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F. MÜLLER

FUEL INJECTION VALVE FOR INTERNAL COMBUSTION ENGINES

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Fig. 1

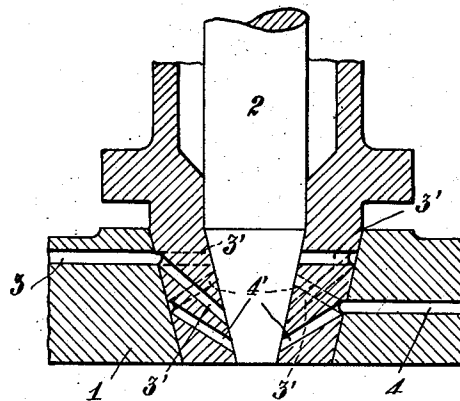


Fig. 2

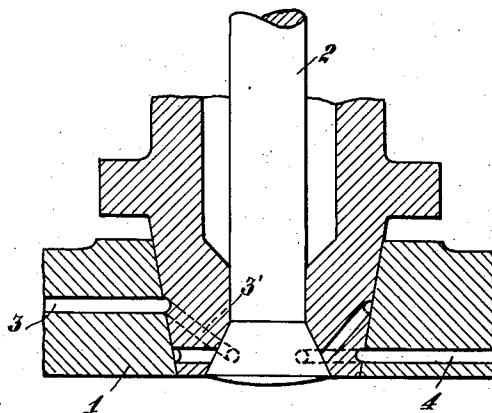
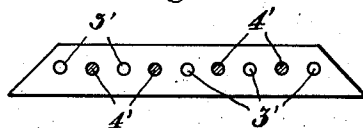


Fig. 3



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UNITED STATES PATENT OFFICE.

FRIEDRICH MÜLLER, OF VIENNA, AUSTRIA.

FUEL-INJECTION VALVE FOR INTERNAL-COMBUSTION ENGINES.

Application filed August 13, 1921. Serial No. 492,196.

(GRANTED UNDER THE PROVISIONS OF THE ACT OF MARCH 3, 1921, 41 STAT. L., 1313.)

To all whom it may concern:

Be it known that I, FRIEDRICH MÜLLER, a citizen of the Republic of Switzerland, residing at Vienna, Austria, have invented a Fuel-Injection Valve for Internal-Combustion Engines (for which I have filed applications as follows: Austria, filed 18th Nov., 1916, granted 28th Oct., 1919, No. 79,972; Germany, filed 10th July, 1920, granted 31st Aug., 1922, No. 363,407; Czechoslovakia, filed 30th July, 1920, granted 4th Aug., 1923, No. 11,476; Hungary, filed 31st Aug., 1920, granted 12th Feb., 1923, No. 82,935; Poland, filed 23rd Oct., 1920, not yet granted; Switzerland, filed 22nd Mar., 1921, granted on 16th June, 1922, No. 95,734; Belgium, filed 24th Mar., 1921, granted 15th Sept., 1921, No. 294,853; France, filed 29th Mar., 1921, granted 31st Jan., 1922, No. 535,753; Italy, filed 29th Mar., 1921, granted 22nd June, 1923, No. 562,56), of which the following is a specification.

The invention relates to an injection valve, in which the fuel and the injection air are brought together after the opening of the fuel valve. The injection valve according to the invention is characterized by the feature, that in the seating surface forming together with the single-seat valve member a multi-way fuel supply distributor the fuel and injection air supply apertures are alternately cut off from each other, so that during the injection a recurring mixing action is brought about, a suitably great number of fuel orifices in the seat effecting the distribution of the fuel in the manner of a sieve.

As compared with the well-known multi-seat valves, for instance according to the Austrian Patent 53,086, in which the fuel ducts open for the purpose of distributing the fuel in the seating surface into groove shaped collecting spaces between the valve seats, the valve according to the invention has the advantage, that it has only one seat and that the detrimental effect of the grooves between adjacent seats, required for distributing the fuel, each of which obturates another medium, is avoided.

The grooves are not adapted for taking the quantity of fuel conveyed both in the case of light running and at full load, as their capacity is either too great or too small. In the case of light running, idle strokes will

occur, because the grooves are not filled with fuel, and at full load only the amount of fuel which is ready in the groove will be properly distributed. The consequence of this is that perfect combustion can only take place when the engine uses at each stroke exactly as much fuel as the grooves are capable of holding.

The invention further relates to injection valves, in which the compressed air is stored in grooves before being introduced into the working cylinder. For compressed air is capable of expansion so that it is unnecessary to distribute the compressed air by employing a number of branch ducts.

In the accompanying drawing several constructional examples of the invention are shown.

In the example shown in Fig. 1 both outlet openings for the fuel and the outlet openings for the injection air lie each in two rows in the seating surface, the rows of fuel outlets and injection air outlets alternating. 1 is the head of the cylinder and 2 the injection valve, in the seating surface of which the injection air and the fuel supply apertures are obturated directly and separately. The injection air duct 3 branches off into branch ducts 3' and the fuel duct 4 into branch ducts 4'. On the valve being opened the two media rapidly meet and combine during the process of injection to an intimate mixture.

In the constructional form shown in Figs. 2 and 3, the outlet orifices 4' for the fuel are arranged alternately with the outlet orifices 3' for the injection air in one row round about the valve member 2, as is shown in the developed seat in Fig. 3.

Patent claims:

1. In an internal combustion engine, the combination with a working cylinder comprising separate passages for fuel and compressed air, an injection valve for the injection of the fuel and air when the said valve is opened, and a valve seat for the said valve comprising a plurality of groups of outlets each group adapted to communicate with one of said passages and to deliver the fuel and air in divided volumes at alternate points around the valve seat.

2. In an internal combustion engine the combination with a working cylinder com-

prising separate passages for fuel and compressed air, an injection valve for the injection of the fuel and air when the said valve is opened, a valve seat for the said 5 valve comprising a plurality of groups of outlets each group adapted to communicate with one of said passages and to deliver the fuel and air in divided volumes around the valve seat all the fuel outlets and air outlets being arranged alternately next to each 10 other in one row.

Vienna, Austria, July 14, 1921.

FRIEDRICH MÜLLER.