

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
8 June 2006 (08.06.2006)

PCT

(10) International Publication Number
WO 2006/059971 A3

(51) International Patent Classification:

F02C 3/045 (2006.01) *F01D 1/02* (2006.01)
F01D 5/02 (2006.01) *F02C 3/107* (2006.01)
F02C 3/08 (2006.01) *F01D 21/04* (2006.01)

(21) International Application Number:

PCT/US2004/039973

(22) International Filing Date:

1 December 2004 (01.12.2004)

(25) Filing Language:

English

(26) Publication Language:

English

(71) Applicant (for all designated States except US): **UNITED TECHNOLOGIES CORPORATION** [US/US]; One Financial Plaza, Hartford, CT 06101 (US).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **SUCIU, Gabriel, L.** [US/US]; 27 Tanglewood Drive, Glastonbury, CT 06033 (US). **NORRIS, James, W.** [US/US]; 75 Levita Road, Lebanon, CT 06249 (US). **NORDEEN, Craig, A.** [US/US]; 48 Delmont Street, Manchester, CT 06040 (US). **MERRY, Brian** [US/US]; 220 Bear Swamp Road, Andover, CT 06232 (US).

(74) Agent: **KOZIARZ, Matthew, L.**; Carlson, Gaskey & Olds, P.C., 400 West Maple Road, Suite 350, Birmingham, MI 48009 (US).

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

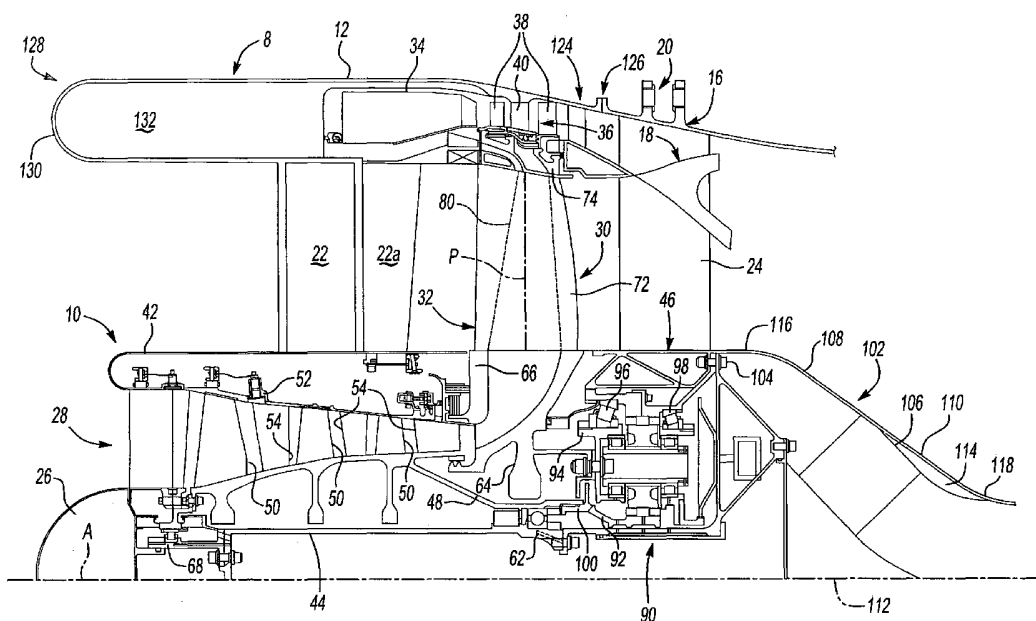
— with international search report

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

24 August 2006

[Continued on next page]

(54) Title: TIP TURBINE ENGINE INTEGRAL FAN, COMBUSTOR, AND TURBINE CASE



(57) Abstract: A tip turbine engine assembly includes an integral engine outer case (8) located radially outward from a fan assembly (30). The integral outer case (8) includes a rear portion (124) and a forward portion (128) with an arcuate portion (130) that curves radially inwardly to form a compartment. An annular combustor is housed and mounted in the compartment (132). Fan inlet guide vanes (22) are integrally formed with the arcuate portion (130) to form the integral case portion. The rear portion, forward portion, and fan inlet guide vanes are integrally formed in a casting process.



For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

INTERNATIONAL SEARCH REPORT

International Application No
PCT/US2004/039973

A. CLASSIFICATION OF SUBJECT MATTER

INV. F02C3/045 F01D5/02 F02C3/08 F01D1/02 F02C3/107
F01D21/04

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)

F02C F01D

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 practical, 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.
X	US 3 283 509 A (MESSERSCHMITT BOELKOW BLOHM) 8 November 1966 (1966-11-08)	1,3, 8-10, 14-16
Y	figures 1,2	2,5-7, 11-13
Y	US 6 430 917 B1 (UNIV CALIFORNIA [US]) 13 August 2002 (2002-08-13) figures 1-4	2
Y	US 2003/031556 A1 (ROLLROYCE PLC (GB)) 13 February 2003 (2003-02-13) paragraph [0028]; figures	5,11
Y	US 5 328 324 A (ROLLS ROYCE PLC [GB]) 12 July 1994 (1994-07-12) figures	6,7,12, 13
	----- -/--	

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in 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 document but published on or after the international filing date

L document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

O document referring to an oral disclosure, use, exhibition or other means

P document published prior to the international filing date but later than the priority date claimed

T later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

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.

Z document member of the same patent family

Date of the actual completion of the international search

12 May 2006

Date of mailing of the international search report

30/05/2006

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax: (+31-70) 340-3016

Authorized officer

Argentini, A

INTERNATIONAL SEARCH REPORT

International Application No
PCT/US2004/039973

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2003/192304 A1 (PAUL MARIUS A) 16 October 2003 (2003-10-16) figures 1-3, 9, 11-13, 23, 25 -----	1, 3, 14-16

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US2004/039973

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 3283509	A	08-11-1966	NONE	
US 6430917	B1	13-08-2002	US 2003230070 A1	18-12-2003
US 2003031556	A1	13-02-2003	GB 2380527 A	09-04-2003
US 5328324	A	12-07-1994	GB 2262313 A	16-06-1993
US 2003192304	A1	16-10-2003	US 2003192303 A1	16-10-2003