Oct. 23, 1945. R. W. STELZEL 2,387,690

FUEL INJECTION

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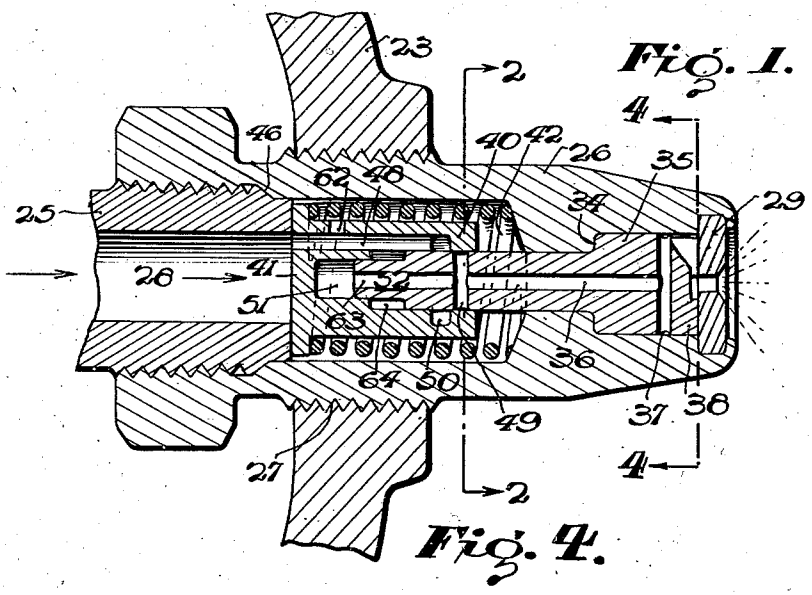


Fig. 1.

Fig. 4.

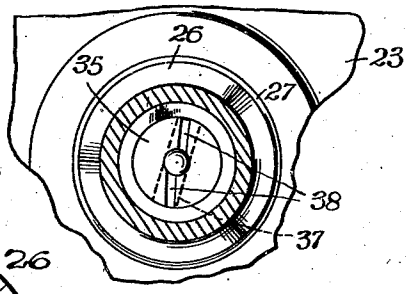


Fig. 2.

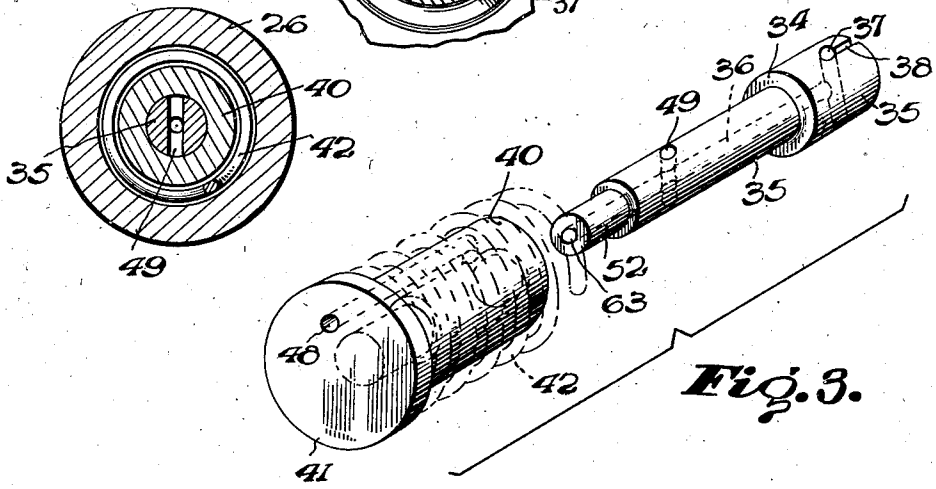


Fig. 3.

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FUEL INJECTION

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2 Claims. (Cl. 299—107.6)

My invention relates to a fuel injecting device and more particularly to a system embodying means which intermittently introduces fuel under pressure to an injecting device provided with an improved fuel jet control means.

In the conventional type fuel injecting devices it is difficult to positively control fuel flow to the discharge jet, particularly when the fuel in the system is subjected only to relatively low pressure. It is difficult to accurately control the beginning and ending of fuel discharges with such devices as are now on the market.

An object of my present invention is to overcome the difficulties aforesaid by providing a fuel injector device, associated with a fuel supply system which intermittently supplies fuel under pressure thereto, which incorporates an improved valve means responsive in its operation to fuel pressure and which is freely operable to positively control fuel flow to the engine.

Another object of my present invention is to provide an improved fuel injecting device particularly suitable for association with a low pressure fuel injection system by providing a free floating sleeve valve operable in response to fuel pressure for controlling flow of fuel to the discharge jet of the device.

A further object of my present invention is to provide a fuel injecting device of economical construction and positive action by constructing same with an internal valve means consisting of a free floating sleeve valve operable in response to fuel pressure to open the valve and operable in response to spring pressure to yieldingly close the valve and to thereby positively cut off the fuel injection when the fuel pressure in the supply line is relieved.

Still further objects of the invention relate to various features of construction and assembly of the injecting device in conjunction with a fuel supply system having incorporated therewith a fuel injector having a fuel pump which is operable to intermittently supply fuel under pressure thereto.

For a more detail understanding of my invention, reference may be had to the accompanying drawing illustrating in detail an embodiment of my invention in conjunction with a fuel supply system of an internal combustion engine, in which drawing like characters refer to like parts throughout the several views, and in which:

Fig. 1 is a longitudinal detail sectional view through a fuel injecting device illustrating the valve construction in detail and showing the valve in the closed position;

Fig. 2 is a view along line 2—2 of Fig. 1; and

Fig. 3 is an exploded perspective view of the sleeve valve and outlet fixture.

Fig. 4 is a cross-sectional view taken on the line 4—4 of Fig. 1.

These fuel injecting devices may, if desired, be suitably attached directly to a fuel injector, or may be suitably connected to a union 25 when same is remotely associated with a fuel injector. The union 25 preferably is suitably connected to a source of fuel supply that is intermittently subjected to pressure.

The fuel injecting device particularly illustrated in Figs. 1 to 3 inclusive, comprises a casing 26 having external threads 27 by which same may be suitably assembled to an engine wall 23; also internal threads adapted to receive a pipe terminal fitting 25, whose bore 28 serves as the fuel conveying means. An outlet fixture 35 is tightly fitted into the casing, and has a shoulder 34 registering with a mating shoulder in the casing. There is a central passage 36 extending longitudinally of the fixture and communicating with a transverse passage 37 extending substantially normal to passage 36. Radial slots 38 are machined in the outer end of fixture 35 and these slots communicate with the transverse passage 37 and serve as a passageway for conducting fuel to the discharge jet 29; said slots 38 being preferably constructed to extend substantially tangentially with respect to the discharge jet 29. Thus the fuel introduced to the discharge jet is induced to swirl and results in finely atomizing the fuel as it is discharged through the discharge jet 29. This arrangement is substantially the same as in Patent No. 2,044,694, granted to Henry Huss, or as in Patent No. 2,294,029, granted to Carl F. High on August 25, 1942, but the associated valve structure differs from that of these patents, and will now be described.

The valve structure consists of a sleeve 40 having a sliding fit over the end portion of the outlet fixture 35, and a closed head 41 constantly urged (by a spring 42) against the annular end surface of fitting 25, the innermost position of the fitting being determined by the engagement of mating tapered portions of the fitting and casing, as shown at 46. A hole 48 is drilled longitudinally of the sleeve, and in line with the larger inner diameter thereof, so as to form a passage to communicate with circular groove 50, and also with transverse passage 49 of the outlet fixture, when the sleeve is moved forward by pressure of the intermittently admitted fuel supply. The smaller di-

ameter bore 51 of the sleeve 40 receives the reduced end 52 of the fixture 35, and a bleed hole 63 connects said bore 51 with axial passage 36, to facilitate free release of pressure from bore 51, at all times. Vent 62 acts similarly to release fuel which enters the space occupied by spring 42.

The parts 35 and 29 are held in place by inwardly turning the end of casing 35, after insertion of said parts 35 and 29. Hence there are only two removable parts, namely, the sleeve 40 and the spring 42. Because of this, there is less likelihood of anything being mislaid or damaged during overhaul. Moreover, the feature of the tapered seat 46 provides automatic correct registry of parts.

What is claimed is:

1. In a fuel injecting device having a casing provided with a detachable fuel intake conduit and a fuel discharge jet, valve means disposed within said casing and comprising an outlet member abutting said discharge jet and having a longitudinal bore communicating with said jet, a removable sleeve valve member slidably mounted on said outlet member and operable in one direction to an open position in response to fuel pressure in said conduit and in an opposite direction to a closed position, said valve member formed with a circular groove in its inner peripheral face and a longitudinal bore effecting communication between said groove and said intake conduit, said outlet member having a transverse bore communicating with its longitudinal bore and intermittently registrable with said groove when said valve member is operated between said positions, a spring constantly urging said valve member in said opposite direction, and means including mating tapered surfaces on said casing and conduit for automatically locating said valve member and limiting its travel in said opposite direction.

2. A fuel injecting device comprising a casing provided with a fuel intake means and a fuel discharge jet member and unitary valve means supported within said casing and including an outlet fixture abutting said discharge jet member, and a sleeve valve operable in one direction to an open position in response to fuel pressure in said casing and in an opposite direction to a closed position, said valve and outlet fixture having axially offset, longitudinal bores, one of which is aligned with the discharge jet member, said outlet fixture having a transverse bore opening into said one longitudinal bore and intermittently registrable with the other of said longitudinal bores when said valve is operated between said positions, a spring constantly urging said sleeve valve in said opposite direction, and means, including mating tapered surfaces on said casing and fuel intake means, for automatically locating said sleeve valve and limiting its travel in said opposite direction, said spring and sleeve valve being removable and said outlet fixture being permanently secured.

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