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(54) **Fuel injector**

(57) A fuel injector comprises a valve needle (14) engageable with a seating to control fuel flow from a delivery passage (18) to an outlet opening (20), a control chamber (24) communicating with the delivery passage (18), the control chamber (24) being defined, in part, by a surface associated with the valve needle (14) orientated such that the application of fuel under pressure to the control chamber (24) applies a force to the valve needle (14) urging the valve needle (14) towards its seating, a control valve (62) controlling the fuel pressure within the control chamber (24), and a delivery valve (40, 46) responsive to the fuel pressure within the control chamber (24) to control the flow of fuel along the delivery passage (18) towards the seating.

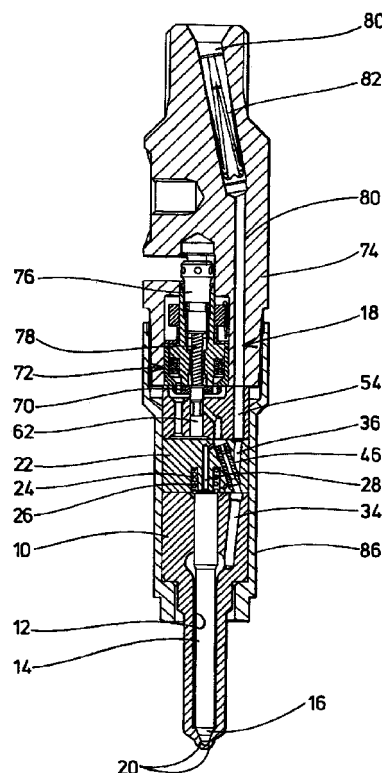


FIG 1

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EUROPEAN SEARCH REPORT

Application Number
EP 98 30 9515

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.CI.6)
X	DE 27 59 255 A (BOSCH GMBH ROBERT) 12 July 1979 (1979-07-12) * page 11, line 28 - page 13, line 14; figures 1,2 *	1	F02M47/02
E	DE 197 42 320 A (BOSCH GMBH ROBERT) 1 April 1999 (1999-04-01) * column 7, line 49 - column 8, line 40; figure 7 *	1	
A	US 5 263 645 A (PAUL MARIUS A ET AL) 23 November 1993 (1993-11-23) * column 4, line 52 - column 5, line 46; figures 1,2 *	1	
A	EP 0 753 660 A (ISUZU MOTORS LTD) 15 January 1997 (1997-01-15) * abstract; figures *	2	
The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (Int.CI.6)
			F02M
Place of search		Date of completion of the search	Examiner
THE HAGUE		13 July 2000	Torle, E
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			

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

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13-07-2000

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
DE 2759255 A	12-07-1979	NONE	
DE 19742320 A	01-04-1999	WO 9915778 A EP 0939857 A	01-04-1999 08-09-1999
US 5263645 A	23-11-1993	US 5397055 A US 5299919 A	14-03-1995 05-04-1994
EP 0753660 A	15-01-1997	JP 9032680 A DE 69605155 D DE 69605155 T US 5722600 A	04-02-1997 23-12-1999 04-05-2000 03-03-1998

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