

(19)



Europäisches Patentamt
European Patent Office
Office européen des brevets



(11)

EP 1 482 169 A3

(12)

EUROPEAN PATENT APPLICATION

(88) Date of publication A3:
07.06.2006 Bulletin 2006/23

(51) Int Cl.:
F02M 61/14 (2006.01) **F02M 55/00** (2006.01)

(43) Date of publication A2:
01.12.2004 Bulletin 2004/49

(21) Application number: **04252501.4**

(22) Date of filing: **30.04.2004**

(84) Designated Contracting States:
**AT BE BG CH CY CZ DE DK EE ES FI FR GB GR
HU IE IT LI LU MC NL PL PT RO SE SI SK TR**
Designated Extension States:
AL HR LT LV MK

(30) Priority: **29.05.2003 GB 0312406**

(71) Applicant: **Delphi Technologies, Inc.**
Troy, MI 48007 (US)

(72) Inventor: **Cooke, Michael**
Gillingham
Kent ME7 1DR (GB)

(74) Representative: **Hopley, Joanne Selina et al**
David Keltie Associates,
Fleet Place House,
2 Fleet Place
London EC4M 7ET (GB)

(54) Injector clamp and assembly

(57) An injector clamp (80) for securely clamping a plurality of fuel injectors (14) to an engine housing (16) is described. The clamp comprises a plurality of rigid clamp regions (82) separated by flexible clamp regions (84), each of the clamp regions (82) providing clamping means (56) for clamping an injector (14) to the engine housing (16). The injector clamp (80) further comprises a fuel passageway (22) for fluidically connecting a high pressure fuel inlet to the plurality of fuel injectors. The flexible clamp regions (84) allow the injector clamp (80) to bend to adapt to variations of height of each fuel injector (14). An injector assembly suitable for mounting in an engine housing is also described.

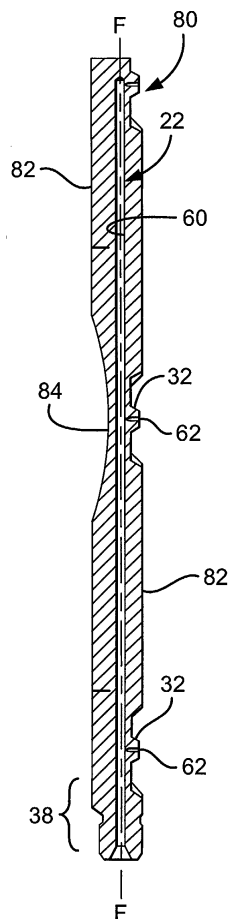


Fig. 7b



European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 04 25 2501

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	EP 0 915 253 A (BAYERISCHE MOTOREN WERKE AKTIENGESELLSCHAFT) 12 May 1999 (1999-05-12) * figures *	1-5	INV. F02M61/14 F02M55/00
P,X	EP 1 318 292 A (DANA CORPORATION) 11 June 2003 (2003-06-11) * column 2, line 41 - line 58; figure 1 *	1-5	
X	EP 0 751 290 A (ISUZU MOTORS LIMITED) 2 January 1997 (1997-01-02) * column 5, line 27 - line 48; figures 4-6 *	1-3	
A	DE 101 52 261 A1 (ROBERT BOSCH GMBH) 30 April 2003 (2003-04-30) * figure 3 *	1-6	
D,A	EP 0 627 553 A (ADAM OPEL AG; GENERAL MOTORS ESPANA, S.A) 7 December 1994 (1994-12-07) * figures *	1-6	TECHNICAL FIELDS SEARCHED (IPC) F02M
3 The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 29 November 2005	Examiner 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	

EPO FORM 1503 03.82 (P04C01)



European Patent
Office

Application Number
EP 04 25 2501

CLAIMS INCURRING FEES

The present European patent application comprised at the time of filing more than ten claims.

- ☐ Only part of the claims have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims and for those claims for which claims fees have been paid, namely claim(s):
- ☐ No claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims.

LACK OF UNITY OF INVENTION

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

see sheet B

- ☐ All further search fees have been paid within the fixed time limit. The present European search report has been drawn up for all claims.
- ☐ As all searchable claims could be searched without effort justifying an additional fee, the Search Division did not invite payment of any additional fee.
- ☐ Only part of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the inventions in respect of which search fees have been paid, namely claims:
- ☒ None of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims, namely claims:

1-6



European Patent
Office

LACK OF UNITY OF INVENTION
SHEET B

Application Number
EP 04 25 2501

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

1. claims: 1-6

An injector clamp for clamping a plurality of injectors, the clamp having rigid and flexible regions, each of the rigid clamp regions providing clamping means for clamping an injector to the engine.

2. claims: 7-22

An injector assembly comprising a fuel injector and an injector clamp with a fuel passageway and a locating member engageable with the fuel injector.

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

EP 04 25 2501

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.

29-11-2005

Patent document cited in search report		Publication date		Patent family member(s)	Publication date
EP 0915253	A	12-05-1999	DE	19748593 A1	06-05-1999
			ES	2210638 T3	01-07-2004

EP 1318292	A	11-06-2003	MX	PA02012196 A	29-10-2004
			US	6651327 B1	25-11-2003

EP 0751290	A	02-01-1997	DE	69607248 D1	27-04-2000
			DE	69607248 T2	28-09-2000
			JP	2937081 B2	23-08-1999
			JP	9014084 A	14-01-1997

DE 10152261	A1	30-04-2003	WO	03036075 A1	01-05-2003
			EP	1440236 A1	28-07-2004

EP 0627553	A	07-12-1994	DE	4318434 A1	08-12-1994
			DE	4408385 A1	14-09-1995
			ES	2097574 T3	01-04-1997
