



(12) **EUROPEAN PATENT APPLICATION**

(88) Date of publication A3:
05.11.2003 Bulletin 2003/45

(51) Int Cl.7: **F01D 5/08**

(43) Date of publication A2:
13.08.2003 Bulletin 2003/33

(21) Application number: **03004315.2**

(22) Date of filing: **29.11.1996**

(84) Designated Contracting States:
DE FR GB

(62) Document number(s) of the earlier application(s) in
accordance with Art. 76 EPC:
96940152.0 / 0 965 726

(71) Applicant: **Hitachi, Ltd.**
Chiyoda-ku, Tokyo 101 (JP)

(72) Inventors:
• **Marushima, Shinya**
Hitachinaka-shi, Ibaraki 312-0057 (JP)
• **Matsumoto, Manabu**
Higashiibaraki-gun, Ibaraki 311-3116 (JP)

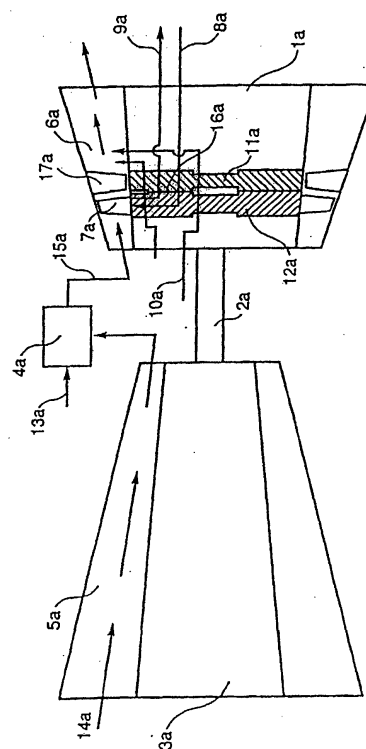
• **Kawaike, Kazuhiko**
Hitachinaka-shi, Ibaraki 312-0012 (JP)
• **Ikeguchi, Takashi**
Hitachi-shi, Ibaraki 316-0014 (JP)
• **Machida, Takashi**
Tsuchiura-shi, Ibaraki 300-0065 (JP)
• **Sekihara, Masaru, Sanhiruta Omika Room 303**
Ibaraki, 319-1221 (JP)

(74) Representative: **Hano, Christian, Dipl.-Ing. et al**
v. Fünier Ebbinghaus Finck Hano
Mariahilfplatz 2 & 3
81541 München (DE)

(54) **Coolant recovery type gas turbine**

(57) A gas turbine includes a rotor shaft comprising a plurality of discs (8, 9, 10, 11, 12a). Each disc (8, 9, 10, 11, 12a) has a plurality of moving blades (4, 5, 6, 7, 7a) driven by combustion gas and arranged annularly on the peripheral portion. Spacers (11a, 13, 14, 15) are arranged between the discs (8, 9, 10, 11, 12a), the respective discs (8, 9, 10, 11, 12a) and the spacers (11a, 13, 14, 15) being arranged in the axial direction. The moving blades (4, 5, 6, 7, 7a) are provided with flow paths (8a, 9a) for introducing coolant for cooling and discharging the coolant heated by the combustion gas. Contact surfaces (16a, 31, 32, 33, 34, 35, 36) contacting both the discs (8, 9, 10, 11, 12a) in rotor peripheral side regions and adjacent spacers (11a, 13, 14, 15) are formed therebetween. A supply flow path (8a) passes through the discs (8, 9, 10, 11, 12a) and the spacers (11a, 13, 14, 15) in the regions forming the contact surfaces (16a, 31, 32, 33, 34, 35, 36) and supply the coolant for cooling the moving blades (4, 5, 6, 7, 7a). A recovery flow path (9a) recovers the coolant which is heated by the moving blades (4, 5, 6, 7, 7a).

FIG. 1





European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 03 00 4315

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
X	EP 0 735 238 A (GEN ELECTRIC) 2 October 1996 (1996-10-02) * abstract; figure 11A *	1,3	F01D5/08
X	US 5 558 496 A (WOODMANSEE DONALD E ET AL) 24 September 1996 (1996-09-24) * figures 1,2,5 *	1,3	
E	PATENT ABSTRACTS OF JAPAN vol. 1998, no. 01, 30 January 1998 (1998-01-30) & JP 09 242563 A (HITACHI LTD), 16 September 1997 (1997-09-16) * abstract; figures 2,5 *	1,2	
E	PATENT ABSTRACTS OF JAPAN vol. 1997, no. 11, 28 November 1997 (1997-11-28) & JP 09 195702 A (HITACHI LTD), 29 July 1997 (1997-07-29) * abstract; figures 1,3,4 *	1,2	
			TECHNICAL FIELDS SEARCHED (Int.Cl.7)
			F01D
The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
THE HAGUE		11 September 2003	Argentini, A
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

EPO FORM 1503 03 82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 03 00 4315

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
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

11-09-2003

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 0735238 A	02-10-1996	US 5593274 A	14-01-1997
		DE 69618492 D1	21-02-2002
		DE 69618492 T2	26-09-2002
		EP 0735238 A1	02-10-1996
		JP 9013902 A	14-01-1997
US 5558496 A	24-09-1996	NONE	
JP 09242563 A	16-09-1997	NONE	
JP 09195702 A	29-07-1997	CN 1133936 A ,B	23-10-1996
		US 5695319 A	09-12-1997