

CERTIFICATE OF PATENT

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Title of the Invention

Generator assembly devices for wind power unit

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This is to certify that, in accordance with the Patent Act, a patent for the invention has been registered at the Korean Intellectual Property Office.



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REGISTRATION FIELD

Patent Number **Registration No. 10-1665061**

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【Description of the invention】

【Title of the invention】

Generator assembly devices for wind power unit

【Field of the invention】

【0001】 The present disclosure relates to the wind power unit, and more particularly, the generator assembly devices for wind power unit that can sequentially assemble the generator executing power generation by using the torque of blade while controlling the gap.

【Description of the related art】

【0002】 In general, wind mills generate power by changing kinetic energy of wind into rotational energy, and are divided into horizontal axis-type wind mill where the rotary axis is horizontal with respect to the wind, and vertical axis-type wind mill where the rotation axis is vertical with respect to the wind. For the horizontal axis-type wind mill, Dutch wind mills are representative, while the vertical axis-type wind mills are classified into the drag type which rotates the wind mill by drag produced in the blade as with Savonius type, etc. and the lift type which rotates the wind mill by lift produced in the blade as with Darrieus type, etc.

【0003】 As compared with the lift type, the drag type has a simple rotor shape so that production using sheet materials, etc. is very easy and production cost is low, but has a lower energy efficiency than the lift type which has the opposite advantages and disadvantages. Thus, wind power units having both advantages of lift type and drag type have been proposed recently.

【0004】 Also, while the most important power source for the wind power units is natural wind, the existing wind power units attempt to enhance efficiency of the wind power unit by installing the structures on the four sides surrounding the generator, but fail to utilize natural wind as the main power source for rotating blade of the wind power unit, rather creating problems of dropping the efficiency of the generator.

【0005】 And, although there have been attempts for wind power generation by installing a small-scale wind power unit in the building using the phenomenon where wind flow rate is increased while flowing along the obstacle upon meeting an obstacle, various conventional technologies of installing the wind power unit in the building should transform the building's form so as not to be in harmony with the building's beauty since foundations should be configured on the floor with the unit's blade & generator being installed on the top.

【0006】 Therefore, the present applicant has proposed a wind power unit in the registered patent gazette No.10-1269109 where the outside blade

rapidly accelerates the wind speed by increasing acceleration forces due to occurrence of tension using Darrieus blade, and the inside blade transmits the force required upon early activation of power generation using Savonius blade.

【0007】 Also, in application No.10-2015-51888, a wind power generator of an airfoil blade with application of the surface texturing technique has been proposed where lift and torque are increased by forming plural dimples and energy efficiency can be maximized by simple structural improvement.

【0008】 Since, however, such wind power units are produced in a large scale to produce the maximum efficiency, there were problems where assembly was not easy due to the size and weight of the rotary shaft rotating with blade and of the generator.

【Description of the invention】

【What is provided by the present disclosure】

【0009】 The present disclosure is aimed at solving such problems as mentioned above, and has the purpose of providing the generator assembly devices for wind power unit that can sequentially assemble large-scale rotary shafts and generators while controlling the gap.

【0010】 Also, another purpose of the present disclosure is to provide the generator assembly devices for wind power unit that are suitable for mass production and provide easy maintenance management by assembling the generator according to the simple configuration and action.

【Summary of the invention】

【0011】 The generator assembly device for wind power unit according to the present invention is comprised of:

plural stationary plates with formation of the seating unit for seating of the said rotary shaft, and the cylinder fixing plate having a gap with the said stationary plate and coupled by plural guides, and the mobile plate coupled to the guide between the said stationary plate and the cylinder fixing plate so as to allow movement to the left and the right so that the said center plate and the lower plate are sequentially moved to be assembled to the upper plate

in the generator for wind power unit configured to include :

the upper plate coupled to the rotary shaft rotating together with blade, and
the center plate coupled to the stationary shaft inserted in the said rotary shaft, and
the lower plate coupled to the said upper plate so as to allow rotation with the said center plate placed in between, and

is characterized by:

coupling of the cylinder to the said cylinder fixing plate, and
coupling of the support block to the rod of the said cylinder, and
coupling of one side of the support bar to the said support block, and
coupling of the other side of the said support bar to the mobile plate.

【Effects of the invention】

【0012】 According to the generator assembly devices for wind power unit of the present disclosure, production costs for the wind power unit

can be reduced, and assembly times can be shortened for further economic benefits by sequential assembly of the generator, while controlling the gap with the upper plate by moving the stationary shaft, the center plate, and the lower plate in the state where the rotary shaft is seated.

【0013】 Also, there are effects of being suitable for mass production by assembling the generator with simple configuration and action where the mobile plate is moved by the cylinder, and of being easy to operate and maintain/manage the device.

【Brief description of the drawings】

【0014】 Figure 1 is an oblique view of the generator assembly device for wind power unit according to the present disclosure.

Figure 2 is a front view of the generator assembly device for wind power unit according to the present disclosure.

Figure 3 is a front view of the rotary shaft and the stationary shaft to which the generator of the present disclosure is coupled

Figure 4 is a front view where the rotary shaft and the stationary shaft are seated in the assembly device of the present disclosure

Figure 5 is a front view showing the assembly process where the center plate is coupled to the upper plate

Figure 6 is a front view showing the coupled state for the cover ring and the preparation state for coupling of the lower plate

Figure 7 is a front view showing the process where the lower plate is assembled

Figure 8 is a front view showing the state where the generator is assembled to the rotary shaft of the present disclosure

【Detailed description of the embodiments】

【0015】 Examples of desirable embodiment of the present disclosure are described in detail through the attached drawings.

【0016】 In the generator assembly device for wind power unit of the present disclosure, the bottom plate (10) is provided as shown in Fig. 1 and Fig. 2, and the 1st stationary plate (20) as well as the 2nd stationary plate (30) are vertically coupled to one side producing a gap on the upper side, while the cylinder fixing plate (40) is vertically coupled to the other side of the bottom plate (10).

【0017】 The said 1st stationary plate(20) and the 2nd stationary plate (30) are solidly coupled by four guides (41) coupled respectively to the corner parts of the cylinder fixing plate (40), and the mobile plate(50) is coupled between the 2nd stationary plate (30) and the cylinder fixing plate (40) so as to be allowed to move to the left and right along the guide (41).

【0018】 On the upper side of the 1st stationary plate (20) and the 2nd stationary plate(30), "V" -shaped seating units

(21)(31) are formed respectively, and a curved surface corresponding to the diameter of the rotary shaft (70) is formed on the lower side to allow seating of the rotary shaft (70) as shown in Fig.3.

【0019】 Needless to say, the said stationary plates (20)(30) can be produced by adding or subtracting the quantities according to the rotary shaft (70) formed in a variety of lengths, and can be coupled by controlling the gap between the stationary plates.

【0020】 On the right side of the said cylinder fixing plate (40), the hydraulically operated cylinder (60) is coupled by penetrating through the center part. While the support block (61) is coupled to the rod of the said cylinder (60), one side of a pair of support bars (62) is coupled to the said support block (61) with the other side of the said support bar (62) being coupled to the mobile plate (50).

【0021】 In the center part of the said mobile plate (50), the penetrating part (51) is formed, while the vertically extended groove part (52) is formed on the left-side face of the mobile plate (50) in communication with the said penetrating part (51).

【0022】 The generator assembly device for wind power unit of the present disclosure that is configured in this way has the rotary shaft (70) as shown in Fig. 3 seated for assembly of the generator to be installed in the wind power unit.

【0023】 The said rotary shaft (70) is configured so that it is allowed to rotate together with wind mill such as blade, etc. being rotated by wind after installation on the upper side (the left side when viewed in the drawing), and the generator coupled to the lower side (the right side when viewed in the drawing) is rotated together to execute power generation as the rotary shaft (70) is rotated.

【0024】 Since the technology related to power generation by a generator according to rotation of such rotary shaft (70) has been already known, detailed descriptions on its configuration and action are omitted herein.

【0025】 For said rotary shaft (70), its inside is composed of an empty pipe, where plural bearings (71) are coupled inside having a gap, and the ring-shaped upper-side plate (80) of generator with a hole formed at the center is coupled to the right side of the rotary shaft (70)

【0026】 Inside the said rotary shaft (70), the stationary shaft (72) is inserted to the side of upper plate (80), while the ring-shaped center plate (81) is coupled to the outer circumferential surface of the said stationary shaft (72).

【0027】 By the stationary shaft (72) inserted inside the said rotary shaft (70), the rotary shaft (70) is seated in the seating units of the 1st stationary plate (20) and the 2nd stationary part (30) in the state where the upper plate (80) and the center plate (81) have a prescribed gap as shown in Fig.4.

【0028】 In the state where the rotary shaft (70) is seated in the seating units (21)(31), the fixture (91) is inserted inside the rotary shaft (70) by the support fixture (90) so that the bearing (71) coupled inside the top part of the rotary shaft (70) does not break away to outside during assembly process of the generator as shown in Fig. 5.

【0029】 At this time, the support fixture (70) and the fixture (91) are bound to the device of the present disclosure by using the wire (92), etc.to prevent being pushed to the left side.

【0030】 Then, the support block (61) and the mobile plate (50) move to the left as the rod of the cylinder (60) is pulled out as a result of operation of the controller (not shown in the drawing). Accordingly, the stationary shaft (72) is moved inside the rotary shaft (70) by adhering to the center plate (81) so as to allow insertion of the tip in the bearing (71) coupled to the upper side of the rotary shaft (70).

【0031】 When the stationary shaft(72) moves into the rotary shaft (70), the mobile plate (50) is returned by the cylinder (60) as shown in Fig.6, while the cover ring (82) is coupled between the adhering upper plate (80) and the center plate (81) by using coupling means such as bolt and nut, and the lower plate (83) of the generator is fixed onto the penetrating part (51) of the said mobile plate(50) for assembly preparation.

【0032】 The said lower plate (83) is coupled to the upper plate (80) as the mobile plate (50) is moved next as shown in Fig. 7, and plural magnets are installed on the upper plate (80) and the lower plate (83) so as to face each other so that the lower plate (83) is separated from the mobile plate (50) by magnetic force to be coupled to the upper plate (80) when the lower plate (83) approaches the upper plate (80) by the mobile plate (50).

【0033】 When the lower plate (83) is coupled in this way, the mobile plate (50) is returned as shown in Fig.8, and assembly of the generator is completed as the upper plate (80) and the lower plate (83) are coupled by using coupling means such as bolt and nut, etc.

【0034】 The groove part (52) formed in the said mobile plate (50) is aimed at visual confirmation of the gap when the upper plate (80), the center plate (83), and the lower plate (83) are coupled, allowing adjustment of the gap by insertion of a tool.

【0035】 Through configuration of the upper side of the rotary shaft (70) with completion of assembly by organic coupling using plural gears so as to allow rotation of the rotary shaft (70) together with the blade, the rotary shaft (70) and the generator are rotated together with the stationary shaft (72) fixed onto the ground surface at the center to execute power generation as the blade is rotated by wind.

【0036】 As the generator is comprised of the upper plate (80), the center plate (81), the lower plate (83), etc. the upper plate (80) and the lower plate (83) are rotated with the fixed center plate (81) at the center at this time to execute power generation.

【0037】 Therefore, the present invention allows reduction of production costs for the wind power unit by moving the stationary shaft (72), the center plate (81) and the lower plate (83) to control the gap with the upper plate (80) in the state where the rotary shaft (70) has been seated and by sequentially assembling the generator, as well as shortening of the assembly times for further economic benefits.

【0038】 Also, there are effects of being suitable for mass production due to assembly of the generator according to simple configuration and action that involves moving of the mobile plate (50) by the cylinder (60), as well as being easier to operate and maintain/manage the device.

【Description of symbols】

【0039】 10 : Bottom plate	20 : 1 st stationary plate
21,31 : Seating unit	30 : 2 nd stationary plate
40 : Cylinder fixing plate	41 : Guide
50 : Mobile plate	51 : Penetrating part

52 : Groove part	60 : Cylinder
61 : Support block	62 : Support bar
70 : Rotary shaft	71 : Bearing
72 : Stationary shaft	80 : Upper plate
81 : Center plate	82 : Cover ring
83 : Lower plate	90 : Support fixture
91 : Fixture	92 : Wire

【What is claimed】**【Claim 1】**

In the generator for wind power unit configured to include :
the upper plate coupled to the rotary shaft that is rotated together with blade, and
the center plate coupled to the stationary shaft that is inserted inside the said rotary shaft, and
the lower plate coupled to the said upper plate to allow rotation with the said center plate placed in between,

the generator assembly devices for wind power unit that is comprised of:
plural stationary plates with formation of seating units (21)(31) where the said rotary shaft (70) is seated, and
the cylinder fixing late (40) having a gap with the said stationary plate (30) and coupled by plural guides (41), and
the mobile plate (50) assembled to the upper plate (80) by being coupled to the guide (41) between said stationary plate (30) and the cylinder fixing plate (40) so as to allow movement to the left and the right and by sequentially moving the said center plate (81) and the lower plate (83),

and that is characterized by:
coupling of the cylinder (60) to said cylinder fixing plate (40), and
coupling of the support block (61) to the rod of said cylinder (60), and
coupling of one side of the support bar (62) to said support block (61), and
coupling of the other side of said support bar (62) to the mobile plate (50).

【Claim 2】

In the claim 1,
the generator assembly device for wind power unit that is characterized by;
penetration of the stationary shaft (72) in the said mobile plate(50), or
formation of the penetrating part (51) with the lower plate (83) being fixed.

【Claim 3】

In the claim 1 or claim 2,

the generator assembly device for wind power unit that is characterized by;
the groove part (52) in said mobile plate (50) where the gap can be visually confirmed upon assembly of the generator, or
can be adjusted by insertion of a tool

【Claim 4】

In the claim 1,

the generator assembly device for wind power unit that is characterized by;
seating of the said rotary shaft (70) and the stationary shaft (72) in the seating units (21)(31) so that the upper plate (80) and the center plate (81) have a gap, and
coupling of the cover ring (82) to the said upper plate (80) and the center plate (81) after coupling of the center plate (81) by the 1st moving of the said mobile plate (50), and
coupling of the lower plate (83) fixed onto the mobile plate (50) to the upper plate (80) by the 2nd moving of said mobile plate (50).

【Claim 5】

In the claim 1,

the generator assembly device for wind power unit that is characterized by;

fixing of the fixture (91) formed on the support fixture (90) to prevent breakaway of the bearing (71) to outside when the stationary shaft (72) is

inserted on the upper side of the rotary shaft (70), while said stationary shaft (72) is inserted in plural bearings coupled to inside of the rotary shaft (70).

【Abstract】**【Summary】**

The present invention relates to the generator assembly devices for wind power unit that can sequentially assemble the generator executing power generation by using torque of the blade while controlling the gap.

There are problems in the conventional wind power units that assembly of the same is not easy due to the size and weight of the rotary shaft rotating with the blade and of the generator since these units are produced in a large scale to produce the maximum efficiency. To solve said problems, the present invention relates to the generator for wind power units configured to include:

the upper plate coupled to the rotary shaft rotating together with the blade, and
the center plate coupled to the stationary shaft inserted inside the said rotary shaft, and
the lower plate coupled to the said upper plate so as to allow rotation with the said center plate placed in between,

and is comprised of:

plural stationary plates with formation of the seating unit where the said rotary shaft is seated, and
the cylinder fixing late that has a gap with the said stationary plate and is coupled by plural guides, and
the mobile plate assembled to the upper plate by being coupled to the guide between said stationary plate and the cylinder fixing plate allowing movement to the left & the right and by sequentially moving said center plate as well as the lower plate,

and is characterized by:

coupling of the cylinder to the said cylinder fixing plate, and
coupling of the support block to the rod of the said cylinder, and
coupling of the one side of the support bar to the said support block, and
coupling of the other side of the said support bar to the mobile plate.

Therefore, the present invention can reduce production costs of wind power units by moving the stationary shaft, the

center plate, and the lower plate to control the gap with the upper plate in the state where the rotary shaft is seated and by sequentially assembling the generator, and also can shorten the assembly time, producing further economic benefits. Also, there are effects of being suitable for mass production and of being easy to operate, maintain/manage the device by assembling the generators according to simple configuration and action that involves moving of the mobile plate by the cylinder