(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization

International Bureau



(10) International Publication Number WO 2012/040320 A3

(43) International Publication Date 29 March 2012 (29.03.2012)

- (51) International Patent Classification: F03D 11/00 (2006.01) F03D 3/06 (2006.01)
- (21) International Application Number:

PCT/US2011/052540

(22) International Filing Date:

21 September 2011 (21.09.2011)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

61/384,949 21 September 2010 (21.09.2010)

US (71) Applicant (for all designated States except US): E-NET,

- LLC [US/US]; c/o Miller Johnson, 250 Monroe Avenue NW, Suite 800, P.O. Box 306, Grand Rapids, Michigan 49501 (US).
- (72) Inventor; and
- (75) Inventor/Applicant (for US only): MAHAWILI, PH.D, Imad [US/US]; 4225 Solano Avenue, #735, Napa, California 94558 (US).
- (74) Agents: WARNER NORCROSS & JUDD LLP et al.; Catherine S. Collins, 900 Fifth Third Center, 111 Lyon Street, N.W., Grand Rapids, Michigan 49503-2487 (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.
- **Designated States** (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, 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))

[Continued on next page]

(54) Title: WIND TURBINE WITH MULTI-STAGE BLADES

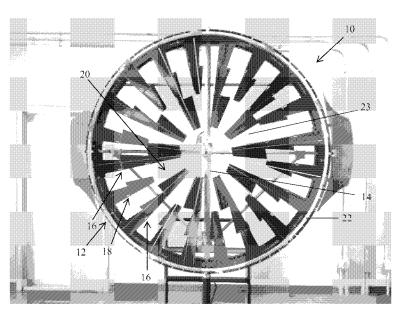


FIG. 1

(57) Abstract: A wind turbine includes a first set of wind turbine blades mounted for rotation about an axis of rotation, and a second set of wind turbine blades mounted for rotation about the axis of rotation with the first set of blades. Each blade of the first set of wind turbine blades includes a blade surface formed by at least two blade portions. Further, each blade of the second set of blades includes a blade surface area that is formed by at least one blade portion, which has a different blade surface area configuration than the surface area of the blades of the first set of blades.



 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: $$10{\rm\ May}\ 2012$

INTERNATIONAL SEARCH REPORT

International application No. PCT/US2011/052540

A. CLASSIFICATION OF SUBJECT MATTER

F03D 3/06(2006.01)i, F03D 11/00(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) F03D 3/06; B64C 11/06; F01D 5/14; F03D 1/02; F03D 9/00; F03D 1/00

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: first set of wind turbine blades, second set of wind turbine blades

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 2008-0226450 A1 (CLARKE JOE et al.) 18 September 2008 See abstract, claims 1-24, figures 1-5	1-15
A	WO 2007-057021 A1 (L.M. GLASFIBER S/A et al.) 24 May 2007 See abstract, claims 1-10, figures 1-11	1-15
A	US 2010-0215502 A1 (HARRISON HOWARD ROBERT) 26 August 2010 See abstract, figures 1-6	1-15
A	US 6899523 B2 (ALOYS WOBBEN) 31 May 2005 See abstract, claims 1-14, figures 1-6	1-15

		Further	documents	are listed	l in tl	he conti	nuation	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 20 MARCH 2012 (20.03.2012)

Date of mailing of the international search report

23 MARCH 2012 (23.03.2012)

Name and mailing address of the ISA/KR



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

Facsimile No. 82-42-472-7140

Authorized officer

BAEK, On Ki

Telephone No. 82-42-481-5484



INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/US2011/052540

Patent document cited in search report 18.09.2008 18.09.2008 EP 1917436 A1 07.05.2008 EP 0.0516149 D0 14.09.2005 KR 10-2008-0033476 A 16.04.2008 KR20080033476A 18.04.2008 KR20080033476A 18.04.2008 KR20080033476A 18.04.2008 KR20080135B 18.04.2008 W0 2007-017629 A1 15.02.2007 W0 2007-057021 A1 24.05.2007 EP 1969229 A1 17.09.2008 US 2010-0215502 A1 26.08.2010 AU 2008-234369 A1 09.10.2008 CN 101688514 A 31.03.2010 EP 2198151 A1 23.06.2010 JP 2010-522847 A 08.07.2010 JP 2010-522847 T 08.07.2010 W0 2008-119165 A1 09.10.2008 US 6899523 B2 31.05.2005 AT 329152 T 15.06.2006 AU 2001-21685 A1 09.07.2010 BR 0016726 A 03.09.2010 AU 2008-234369 A1 09.07.2010 BR 0016726 A 03.09.2010 AU 2008-119165 A1 09.07.2010 BR 0016726 A 03.09.2002 CA 2395214 C 26.04.2005 DE 19963086 C1 28.05.2011 DE 50012942 D1 20.07.2006 EP 1244872 B1 07.06.2006 EP 1244872 B1 07.06.2006 AU 2003-524100 A 12.08.2001 JP 2003-524100 T 12.08.2003 JP 2003-524100 T 12.08.2003 JP 2003-524100 T 12.08.2003 KR 10-0632215 B1 29.11.2005 PT1244872E 29.09.2006 PT1244872E 29.09.2006
GB 0516149 D0
DK200501626A
CN 101688514 A 31.03.2010 EP 2198151 A1 23.06.2010 JP 2010-522847 A 08.07.2010 JP 2010-522847 T 08.07.2010 W0 2008-119165 A1 09.10.2008 US 6899523 B2 31.05.2005 AT 329152 T 15.06.2006 AU 2001-21685 A1 09.07.2001 BR 0016726 A 03.09.2002 CA 2395214 A1 05.07.2001 CA 2395214 C 26.04.2005 DE 19963086 C1 28.06.2001 DE 50012942 D1 20.07.2006 DK1244872T3 16.10.2006 EP 1244872 A1 02.10.2002 EP 1244872 B1 07.06.2006 ES 2264426 T3 01.01.2007 JP 2003-524100 A 12.08.2003 JP 2003-524100 T 12.08.2003 JP 2003-524100 T 12.08.2003 JP 2003-524100 T 12.08.2003 JR 10-0532215 B1 29.11.2005 PT1244872E 29.09.2006 PT1244872T 29.09.2006 PT1244872T 29.09.2006
AU 2001–21685 A1 09.07.2001 AU 2168501 A 09.07.2001 BR 0016726 A 03.09.2002 CA 2395214 A1 05.07.2001 CA 2395214 C 26.04.2005 DE 19963086 C1 28.06.2001 DE 50012942 D1 20.07.2006 DK1244872T3 16.10.2006 EP 1244872 B1 02.10.2002 EP 1244872 B1 07.06.2006 ES 2264426 T3 01.01.2007 JP 03–833535 B2 11.10.2007 JP 2003–524100 A 12.08.2003 JP 2003–524100 T 12.08.2003 KR 10–0532215 B1 29.11.2005 PT1244872E 29.09.2006 PT1244872T 29.09.2006 PT1244872T 29.09.2006
WO 01-48377 A1 05.07.2001