



- (51) International Patent Classification:  
*F01D 11/22* (2006.01)    *F02C 7/28* (2006.01)
- (21) International Application Number:  
PCT/US2013/071429
- (22) International Filing Date:  
22 November 2013 (22.11.2013)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:  
13/721,435    20 December 2012 (20.12.2012)    US
- (71) Applicant: UNITED TECHNOLOGIES CORPORATION [US/US]; One Financial Plaza, Hartford, Connecticut 06101 (US).
- (72) Inventor: HARRIS, Meggan; 83 Dara Drive, Colchester, Connecticut 06415 (US).
- (74) Agent: COON, Benjamin J.; c/o CPA Global, P.O. Box 52050, Minneapolis, Minnesota 55402 (US).
- (81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY,

BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IR, IS, JP, KE, KG, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

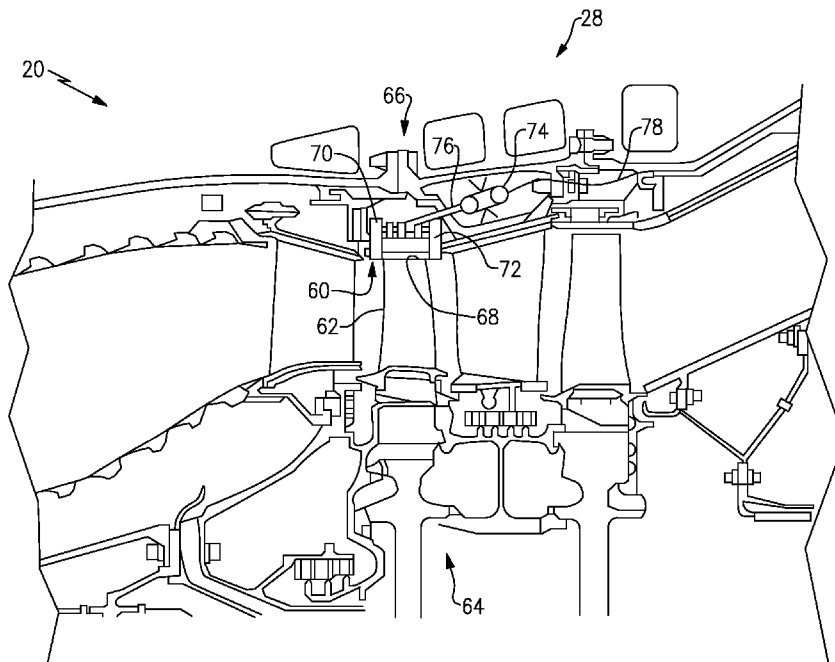
- (84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

**Published:**

- with international search report (Art. 21(3))
- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))

[Continued on next page]

(54) Title: VARIABLE OUTER AIR SEAL SUPPORT



**FIG.2**

(57) Abstract: A variable outer air seal support system according to an exemplary aspect of the present disclosure includes, among other things, a case having a plurality of slots, and an extension of a variable outer air seal segment. The extension provides at least one extension aperture. A connector pin is configured to move within the slot to move the variable outer air seal segment from a first position to a second position. The variable outer air seal segment overlaps a circumferentially adjacent variable outer air seal segment more in the first position than in the second position.



**(88) Date of publication of the international search report:**  
23 October 2014

**A. CLASSIFICATION OF SUBJECT MATTER****F01D 11/22(2006.01)i, F02C 7/28(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 11/22; F01D 25/00; F01D 11/08; F01D 11/20; F01D 11/06; F01D 5/20; F02C 7/28Documentation 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 modelsElectronic data base consulted during the international search (name of data base and, where practicable, search terms used)  
eKOMPASS(KIPO internal) & Keywords:turbine engine, blade tip clearance, control, actuate, linkage, and case**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 2005-0265827 A1 (WILSON, JR., JACK) 01 December 2005 See abstract; paragraphs [0023],[0024]; and figures 1-3.	1-20
A	US 2007-0020095 A1 (DIERKSMEIER et al.) 25 January 2007 See abstract; paragraphs [0021],[0023],[0026],[0029]; and figures 1-7.	1-20
A	US 5,056,988 A (CORSMEIER et al.) 15 October 1991 See abstract; column 6, line 6 - column 7, line 4; and figures 1-10.	1-20
A	US 2012-0063884 A1 (KLINGELS, HERMANN) 15 March 2012 See abstract; paragraphs [0068],[0069]; and figures 2-12.	1-20
A	JP 2010-037969 A (GENERAL ELECTRIC CO.) 18 February 2010 See abstract; paragraphs [0011]-[0015]; and figures 1,2.	1-20

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

"&amp;" document member of the same patent family

Date of the actual completion of the international search

28 August 2014 (28.08.2014)

Date of mailing of the international search report

**01 September 2014 (01.09.2014)**

Name and mailing address of the ISA/KR

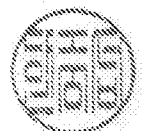
International Application Division  
Korean Intellectual Property Office  
189 Cheongsu-ro, Seo-gu, Daejeon Metropolitan City, 302-701,  
Republic of Korea

Facsimile No. +82-42-472-7140

Authorized officer

HAN, Joong Sub

Telephone No. +82-42-481-5606



**INTERNATIONAL SEARCH REPORT**

Information on patent family members

International application No.

**PCT/US2013/071429**

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2005-0265827 A1	01/12/2005	US 2004-0071548 A1 US 6877952 B2 US 7210899 B2	15/04/2004 12/04/2005 01/05/2007
US 2007-0020095 A1	25/01/2007	US 7575409 B2	18/08/2009
US 5056988 A	15/10/1991	CA 2034405 A1 DE 4031477 A1 FR 2658242 A1 GB 2240818 A GB 9022100 D0 IT 1243833 B IT 9021736 A1 IT 9021736 D0 JP 03-242402 A	13/08/1991 14/08/1991 16/08/1991 14/08/1991 21/11/1990 28/06/1994 13/08/1991 12/10/1990 29/10/1991
US 2012-0063884 A1	15/03/2012	DE 102009023061 A1 EP 2435665 A2 EP 2435665 B1 US 8678742 B2 WO 2010-136018 A2 WO 2010-136018 A3	02/12/2010 04/04/2012 13/02/2013 25/03/2014 02/12/2010 24/02/2011
JP 2010-037969 A	18/02/2010	JP 05220509 B2	26/06/2013