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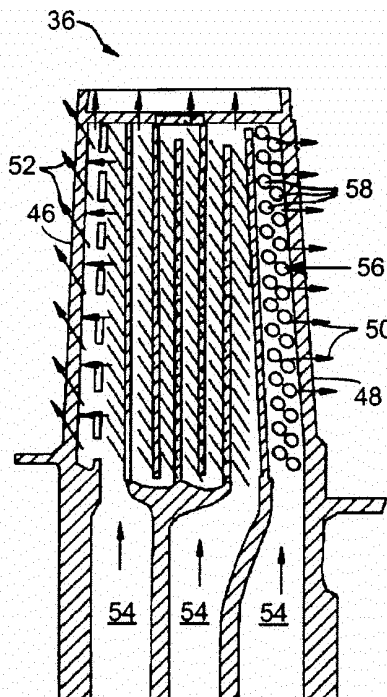
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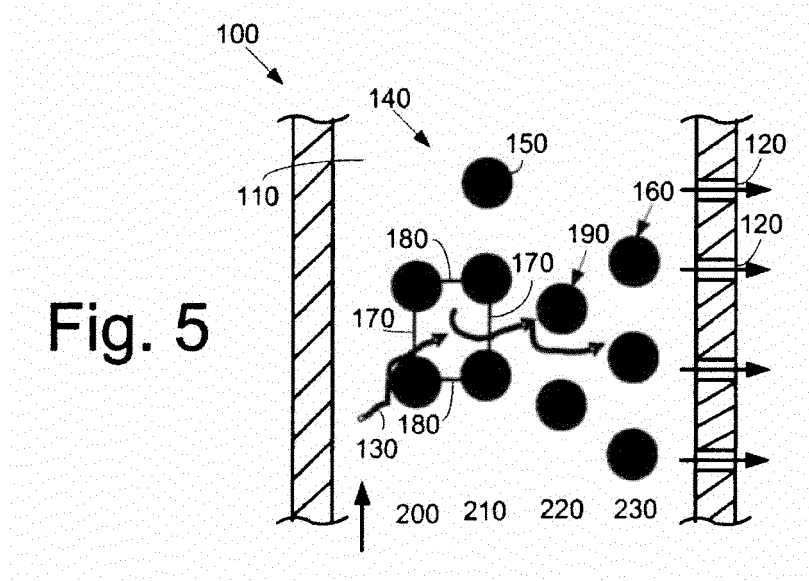
(54) **Airfoil with array of cooling pins**

(57) The present application provides an airfoil (100) with a cooling flow (130) therein. The airfoil (100) may include an internal cooling passage (110), a number of cooling holes (120) in communication with the internal cooling passage (110), and a number of pin-fins (150) positioned within the internal cooling passage (110). The pin-fins (150) are arranged with one or more turning openings (170) and one or more guiding openings (180) so as to direct the cooling flow (130) towards the cooling holes (120).

**Fig. 3**



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EUROPEAN SEARCH REPORT

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EP 12 18 0753

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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	US 3 858 290 A (ALBANI PETER E) 7 January 1975 (1975-01-07) * figure 1 *	1-10	INV. F01D5/18
X	----- EP 1 113 145 A1 (ALSTOM POWER SCHWEIZ AG [CH] ALSTOM TECHNOLOGY LTD [CH]) 4 July 2001 (2001-07-04) * figure 2c *	1,3-10	
Y	----- EP 0 034 961 A1 (SNECMA [FR]) 2 September 1981 (1981-09-02) * figure 1 *	2	
Y	----- WO 01/31171 A1 (PRATT & WHITNEY CANADA [CA]) 3 May 2001 (2001-05-03) * figures 1,4 *	2	
	-----		
			TECHNICAL FIELDS SEARCHED (IPC)
			F01D
The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
Munich		16 March 2015	Raspo, Fabrice
CATEGORY OF CITED DOCUMENTS			
X : particularly relevant if taken alone		T : theory or principle underlying the invention	
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ANNEX TO THE EUROPEAN SEARCH REPORT  
ON EUROPEAN PATENT APPLICATION NO.

EP 12 18 0753

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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  
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16-03-2015

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 3858290 A	07-01-1975	DE 2355631 A1	27-03-1975
		FR 2206999 A1	14-06-1974
		GB 1441970 A	07-07-1976
		IT 996487 B	10-12-1975
		JP S4981711 A	07-08-1974
		JP S5742456 B2	08-09-1982
		US 3858290 A	07-01-1975
-----			
EP 1113145 A1	04-07-2001	DE 19963349 A1	28-06-2001
		EP 1113145 A1	04-07-2001
		US 2001012484 A1	09-08-2001
-----			
EP 0034961 A1	02-09-1981	DE 3166389 D1	08-11-1984
		EP 0034961 A1	02-09-1981
		FR 2476207 A1	21-08-1981
		JP S6326242 B2	28-05-1988
		JP S56159507 A	08-12-1981
-----			
WO 0131171 A1	03-05-2001	CA 2383961 A1	03-05-2001
		CZ 20021393 A3	16-10-2002
		DE 60017166 D1	03-02-2005
		DE 60017166 T2	25-05-2005
		EP 1222366 A1	17-07-2002
		JP 2003513189 A	08-04-2003
		US 6257831 B1	10-07-2001
		WO 0131171 A1	03-05-2001
		-----	

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82