

Title (en)
HIGH-PRESSURE FUEL INJECTION DEVICE FOR A COMBUSTION ENGINE

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Application
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Priority
DE 3504265 A 19850208

Abstract (en)
[origin: EP0194431A1] 1. High-pressure fuel injection device for a combustion engine - with a high-pressure injection pump (1) having a pump piston (5) without a guiding edge and controlled by a cam (8) of a control shaft (9), through which injection pump fuel from a pump surge chamber (11) can be supplied to an injection port via a delivery canal (12) and a pressure valve (13) as well as via a connecting line (14) connected to it, - further with a low-pressure feed pump (18) with which fuel can be delivered from a tank (19) via a feed line (20) into the pump surge chamber (11) of the high-pressure injection pump (1), - with a return line (38; 38/1, 38/2) which branches off from the pump surge chamber (11) of the high-pressure injection pump (1) or the delivery canal (12) which runs between it and the pressure valve (13), and leads directly to the tank (19), - with a gate valve (39) which serves as a means to influence the injection process independently of the pump delivery, is connected into the return line (38) and is arranged in or at the pump head (3) of the high-pressure injection pump (1), which gate valve has a valve body which can be slid axially in a receiving bore and further, when in a final position with its valve seat, arranged at its front part, pressed against a valve seat ring surface (45), blocks off the return line (38) and, when withdrawn from this final position, releases the return line, which valve body also, through a closing pressure spring (50) acting on its rear part, can be pressed in the direction of the valve seat ring surface (45) and further has a canal (53) passing through it by means of which fuel constantly arrives from the inlet-side part (38/1) of the return pipe (38) into a dynamic pressure chamber (55) which works behind the canal, with respect to the direction of flow, characterised in that - the pressure valve (13) is part of the high-pressure injection pump (1) and the injection port is arranged in an injection valve (15) located at the end of the connecting line (14) ; - a one-way suction valve (21) is inserted into the feed line (20), allowing flow only in the direction of delivery of the low-pressure feed pump (18) ; - the closing pressure spring (50) of the gate valve (39) exercises a compressive force on the valve body (48), which, related to the valve body's back surface, gives a pressure which lies slightly below the delivery pressure of the low-pressure feed pump (18) ; - a choke bore (54) is provided in the through canal (53) of the valve body (48) ; - a dynamic pressure control line (56) connected to the dynamic pressure chamber (55) splits up downstream of the latter at a branching point (57) into two parallel branches (56/1, 56/2) which separately, or reunited as one line component (58), flow, downstream of the branching point (57), into the part (38/2) of the return line (38) lying downstream of the gate valve (39) ; - as a further means for influencing the injection process independently of the pump delivery, in each of the two parallel branches (56/1, 56/2) of the dynamic pressure control line (56) a controlled one-way valve (59, 60) is inserted, one of which marks the begin of delivery of the high-pressure injection pump (1) at the moment it closes, with the other one closed, and the other marks the end of delivery at the moment it opens, and - each of the two one-way valves (59, 60) is connected to an operating device (61, 62) and this in turn is connected to a control device (63) which controls a machine-synchronous operation of both one-way valves (59, 60) in the direction of operationally optimal values for the begin and end of delivery of the high-pressure injection pump (1).

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