(19) World Intellectual Property Organization

International Bureau

(43) International Publication Date 25 November 2010 (25.11.2010)





(10) International Publication Number WO 2010/133649 A3

(51) International Patent Classification: F03D 1/06 (2006.01)

(21) International Application Number:

PCT/EP2010/056925

(22) International Filing Date:

19 May 2010 (19.05.2010)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

PA 2009 70008 61/179,534

19 May 2009 (19.05.2009)

DK 19 May 2009 (19.05.2009) US

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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).

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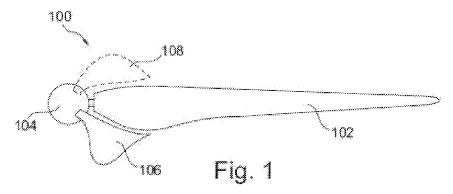
- as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))
- as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii))
- of inventorship (Rule 4.17(iv))

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:

7 April 2011

(54) Title: A WIND TURBINE AND A BLADE FOR A WIND TURBINE



(57) Abstract: A wind turbine with a rotor mounted on a hub section, wherein the rotor comprises a plurality of blades, at least one of which comprises a main blade section, which is optionally pitchable, and an auxiliary blade section mounted to the hub section. The auxiliary blade section is arranged in the area of a leading edge or of a trailing edge of the main blade, so that each blade is thereby provided with a leading edge slat or a trailing edge flap formed by the auxiliary blade section to increase the planform area of the blade and increase aerodynamic lift. A control method for a wind turbine controls a main blade section and an auxiliary blade section to provide different angles of attack to reduce undesired loads at sudden extreme changes of wind speed, e.g. during idling of the wind turbine. In a separate aspect, the invention provides a wind turbine having a blade with a non-pitchable leading edge slat, which extends at most 40% of the radius of the rotor in a longitudinal direction of the blade.





INTERNATIONAL SEARCH REPORT

International application No PCT/EP2010/056925

a. classification of subject matter INV. F03D1/06

ADD.

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

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

C. DOCUM	ENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the	relevant passages	Relevant to claim No.
X	WO 2007/057021 A1 (L M GLASFIBE GRABAU PETER [DK]) 24 May 2007 (2007-05-24) figures 4,5,7	ER S A [DK];	1-28
X	CA 2 425 447 A1 (AUCLAIR MICHE 17 October 2004 (2004-10-17) figures 1,3,5	L J L [CA])	1-28
X	WO 2007/045244 A1 (LM GLASFIBER GRABAU PETER [DK]) 26 April 2007 (2007-04-26) page 8, line 24 - line 36; figu		1-28
X	GB 264 511 A (INST VOOR AERO ENDYNOMI) 14 July 1927 (1927-07-1 page 1, line 68 - page 2, line 1,2	14)	1,14,23
		-/	
X Furti	her documents are listed in the continuation of Box C.	X See patent family annex.	
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Date of the	actual completion of the international search	Date of mailing of the international sea	rch report

17/02/2011

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4 February 2011

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European Patent Office, P.B. 5818 Patentlaan 2

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2010/056925

C(Continua	tion). DOCUMENTS CONSIDERED TO BE RELEVANT	
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	JP 61 167175 A (MITSUBISHI HEAVY IND LTD) 28 July 1986 (1986-07-28) * abstract; figure 1	1,14
Х	JP 56 138465 A (MATSUSHITA ELECTRIC WORKS LTD) 29 October 1981 (1981-10-29) * abstract; figure 1	1,14
Х,Р	EP 2 107 235 A1 (LM GLASFIBER AS [DK]) 7 October 2009 (2009-10-07) paragraphs [0037], [0038]; figures 5,6	1-28
X,P	WO 2009/146810 A2 (MICKELER SIEGFRIED [DE]) 10 December 2009 (2009-12-10) * abstract; figures 2,4,5-9,19,20	1-28

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/EP2010/056925

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 2007057021 A1	24-05-2007	DK 176357 B1 EP 1969229 A1	24-09-2007 17-09-2008
CA 2425447 A1	17-10-2004	NONE	
WO 2007045244 A1	26-04-2007	AT 454552 T CA 2625997 A1 CN 101300419 A DK 176317 B1 EP 1945942 A1 EP 2163760 A1 EP 2172648 A1 ES 2340522 T3 US 2009232656 A1	15-01-2010 26-04-2007 05-11-2008 30-07-2007 23-07-2008 17-03-2010 07-04-2010 04-06-2010 17-09-2009
GB 264511 A	14-07-1927	NONE	
JP 61167175 A	28-07-1986	NONE	
JP 56138465 A	29-10-1981	NONE	
EP 2107235 A1	07-10-2009	WO 2009121927 A1 US 2011020128 A1	08-10-2009 27-01-2011
WO 2009146810 A2	10-12-2009	DE 102008026474 A1	10-12-2009