July 25, 1933. G. PIELSTICK 1,919,904

FUEL VALVE

Filed April 28, 1931

Fig. 1.

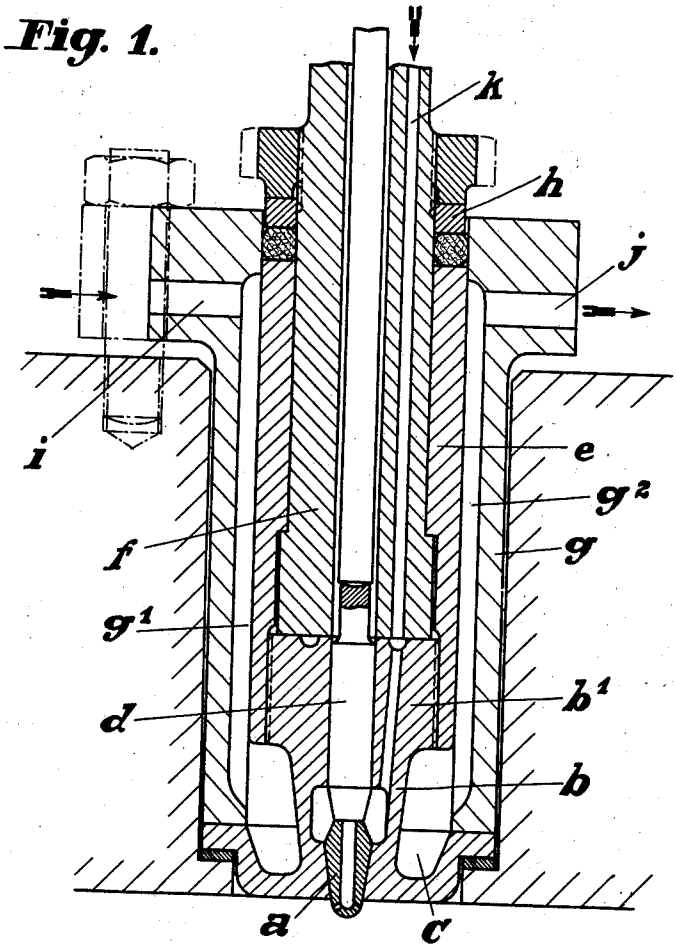
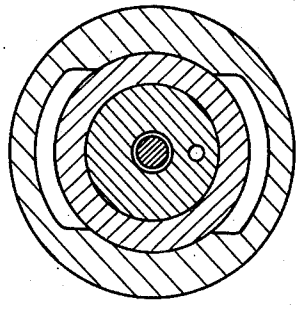


Fig. 2.



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FUEL VALVE

Application filed April 28, 1931, Serial No. 533,568, and in Germany May 7, 1930.

This invention relates to fuel valves for internal combustion engines and more particularly to engines operating with fuel injection into the cylinder.

One object of the invention is the provision of a fuel valve of the character mentioned, provided with a removable nozzle and a carrying member therefor, the carrying member forming a guide for the needle valve which seats against the nozzle.

Another object of the invention is the provision of a water cooled fuel injection valve having a water cooling chamber adjacent the nozzle location, the needle valve seating against a readily replaceable nozzle provided in a nozzle carrier in which the needle valve is guided. Thus a single tight seal for the fuel chamber insures against any leakage, the valve being especially adapted for injection type engines having spray atomization under injection pressures up to 300 atmospheres or more.

Other objects and advantages of the invention will be apparent from the following description, the appended claims and the accompanying drawing, in which—

Fig. 1 is a central longitudinal section of a fuel valve embodying the present invention; and

Fig. 2 is a transverse section through the same.

In accordance with the present invention the fuel valve of an engine operating with compressorless spray atomization of the fuel at injection pressures as much as 300 atmospheres or more comprises a nozzle carrying member preferably provided with a cooling chamber adjacent the nozzle location, the nozzle carrying member exchangeably receiving nozzles in a readily removable manner. The nozzle carrying member itself guides and receives the needle or movable valve member which is adapted to seat directly against the inner end of the nozzle so as to provide a tight single seal for the fuel chamber, sealing it tightly against both inward and outward leakage.

Referring more particularly to the accompanying drawing by letters of reference, the injection nozzle a is removably seated in the nozzle carrying member b, which is preferably so shaped in its lower portion as to form a wall of the water cooling chamber c. The upper portion b' of the nozzle carrying member guides and receives the movable needle d of the valve. The nozzle a is provided preferably with a plane upper surface forming a seat for the plane lower surface of the needle d. The needle d is, therefore, sealed tightly against both inward and outward pressures or leakage as it directly engages the nozzle carried by the nozzle carrier.

The nozzle carrying member b is connected to an outer valve body f through which the needle extends, by means of a threaded engagement with a screw threaded case e. This case e is surrounded by a cooling casing g which provides therewith the channels g^1 and g^2 forming ducts for the cooling water which flows through the chamber c around the nozzle carrying member. The casing g is supported upon the flange-like outer edge of the nozzle carrying member b and is connected tightly with the case e by means of a suitable stuffing box h. i is the cooling water inlet and j the water outlet. Fuel is supplied into the fuel chamber adjacent the bottom of the needle in the nozzle carrying member through a channel k extending through the nozzle carrying member b and through the outer valve body f.

It will now be apparent that by reason of the single tight seal provided by means of the direct engagement with the needle d of the fuel nozzle, the needle being guided in the nozzle carrying member itself, all leakage is prevented and a safe compression is obtained in injection engines having spray atomization even exceeding pressures of 300 atmospheres, yet the nozzles are held in a readily removable manner and are adequately cooled.

While the form of apparatus herein described constitutes a preferred embodiment of the invention, it is to be understood that the invention is not limited to this precise form of apparatus, and that changes may be made therein without departing from the

scope of the invention which is defined in the appended claims.

What is claimed is:

1. A fuel valve comprising an integrally formed nozzle carrying member, an outer casing, said carrying member and outer casing providing a cooling chamber adjacent the nozzle location, a nozzle removably seated within said carrying member, and a needle valve guided in said carrying member and seating against said nozzle.

2. An integrally formed fuel valve of the character described comprising a nozzle carrying member, a nozzle removably seated thereon so as to be entirely supported thereby, a needle valve guided in said member and seating against said nozzle, said member having a fuel chamber provided therein and having a passage leading to said fuel chamber, and an outer casing engaging said member and cooperating therewith to form a cooling chamber around said fuel chamber.

3. An integrally formed fuel valve of the character described comprising a nozzle carrying member, a nozzle removably supported and seated thereon, a needle valve guided in said member and seating against said nozzle, an outer valve body, a case enclosing said body and securing it to said member, an outer casing cooperating with said case and said member and providing water inlet and outlet passages, and a cooling chamber defined by said case, outer casing and nozzle carrying member adjacent the nozzle location.

4. A fuel valve comprising an integrally formed nozzle carrying and needle valve guiding member having a downwardly tapered hole, a nozzle removably seated in said hole and supported entirely by said member, a needle valve guided in said carrying member and engagable with said nozzle and having a diameter at least as great as the largest diameter of said nozzle, said member having a fuel chamber therein and having a fuel supply passage leading to said fuel chamber.

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CERTIFICATE OF CORRECTION.

Patent No. 1,919,904. **July 25, 1933.**

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It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 2, lines 12 and 24, claims 2 and 3 respectively, for "An integrally formed" read "A"; and lines 13 and 25, same claims, for "a" read "an integrally formed"; and that the said Letters Patent should be read with these corrections therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 22nd day of August, A. D. 1933.

M. J. Moore.

(Seal) **Acting Commissioner of Patents.**