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FUEL PUMP FOR INTERNAL COMBUSTION ENGINES.

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1,289,716. Patented Dec. 31, 1918.

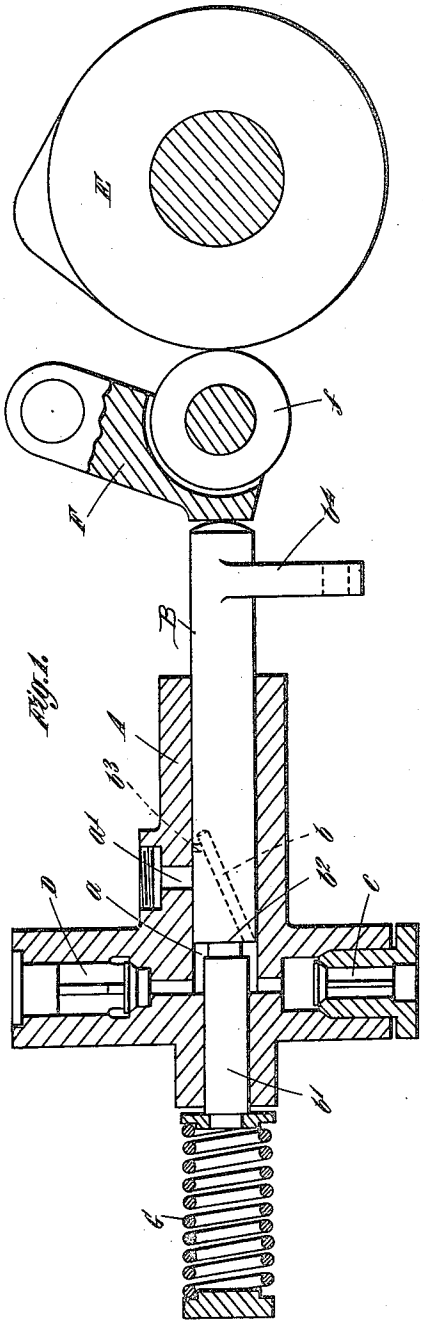


Fig. 1.

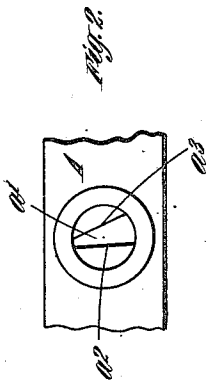


Fig. 2.

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FUEL-PUMP FOR INTERNAL-COMBUSTION ENGINES.

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To all whom it may concern:

Be it known that I, HUGH EMILE FENCHELLE, a British subject, residing at Via XX Settembre 34/4, Genoa, in the Kingdom of Italy, have invented certain new and useful Improvements in Fuel-Pumps for Internal-Combustion Engines, of which the following is a specification.

This invention relates to an improved construction of fuel pump for internal combustion engines of the kind employing ignition on Diesel lines and especially engines in which the fuel is sprayed into the cylinder mechanically without the aid of an air injector, the chief object of the invention being to provide simple means by which a pump plunger having no valve attachment may deliver varying quantities of fuel without altering the time at which injection begins.

According to this invention the pump plunger is formed with a fuel relief passage which at a variable predetermined point in the delivery stroke registers with a relief port in the pump casing and thus makes communication between the pump chamber and the said port, so that the pressure in the chamber is relieved and the delivery of fuel to the engine stopped. The amount of fuel supplied to the engine will therefore vary according to the point in the pump stroke at which release of the fuel occurs and in the construction preferred the plunger is rotatable by means of connections from the engine governor or regulator and the pump casing is formed with a relief port, preferably leading to the suction side of the pump, the rear edge of which port is inclined along the axis of the pump so that the moment at which the fuel pressure is relieved varies according to the angular adjustment of the plunger.

In order that the said invention may be clearly understood and readily carried into effect I will describe the same more fully with reference to the accompanying drawings, in which:—

Figure 1 is a longitudinal section of a pump constructed in accordance with this invention, showing also the cam mechanism for operating the pump; and

Fig. 2 is a detail view illustrating the operation of the pump.

A is the pump casing, within which works the plunger B provided with the relief passage b. C is the suction valve and D the delivery valve of the pump. E is a cam operating the pump through the intermediate member F having the cam roller f.

The suction stroke of the plunger B is effected by means of the spring G mounted on the end of the plunger extension b' which passes through the casing A. This spring G keeps the opposite end of the plunger up against the member F, maintaining the cam roller f against the cam E.

Assuming the pump chamber a to be filled with fuel at the end of the suction stroke of the pump, the cam E as it turns to meet the roller f drives in the plunger B against the pressure of the spring G, causing the annular shoulder b^2 of the pump plunger to compress the fuel in the pump chamber a and to force it at high pressure through the delivery valve D, from which it passes to a suitable spraying nozzle or atomizer in the engine cylinder. The delivery of the fuel continues until the outer end b^3 of the relief passage b reaches the relief outlet a' in the casing A, when the pressure on the fuel is instantly relieved, permitting the delivery valve D to close, while the fuel during the remainder of the compression stroke escapes through the outlet port a', whence it may pass to the suction side of the pump.

Fig. 2 shows the form of the relief aperture or port a' which permits the amount of fuel delivered by the pump to be regulated by rotation of the plunger B through its regulating arm b^4. As will be noted in Fig. 2 the front edge a^2 of the outlet a' is transverse to the axis of the pump, while the rear edge a^3 is inclined at an angle. Since the relief of the pressure occurs when the end b^3 of the plunger passage b reaches the edge a^3 of the port the period in the stroke at which relief occurs will vary with the angular displacement of the pump plunger, which is free to turn in the casing. By turning the plunger through the lever arm b^4, operated automatically or otherwise through any suitable gear, the end of the effective stroke of the pump is timed in a very simple manner by bringing the end b^3 of the passage b in line with the desired point on the sloping port edge a^3.

When the cam has completed its delivery stroke the spring G returns the plunger and

fresh fuel is drawn through the suction valve C into the pump chamber *a* ready for the next delivery stroke.

What I claim and desire to secure by Letters Patent of the United States is:—

1. In a liquid fuel pump, a pump casing provided with a fuel relief port, a plunger moving in the said casing having a passage adapted to make communication between the said port and the pump chamber and means for varying the point in the plunger stroke at which such communication is made.

2. In a liquid fuel pump, a pump casing provided with a fuel relief port in its wall, which port is formed with a slanting edge, a plunger having a passage adapted during the delivery stroke to make communication between the said port and the pump chamber and means for angularly adjusting the plunger to vary the point in the stroke at which such communication is made.

3. In a liquid fuel pump, a pump casing provided with a fuel relief port, a plunger moving in the said casing having a passage adapted to make communication between the said port and the pump chamber at a point in the stroke depending on the angular position of the plunger, and means for angularly adjusting the plunger.

4. In a liquid fuel pump, a pump casing provided with a fuel relief port, a plunger having a fuel relief passage adapted to register with the said port at a predetermined point in the pump stroke, a cam effecting the delivery stroke of the plunger and a spring adapted to return the plunger on the suction stroke.

5. A liquid fuel pump having a relief passage arranged to discharge fluid from the pump chamber independently of the regular delivery of the pump and to the exclusion thereof, and means whereby said relief passage may be brought into action at any one of a number of different predetermined points in the delivery stroke of the pump.

HUGH EMILE FENCHELLE.