

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
13 January 2011 (13.01.2011)

PCT

(10) International Publication Number
WO 2011/005385 A3

- (51) **International Patent Classification:**
F03D 7/00 (2006.01) *F03D 11/00* (2006.01)
- (21) **International Application Number:**
PCT/US2010/036928
- (22) **International Filing Date:**
1 June 2010 (01.06.2010)
- (25) **Filing Language:** English
- (26) **Publication Language:** English
- (30) **Priority Data:**
61/223,326 6 July 2009 (06.07.2009) US
- (71) **Applicant (for all designated States except US):**
SOUTHWEST WINDPOWER, INC. [US/US]; 1801 West Route 66, Flagstaff, Arizona 86001 (US).
- (72) **Inventors; and**
- (75) **Inventors/Applicants (for US only):** **JIANG, Yong** [CA/US]; 3601 South Mary Lake Road, Apt 276, Flagstaff, Arizona 86001 (US). **CLIFTON, Mike** [US/US]; 3309 East Ascona Way, Flagstaff, Arizona 86004 (US). **BONIELLA, Ron** [US/US]; PO Box 31119, Flagstaff, Arizona 86003-1119 (US).
- (74) **Agent:** **STEGGE, Adam**; Snell & Wilmer L.L.P., One Arizona Center, 400 East Van Buren Street, Phoenix, Arizona 85004-2202 (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, RO, RS, RU, 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, 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, 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:**
3 March 2011

(54) **Title:** WIND TURBINE MONITORING AND ADJUSTING

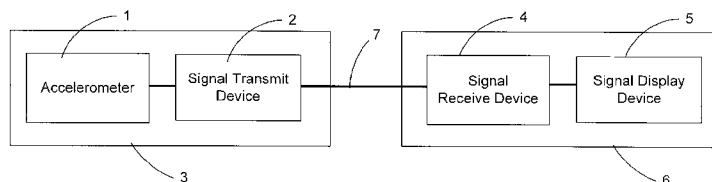


Figure 3

(57) **Abstract:** Systems, devices, and methods are provided for leveling and monitoring a wind turbine tower. An exemplary system may comprise an accelerometer, signal transfer device, signal receiving device and signal display device. In an exemplary embodiment, the system is installed at or near the top of the wind turbine tower. The system maybe permanently installed. The installer may adjust tower mounting nuts to level the tower based on the display device information. In another exemplary embodiment, the system may be used for monitoring tower vibration during wind turbine operation and measuring wind speed during wind turbine operation.



WO 2011/005385 A3

A. CLASSIFICATION OF SUBJECT MATTER***F03D 7/00(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 7/00; G06F 15/16; H04J 3/22; H04B 7/02

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: wind, turbine, tower, accelerometer, level, signal, guage, cable, indicator, etc

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2007-0182162 A1 (FRANK MCCLINTIC) 09 August 2007 See claims 1-22, figures 1-4 (A,B).	1, 8, 16
A	See claims 1-22, figures 1-4 (A,B).	2-7, 9-15, 17-30
A	US 4858723 A1 (HOLMES; WILLIAM K. et al.) 22 August 1989 See abstract, figures 1-3.	1-30
A	WO 2009-000787 A2 (SIEMENS AKTIENGESELLSCHAFT et al.) 31 December 2008 See claims 1-15, figure 7.	1-30
A	US 2004-0057828 A1 (JOHN VANDEN BOSCHE) 25 March 2004 See claims 1-16.	1-30

 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

17 DECEMBER 2010 (17.12.2010)

Date of mailing of the international search report

03 JANUARY 2011 (03.01.2011)

Name and mailing address of the ISA/KR

Korean Intellectual Property Office
Government Complex-Daejeon, 139 Seonsa-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/US2010/036928

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2007-0182162 A1	09.08.2007	AU 2006-275926 A1	08.02.2007
		CA 2616340-A1	08.02.2007
		CN 101268275 A	17.09.2008
		CN 101268275 A0	17.09.2008
		EP 1915529 A2	30.04.2008
		EP 2118510 A2	18.11.2009
		JP 2009-503339 A	29.01.2009
		JP 2009-503339 T	29.01.2009
		US 2007-0024058 A1	01.02.2007
		US 2007-0138798 A1	21.06.2007
		US 2007-024058 A1	01.02.2007
		US 2007-138798 A1	21.06.2007
		US 2009-058095 A1	05.03.2009
		US 7183664 B2	27.02.2007
		US 7436086 B2	14.10.2008
		WO 2007-016120 A2	08.02.2007
		WO 2007-016120 A3	08.02.2007
		WO 2007-016120 A3	13.12.2007
		WO 2008-092137 A2	31.07.2008
		WO 2008-092137 A3	31.07.2008
US 4858723 A1	22.08.1989	None	
WO 2009-000787 A2	31.12.2008	CN 101743398 A	16.06.2010
		EP 2158402 A2	03.03.2010
		US 2010-0209243 A1	19.08.2010
		WO 2009-000787 A3	31.12.2008
US 2004-0057828 A1	25.03.2004	US 2004-057828 A1	25.03.2004
		US 2008-0101930 A1	01.05.2008
		US 7246991 B2	24.07.2007