

PROVISIONAL APPLICATION FOR PATENT

INVENTION TITLE

A Wind turbine with turbine blade rings to generate electric power by utilizing venturi's law.

BACKGROUND OF THE INVENTION

Problem Solved: A Windturbine with counterrotating blade rings generates 4(four!) times more electric power than current 3 bladed wind turbines of the same diameter by accelerating the airflow entering the turbine blades with an entry dome (nozzle) and exit cone (diffuser).

This Wind turbine swings into the oncoming wind near the ground on the base, instead at its center hub at generator height. Hence this allows the tower to tilt more or less into the wind depending on wind speed in order to counteract tip over load forces. Therefore, smaller basement with less amount of concrete is needed.

The blade rings appear to birds as a solid structure so they would not try to fly through it.

Due to the arrangement of the blades and the rotation speed, there will not be a visible strobe light.

Hence, no disturbing effect on humans and animals in the shadowed projection of the turbine.

Disadvantage of current three blade Wind turbines: they have disturbing "disco" shadow effect on humans living in its shadow, kill birds in the blade area, need a high amount of concrete base material and need crane for erecting and assembly.

DETAILED DESCRIPTION OF THE INVENTION

A Wind turbine with counterrotating blade rings generates 4 times more electric power than current 3 bladed wind turbines of the same diameter.

This invention is an improvement on what currently exists. Utilizing Venturi's Law ($A_1 \cdot v_1 = A_2 \cdot v_2$) where A_1 is the area and v_1 the speed of ambient Windstream (mass-air-flow); A_2 is the reduced Area and V_2 the accelerated speed in the reduced Area. Doubling the wind speed results in quadrupling the power output according to: $P = \pi / 2 * r^2 * v^3 * \rho * \eta$ (Power = π /half *times* radius square *times* velocity-to-power-of-3 *times* density *times* turbine-efficiency). This turbine does not have a visible shadow "disco" effect, no killing birds, less material use in building basement, easy assemble and erect procedure.

The Wind turbine swings on its vertical axis near the ground on the base instead at its center hub at generator height, thus allow the tower to tilt more or less into the wind depending on wind speed. Therefore, only a small basement is needed. The blade rings appear to birds as a solid structure hence they would not try to fly through it.

An entry dome and aft cone reduce the area of the oncoming streaming wind (mass air flow) in order to accelerate the stream before it actuates on the blades. The blades are mounted on two base-rotor-frames with coils or permanent magnets which are counterrotating on an electric stator. The stator is mounted on a center hub. This center hub can be swing 360 deg around its base and tilted for assemble, maintaining and force control.

Princip: The mass-air-flow (Windstream) accelerated by the dome nozzle hit the airfoil shaped blade rings. Due to the aerodynamic form (modified NACA63-415, NACA6409 profile) the kinetic energy in the airflow is deflected and accelerated through the blades, creating a lift force on the blade profile. Because of the arrangement of the blade, that force can only escape by turning the blade ring assy. The resulting torque force in a NO LOAD CONFIGURATION is limited by reaching its drag limit, (Wind resistance, $T_{orque} = F_{drag}$) or limited in a LOAD CONFIGURATION by magnetic brake force ($F_{torque} = F_{drag} + F_{load}$) on the electric generators' arrangement. This brake force generate the useable "sellable" electric power. A control module uses this brake power to adjust the load in order to keep the turbine spinning on its most effective output rpm, (revolutions per minute).

The blade rings are designed counter rotating to avoid high gyroscopic load and inertia in order to protect the structure, reduce swing force and safe reinforcement and cost.

The blade ring assembly is designed in a sweep back configuration, the outer diameter parts are further down Windstream than the inner diameter parts. This assists the tower swing mechanism while turning the turbine tower into the wind direction. It also stabilizes the structure when wind direction changes, principle as a windsock or a weathervane does.

The Version of The Invention Discussed Here Includes:

1. Fullview
2. Detail Bladerings
3. Aft Detail

4. Explosion
5. Sideview with open Dome and aft Cone
6. Magnetic leveled Generator
7. Blade Innerring detail
8. Blade outerring detail

Relationship Between The Components:

The Centerhub mounts on top of Tower structure and carries in its axle the Dome and Aft cone.

The Inner-, and Outer-Bladering are magnetic “bearing” leveled on the outer Stator ring which is part of the Center hub.

Dome and Aft cone can change area size (similar to an umbrella) to reduce wind force in high wind condition in order to protect the structure.

The tower structure is mount on the tilt and hinge plate on the basement.

How The Invention Works:

Base Structure: made from reinforced concrete, carries the Turn Plate and takes all resulting forces from the Turbine into ground.

Turn Plate: mounted on the Base Structure, has a turn bearing and a drive gear to move the tower into the oncoming wind. Has one part of the Tilt Hinge and an actuator to allow tower tilt.

Tilt Hinge: it’s connected to the tower part of tilt mechanism and guides force from tower into Turnplate and allows tilting.

Tower: connects Turbine center Hub and transfers all forces to tilt hinge. carries cable runners.

Centerhub: on its forward and aft tubes it carries Dome and Aft cone with their umbrella folding mechanism and actuators. The inner Ring gives aerodynamic cover to allow smooth airflow through turbine and provides structural load relief outwards to the Generator ring and inwards to the Hub. The outer Ring carries the generator stator coils see item 6.

Dome: Either fabric or composite panels on ribs to shape a half dome form. It accelerates wind stream due to reducing the area (nozzle) from a circle shaped area to a ring-shaped area of wind stream and guides wind into turbine (same as an umbrella).

Aft Cone: Either fabric or composite panels on ribs to shape a cone to assist wind suction through turbine (diffuser), can fold away in high wind load (same as an umbrella).

Inner Blade ring: consist of 36 blade assemblies, on foot and head section is an aerodynamic cover and structure support. On Outer Side it carries magnets to A: float on generator ring and B: excites the stator coils

Outer Blade Ring: consist of 36 blade assemblies, on foot and head section is an aerodynamic cover and structure support plus on head is an aerodynamic diffuser profile. On inner side it carries magnets to a: float on generator ring and b: excites the stator coils

Generator: consist of a round pipe shape tube with 2 sets of coil windings around it. One set oscillates electric current in order to keep the inner and outer ring afloat (thus no other bearing is required) the second coil set does the electric load generating. This “magnetic float bearing” transfers all forces such as torque, bend, push, pull and twist force from the blade rings to the center hub.

How To Make The Invention:

Base: construction company pours concrete according to static plans.

Turn Plate and Tilt Hinge forged and milled in heavy machinery ward, same technic as it is used in tower crane manufacturing, etc.

Tower, Bladeringassys, Dome and Aft cone with their mechanism made out of CFK or GFK in mold process and autoclave.

Centerhub made out of steel or Aluminum on heavy vertical lathe and milling machines.

All describe elements are essential. However, the magnetic leved generator could be replaced by a set of 6 axial generator distributed around the outer ring of the Center Hub. For this case the blade rings has to be mounted on two herring gear rings, one facing outwards the other one faces inwards. to drive the generators herring gear counterpart.

Other possible use of proposed invention; by changing the Repeller style blades into a propeller style and convert the generator part to a motor: This would convert the counter rotating turbine into a DUCTED FAN without any notable gyro-forces. This results in high effective **wind blower fan, aircraft propulsion fan** or even **helicopter lift fan** without the balance rotor on the tail.

How To Use The Invention:

Either a person or company would order a finished designed and manufactured unit, has it installed on its designated geographical position to generate, use and sell electric power.

A small wind turbine with 2,5 Meter diameter of this design can power a farm or homestead.

A medium size turbine 50 Meter allows smaller factories or city to generate their own electric power.

An industrial style wind turbine with up to 150m diameter single or (multiple turbines on a wind-turbine-farms) can generate power for nation's needs.

Additionally: in Motor driven and blade converted setup it acts as a fan or Jet or Piston engine propeller or as helicopter propeller

ABSTRACT

A Windturbine with blade rings to generate four times more electric power as common 3 blade wind turbines by utilizing venturi's law is disclosed. The Windturbine swings into the wind near the ground on the base, instead at its center hub at generator height, thus allow the tower to tilt more or less into the wind depending on wind speed. Therefore, only small basement is needed. The blade rings appear to birds as a solid structure hence they would not try to fly through it. No disturbing strobe light effect in the projected shadow area. No heavy lift machinery is needed to erect and maintain the structure as its self erects.