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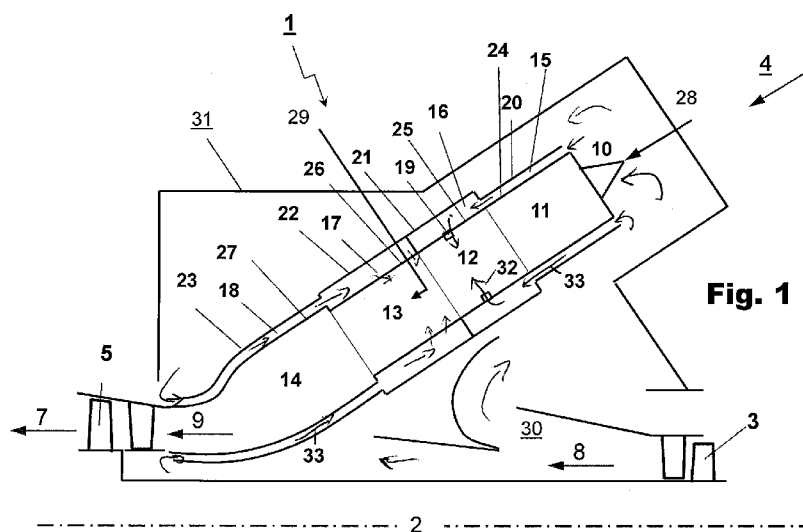
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(54) Title: SEQUENTIAL COMBUSTION WITH DILUTION GAS MIXER



(57) Abstract: The invention refers to a sequential combustor arrangement (4) comprising a first burner (10), a first combustion chamber (11), a mixer (12) for admixing a dilution gas (32) via a dilution gas inlet (19) to the hot gases leaving the first combustion chamber (11) during operation, a second burner (13), and a second combustion chamber (14) arranged sequentially in a fluid flow connection. The sequential combustor arrangement (4) further comprises four cooling zones with a cooling channel (15, 16, 17, 18). During operation a cooling gas (33) flows through the cooling channels (15, 16, 17, 18). The disclosure further refers to a method for operating a gas turbine (1) with such a sequential combustor arrangement (4).

INTERNATIONAL SEARCH REPORT

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PCT/EP2013/058654

A. CLASSIFICATION OF SUBJECT MATTER

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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)
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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 2006/053825 A1 (ALSTOM TECHNOLOGY LTD [CH]; DOEBBELING KLAUS [CH]) 26 May 2006 (2006-05-26)	1-4,6,8, 9,11, 13-15
Y	page 6, line 3 - page 7, line 1 page 9, line 1 - page 10, line 2 figure 1	5,7,10, 12
Y	----- EP 1 850 070 A2 (GEN ELECTRIC [US]) 31 October 2007 (2007-10-31)	5,12
A	paragraph [0015]; figure 2	2-4,6, 11,15
Y	----- EP 0 669 500 A1 (ABB MANAGEMENT AG [CH] ABB ALSTOM POWER CH AG [CH]) 30 August 1995 (1995-08-30) column 5, line 5 - line 42; figure 1 ----- -/--	7



Further documents are listed in the continuation of Box C.



See patent family annex.

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C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	WO 99/64791 A1 (SOLAR TURBINES INC [US]) 16 December 1999 (1999-12-16) page 8, line 24 - page 9, line 3; figure 3 -----	10
A	WO 2011/061059 A2 (ALSTOM TECHNOLOGY LTD [CH]; EROGLU ADNAN [CH]; MEEUWISSEN THIEMO [CH];) 26 May 2011 (2011-05-26) page 1, paragraph 1 page 3, paragraph 4 - page 4, paragraph 1 page 5, paragraphs 2,3 page 13, paragraph 2 - page 14, paragraph 2 figures 2,3a,4 -----	1-15
A	US 2011/314825 A1 (STRYAPUNIN SERGEY ALEKSANDROVICH [RU] ET AL) 29 December 2011 (2011-12-29) paragraphs [0001], [0002], [0033], [0034], [0040] - [0042]; figures 4-6 -----	1,13
A	DE 103 12 971 A1 (ALSTOM TECHNOLOGY LTD BADEN [CH]) 2 December 2004 (2004-12-02) cited in the application the whole document -----	1,13

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
WO 2006053825	A1	26-05-2006	NONE	

EP 1850070	A2	31-10-2007	CN 101063422 A	31-10-2007
			EP 1850070 A2	31-10-2007
			JP 4927636 B2	09-05-2012
			JP 2007292451 A	08-11-2007
			US 2007245741 A1	25-10-2007

EP 0669500	A1	30-08-1995	CA 2141066 A1	19-08-1995
			CN 1114732 A	10-01-1996
			CZ 9500349 A3	13-09-1995
			DE 59508712 D1	19-10-2000
			EP 0669500 A1	30-08-1995
			JP 3710510 B2	26-10-2005
			JP H07260147 A	13-10-1995
			US 5497611 A	12-03-1996

WO 9964791	A1	16-12-1999	EP 1019658 A1	19-07-2000
			JP 2002517673 A	18-06-2002
			US 6098397 A	08-08-2000
			WO 9964791 A1	16-12-1999

WO 2011061059	A2	26-05-2011	DE 112010004467 T5	13-09-2012
			US 2012260665 A1	18-10-2012
			WO 2011061059 A2	26-05-2011

US 2011314825	A1	29-12-2011	RU 2010126341 A	10-01-2012
			US 2011314825 A1	29-12-2011

DE 10312971	A1	02-12-2004	NONE	
