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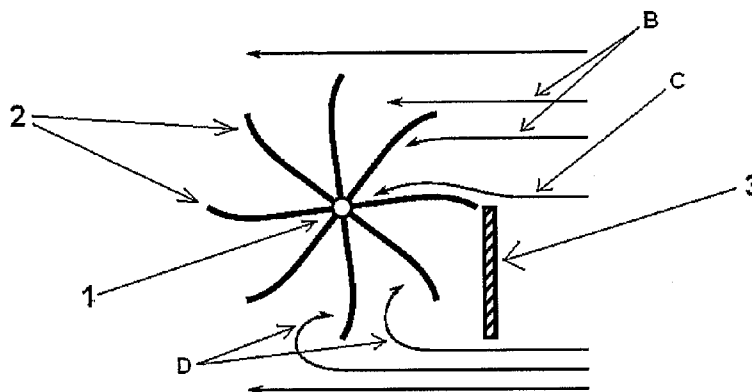


Fig. 1

(57) Abstract: The rotating movement of turbine is produced by three forces in effect: direct air flow pressure towards blades (B), a force received by wing effect - air flow (C) and turbulent air flows (D), generated through the wind shield 3. Wind turbine can be horizontal or vertical. The wind turbine is equipped with spindle mounted to rotate around the horizontal or vertical axis (1), multiple blades (2) radially positioned around the spindle and the wind shield (3). The rotation of turbine around its axis in the centre line of wind direction is conditionally divided into two parts: a wind receiving part and a part resisting the wind. The shield (3) covering from the wind is flat and covering half of working turbine part in the projection in such way that the turbulent air flows (D) created behind it impact on the covered blades (2) and increase the efficiency of turbine.

WO 2010/056094 A2

**WIND TURBINE**

## TECHNICAL FIELD

The invention falls into the field of energetics and is assigned to wind engines. A  
5 wind engine transforms kinetic wind power into mechanic power.

## BACKGROUND ART

The application of wind power to generate mechanical movement is realized in  
constructions of wind engines where the blades presses by wind may be mounted either on  
10 vertical or on horizontal axis.

The patent application GB 2264754 describes a wind turbine with a spindle mounted  
to rotate around a horizontal axis. Many blades are positioned along and around this spindle.  
The arched shifting plate is mounted downwards from the horizontal plane crossing the  
spindle, it wraps the blades positioned under this plane and is designed to shift the wind  
15 flow.

Other wind turbine with horizontal axis is described in the patent application US  
2002/015639. It is comprised of frame turning around vertical axis, and the spindle rotating  
around horizontal axis, mounted on it. The wind rotor is attached to this spindle and has  
several pairs of radially positioned arms, at the ends of which the scoops catching wind  
20 flows are fixed. The plate directing the wind flow is mounted in cant on the turning frame,  
one end of the plate is based on the frame and the other end is lifted up to the axis of  
spindle, in this way the wind flow is directed to the top scoops of turbine. The turbine is also  
equipped with the wind direction wing connected to the turning frame to shift the wind rotor  
perpendicularly to the wind direction.

25 The wind turbine with vertical axis is described in the patent application DE 195 14  
499. The wind force affects the surfaces of blades mounted on vertical axis perpendicular to  
the wind direction. One side of operating circle is covered with wall so the wind power is  
concentrated towards an open side. Blades move in the direction of the wind.

Similar technical solution is described in patent application JP 2003/042055. The  
30 wind turbine described in the application is comprised of rotor with scoop-formed blades  
rotating around the vertical axis. A plate directing the wind is also mounted on this axis; it  
is positioned to the direction of part of rotor revolution confronting the wind. Therefore this  
plate directs a part of wind flow towards the blades, increasing the rotating speed of rotor.

Besides, a wind direction wing is mounted on the downwind side of the rotor, connected firmly to the plate directing the wind. In this way this plate is always in the right position regarding the shifting wind direction.

A rotor with vertical axis is described in patent application FR 2902157, transforming the wind power into mechanical power; it has a cylindrical ferrule co-axial with cylindrical turbine and with vertical gap allowing the wind get into ferrule and affect the blades of turbine. Deflector is mounted on an edge of the gap.

A technical solution closest to the proposed one is described in the patent application JP 2008/025518. In the described wind turbine generator with vertical spindle the revolution of turbine around its axis in the centre line of wind direction is conditionally divided into two parts: a wind receiving part and a part resisting the wind. The wind shield covers more than a half of revolution of wind receiving part of turbine, and the wind direction wing controls the direction of front surface of the wind receiving part according to the wind direction.

The constructions of the named wind turbines are not completely suitable for getting the most benefit from the wind power.

The purpose of this invention is to increase efficiency of the wind turbine.

#### SUMMARY OF INVENTION

The wind turbine with the proposed construction transforms air movement into a rotating mechanical movement. The rotating movement of turbine is produced by three forces in effect: direct air flow pressure towards blades, a force received by wing effect and turbulent air flows. The construction of wind turbine can be horizontal or vertical.

The wind turbine is equipped with spindle mounted to rotate around the horizontal or vertical axis, multiple blades radially positioned around the spindle and the wind shield. The new thing in it is the shield covering from the wind is flat and covering half of working turbine part in the projection in such way that the turbulent air flows created behind it impact on the covered blades, besides, the wind shield is hinged on the turbine axis so it can rotate around the axis of turbine. The turbulent air flows impact on the covered blades and increases the torque force of turbine. It significantly increases efficiency of turbine.

When blades with arched profile are applied in the construction, the position of wind shield is chosen in a way that one edge of the shield coincides with the end of the first blade falling into turbine working zone, and the blade operates as a wing to create the force of

wing effect. In this way, when the blade is turned towards the wind with its end, it works as a wing and increases the torque efficiency.

When the turbine with vertical construction is made, the shield must be controlled so it always turns perpendicularly to the wind direction. Therefore it is hinged on the turbine axis so it can rotate around the turbine axis. The work of wind shield turning around the turbine axis is done by the wind direction wing mounted on the turbine, which is hinged on the turbine axis and firmly fixed to the wind shield. The force balancer is mounted to balance the wind shield turning movement.

## 10 BRIEF DESCRIPTION OF DRAWINGS

Fig. 1 is a scheme of horizontal wind turbine;

Fig. 2 is a scheme of vertical wind turbine with covering part control.

## DESCRIPTION OF EMBODIMENT

15 Drawing in the Fig. 1 shows the operation of horizontal wind turbine.

Wind turbine with the proposed construction includes spindle axis 1 with blades 2 mounted on it, and the wind shield 3.

The rotating movement of turbine with the proposed construction is produced by three forces in effect: direct air flow pressure towards blades 2 - air flows B in the drawing; a force received by wing effect – air flow C; turbulent air flows D, generated through the wind shield 3. Wind flows B directly affect the blades of turbine and rotating movement is produced. Wind flow C bypasses the wing-formed blade and produces an elevating power also converting into a rotating movement. Wind flows D generates whirls behind the screen, they impact on the blades covered from the direct wind and increase turbine efficiency.

Drawing in the Fig. 2 shows the operation of vertical wind turbine.

Wind turbine with the proposed construction includes spindle axis 1 with blades 2 mounted on it, the wind shield 3, wind direction wing 4 fixed in a jointed manner and a balancer 5 mounted to compensate the rotating movement.

30 The wind shield 3 in vertical construction must be oriented in the wind direction, it must be able to turn in regard to the turbine axis. The wind direction wing 4 orients the shield 3 towards the wind flow or this work is done by controlled electric motors. In order to compensate the tendency of wind shield 3 rotating movement (i.e. the wind not to twist the

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shield off), a force balancer 5 is used in the construction. The balancer 5 may be perpendicular to the wind flow or in cant with the wind flow. When in cant to the wind flow, it directs the mass of moving air towards the turbine A, increasing efficiency of the turbine.

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#### INDUSTRIAL APPLICABILITY

The surveys have shown that cover of this type increases the capacity of turbine by three times compared with turbines without cover. Since the device has conditionally low cost price and increased efficiency in comparison with traditional wind turbines, it can be widely applied in transforming wind power into rotating mechanical movement and producing electric power.

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## CLAIMS

5 Claim 1. Wind turbine, equipped with spindle mounted to rotate around horizontal or vertical axis (1), multiple blades (2) radially positioned around the spindle and wind shield (3), **characterized in that** the shield (3) covering from the wind is flat and covers half of working part of turbine in a projection in such way that the turbulent air flows (D) created behind it impact on the covered blades (2), besides, the wind shield (3) is hinged on the turbine axis (1) so it can rotate around the axis of turbine.

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Claim 2. Wind turbine according to claim 1, **characterized in that** when the blades are arched, the position of wind shield (3) is chosen in a way that one edge of the shield coincides with the end of the first blade (2) falling into turbine working zone, and the blade (2) operates as a wing to create the force of wing effect.

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Claim 3. Wind turbine according to claim 1 or 2, **characterized in that** the transmission of the wind shield (3) is a wind direction wing (4) hinged on the turbine axis .

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Claim 4. Wind turbine according to any of the aforementioned claims, **characterized in that** the balancer (5) is mounted to compensate the rotating movement of the wind shield (3).

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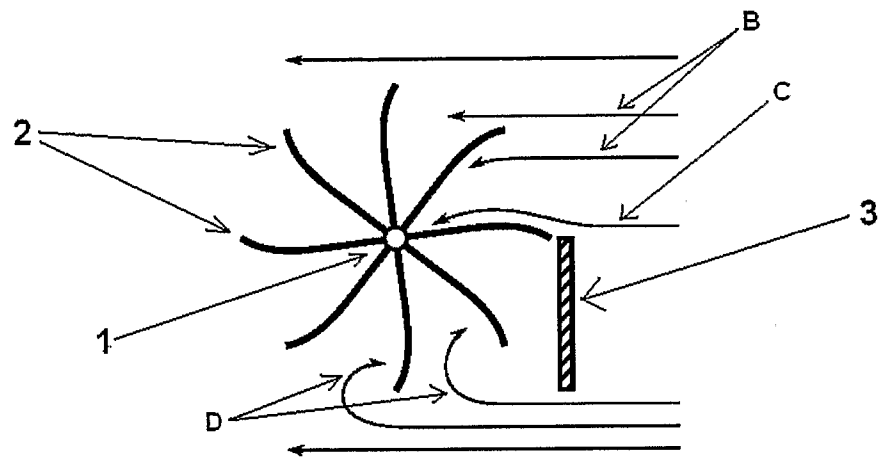


Fig. 1

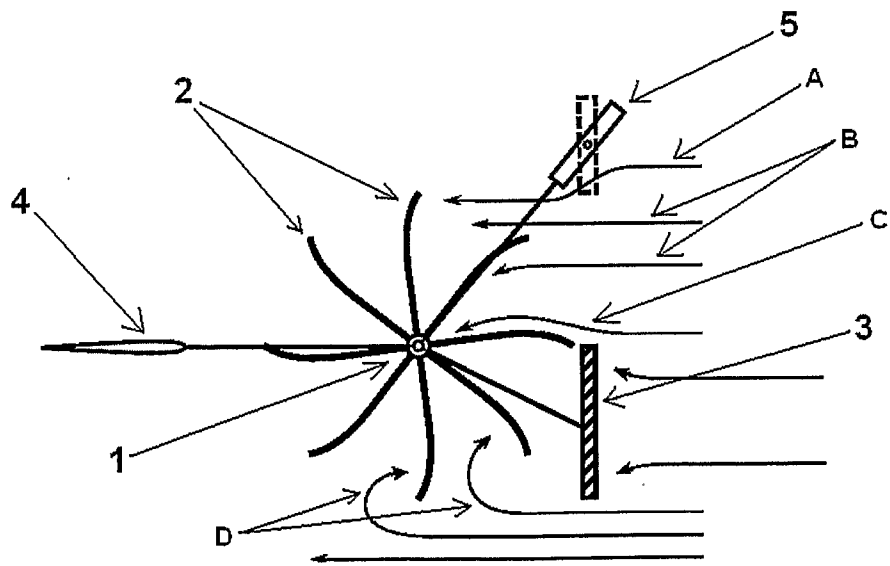


Fig. 2