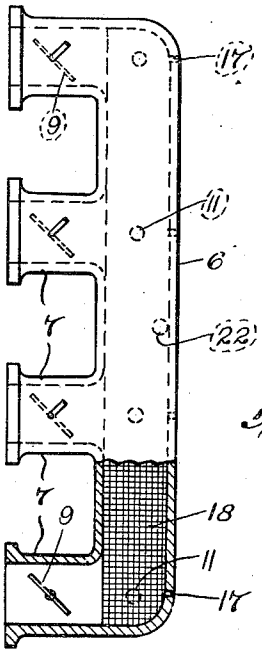

Fig. 2

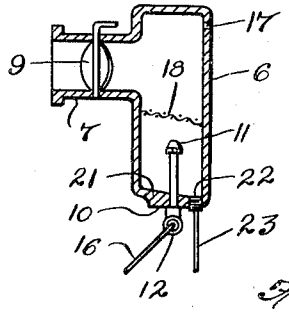

Fig. 3

INVENTOR.

John S. Walters

BY

Paul, Oberlin & Ray

ATTORNEYS

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FUEL INJECTION SYSTEM

John S. Walters, Lakewood, Ohio

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1 Claim. (Cl. 261—115)

This invention relates, as indicated, to a fuel injection system, but has reference more particularly to a system of this character which is especially adapted for internal combustion engines and the like.

An object of the invention is to provide a fuel injection system, the use of which will materially reduce the fuel costs in the operation of an internal combustion engine and dispense with the need for heavy, expensive accessories usually required when utilizing fuel oil for the operation of such engines.

Another object of the invention is to provide a fuel injection system which is readily adapted for use in connection with existing types of gasoline engines by virtue of the low first cost of installation of the system and the use of a minimum number of new parts for modification of the engine proper.

To the accomplishment of the foregoing and related ends, said invention, then, consists of the means hereinafter fully described and particularly pointed out in the claim.

The annexed drawing and the following description set forth in detail certain mechanism embodying the invention, such disclosed means constituting, however, but one of various mechanical forms in which the principle of the invention may be used.

In said annexed drawing:

Fig. 1 is a fragmentary transverse cross-sectional view of an internal combustion engine of the type employed for the propulsion of motor vehicles, and showing a preferred form of the fuel injection system in association therewith;

Fig. 2 is a view partly in plan and partly in horizontal cross-section of the manifold of the fuel injection system; and

Fig. 3 is a fragmentary transverse cross-sectional view of a manifold, showing the filter or screen in an inclined position.

Referring more especially to Figs. 1 and 2, there is disclosed an internal combustion engine 1, provided with the usual cylinders 2, pistons 3, spark plugs 4 and valves 5.

Secured to the engine is a manifold 6, having outlets 7 in communication with the intake passage 8 of each cylinder. Each of the outlets 7 is provided with a throttle valve 9 for controlling the fuel feed to each cylinder.

Extending vertically upwardly through the bottom or lower wall 10 of the manifold and into the interior of the manifold is a series of spray jets 11. These jets extend from a conduit 12 which receives fuel from the fuel tank 13 through the intermediary of conduit 14, pump 15 and conduit 16. The pump 15 is suitably mounted on the engine and is preferably of the rotary, gear or plunger type, capable of discharging fuel at approximately three hundred pounds pressure. It is driven from the accessory shaft. The pump draws fuel from the fuel supply tank and forces it through the spray jets 11 into the intake manifold.

Extending into the manifold 6 at any desired point are air inlets 17 for supplying air to form a fuel-air mixture of the desired properties.

It will be understood that although the spray jets 11 serve to deliver the fuel in a vaporized or atomized condition, some globules or particles of an unvaporized or unatomized character may be supplied which are too large for proper combustion. For the purpose of preventing such globules or particles from entering the intake passages 8 of the cylinders, there is provided a screen 18 preferably extending horizontally entirely across the interior of the manifold at a point somewhat above the spray jets and dividing the manifold in effect into two compartments, one of which designated 19 may be termed a spray chamber and the other of which designated 20, may be termed the air mixing chamber.

Particles which pass through the screen, but are too heavy to be carried into the cylinder intake passages may fall on the screen and drop through the screen into the spray chamber.

To facilitate drainage of particles of the aforesaid character, the upper surface 21 of the lower wall 10 of the manifold is sloped rearwardly, and a sump or drain outlet 22 is provided which is in communication with a conduit 23, whereby the particles are returned to the supply tank 13. To further facilitate drainage, the screen 18 may be inclined, as shown in Fig. 3.

Where the present system is employed in connection with jump spark ignition, as in an internal combustion engine of the character described, compression pressures as low as 150 to 200 pounds per square inch may be used, thereby avoiding the necessity of using heavy connecting rods, crankcase, cylinders and bearings, which are required in other oil-burning engines of high compression type, due to the inherent high stresses on these parts.

The present fuel injection system is readily adapted to be used in connection with either two or four cycle engines. Moreover, the use of this system dispenses with the the need for cams of special shape, timed fuel pumps and injection valves, as required in other systems.

Various changes may be made without departing from the scope of the invention. It may, for example, be desirable to place the air inlet ports in such manner that the air for mixing with the fuel enters the spray chamber 19. Furthermore, provision may be made for adjusting the elevation of the screen 18, or the screen may in fact be placed in an auxiliary or sub-manifold.

Other modes of applying the principle of my invention may be employed instead of the one explained, change being made as regards the mechanism herein disclosed, provided the means stated by the following claim or the equivalent of such stated means be employed.

I therefore particularly point out and distinctly claim as my invention:

A fuel injection system comprising a manifold having a plurality of spaced fuel outlets, spray jets in the lower portion of said manifold, means for supplying fuel under pressure to said spray jets, and a single horizontally-extending screen disposed in said manifold above all of said spray jets and adapted to separate from the total fuel supply for all of said outlets particles which are too large for combustion purposes, said spray jets extending at right angles to said screen, and emitting fuel in a finely divided condition.

JOHN S. WALTERS.