

Title (en)  
Fuel injection apparatus.

Title (de)  
Kraftstoffeinspritzvorrichtung.

Title (fr)  
Dispositif d'injection de combustible.

Publication  
**EP 0615065 A1 19940914 (EN)**

Application  
**EP 94103689 A 19940310**

Priority  
JP 5097493 A 19930311

Abstract (en)  
A low-speed area where a cam speed is low is provided in the cam characteristic of non-uniform speed cams (8a) of an injection pump (1) for moving a plunger (12) at a low speed, and a high-speed area for moving the plunger (12) at a high speed is provided in the back portion of the cam characteristic. The nozzle needle (37) of an injection valve (2) is opened at a predetermined first injection-valve opening pressure (P1), and is held at a predetermined valve-open position until fuel pressure reaches a second injection-valve opening pressure (P2) set higher than the first injection-valve opening pressure (P1). The injection valve (2) is provided with a steady flow-rate portion for keeping the area of an injection port (45) nearly constant even when the shift amount of the nozzle needle (37) varies, and the nozzle needle (37) is held at the predetermined valve-open position in this steady flow-rate area. The period in which the plunger moves in the low-speed area of the cam characteristic and the period in which the nozzle needle (37) is held at the predetermined valve-open position in the steady flow-rate area overlap each other at least partially. Accordingly, the low injection-rate period is secured at the beginning of fuel injection, thus ensuring high-pressure injection. <IMAGE>

IPC 1-7  
**F02M 61/06**; **F02M 59/10**; **F02M 45/12**

IPC 8 full level  
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**F02M 45/083** (2013.01); **F02M 45/12** (2013.01); **F02M 59/102** (2013.01); **F02M 61/06** (2013.01)

Citation (search report)  
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• [A] FR 887679 A 19431119 - BOSCH GMBH ROBERT  
• [A] PATENT ABSTRACTS OF JAPAN vol. 9, no. 25 (M - 355)<1748> 2 February 1985 (1985-02-02)  
• [DA] PATENT ABSTRACTS OF JAPAN vol. 12, no. 179 (M - 701) 26 May 1988 (1988-05-26)  
• [A] PATENT ABSTRACTS OF JAPAN vol. 11, no. 247 (M - 615) 12 August 1987 (1987-08-12)

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