



(51) International Patent Classification:

F04D 29/048 (2006.01) F04D 1/06 (2006.01)
F04D 29/08 (2006.01) F04D 29/58 (2006.01)

(21) International Application Number:

PCT/US2012/031240

(22) International Filing Date:

29 March 2012 (29.03.2012)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

61/473,467 8 April 2011 (08.04.2011) US

(71) Applicant (for all designated States except US):

DRESSER-RAND COMPANY [US/US]; 1101 Paul Clark Drive, P.O. Box 560, Olean, New York 14760 (US).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **TECZA, Joseph A.** [US/US]; 4304 Fuller Avenue, Scio, New York 14880 (US). **KIDD, H. Allan** [US/US]; 984 Bell Run Rd, Shinglehouse, Pennsylvania 16748 (US).

(74) Agents: **NOLTE, N. Alexander** et al.; Edmonds & Nolte, PC, 10411 Westheimer Road, Suite 201, Houston, Texas 77042 (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, 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, IS, JP, KE, KG, KM, 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, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, 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, MD, 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, ML, MR, NE, SN, TD, TG).

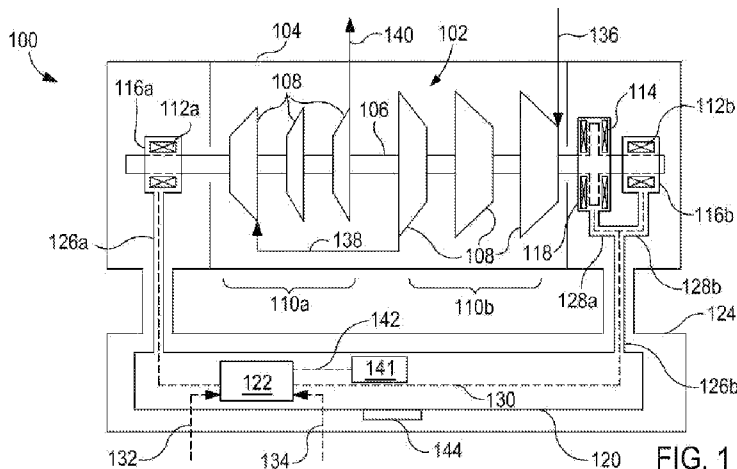
Published:

- 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))

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

27 December 2012

(54) Title: CIRCULATING DIELECTRIC OIL COOLING SYSTEM FOR CANNED BEARINGS AND CANNED ELECTRONICS



(57) Abstract: A cooling system for a rotating machine, such as a centrifugal compressor. Specifically, the cooling system may be configured to cool radial and axial magnetic bearings in the rotating machine and the bearing control system that controls said bearings. The cooling system includes canned magnetic radial bearings on each end of the rotor and a canned bearing control system. The canned bearings and canned bearing control system may be filled with a dielectric cooling fluid and in fluid communication with each other via sealed conduits. Accordingly, the radial magnetic bearings and the bearing control system may be entirely immersed in the dielectric cooling fluid to regulate heat generation. An axial magnetic bearing may also be canned and fluidly coupled to the cooling system to immerse the axial magnetic bearing in the dielectric cooling fluid.

A. CLASSIFICATION OF SUBJECT MATTER*F04D 29/048(2006.01)i, F04D 29/08(2006.01)i, F04D 1/06(2006.01)i, F04D 29/58(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)

F04D 29/048; H02K 7/09; F04B 49/00; F04D 25/06; F04D 29/04; F25B 43/02; F04B 17/03

Documentation 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 models

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

eKOMPASS(KIPO internal) & Keywords: bearing, cooling, coolant, control

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 7244111 B2 (MAN Turbomaschinen AG Schweiz) 17 July 2007 See column 1, line 27 - column 2, line 54; column 3, line 12 - column 4, line 3; column 5, line 25-34; and figures 1,2a,3,6.	1-20
A	US 2008-0260539 A1 (STINESSEN KJELL O. et al.) 23 October 2008 See paragraphs [0017],[0018]; and figure 1.	1-20
A	WO 2007-067169 A1 (CARRIER CORPORATION et al.) 14 June 2007 See page 5, line 3 - page 6, line 3; and figure 2B.	1-20
A	US 2011-0044832 A1 (NIJHUIS THEO) 24 February 2011 See paragraphs [0023]-[0024],[0027]; and figure 1.	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 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

"&" document member of the same patent family

Date of the actual completion of the international search

18 OCTOBER 2012 (18.10.2012)

Date of mailing of the international search report

19 OCTOBER 2012 (19.10.2012)

Name and mailing address of the ISA/KR

Korean Intellectual Property Office
189 Cheongsa-ro, Seo-gu, Daejeon Metropolitan
City, 302-701, Republic of Korea

Facsimile No. 82-42-472-7140

Authorized officer

HONG, Geun Jo

Telephone No. 82-42-481-8560



INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/US2012/031240

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 7244111 B2	17.07.2007	AT 348267 T	15.01.2007
		DE 502004002264 D1	25.01.2007
		EP 1482179 A1	01.12.2004
		EP 1482179 B1	13.12.2006
		US 2005-0019170 A1	27.01.2005
US 2008-0260539 A1	23.10.2008	CA 2624785 A1	19.04.2007
		GB 0805821 D0	30.04.2008
		GB 2444220 A	28.05.2008
		GB 2444220 B	11.05.2011
		N020054620A	10.04.2007
		N020054620D0	07.10.2005
		N0325900B1	11.08.2008
		RU 2008118142 A	20.11.2009
		RU 2427704 C2	27.08.2011
		WO 2007-043889 A1	19.04.2007
WO 2007-067169 A1	14.06.2007	CN 101326413 A	17.12.2008
		EP 1963762 A1	03.09.2008
		US 2008-0245082 A1	09.10.2008
		US 8104298 B2	31.01.2012
US 2011-0044832 A1	24.02.2011	CN 102016322 A	13.04.2011
		DE 102008031994 A1	05.11.2009
		DE 102008031994 B4	07.07.2011
		EP 2279351 A1	02.02.2011
		WO 2009-133125 A1	05.11.2009