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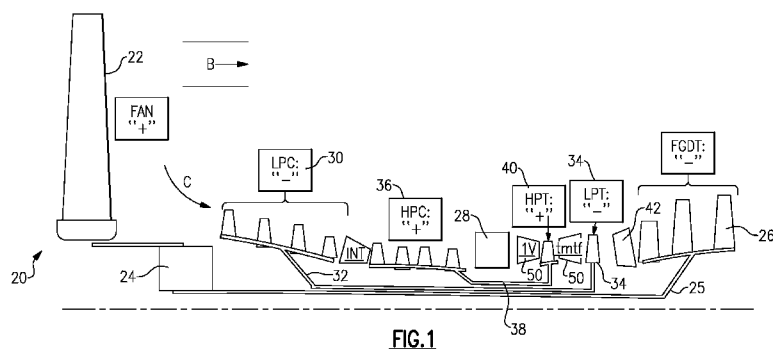
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(54) Title: GEARED TURBOFAN WITH THREE TURBINES WITH FIRST TWO COUNTER-ROTATING, AND THIRD CO-ROTATING WITH THE SECOND TURBINE



(57) Abstract: A gas turbine engine has a fan rotor, a first compressor rotor and a second compressor rotor. The second compressor rotor compresses air to a higher pressure than the first compressor rotor. A first turbine rotor drives the second compressor rotor and a second turbine rotor. The second turbine drives the compressor rotor. A fan drive turbine is positioned downstream of the second turbine rotor. The fan drive turbine drives the fan through a gear reduction. The first compressor rotor and second turbine rotor rotate as an intermediate speed spool. The second compressor rotor and first turbine rotor together as a high speed spool, with the high speed spool rotating in an opposed direction to the intermediate speed spool. The fan drive turbine rotates in the same direction as the intermediate speed spool.

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A. CLASSIFICATION OF SUBJECT MATTER**F01D 5/02(2006.01)i, F02C 7/00(2006.01)i**

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)

F01D 5/02; F02C 3/10; F02C 7/32; F01D 1/00; F02C 1/06; F01D 1/02; F01D 1/26; F02C 9/18; F02C 7/00

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

Korean utility models and applications for utility models

Japanese utility models and applications for utility models

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

eKOMPASS(KIPO internal) & keywords: gas, engine, shaft, spool, rotate, counter, opposite, reverse, compressor, turbine, gear, and direction

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 2009-0064683 A1 (MONIZ et al.) 12 March 2009 See abstract; paragraphs [0029]-[0031]; figure 5.	1-20
A	US 5,694,765 A (HIELD et al.) 09 December 1997 See abstract; column 7, lines 1-45; figure 5.	1-20
A	US 2005-0226720 A1 (HARVEY et al.) 13 October 2005 See abstract; paragraphs [0011],[0012]; figure 1.	1-20
A	EP 1777370 A2 (GENERAL ELECTRIC COMPANY) 25 April 2007 See abstract; paragraphs [0011],[0016]; figure 1.	1-20
A	US 2009-0288421 A1 (ZEINER et al.) 26 November 2009 See abstract; paragraphs [0017]-[0019]; figure 1.	1-20

 Further documents are listed in the continuation of Box C. See patent family annex.

* Special categories of cited documents:

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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

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"&" document member of the same patent family

Date of the actual completion of the international search

09 January 2014 (09.01.2014)

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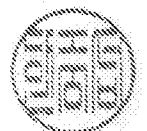
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INTERNATIONAL SEARCH REPORT

Information on patent family members

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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