

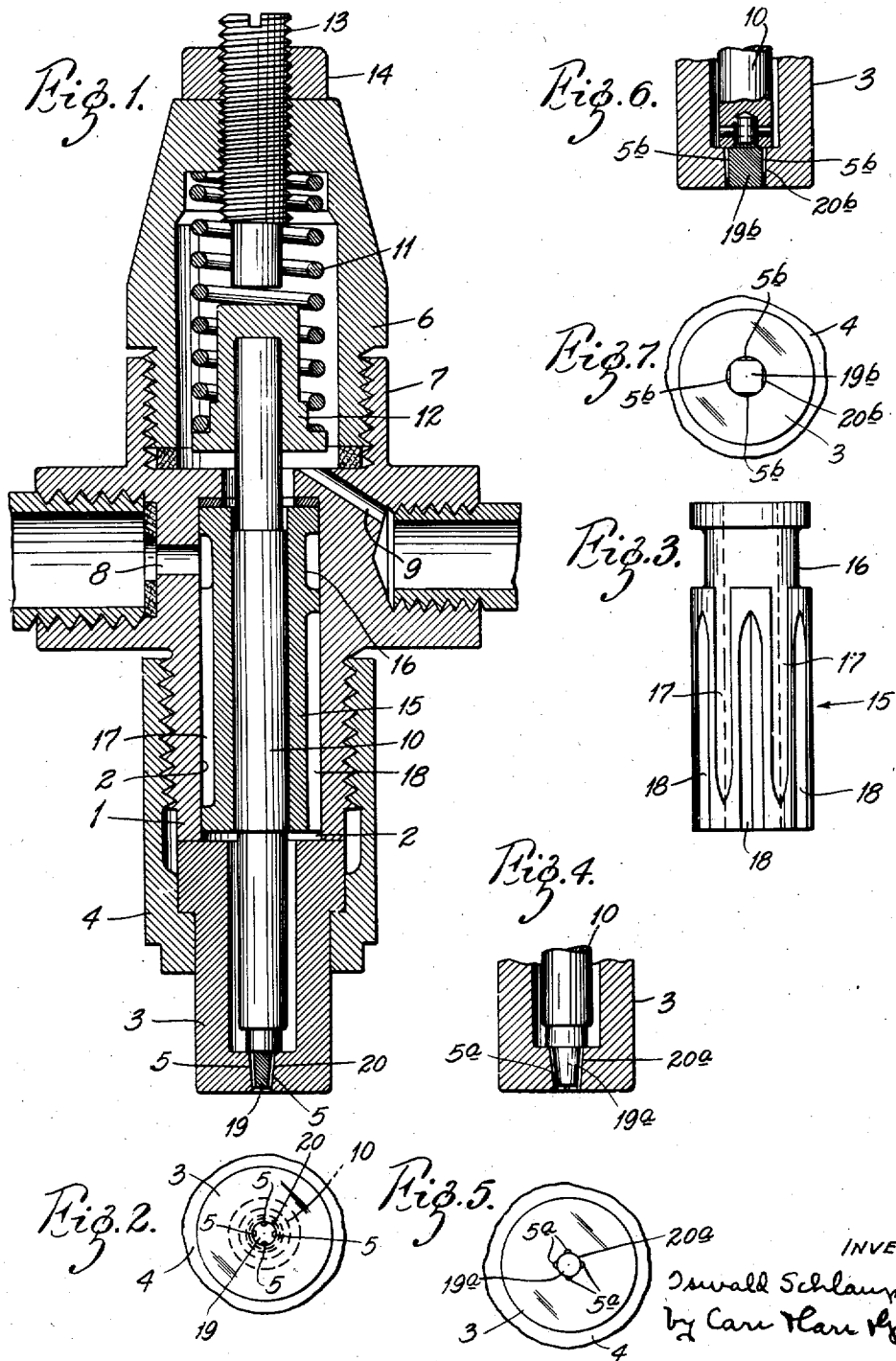
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O. SCHLAUPITZ

2,067,131

FUEL INJECTOR

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INVENTOR:

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UNITED STATES PATENT OFFICE

2,067,131

FUEL INJECTOR

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Application August 5, 1935, Serial No. 34,701

4 Claims. (Cl. 299—107.6)

This invention relates to fuel injectors for internal combustion engines of the Diesel type. It has for its principal objects to provide the nozzle with a device for filtering the fuel oil passing therethrough, to simplify the operation of forming the discharge orifices and to provide for cheapness of construction and compactness of design. The invention consists in the fuel injector and in the construction, combinations and arrangements of parts hereinafter described and claimed.

In the accompanying drawing, which forms part of this specification and wherein like symbols refer to like parts wherever they occur,

Fig. 1 is a central vertical sectional view of a fuel injector embodying my invention.

Fig. 2 is an end view of the tip or nozzle portion of the injector.

Fig. 3 is a side elevation of a filter sleeve.

Fig. 4 is a section through the nozzle end of an injector provided with a modified arrangement of discharge orifices.

Fig. 5 is an end view of the nozzle or tip shown in Fig. 4.

Fig. 6 is a section similar to Fig. 4, showing another modified construction; and

Fig. 7 is an end view of the nozzle shown in Fig. 6.

The fuel injector valve or nozzle shown in Figs. 1 and 2 comprises a substantially cylindrical casing or main body portion 1 provided with an axial bore 2 whose lower end opens into a nozzle or tip 3 that is removably secured to said body portion by means of a cap nut 4 threaded thereon. The nozzle 3 is a multiple hole nozzle; that is, it is provided at its discharge end with a series of circumferentially spaced discharge orifices 5. The upper end of said bore opens into a cap nut 6 that is threaded into an upstanding boss 7 on the upper end of the body of the injector. The body portion of the injector has an inlet passageway 8, which communicates with the axial bore near the upper end thereof, and a drain passageway 9 which leads from the interior of the upper cap nut 6.

Located in the bore 2 of the injector is a valve stem or plunger 10 in the form of a cylindrical rod whose lower end portion extends into the nozzle 3 and terminates in a flat end face adapted to bear against the end wall of the nozzle and close with the discharge orifices 5 therein. The plunger 10 extends upwardly into the upper cap nut 6 and is normally held in closed position by means of a helical spring 11 located in said cap nut between the top thereof and a spring seat 12

supported on the upper end of said plunger. Upward movement of the plunger is limited by an adjustable stop in the form of a screw 13 that is threaded through an axial bore provided therefor in the top of the upper cap nut 6 with its inner or lower end disposed in abutting relation to the upper end of the spring seat 12. The stop screw 13 is locked in desired position of adjustment by means of a suitable lock nut 14 threaded on the upper end thereof in abutting relation to the top of the upper cap nut.

Located in the axial bore 2 of the injector is an oil filtering device in the form of a cylindrical member 15, which snugly fits said bore and has an axial bore adapted to slidably support the intermediate portion of the spring-loaded valve stem or plunger 10. As shown in Figs. 1 and 3, the upper portion of this cylindrical filter sleeve 15 is provided opposite the inlet passageway 8 with an exterior annular groove 16 and the portion below said groove is provided with two series of exterior, longitudinal V-shaped grooves that alternate one with the other. The grooves 17 of one series communicate at their upper series with the annular groove 16 and their lower ends terminate short of the lower end of the filter sleeve; and the grooves 18 of the other series terminate short of said annular groove and extend clear to the lower end of said sleeve.

The operation of the device is as follows: Fuel oil enters the inlet passageway 8 of the injector under pressure of the usual fuel injection pump (not shown) and is forced into the exterior annular groove 16 of the filter sleeve 15 and thence into the series of grooves 17 leading downwardly therefrom. From these grooves the oil passes between the peripheral portions of the filter sleeve and axial bore 2 therefor into the grooves 18 which are open at the lower end of said filter sleeve, the filter action being brought about by the closely fitting portions of said filter sleeve and said bore. The oil is thence forced downwardly around the lower end of the spring-loaded plunger of valve stem 10; and, when the pressure of the oil overcomes the resistance of the spring 11 on the plunger, the plunger is raised clear of the discharge orifices 5 in the nozzle 3 and the oil is sprayed from said nozzle through said orifices. Any oil that leaks around the plunger into the upper spring enclosing cap nut 6 is discharged therefrom through the drain passageway 9.

The discharge orifices 5 shown in Figs. 1 and 2 are formed by fitting a longitudinally fluted or grooved plug 19 in a bore 20 provided therefor

in the end of the nozzle cap, the plug and bore being preferably tapered toward the outer end of the nozzle 3 so that the pressure of the oil on said plug tends to seat it firmly in said bore.

5 In the modified construction shown in Figs. 4 and 5 the discharge orifices 5a are formed by flutes or grooves located in the bore 20a instead of being located in the plug 19a for said bore. In the pin nozzle construction shown in

10 Figs. 6 and 7, the plunger has a flatsided pin or plug 19b fixed to its lower end that fits within a bore 20b provided therefor in the end of the nozzle, thereby forming a series of circumferentially spaced discharge orifices 5b. It is noted

15 as an important advantage of each of the above arrangements for forming the discharge orifices in the nozzle that it dispenses with the operation of drilling said orifices, which are relatively small and result in considerable drill breakage. Other

20 advantages are that the plug size is such that the hole therefor can be drilled and reamed without drill breakage and that the small grooves or flutes in the hole or plug may be tool cut or broached.

25 Obviously, numerous changes may be made without departing from the invention and I do not wish to be limited to the precise construction shown.

What I claim is:

30 1. A fuel injector comprising a body portion having a bore therein, an inlet passageway opening into said bore and a discharge orifice leading from said bore, a plunger mounted in said bore for opening and closing said discharge orifice, and a filter mounted in said bore between

35 said inlet passageway and said discharge orifice, said filter comprising a separate member fitting

in said bore and provided with a bore adapted to slidably support said plunger.

2. A fuel injector comprising a body portion having an inlet passageway and a series of circumferentially spaced discharge orifices, and a 5 filter mounted in said body portion between said inlet passageway and said discharge orifices, the discharge end of said injector being provided with an axial bore, a plug fitting in said bore, one of said plug and bore provided with longi- 10 tudinal grooves that extend substantially straight from end to end thereof to form said discharge orifices, and a plunger slidably supported in said filter and having a flat end face adapted to close the inner ends of said discharge orifices. 15

3. A fuel injector nozzle comprising a body portion provided at its discharge end with an axial bore, and a plug fitting said bore, one of said plug and bore being provided with longitudinal grooves that extend substantially straight 20 from end to end thereof and form a plurality of circumferentially spaced discharge orifices and a plunger slidably mounted in said body portion and having a flat end face adapted to close the inner ends of said discharge orifices. 25

4. A fuel injector comprising a body portion having a bore therein and an inlet passageway opening into said bore near one end thereof, a nozzle member removably secured to said body portion at the other end of said bore and provided with a discharge orifice, a sleeve mounted 30 in said bore and having filtering grooves in its exterior surface, and a valve stem slidably supported in said sleeve and extending into said nozzle for closing the discharge orifice therein. 35

OSWALD SCHLAUPITZ.

DISCLAIMER

2,067,131.—*Oswald Schlaupitz*, Canton, Ohio. FUEL INJECTOR. Patent dated January 5, 1937. Disclaimer filed June 4, 1937, by the assignee, *The Timken Roller Bearing Company*.

Hereby disclaims the subject matter of claims 1 and 4 of said Letters Patent.
[*Official Gazette June 29, 1937.*]

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in said bore and provided with a bore adapted to slidably support said plunger.

2. A fuel injector comprising a body portion having an inlet passageway and a series of circumferentially spaced discharge orifices, and a 5 filter mounted in said body portion between said inlet passageway and said discharge orifices, the discharge end of said injector being provided with an axial bore, a plug fitting in said bore, one of said plug and bore provided with longitudinal grooves that extend substantially straight 10 from end to end thereof to form said discharge orifices, and a plunger slidably supported in said filter and having a flat end face adapted to close the inner ends of said discharge orifices. 15

3. A fuel injector nozzle comprising a body portion provided at its discharge end with an axial bore, and a plug fitting said bore, one of said plug and bore being provided with longitudinal grooves that extend substantially straight 20 from end to end thereof and form a plurality of circumferentially spaced discharge orifices and a plunger slidably mounted in said body portion and having a flat end face adapted to close the inner ends of said discharge orifices. 25

4. A fuel injector comprising a body portion having a bore therein and an inlet passageway opening into said bore near one end thereof, a nozzle member removably secured to said body portion at the other end of said bore and provided with a discharge orifice, a sleeve mounted 30 in said bore and having filtering grooves in its exterior surface, and a valve stem slidably supported in said sleeve and extending into said nozzle for closing the discharge orifice therein. 35

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