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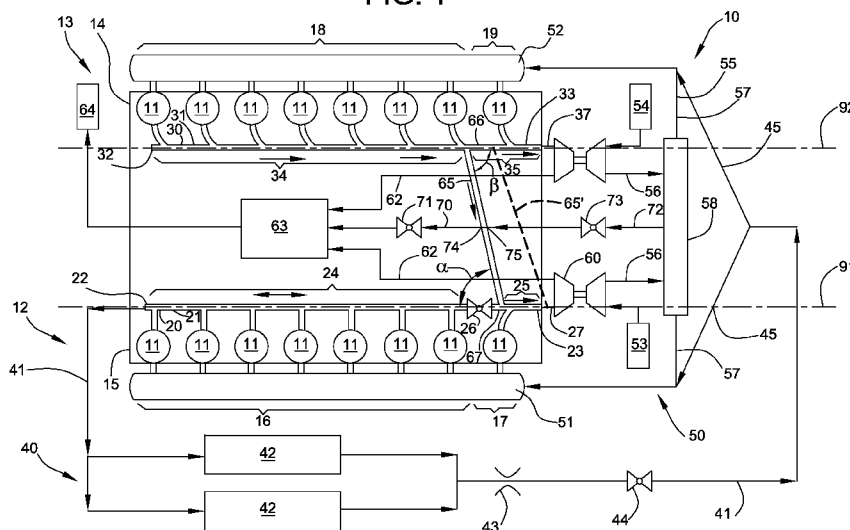
- with international search report (Art. 21(3))
- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))

(88) Date of publication of the international search report:

17 January 2013

(54) Title: INTERNAL COMBUSTION ENGINE WITH IMPROVED EXHAUST MANIFOLD

FIG. 1



(57) Abstract: An internal combustion engine includes a plurality of combustion cylinders, at least one turbocharger, an air supply line, an exhaust gas line and an exhaust gas recirculation system. An exhaust manifold of the exhaust gas line may have both non-direction specific and modular pulse exhaust manifold elements. If the internal combustion engine has dual cylinder banks, an exhaust gas balance tube may extend between exhaust gas lines of the cylinder banks and be fluidly connected to an exhaust manifold between the ends thereof.

INTERNATIONAL SEARCH REPORT

International application No

PCT/US2012/033441

A. CLASSIFICATION OF SUBJECT MATTER
 INV. F02M25/07 F02B37/20 F02B37/007 F01N13/10
 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)

F02M F02B F01N

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)

EPO-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.
A	US 6 378 308 B1 (PFLUEGER FRANK [DE]) 30 April 2002 (2002-04-30) column 3, line 45 - column 5, line 4; figures 1-3	1-4
A	----- US 2006/059908 A1 (SCHORN NORBERT A [DE] ET AL SCHORN NORBERT ANDREAS [DE] ET AL) 23 March 2006 (2006-03-23) the whole document	1-4
A	----- EP 1 734 237 A1 (TOYOTA JIDOSHOKKI KK [JP]; TOYOTA MOTOR CO LTD [JP]) 20 December 2006 (2006-12-20) paragraph [0065] - paragraph [0080]; figures 5,7,8 ----- -/-	1-4



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

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"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

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27/11/2012

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2012/033441

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.:

1-4

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.

INTERNATIONAL SEARCH REPORT

International application No

PCT/US2012/033441

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 2009/090098 A1 (SUGIYAMA TOSHIHISA [JP]) 9 April 2009 (2009-04-09) paragraph [0030] - paragraph [0042]; figure 1 -----	1-4

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/US2012/033441

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 6378308	B1	30-04-2002	EP 1071870 A1 31-01-2001
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			WO 2007145372 A1 21-12-2007

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

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

1. claims: 1-4

Exhaust manifold having an exhaust balance tube

2. claims: 5-10

EGR system
