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Westergaard

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(54) **METHOD FOR ASSEMBLING AND TRANSPORTING AN OFFSHORE WIND TURBINE**

(71) Applicant: **Envision Energy (Denmark) ApS**,
Silkeborg (DK)

(72) Inventor: **Jan Westergaard**, Brande (DK)

(73) Assignee: **Envision Energy (Denmark) ApS**,
Silkeborg (DK)

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(58) **Field of Classification Search**
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See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

5,226,805	A *	7/1993	Proven	F03D 7/0224
				416/132 A
7,805,893	B2 *	10/2010	Scholte-Wassink	F03D 1/001
				290/55
8,528,735	B2	9/2013	Nies	
8,640,340	B2 *	2/2014	Foo	B63B 35/003
				114/259
2009/0317250	A1 *	12/2009	Gamble	F03D 1/0658
				416/1
2010/0293781	A1 *	11/2010	Foo	B63B 35/003
				29/791
2011/0220538	A1	9/2011	Nies	

FOREIGN PATENT DOCUMENTS

EP	2 463 511	A1	6/2012
JP	2004-353644	A	12/2004
JP	2012-122481	A	6/2012

* cited by examiner

Primary Examiner — Jason L Vaughan

Assistant Examiner — Amanda Meneghini

(74) *Attorney, Agent, or Firm* — David S. Safran

(57) **ABSTRACT**

A method for assembly and installation of an offshore wind turbine, where components such as a nacelle, one or more tower sections and/or blades for at least one wind turbine is manufactured, assembled at or transported to a harbor area, where said components are loaded onto a transport and installation vessel and subsequently transported to an erection site. The method involves at least the steps of assembling at least one nacelle for a two-bladed wind turbine having hub with two sets of blade installation interfaces facing in a radial direction, the blade installation interfaces having a 180 degree angular distance therebetween, installing at least one, but preferably two inner blade parts to the hub, and arranging the at least one nacelle with the at least one inner blade part attached to the hub on the deck of a transport and installation vessel.

16 Claims, 8 Drawing Sheets

