Dec. 26, 1950 L. LE BOZEC ET AL 2,535,937

FUEL INJECTING MEANS FOR MOTORS

Filed Aug. 8, 1945

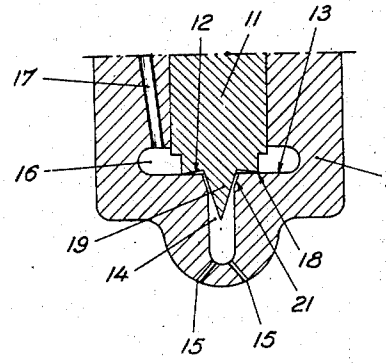


Fig.1

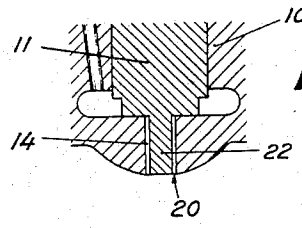


Fig.2

Inventors,
Leon Le Bozec and
Georges Gautier
By Young, Emery & Thompson
Attys.

Patented Dec. 26, 1950 2,535,937

UNITED STATES PATENT OFFICE

2,535,937

FUEL INJECTING MEANS FOR MOTORS

Leon Le Bozec, Courbevoie, and Georges Gautier, Mesnil-le-Roy, France

Application August 8, 1945, Serial No. 609,550
In France July 19, 1939

Section 1, Public Law 690, August 8, 1946
Patent expires July 19, 1959

2 Claims. (Cl. 299—107.6)

1

Our invention has for its object improvements in injectors adapted to provide for the admission of fuel into the cylinders of internal combustion or explosion motors.

Injectors are already known wherein the closing member or needle of a diameter much greater than that of the channel which is to be closed bears against the entrance of said channel through a surface which may be flat or very slightly hollowed out into the shape of a spherical cap or of a very open cone; in this latter case, the closing member bears through a circular edge against the flat surface surrounding the entrance into the channel without however forming any objectionable chamber in front of said entrance.

It has been found that these known injectors show in spite of their advantages, the drawback of producing a substantial loss of head at the moment of the passage of the fuel through said channel, said loss being due to the fact that as soon as the closing means are raised, the fuel distributed over the outer periphery of said closing means is driven radially towards the center thereof so that the liquid streams assume a convergent movement and a meeting point thereof is formed exactly at the entrance into the channel, which leads to violent eddies of the liquid.

The present invention has as an object the correction of these disadvantages.

According to the present invention, the frontal surface of the valve element or closing means is provided with an annular recess of slight depth from the center of which extends an axial projection extending into the injection channel.

Due to this arrangement, the liquid fuel having passed the outer periphery of the closing means and of the annular recess is guided by the bottom of this recess, then by the projection towards the injection channel, and the flow is effected in a very uniform manner without eddying.

The improvements according to our invention are illustrated by a few examples shown in the accompanying drawings wherein:

Fig. 1 shows the head piece of an injector adapted to atomize through a plurality of small holes.

Fig. 2 shows an injector headpiece wherein the central projection acts as an atomizing member.

According to Fig. 1, 10 designates the end of an injector provided with a closing member 11, the lower surface of which is adapted to bear against a flat seat 13 into the center of which a channel 14 opens the end of which communicates with a certain number of small holes 15 providing for the atomizing of the fuel under pressure which escapes therethrough when the closing member is opened.

2

The seat 13 forms one of the walls of the fuel chamber 16 which is connected through a duct 17 with a feed pump not illustrated.

According to this first form of invention the active surface 12 of the closing member 11 is hollowed out into the shape of a spherical cap whereby said closing member may rest against the seat 13 only through its edge 18 but however by reason of the concavity given to the surface 12 being very slight, no substantial expansion chamber is formed at the entrance into the channel 14.

To further the passage of the liquid fuel when the closing member 11 is raised, there is provided in accordance with our invention at the center of the operative surface 12 of said member 11 an axial projection 19 adapted to partly engage the channel 14.

According to the example illustrated in Fig. 1 the edge 21 at the entrance of the channel 14 has a flaring shape and moreover the projection 19 appears under the shape of a cone the apex of which engages the channel 14 but without touching the edge thereof.

With such an arrangement, it is obvious that when the closing member 11 is raised, the fuel under pressure enters at a high speed the channel 14 without being submitted thereby to any expansion or throttling, eddying motion or sudden change in direction; thus the losses of head are reduced to a minimum and the atomization obtained is for an equal pressure of fuel better than that provided in the prior devices and this leads to an increased efficiency of the engine, provided with our improved injector.

In the example illustrated in Fig. 2 the channel 14 opens directly at 20 into the motor cylinder; the lower surface of the closing member 11 is flat but the projection carried centrally by said closing member 11 and designated in the present case by the reference number 22 extends throughout the length of the channel.

At the end 20 of the channel, the central projection 22 defines a throttled annular space the width of which is sufficiently small for producing the desired atomizing of the fuel during operation.

According to Fig. 2 the channel 14 and the central projection 22 are both cylindrical.

Moreover, it should be well understood that the invention is not limited to the few examples

given hereinabove by way of illustration and it is possible without widening its scope to embrace all the detail modifications which may be suggested by practice and which are included within the scope of the appended claims.

What we claim is:

1. A fuel injector comprising a body having a fuel supply chamber therein, said body also having a fuel injector channel therein opening through an orifice in a wall of said chamber, said wall being plane on the interior of said chamber and perpendicular to the axis of said injector channel, said body having a valve element-receiving-bore coaxial with the axis of said channel and extending into said chamber through a wall opposite said plane wall, a valve element axially movably mounted in said bore and provided with a circular end face of larger diameter than the diameter of said orifice, said end face of the valve element being slightly hollow and surrounded by a circular peripheral edge for cooperating with the plane surface surrounding the orifice, and a projection of circular cross section extending axially from the center of the hollow end face of the valve element into the orifice and channel and spaced from the interior edges and surfaces of the orifice and channel in all positions of axial movement of said valve element.

2. A fuel injector comprising a body having a fuel supply chamber therein, said body also having a fuel injector channel therein opening through an orifice in a wall of said chamber, said wall being plane on the interior of said chamber and perpendicular to the axis of said injector channel, said body having a valve element receiving bore coaxial with the axis of said channel and extending into said chamber through a wall opposite said plane wall, a valve element axially movably mounted in said bore and provided with a circular end face of larger diameter than the diameter of said orifice, said end face of the valve element being slightly hollow and surrounded by a circular peripheral edge for cooperating with the plane surface surrounding the orifice, and a conical projection extending axially from the center of the hollow end face of the valve element into the orifice and channel, said orifice, channel and conical projection being of such diameters that the conical projection will be spaced from the interior edges and surfaces of the orifice and channel in all positions of axial movement of said valve element.

LEON LE BOZEC.
GEORGES GAUTIER.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
2,017,028	Heinrich et al.	Oct. 8, 1935
2,067,131	Schlaupitz	Jan. 5, 1937
2,172,556	Edwards	Sept. 12, 1939

FOREIGN PATENTS

Number	Country	Date
146	Great Britain	Jan. 3, 1910
43,447	France	Mar. 5, 1934
671,686	Germany	Nov. 8, 1936