

Abstract

This invention of Wind Turbine of vertical-axis, which has freely moving blades which change orientation such that there is minimum loss of energy caused due to backward movement – that is movement against the wind – and the net gain of energy is maximized. The change in orientation is facilitated by the wind itself.

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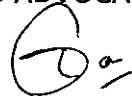
TO,
THE CONTROLLER OF PATENTS,
THE PATENT OFFICE, AT MUMBAI.

12 JUL 2010

I claim:

- 1) A Wind Turbine of vertical axis type,
with an arrangement to change the orientation of the blades -
such that when the blade is moving in the direction of the wind it is
firmly fixed and is therefore pushed by wind - thereby the turbine gets
energized,
and when moving against the wind, the blades are so moved that they
do not offer any resistance to the wind and thereby the loss of energy
is minimized,
and the net gain of the windmill is achieved at a high level.
- 2) The wind-turbine as claimed in Claim (1) wherein the blades, being
fitted on the blade-frame which has free movement on the suspension,
the orientation of the blades is changed by the blowing wind such that
the condition for optimization of gain in energy as described in claim (1)
is achieved.

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TECHNICAL FIELD OF THE INVENTION

Wind is an important source of energy for human activities. For over two thousand years it has been used in different parts of the world through various types of windmills. In last hundred years, efforts have been made to generate electricity through wind power. Certain areas, where the wind is available at a high speed and for a larger part of the year, have been identified as High Velocity Wind Zones and the windmills have been erected to harness wind power profitably. But these machines are either not useful in other areas, or if useful, they do not justify the cost because of lower output. The present invention makes possible to harness wind power even where the wind speed is low – and all this at a lower cost too.

BACKGROUND OF THE INVENTION AND PRIOR ART

In various parts of the world, through various mechanisms, wind-power is manipulated and a circular motion is obtained. For this, the wind is obstructed by what are called 'blades', and when the wind presses these blades along its own direction the blades move on their axis and a circular motion is obtained. These machines are known as Windmills. When such windmills are used for generation of electricity these are conveniently called Wind Turbines. These turbines are classified as

- i) Horizontal Axis Wind Turbines (HAWT) – the axis being horizontal and the blades moving vertically and
- ii) Vertical Axis Wind Turbines (VAWT) – the axis being vertical and the blades moving horizontally..

The more popular form however has been the HAWT, because of their ability to use the wind power conveniently and at any scale – though with

increasing cost. Even though the VAWT have advantage of being useful in slow winds also, they have not become popular because in such arrangement the blades have to move against the flow of the wind also. By some or other mechanisms, the earlier inventors have attempted to reduce the loss of power due to blades' movement against the wind. But in all the inventions so far, the net gain has not been achieved to the level that it could justify the cost of the machine and therefore they have not become popular. The present invention drastically reduces the said loss.

The purpose of present invention is not only to reduce the said loss but also to make the windmill useful, where and when, the winds are very slow and cannot be used to move the turbines at a minimum speed required for any purpose including electricity generation.

SUMMARY OF THE INVENTION

Like any vertical axis windmill the present invention consists of three or more blades which move circularly on a vertical axis by the energy of the wind. The present invention has a novel arrangement where the blades

- i) while moving in the direction of the wind, and being pushed by the wind, they hold a fixed position firmly, and move on the said vertical axis when energized by the wind,
- ii) but when moving against the direction of the wind, they lose their firm hold and loosely occupy the position such that they offer minimum resistance to the wind and thereby the machine loses minimum energy that is being gained through the blades moving in the direction of the air.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig - 1.

This shows the three major parts of the machine, namely a stand (1), Turbine (2) having a central-axis-shaft, and the blades (3) fitted on the said central-axis-shaft, and a base-pipe (4).

Whole structure of the machine is erected on the Stand (1). Turbine (2) consists of a freely rotating central axis-shaft on which blades are firmly fitted at a right angle. The said central axis shaft is rotatably fitted on the Base-pipe (4).

Fig - 2.

This shows components of the Turbine (2) described in fig - 1.

Central-axis-shaft (21) is a circular pipe which rests on free bearings (27-A and B) fitted on a base-pipe and has on one end the suspension (22) and on the other the Power-gear (28) which transfers the energy to Gear-box (29) for the desired use. Gear-box (29) increases the rounds per minute to make possible the profitable use of energy such as to run water-pump or a dynamo to produce electricity. Suspension (22) consists of a metallic disc having a hole at its center through which the Central-axis-shaft (21) is rigidly fitted; on the said disc three or four metallic strips/pipes (23) are firmly fitted to hold the blades.

Fig -3.

This shows the components of blades shown in fig-1.

Three or four strips/pipes are fitted on a disc . The pipe (31) is a long pipe which is cut and bent at an angle of 120 to 135 degree at nearly three fourth of its total length. A hollow pipe (32) having free bearing (34-A and 34-B) on each end is fitted on the pipe (31), at a right angle, at the point

of the above described bend. On this pipe (32), the frame of the blade (35) is fitted. One arm of the Blade-frame (35), which is a circular pipe (33), runs through the bearings (34-A and B) to have a free movement of the blade frame (35). The free movement of the blade (35) is limited by the pipe (31) to 120/135 degree.

Figure-4.

This figure shows top-view of the movement of the windmill.

As described in figures 1-3, four identical Blade-frames are fitted on the disc of the central-axis-shaft. Assuming the position [I] as initial position, the wind will push blade-A in its own direction and the turbine will come in the position [II].

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS.

(Please see Figs 1, 2, 3 and 4)

Construction and Assembly.

(Please see Figs 1) The Base-pipe (4) is fitted on the stand (1) which is a tower having a suitable height according to availability of the wind in the local area of operation of the machine.

(Please see Figs 2) On this Base-pipe (4) the Central axis shaft (21) is vertically fitted through bearings (27-A and B). The circular disc (22) is fitted firmly on the central-axis-shaft (21) at a right angle. On the circular disc (22), four metallic strip or pipes (numbered as 31 in figure-3) are firmly fitted by fasteners.

(Please see Figs 3) As described earlier, the pipe (31) is a long pipe which is cut and bent at an angle of 120 to 135 degree at nearly three fourth of its total length. By this bending the pipe(31) has two arms virtually joined at an angle of 120/135 degree. On this metallic pipe (31) a

hollow pipe (32), having free bearings on each end, is fitted at a right angle vertically. An arm of the blade-frame (35) is fitted into the said pipe (32) on its bearings. The blade-frame (35) has a bar (36) which limits the movement of the frame (35) between the two arms of the bent pipe (31)

Working of the Machine.

When the machine is constructed and assembled as above, it is ready for operation. When the wind starts blowing and gets obstructed by the blades, it pushes the blades in its own direction.

Now, as can be seen in figure -4, at least one blade – like blade A in position [I] - will always be in a 'fixed position' i.e. obstructed by one or the other arm of the pipe (31) and will be facing wind. This 'fixed position' blade will offer resistance to the wind but being overpowered by wind will move in the direction of the wind, and being fitted on the Central-axis (21), it will start moving the Central-Axis in a circular path.

Then, as again can be seen in figure-4, the turbine will come to position [II]. In this position, three blades D,A and B are in 'fixed position' and also facing wind, therefore they will be pushed by wind and the turbine will be continue to move in a circular path – now with greater energy.

Then due to its circular movement, the turbine will again come in a position like position [I] of the figure – 4, and the blades being free to move blade-A will occupy the position of blade-B, B that of C, C that of D and D will occupy position of blade-A, and again the wind will push the blade facing it. These cycles of change, from position [1] to position [2] will continue and the turbine would continue to be energized by the wind until the wind stops blowing.

The energy of the turbine can be transferred to other devices for generating electricity or any other purpose after suitably changing the r.p.m. (rounds per minute) with the help of gear-work.

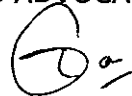
OPTIONAL CHANGES.

- i). The turbine may have three blades.
- ii) There can be multiple sets of blades. More than one set of blades can be fitted on the central-axis-shaft (21) on different discs (22).

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