

VANE STRUCTURE FOR VERTICAL AXIS WIND POWER GENERATOR

FIELD OF THE INVENTION

5 The present invention relates to a vane structure for a vertical axis wind power generator, and more particularly to a vane for vertical axis wind power generator that includes a movable baffle unit to close or open a through hole on the vane to thereby effectively intercept the wind or reduce the air resistance to the vane, respectively.

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BACKGROUND OF THE INVENTION

A vertical axis wind power generator has a vertical main shaft, on which a plurality of vanes are mounted to space from one another along a circumferential surface of the main shaft. Each of the vanes has a front side and a rear side that are generally two corresponding outward curved face and inward curved face, respectively. The inward curved face of the vane is located against the wind to intercept the flow of air currents, so that the vane is push by the wind to thereby drive the main shaft to rotate. Then, the rotating force of the main shaft is transmitted to a plurality of power generator sets for generating electric power.

Since the vanes of the vertical axis wind power generator are sequentially circumferentially spaced around the main shaft, the inward curved rear face of a preceding vane is oriented toward the outward curved front face of a following vane. When the wind blows against the inward curved rear face of one vane, it also blows against the outward curved front face of another diametrically

opposite vane. That is, only the wind blowing to the inward curved rear face of the vane is useful to effectively rotate the main shaft, while the wind blowing to the outward curved front face of the vane simply forms a resistance to the rotation of the main shaft.

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It is noted the vanes for the conventional vertical axis wind power generator all are a complete plate without any opening formed thereon. When the wind blows to the outward curved front face of the vane, the outward curved front face functions to guide the wind to outer sides of the vane to thereby reduce the
10 air resistance thereto. Nevertheless, the relatively large area of the vane would still block the wind to thereby reduce the overall push produced by the wind against the inward curved rear faces of other vanes. Since the wind force capable of driving the main shaft to rotate is reduced, the effect of wind power generation is disadvantageously reduced accordingly.

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SUMMARY OF THE INVENTION

A primary object of the present invention is to provide a vane structure for vertical axis wind power generator, which, on the one hand, reduces air
20 resistance to a vane body and, on the other hand, allows the vane body to effectively intercept the wind for driving the main shaft to rotate.

To achieve the above and other objects, the vane structure for vertical axis wind power generator according to a preferred embodiment of the present invention
25 includes a plurality of vanes mounted around and spaced along a main shaft of the wind power generator. Each of the vanes includes a vane body, a first arcuate guide bar, an openwork screen, and a first movable baffle unit. The

vane body has a body portion that defines a rearward recess, and includes a front plate portion, on which a through hole is formed. The first arcuate guide bar is located in the rearward recess, and having a first end and an opposing second end; the second end is fixedly connected to the body portion and the first end is
5 located at a center of the through hole. The openwork screen is fitted in the through hole and connected to the first end of the first arcuate guide bar. The first movable baffle unit is located in the rearward recess and slidably fitted around the first arcuate guide bar, and is pivotally turnably connected to the front plate portion via a baffle support bar, such that the first movable baffle unit
10 openably covers the openwork screen from one side adjacent to the rearward recess. When the rearward recess of the vane is located against the wind, the first movable baffle unit is blown by the wind to cover the openwork screen and accordingly closes the through hole on the front plate portion for the rearward recess of the vane body to effectively intercept the wind. On the other hand,
15 when the rearward recess of the vane is located before the wind, the first movable baffle unit naturally opens the through hole on the front plate portion to reduce the air resistance to the rotation of the vane. That is, the vane of the present invention with the rearward recess located against the wind can effectively utilize the wind force without being adversely affected by an
20 opposing vane that has a rearward recess located before the wind at the same time. Thus, the main shaft of the wind power generator can be more easily driven by the vanes to rotate.

Preferably, the body portion of the vane body includes a front plate portion, an
25 upper plate portion and an opposing lower plate portion extended from an upper and a lower edge of the front plate portion, and a left plate portion and an opposing right plate portion extended from a left and a right edge of the front

plate portion, such that the upper, the lower, the left, the right, and the front plate portion together define the rearward recess.

5 Preferably, the upper plate portion, the lower plate portion and the right plate portion are provided on respective outer surface with a plurality of parallelly and continuously arranged ridges and valleys, which are extended between a front and a rear side of the vane body. With these ridges and valleys, it is able to avoid noise that is produced when the vane body is driven by the wind to rotate.

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Preferably, the second end of the first arcuate guide bar is fixedly connected to the upper plate portion of the body portion, so as to locate the first arcuate guide bar in place.

15 Preferably, the front plate portion has an outward curved front surface, and an area of the outward curved front surface surrounding the through hole is formed into a bell-shaped sunken portion. The outward curved front surface can advantageously guide air currents to outer sides of the vane body, and the sunken portion can advantageously guide part of the air currents through the
20 through hole to outer sides of the vane body.

Preferably, the openwork screen has a sleeve portion and a screen body connected to and located around the sleeve portion. The sleeve portion is fitted around the first end of the first arcuate guide bar, and the screen body is fixedly
25 connected at an outer periphery thereof to an inner peripheral wall of the through hole. Therefore, the openwork screen is fitted in the through hole and supported by the first arcuate guide bar.

Preferably, the first movable baffle unit includes a first sleeve and a first movable baffle connected to and located around an end of the first sleeve. The first sleeve is slidably fitted around the first arcuate guide bar, and the first movable baffle normally covers the openwork screen from one side adjacent to the rearward recess. Thus, the first movable baffle unit openably covers the openwork screen and is supported and guided by the first arcuate guide bar to move between an opened position and a closed position to open and cover the openwork screen, respectively.

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Preferably, a first buffer spring is provided between the openwork screen and the first movable baffle unit to buffer the impact of the first arcuate guide bar against the openwork screen and accordingly, avoid damaged parts and noise caused by such impact.

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Preferably, a first and a second magnetic ring having the same polarity are provided on the first buffer spring and the first movable baffle unit at contact faces thereof, so that a magnetic repulsion between the two magnetic rings can further buffer the impact between the first movable baffle unit and the openwork screen.

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Preferably, the vane further includes a stop unit, which includes a stop ring fixedly mounted to the first arcuate guide bar near the second end thereof, and a stop spring arranged on the first arcuate guide bar to one side of the stop ring facing toward the first end. The stop ring functions to limit a maximum angle by which the first movable baffle unit can be pivotally turned open. Therefore, the first movable baffle unit is protected against damage due to an exceeded

open angle caused by an extremely strong wind. The stop spring can buffer the impact between the first movable baffle unit and the stop ring.

Preferably, the stop unit further includes a holding device, which is pivotally
5 turnably connected to one lateral side of the stop ring. The holding device includes a control lever and a hook connected to the control lever. And, the first movable baffle unit is provided at positions corresponding to the control lever and the hook with a push bar and a retaining ring, respectively. When the
10 first movable baffle unit is blown open by a strong wind and stopped by the stop ring from turning any further, the push bar will strike against the control lever of the holding device at the same time, bringing the control lever to pivotally turn upward and accordingly, bringing the hook to pivotally turn downward to engage with the retaining ring. Thus, the first movable baffle unit is held to the fully
15 opened position, allowing the vane body to rotate at a reduced speed to avoid damaged parts of the vane due to undesirable quick rotation of the vane under extremely strong wind.

Preferably, the holding device further includes an outward projected release lever for disengaging the hook from the retaining ring.

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To achieve the above and other objects, the vane structure for vertical axis wind power generator according to another preferred embodiment of the present invention includes a plurality of vanes mounted around and spaced along a main shaft of the wind power generator. Each of the vanes includes a vane body, a
25 first arcuate guide bar, an openwork screen, a first movable baffle unit, and a second movable baffle unit. The vane body has a body portion that defines a rearward recess and includes a front plate portion, on which a through hole is

formed. The first arcuate guide bar is located in the rearward recess, and has a first end and an opposing second end. The second end is fixedly connected to the body portion and the first end is located at a center of the through hole. The openwork screen is fitted in the through hole and connected to the first end
5 of the first arcuate guide bar. The first movable baffle unit has openings formed thereon and is located in the rearward recess of the vane body behind the openwork screen. The first movable baffle unit includes a second arcuate guide bar in the form of a sleeve slidably fitted around the first arcuate guide bar, and is connected to the front plate portion of the vane body via a pivot point on a
10 baffle support bar, so that the first movable baffle unit is turnable about the pivot point to openably cover the openwork screen from one side adjacent to the rearward recess. The second arcuate guide bar has a proximal end and a distal end, and a radially outward extended flange formed around the distal end. The second movable baffle unit is located in the rearward recess of the vane body
15 behind the first movable baffle unit, and is slidably fitted around the second arcuate guide bar to openably cover the first movable baffle unit from one side adjacent to the rearward recess. When the rearward recess of the vane body is located against the wind, the first and the second movable baffle unit on the vane body are located at a closed position to cover the openwork screen and the
20 through hole, allowing the rearward recess to effectively intercept the wind force; and when the rearward recess of the vane body is located before the wind, the first and the second movable baffle unit are naturally opened, allowing the wind to quickly move through the through hole to outer sides of the vane body without producing an increased air resistance to the rotating vane body. That is,
25 the vane with the rearward recess located against the wind can effectively utilize the wind force without being adversely affected by an opposing vane that has the rearward recess located before the wind at the same time. Thus, the main shaft

of the wind power generator can be more easily driven by the vanes to rotate.

Preferably, a second buffer spring is provided between the first and the second movable baffle unit to buffer the impact therebetween, so as to avoid damaged parts and noise caused by such impact.

BRIEF DESCRIPTION OF THE DRAWINGS

The structure and the technical means adopted by the present invention to achieve the above and other objects can be best understood by referring to the following detailed description of the preferred embodiments and the accompanying drawings, wherein

Fig. 1 is a fragmentary perspective view showing a plurality of vanes according to the present invention is mounted around and spaced along a main shaft of a wind power generator;

Fig. 2 is an enlarged partially sectioned perspective view of the circled area A of Fig. 1;

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Fig. 3 is a sectioned side view of a vane structure for vertical axis wind power generator according to a first embodiment of the present invention, showing a first movable baffle thereof at a closed position;

25 Fig. 4 is a sectioned side view similar to Fig. 3 with the first movable baffle at a partially opened position;

Fig. 5 is a sectioned side view similar to Fig. 4 with the first movable baffle moved to a fully opened position and hooked thereto by a holding device, which is shown in a partially enlarged view;

- 5 Fig. 6 is a sectioned side view of a vane structure for vertical axis wind power generator according to a second embodiment of the present invention, showing a first and a second movable baffle thereof at a closed position;

Fig. 7 is a sectioned side view similar to Fig. 6 with the first and the second
10 movable baffle at a partially opened position; and

Fig. 8 is a sectioned side view similar to Fig. 7 with the first and the second movable baffle moved to a fully opened position and hooked thereto by a holding device.

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DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

The present invention will now be described with two preferred embodiments thereof. For the purpose of easy to understand, elements that are the same in the
20 two preferred embodiments are denoted by the same reference numerals.

Please refer to Fig. 1 that is a fragmentary perspective view showing a plurality of vanes according to the present invention is mounted around and spaced along a main shaft 7 of a wind power generator, and to Fig. 2 that is an enlarged and
25 partially sectioned perspective view of the circled area A of Fig. 1, and to Figs. 3 to 5 that are sectioned side views of one vane according to a first embodiment of the present invention.

As shown, the vane structure for vertical axis wind power generator according to the first embodiment of the present invention includes a plurality of vanes, each of which includes a vane body 1, a first arcuate guide bar 2, an openwork screen 3, and a first movable baffle unit 4.

The vane body 1 includes a body portion 11 that defines a rearward recess 12. In practical implementation, the body portion 11 includes a front plate portion 111, an upper plate portion 112 and an opposing lower plate portion 113 extended from an upper and a lower edge of the front plate portion 111, and a left plate portion 114 and an opposing right plate portion 115 extended from a left and a right edge of the front portion 111. The rearward recess 12 is formed between the front, the upper, the lower, the left and the right plate portion 111, 112, 113, 114, 115 to effectively intercept the flow of air currents.

The front plate portion 111 is provided with a through hole 116, and has an outward curved front surface 117 with an area surrounding the through hole 116 formed into a substantially bell-shaped sunken portion 118. That is, the through hole 116 is located on the front plate portion 111 at a bottom of the sunken portion 118.

The first arcuate guide bar 2 is located in the rearward recess 12, and has a first end 21 and an opposing second end 22. The second end 22 is fixedly connected to a predetermined position on the body portion 11, such as the upper plate portion 112. The first end 21 is located at a center of the through hole 116 on the vane body 1.

The openwork screen 3 is mounted in the through hole 116 on the vane body 1 and connected to the first end 21 of the first arcuate guide bar 2. In practical implementation, the openwork screen 3 includes a sleeve portion 31 and a screen body 32 connected to and located around the sleeve portion 31. The sleeve portion 31 is fitted around the first end 21 of the first arcuate guide bar 2, and the screen body 32 is fixedly connected at an outer periphery thereof to an inner peripheral wall of the through hole 116. On the screen body 32, there is provided a plurality of openings 321. With the above arrangements, the openwork screen 3 is fitted in the through hole 116.

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The first movable baffle unit 4 is located in the rearward recess 12 behind the openwork screen 3 and slidably fitted around the arcuate guide bar 2. The first movable baffle unit 4 is connected to the front plate portion 111 of the vane body 1 via a pivot point 411 on a baffle support bar 41, so that the first movable baffle unit 4 is turnable about the pivot point 411 into the rearward recess 12 or toward the openwork screen 3 to openably close the through hole 116 and accordingly, the openwork screen 3. In practical implementation, the first movable baffle unit 4 includes a first sleeve 42 and a first movable baffle 43 connected to and located around an end of the first sleeve 42. The first sleeve 42 is slidably fitted around the first arcuate guide bar 2, and the first movable baffle 43 normally covers the openwork screen 3 from one side adjacent to the rearward recess 12. That is, the first arcuate guide bar 2 is not only connected to the openwork screen 3 for supporting the same, but also functions to guide the first movable baffle unit 4 to an opened position or a closed position while firmly supporting the first movable baffle unit 4 thereon.

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As can be seen from Fig. 3, when the wind blows against the vane body 1 from

the side with the rearward recess 12, the first movable baffle unit 4 is blown toward the openwork screen 3 to thereby close the openings 321 on the openwork screen 3, allowing the rearward recess 12 of the vane body 1 to effectively intercept the wind for driving the main shaft 7 to rotate.

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While the wind blows against the rearward recess 12 of the above-mentioned vane body 1, it also blows against the outward curved front surface 117 of the front plate portion 111 of a diametrically opposing vane body 1, as shown in Fig. 4. At this point, while some part of the air currents of the wind is guided by
10 the outward curved front surface 117 toward outer sides of the opposing vane body 1, other part of the air currents of the wind acting on the front plate portion 111 is guided into the sunken portion 118 to pass through the openings 321 on the openwork screen 3 and blow against the first movable baffle unit 4, bringing the first movable baffle unit 4 to turn about the pivot point 411 of the baffle
15 support bar 41 while being guided by the first arcuate guide bar 2 to move away from the openwork screen 3 to open the through hole 116. At this point, with the through hole 116 on the opposing vane body 1 in an opened state, the wind is no longer blocked by the opposing vane body 1 but can pass through the openings 321 on the openwork screen 3 and be guided to outer sides of the
20 opposing vane body 1. As a result, the air resistance at the opposing vane body 1 is reduced.

Thus, according to the vane structure of the present invention, when the wind force acts on the rearward recess 12 of one of the vane bodies 2 on the main
25 shaft 7 of the vertical axis wind power generator, a diametrically opposing vane body 1 thereof can quickly remove the air resistance at the same time to thereby eliminate any significant obstruction to the wind force by the opposing vane

body 1, allowing the vane bodies 1 to produce increased push for driving the main shaft 7 of the wind power generator to rotate.

5 A first buffer spring 44 is provided between the openwork screen 3 and the first movable baffle unit 4. When the first movable baffle unit 4 is turned toward the openwork screen 3 to close the same, the first buffer spring 44 functions to buffer the impact of the first movable baffle unit 4 against the openwork screen 3 and accordingly, avoid damaged parts and noise caused by such impact. Further, a first magnetic ring 48 and a second magnetic ring 49 that have the
10 same polarity are respectively provided on the first buffer spring 44 and the first movable baffle unit 4 at contact faces thereof, so that magnetic repulsion between the first and the second magnetic ring 48, 49 further buffers the impact between the first movable baffle unit 4 and the openwork screen 3.

15 The upper plate portion 112, the lower plate portion 113 and the right plate portion 115 are provided on respective outer surface with a plurality of parallelly and continuously arranged ridges and valleys 119, which are extended between a front and a rear side of the vane body 1. With these ridges and valleys 119, it is able to avoid noise that is produced when the vane body 1 is
20 driven by the wind force to rotate. That is, these ridges and valleys 119 provide a muffling effect.

Please refer to Figs. 3 to 5, particularly Fig. 5. The vane structure of the present invention further includes a stop unit 5, which includes a stop ring 51
25 and a stop spring 52. The stop ring 51 is fixedly mounted to the first arcuate guide bar 2 near the second end 22, and the stop spring 52 is arranged on the first arcuate guide bar 2 to one side of the stop ring 51 facing toward the first

end 21. The stop ring 51 functions to limit a maximum angle by which the first movable baffle unit 4 can be pivotally turned open. Therefore, the first movable baffle unit 4 is protected against damage due to an exceeded open angle caused by an extremely strong wind, such as typhoon. The stop spring 52 can
5 buffer the impact between the first movable baffle unit 4 and the stop ring 51.

The stop unit 5 further includes a holding device 53, which is pivotally turnably connected to one lateral side of the stop ring 51. The holding device 53 includes a control lever 531 and a hook 532 connected to the control lever 531.
10 And, the first movable baffle unit 4 is provided at positions corresponding to the control lever 531 and the hook 532 with a push bar 45 and a retaining ring 46, respectively. When the first movable baffle unit 4 is blown open by a strong wind and stopped by the stop ring 51 from turning any further, the push bar 45 will strike against the control lever 531 of the holding device 53 at the same
15 time, bringing the control lever 531 to pivotally turn upward and accordingly, bringing the hook 532 to pivotally turn downward to engage with the retaining ring 46. Thus, the first movable baffle unit 4 is held to the fully opened position, allowing the vane body 1 to rotate at a reduced speed and avoid damaged parts of the vane due to undesirable quick rotation under extremely
20 strong wind.

The holding device 53 also includes an outward projected release lever 533. When the strong wind is no longer a problem, the release lever 533 can be pulled to disengage the hook 532 from the retaining ring 46. At this point, the first
25 movable baffle unit 4 is not bound to the stop unit 5 but can freely pivotally turn between the fully opened position and the fully closed position in response to different wind directions to open or close the openwork screen 3.

To ensure stable rotation of the vanes, a steel cable 8 is extended between and connected to the upper plate portion 112 of each of the vane bodies 1 and the main shaft 7, and any two adjacent vane bodies 1, as can be seen in Fig. 1.

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Figs. 6, 7 and 8 are sectioned side views of a vane structure for vertical axis wind power generator according to a second embodiment of the present invention. The second embodiment is generally structurally similar to the first embodiment, except for a second movable baffle unit 6 for openably covering the first movable baffle unit 4. That is, the vane structure according to the second embodiment of the present invention includes two overlapping movable baffle units to reduce the air resistance as quick as possible when the outward curved front surface of the vane faces against the wind.

15 The portions of second embodiment that are different from the first embodiment will now be described in more details. In the second embodiment, the first movable baffle unit 4 has openings formed thereon, and is located in the rearward recess 12 of the vane body 1 behind the openwork screen 3. The first movable baffle unit 4 includes a second arcuate guide bar 47, which is in the form of a sleeve slidably fitted around the first arcuate guide bar 2. As in the first embodiment, the first movable baffle unit 4 is connected to the front plate portion 111 of the vane body 1 via a pivot point 411 on a baffle support bar 41, so that the first movable baffle unit 4 is turnable about the pivot point 411 into the rearward recess 12 or toward the openwork screen 3 to openably close the through hole 116. As can be seen in Fig. 6, the second arcuate guide bar 47 has a proximal end 471 and a distal end 472, and a radially outward extended flange 473 is formed around the distal end 472.

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In practical implementation, the first movable baffle unit 4 includes a first sleeve 42 located around the proximal end 471 of the second arcuate guide bar 47, and a first movable baffle 43 connected to and located around an end of the first sleeve 42. The first movable baffle 43 normally covers the openwork screen 3 from one side adjacent to the rearward recess 12, and is provided with a plurality of openings 431.

The second movable baffle unit 6 is located in the rearward recess 12 of the vane body 1 and slidably fitted around the second arcuate guide bar 47. The second movable baffle unit 6 normally openably covers the first movable baffle unit 4 from one side adjacent to the rearward recess 12. In practical implementation, the second movable baffle unit 6 includes a second sleeve 61 and a second movable baffle 62 connected to and located around the second sleeve 61. The second sleeve 61 is slidably fitted around the second arcuate guide bar 47, and the second movable baffle 62 normally closes the openings 431 on the first movable baffle unit 4 from one side adjacent to the rearward recess 12.

As shown in Fig. 6, when the rearward recess 12 on the vane body 1 is located against the wind, the second movable baffle unit 6 is blown by the wind toward the first movable baffle unit 4 to close the openings 431, and the first movable baffle unit 4 is also blown by the wind toward the openwork screen 3 to close the openings 321, making the whole vane body 1 a complete plate without any opening. At this point, the rearward recess 12 can effectively intercept the wind to thereby drive the main shaft 7 to rotate.

Please refer to Fig. 7. While the wind blows against the rearward recess 12 of

the above-mentioned vane body 1, it also blows against the outward curved front surface 117 of the front plate portion 111 of an opposing vane body 1 that is located diametrically opposite to the above-mentioned vane body 1. At this point, while some part of the air currents of the wind is guided by the outward curved front surface 117 toward outer sides of the opposing vane body 1, other part of the air currents of the wind acting on the front plate portion 111 is guided into the sunken portion 118 to pass through the openings 321 on the openwork screen 3 and blow against the first movable baffle unit 4, bringing the first movable baffle unit 4 to turn about the pivot point 411 of the baffle support bar 41 while being guided by the first arcuate guide bar 2 to move away from the openwork screen 3 to an opened position. Meanwhile, the wind passes through the openings 431 on the first movable baffle unit 4 to act on the second movable baffle unit 6, bringing the second movable baffle unit 6 to move away from the first movable baffle unit 4 while sliding along the second arcuate guide bar 47. At this point, with the through hole 116 and the first and the second movable baffle unit 4, 6 on the opposing vane body 1 in an opened state, the wind is no longer blocked by the opposing vane body 1 but can pass through the openings 321 on the openwork screen 3 and the openings 431 on the first movable baffle unit 4 to be guided to outer sides of the opposing vane body 1. As a result, the air resistance at the opposing vane body 1 is reduced.

A second buffer spring 63 is provided between the first movable baffle unit 4 and the second movable baffle unit 6. When the second movable baffle unit 6 is moved toward the first movable baffle unit 4 to close the same, the second buffer spring 63 functions to buffer the impact of the second movable baffle unit 6 against the first movable baffle unit 4. Therefore, damaged parts and noise caused by such impact can be avoided.

Similarly, a stop unit 5 is provided on the first arcuate guide bar 2 near the second end 22 thereof. The stop unit 5 includes a stop ring 51 and a stop spring 52, which provide the same functions as in the first embodiment. And, the stop unit 5 further includes a holding device 53, which is pivotally turnably connected to one lateral side of the stop ring 51. The holding device 53 includes a control lever 531 and a hook 532. However, in the second embodiment, the push bar 45 and the retaining ring 46 corresponding to the control lever 531 and the hook 532, respectively, are provided on the flange 473 of the second arcuate guide bar 47 of the first movable baffle unit 4. When the first movable baffle unit 4 and the second movable baffle unit 6 are blown open by a strong wind, they can still be held to the stop unit 5 through engagement of the hook 532 of the holding device 53 with the retaining ring 46, just the same as in the first embodiment.

Similarly, the holding device 53 further includes an outward projected release lever 533, which can be pulled to release the hook 532 from the retaining ring 46.

With the vane structure of the present invention, when the rearward recess 12 of the vane body 1 is located against the wind, the movable baffle unit or units 4, 6 on the vane body 1 are located at a closed position to close the openwork screen 3 and the through hole 116, allowing the rearward recess 12 to effectively intercept the wind force; and when the rearward recess 12 of the vane body 1 is located before the wind, the movable baffle unit or units 4, 6 are naturally moved to an opened position, allowing the wind to quickly move through the through hole 116 on the vane body 1 to outer sides of the vane body 1 without

producing an increased air resistance to the rotating vane body 1. Further, since the movable baffle units 4, 6 are supported and guided by the arcuate guide bars 2, 47 while they are blown to the closed position or the opened position, the movable baffle units 4, 6 can maintain firm structure and stable operation.

- 5 Moreover, with the stop unit 5, the vane body 1 can be protected against exceeded turning angle under strong wind, and accordingly, the whole vane structure and the wind power generator are protected against damage possibly caused by the excessively turned vane body 1.

- 10 The present invention has been described with some preferred embodiments thereof and it is understood that many changes and modifications in the described embodiments can be carried out without departing from the scope and the spirit of the invention that is intended to be limited only by the appended claims.

What is claimed is:

1. A vane structure for vertical axis wind power generator, comprising a plurality of vanes mounted around and spaced along a main shaft of the wind power generator, each of the vanes comprising:
 - a vane body having a body portion that defines a rearward recess; the body portion including a front plate portion, on which a through hole is formed;
 - a first arcuate guide bar being located in the rearward recess, and having a first end and an opposing second end; the second end being fixedly connected to the body portion and the first end being located at a center of the through hole;
 - an openwork screen being fitted in the through hole and connected to the first end of the first arcuate guide bar; and
 - a first movable baffle unit being located in the rearward recess and slidably fitted around the first arcuate guide bar; the first movable baffle unit being pivotally turnably connected to the front plate portion via a baffle support bar, such that the first movable baffle unit is able to openably cover the openwork screen from one side adjacent to the rearward recess.
2. The vane structure for vertical axis wind power generator as claimed in claim 1, wherein the body portion is provided on outer peripheral surfaces thereof with a plurality of parallelly and continuously arranged ridges and valleys, which are extended between a front and a rear side of the vane body.

3. The vane structure for vertical axis wind power generator as claimed in claims 1 or 2, wherein the front plate portion has an outward curved front surface, and an area of the outward curved front surface surrounding the through hole is formed into a bell-shaped sunken portion.
4. The vane structure for vertical axis wind power generator as claimed in any one of the preceding claims, wherein the openwork screen includes a sleeve portion and a screen body connected to and located around the sleeve portion; the sleeve portion being fitted around the first end of the first arcuate guide bar, and the screen body being fixedly connected at an outer periphery thereof to an inner peripheral wall of the through hole; and the screen body having a plurality of openings formed thereon.
5. The vane structure for vertical axis wind power generator as claimed in any one of the preceding claims, wherein the first movable baffle unit includes a first sleeve and a first movable baffle connected to and located around the first sleeve; the first sleeve being slidably fitted around the first arcuate guide bar, and the first movable baffle normally covering the openwork screen from one side adjacent to the rearward recess.
6. The vane structure for vertical axis wind power generator as claimed in any one of the preceding claims, wherein the openwork screen and the first movable baffle unit have a first buffer spring provided therebetween, and a first and a second magnetic ring having the same polarity are respectively provided on the first buffer spring and the first movable baffle unit at contact faces thereof.

7. The vane structure for vertical axis wind power generator as claimed in any one of the preceding claims, wherein the vane further includes a stop unit, which includes a stop ring fixedly connected to the first arcuate guide bar near the second end thereof and a stop spring arranged on the first arcuate guide bar to one side of the stop ring facing toward the first end of the first arcuate guide bar.
8. The vane structure for vertical axis wind power generator as claimed in claim 7, wherein the stop unit further includes a holding device being pivotally turnably connected to a lateral side of the stop ring, and the holding device including a control lever and a hook connected to the control lever; and wherein the first movable baffle unit is provided at positions corresponding to the control lever and the hook with a push bar and a retaining ring, respectively; and the holding device further including an outward projected release lever.
9. A vane structure for vertical axis wind power generator, comprising a plurality of vanes mounted around and spaced along a main shaft of the wind power generator, each of the vanes comprising:
- a vane body having a body portion that defines a rearward recess; and the body portion including a front plate portion, on which a through hole is formed;
- a first arcuate guide bar being located in the rearward recess, and having a first end and an opposing second end; the second end being fixedly

connected to the body portion and the first end being located at a center of the through hole;

an openwork screen being fitted in the through hole and connected to the first
5 end of the first arcuate guide bar;

a first movable baffle unit having openings formed thereon and being located in the rearward recess of the vane body behind the openwork screen; the first movable baffle unit including a second arcuate guide bar in the form of a
10 sleeve slidably fitted around the first arcuate guide bar, and being connected to the front plate portion of the vane body via a pivot point on a baffle support bar, so that the first movable baffle unit is turnable about the pivot point to openably cover the openwork screen from one side adjacent to the rearward recess; and the second arcuate guide bar having a proximal end and
15 a distal end, and a radially outward extended flange formed around the distal end; and

a second movable baffle unit being located in the rearward recess of the vane body behind the first movable baffle unit; the second movable baffle unit
20 being slidably fitted around the second arcuate guide bar to openably cover the first movable baffle unit from one side adjacent to the rearward recess.

10. The vane structure for vertical axis wind power generator as claimed in claim 9, wherein the body portion is provided on outer peripheral surfaces thereof
25 with a plurality of parallelly and continuously arranged ridges and valleys, which are extended between a front and a rear side of the vane body.

11. The vane structure for vertical axis wind power generator as claimed in claims 9 or 10, wherein the front plate portion has an outward curved front surface, and an area of the outward curved front surface surrounding the through hole is formed into a bell-shaped sunken portion.

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12. The vane structure for vertical axis wind power generator as claimed in any one of claims 9 to 11, wherein the openwork screen includes a sleeve portion and a screen body connected to and located around the sleeve portion; the sleeve portion being fitted around the first end of the first arcuate guide bar, and the screen body being fixedly connected at an outer periphery thereof to an inner peripheral wall of the through hole; and the screen body having a plurality of openings formed thereon.

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13. The vane structure for vertical axis wind power generator as claimed in any one of claims 9 to 12, wherein the first movable baffle unit includes a first sleeve and a first movable baffle connected to and located around the first sleeve; the first sleeve being fitted around the proximal end of the second arcuate guide bar, and the first movable baffle having a plurality of openings formed thereon.

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14. The vane structure for vertical axis wind power generator as claimed in any one of claims 9 to 13, wherein the second movable baffle unit includes a second sleeve and a second movable baffle connected to and located around the second sleeve; the second sleeve being slidably fitted around the second arcuate guide bar, and the second movable baffle normally covering the openings on the first movable baffle from one side adjacent to the rearward recess.

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15. The vane structure for vertical axis wind power generator as claimed in any one of claims 9 to 14, wherein the openwork screen and the first movable baffle unit have a first buffer spring provided therebetween, and a first and a second magnetic ring having the same polarity are respectively provided on the first buffer spring and the first movable baffle unit at contact faces thereof.
16. The vane structure for vertical axis wind power generator as claimed in claim 15, wherein the first movable baffle unit and the second movable baffle unit have a second buffer spring provided therebetween.
17. The vane structure for vertical axis wind power generator as claimed in any one of claims 9 to 16, wherein the vane further includes a stop unit, which includes a stop ring fixedly connected to the first arcuate guide bar near the second end thereof and a stop spring arranged on the first arcuate guide bar to one side of the stop ring facing toward the first end of the first arcuate guide bar.
18. The vane structure for vertical axis wind power generator as claimed in claim 17, wherein the stop unit further includes a holding device being pivotally turnably connected to a lateral side of the stop ring and including a control lever and a hook connected to the control lever; and wherein the second arcuate guide bar is provided on the flange at positions corresponding to the control lever and the hook with a push bar and a retaining ring, respectively; and the holding device further including an outward projected release lever.