



Europäisches Patentamt
European Patent Office
Office européen des brevets



(11) **EP 0 922 852 A3**

(12) **EUROPEAN PATENT APPLICATION**

(88) Date of publication A3:
07.06.2000 Bulletin 2000/23

(51) Int Cl.7: **F02M 61/14**, F02M 55/00,
F02M 55/02

(43) Date of publication A2:
16.06.1999 Bulletin 1999/24

(21) Application number: **98309693.4**

(22) Date of filing: **25.11.1998**

(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

- **Colingborn, Peter Alban George**
Rainham, Gillingham, Kent ME8 8RX (GB)
- **Allen, Peter David**
Kennington, Ashford, Kent (GB)

(30) Priority: **09.12.1997 GB 9726090**

(71) Applicant: **Lucas Industries Limited**
London W1Y 4DJ (GB)

(74) Representative: **Bailey, Richard Alan et al**
Marks & Clerk,
Alpha Tower,
Suffolk Street Queensway
Birmingham B1 1TT (GB)

(72) Inventors:

- **Parker, Stephen Michael**
Redhill, Surrey RH1 4DN (GB)

(54) **Fuel system**

(57) A fuel system is described which comprises an injector (12) mounted in a bore of an engine cylinder head (10), a high pressure pipe (30) arranged to supply fuel to the injector (12) from a common rail (32), an end region of the pipe (30) adjacent the injector (12) extending in a direction substantially perpendicular to an axis of the injector (12), and a clamp member (38) arranged to clamp the end region of pipe (30) to the injector (12),

the clamp member (38) including a drilling (40) defining a return fuel passage extending between the injector (12) and a backleak channel (44) provided in the cylinder head (10) or a cam box wall or cover (22) of the engine. The injector (12) may be modified to define a flow passage (40) which communicates directly with the backleak channel (44), thus avoiding providing a drilling in the clamp member (38).

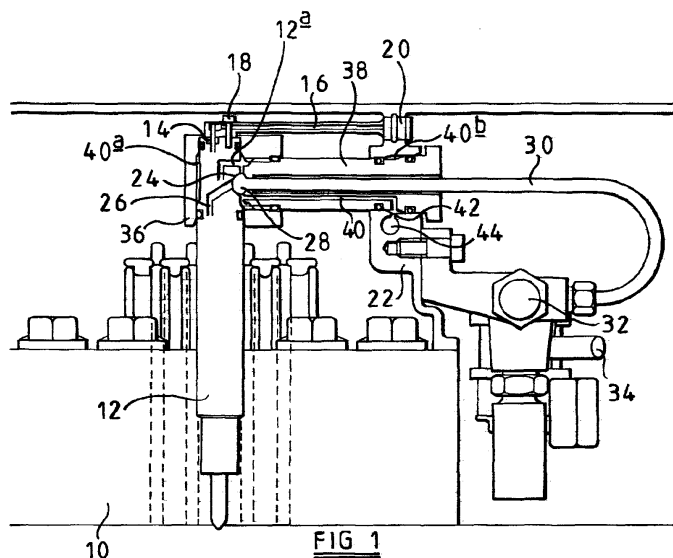


FIG 1

EP 0 922 852 A3



European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 98 30 9693

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,D	US 3 845 748 A (EISENBERG E) 5 November 1974 (1974-11-05)	6,8	F02M61/14 F02M55/00 F02M55/02
Y	* column 4, line 1 - line 25; figure 2 *	1,2,4,5	
Y	GB 925 937 A (TATRA, NARODNI PODNIK) 15 May 1963 (1963-05-15) * page 1, line 68 - page 2, line 7; figures 1,2 *	1,2,4,5	
A,D	EP 0 754 854 A (MAN NUTZFAHRZEUGE AG) 22 January 1997 (1997-01-22) * column 2, line 26 - line 40; figure 3 *	3	
A	DE 196 08 572 A (BOSCH GMBH ROBERT) 11 September 1997 (1997-09-11) * column 3, line 65 - column 4, line 6; figures 1,2 *	1,2,8	
A	US 4 665 876 A (HASHIMOTO YASUAKI) 19 May 1987 (1987-05-19) * abstract; figure 1 *	2	
A	US 4 993 637 A (KANESAKA HIROSHI) 19 February 1991 (1991-02-19) * column 4, line 27 - line 32 * * column 5, line 8 - line 11; figure 1 *	6	
The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (Int.Cl.6)
			F02M
Place of search		Date of completion of the search	Examiner
THE HAGUE		14 April 2000	Schmitter, T
<p>CATEGORY OF CITED DOCUMENTS</p> <p>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</p> <p>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</p>			

EPO FORM 1503 03.92 (P04C01)

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

EP 98 30 9693

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

14-04-2000

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 3845748 A	05-11-1974	NONE	
GB 925937 A		DE 1153212 B FR 1259196 A	04-08-1961
EP 0754854 A	22-01-1997	DE 19526693 A	23-01-1997
DE 19608572 A	11-09-1997	FR 2745850 A GB 2310892 A,B JP 9242642 A	12-09-1997 10-09-1997 16-09-1997
US 4665876 A	19-05-1987	DE 3422630 A FR 2565634 A GB 2160280 A,B	12-12-1985 13-12-1985 18-12-1985
US 4993637 A	19-02-1991	JP 2086953 A DE 3931285 A FR 2636675 A GB 2223273 A	27-03-1990 29-03-1990 23-03-1990 04-04-1990

EPO FORM P/459

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