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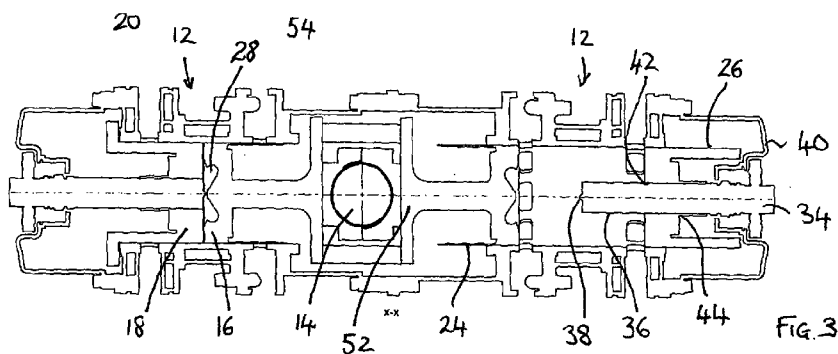
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Published:

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- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))

- (88) Date of publication of the international search report:
25 April 2013

(54) Title: INTERNAL COMBUSTION ENGINES



(57) Abstract: An internal combustion engine comprising at least one cylinder (12) and a pair of opposed, reciprocating pistons (16, 18) within the cylinder forming a combustion chamber (28) therebetween. The engine has at least one fuel injector (34) disposed at least partly within the cylinder, the fuel injector having a nozzle (38) that is positioned within the combustion chamber and through which the fuel is expelled into the combustion chamber, wherein the nozzle (38) is exposed directly within the combustion chamber (28).

INTERNATIONAL SEARCH REPORT

International application No
PCT/GB2012/051161

A. CLASSIFICATION OF SUBJECT MATTER

INV. F01B7/08 F02M61/14
ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

F01B F02M

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EP0-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 2008/149061 A2 (COX POWERTRAIN LTD [GB]; COX DAVID [GB]) 11 December 2008 (2008-12-11) cited in the application paragraph [0055]; figure 3g -----	1,2,4-6, 8,9
X	GB 520 243 A (JOHN HOWARD GOODMAN) 18 April 1940 (1940-04-18)	1-4,7-9
Y	page 1, line 74 - line 78; figure 2 -----	5,6
X	GB 476 386 A (RAUL PATERAS PESCARA) 6 December 1937 (1937-12-06)	1-4,7,8
Y	page 3, line 37 - line 42; figure 10 -----	5,6
X	GB 570 292 A (DAVID KRYGSMAN) 29 June 1945 (1945-06-29) page 2, line 4 - line 11; figure 4 -----	1-4
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☒ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search

8 November 2012

Date of mailing of the international search report

05/03/2013

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INTERNATIONAL SEARCH REPORT

International application No

PCT/GB2012/051161

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	GB 446 070 A (EMILE RENO) 23 April 1936 (1936-04-23) page 2, line 51 - line 56; figure 2 -----	5,6
Y	US 1 984 288 A (KEITH SAUNDERS PHILIP) 11 December 1934 (1934-12-11) page 2, line 10 - line 29; figure 1 -----	5,6

INTERNATIONAL SEARCH REPORT

International application No.
PCT/GB2012/051161

Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. ☐ Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fees, this Authority did not invite payment of additional fees.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

1-9

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.
- ☐ The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
- ☐ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-9

Location and details of the fuel injector in an opposed piston engine

2. claims: 10-20

Drive details for the pistons of an opposed piston engine

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/GB2012/051161

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 2008149061 A2	11-12-2008	CN 101765699 A	30-06-2010
		EP 2171211 A2	07-04-2010
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