



(12)

EUROPEAN PATENT APPLICATION

(88) Date of publication A3:
05.03.2003 Bulletin 2003/10

(51) Int Cl.7: F02M 63/02, F02M 59/36,
F02M 59/08, F02D 41/38

(43) Date of publication A2:
08.12.1999 Bulletin 1999/49

(21) Application number: 99103574.2

(22) Date of filing: 24.02.1999

(84) Designated Contracting States:
AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU
MC NL PT SE
Designated Extension States:
AL LT LV MK RO SI

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(30) Priority: 01.06.1998 JP 15131498

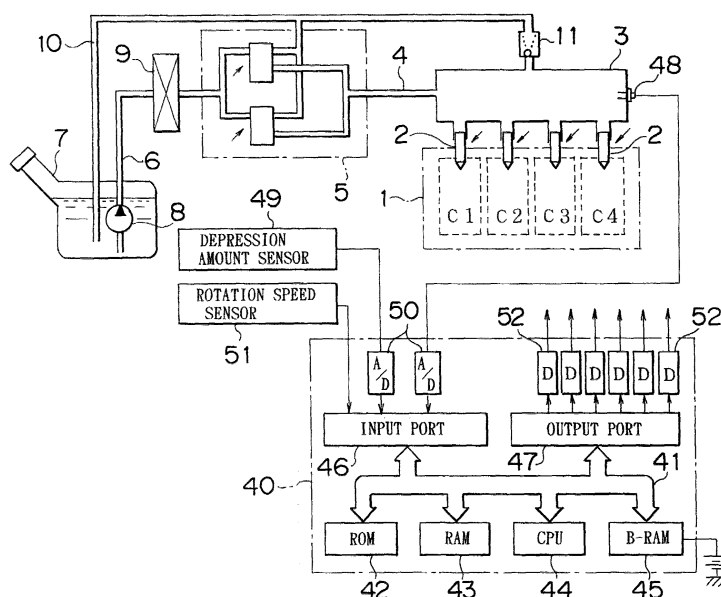
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(54) Accumulator-type fuel injection apparatus and control method for the same

(57) An accumulator-type fuel injection apparatus has a plurality of fuel injection valves for corresponding individual cylinders of an engine. The fuel injection valves (2) are connected to a common pressure-accumulator chamber (3) that is connected to an ejection side of a fuel pump (5). Fuel is pumped from the fuel pump (5) into the pressure-accumulator chamber (3) into the pressure-accumulator chamber (3)

and then supplied into the cylinders via the corresponding fuel injection valves (2). The fuel pumping timing of the fuel pump is set relative to the fuel injection timing so that a variation in fuel pressure in the pressure-accumulating chamber (3) at the time of start of a fuel injecting operation is smaller than a predetermined set value.

FIG. 1





European Patent
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EUROPEAN SEARCH REPORT

Application Number
EP 99 10 3574

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
X	EP 0 481 964 A (NIPPON DENSO CO) 22 April 1992 (1992-04-22)	1-4,6, 9-12	F02M63/02 F02M59/36
A	* abstract; figures 1-4,15,16 *	13-16	F02M59/08 F02D41/38
X,D	PATENT ABSTRACTS OF JAPAN vol. 017, no. 465 (M-1468), 25 August 1993 (1993-08-25) & JP 05 106495 A (NIPPONDENSO CO LTD), 27 April 1993 (1993-04-27) * abstract *	1-4,6, 9-12	
			TECHNICAL FIELDS SEARCHED (Int.Cl.6)
			F02D F02M
The present search report has been drawn up for all claims			
Place of search MUNICH		Date of completion of the search 15 January 2003	Examiner Godrie, P
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 99 10 3574

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15-01-2003

Patent document cited in search report		Publication date		Patent family member(s)	Publication date
EP 0481964	A	22-04-1992	JP	2176158 A	09-07-1990
			JP	2639036 B2	06-08-1997
			JP	2146256 A	05-06-1990
			JP	2639017 B2	06-08-1997
			EP	0481964 A2	22-04-1992
			EP	0516196 A2	02-12-1992
			DE	68910658 D1	16-12-1993
			DE	68910658 T2	17-03-1994
			DE	68922746 D1	22-06-1995
			DE	68922746 T2	05-10-1995
			DE	68925737 D1	28-03-1996
			DE	68925737 T2	22-08-1996
			EP	0375944 A2	04-07-1990
			US	5058553 A	22-10-1991

JP 05106495	A	27-04-1993	NONE		

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82