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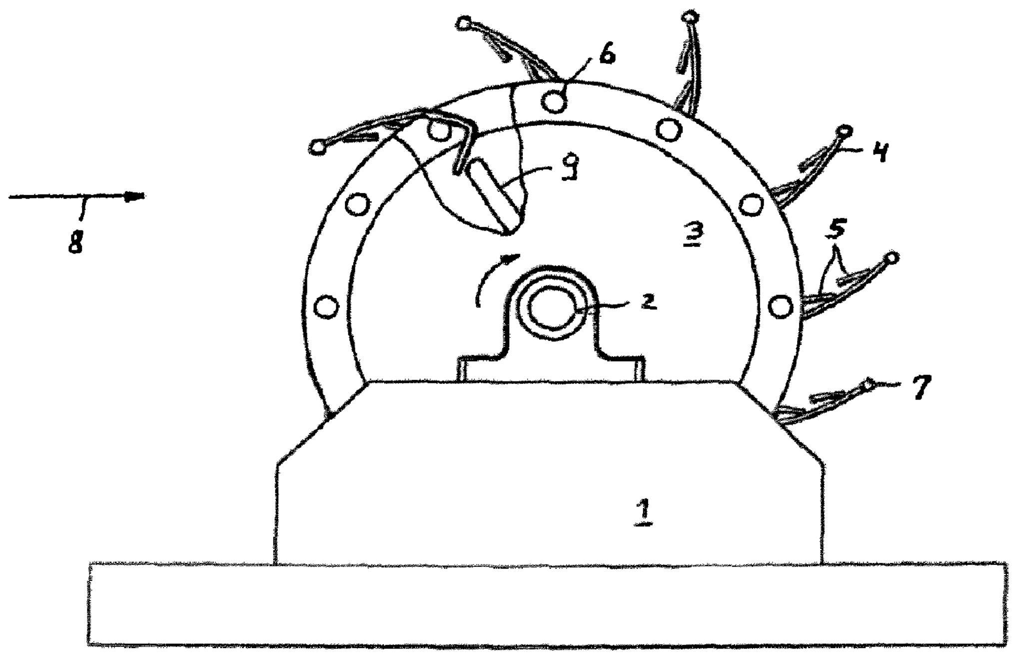

Fig. 1

(57) Abrégé/Abstract:
The invention relates to a turbine, in particular for harvesting energy in flowing air or flowing water, said turbine being easily adaptable to different application conditions and facilitating a comparably high degree of efficiency. This is achieved in that the basic shape of the turbine is cylindrical and is provided with blades (4) which are parallel to an axis (2) of the turbine. The blades (4) are pivotally arranged in joints (6) on the outer circumference of at least one turbine wheel (3). The blades (4) are substantially L-shaped, wherein the longer limb (41) of the blade (4) is curved preferably in a manner corresponding to the radius of the turbine casing, and the shorter limb (42) lies within the surface line of the turbine.

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(54) **Title:** TURBINE

(54) **Bezeichnung:** TURBINE

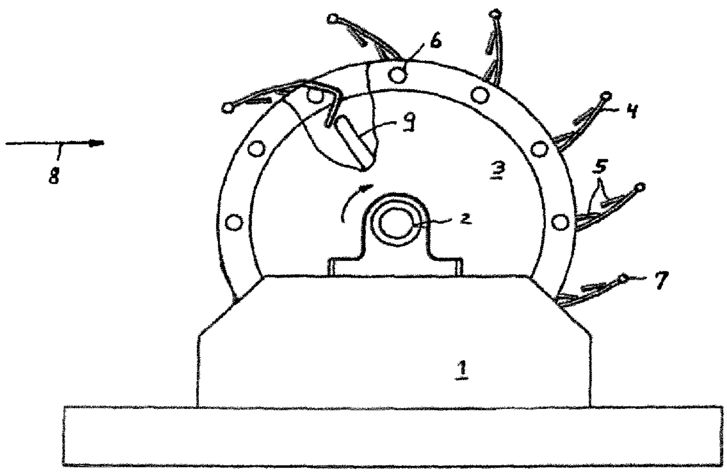

Fig. 1

(57) **Abstract:** The invention relates to a turbine, in particular for harvesting energy in flowing air or flowing water, said turbine being easily adaptable to different application conditions and facilitating a comparably high degree of efficiency. This is achieved in that the basic shape of the turbine is cylindrical and is provided with blades (4) which are parallel to an axis (2) of the turbine. The blades (4) are pivotally arranged in joints (6) on the outer circumference of at least one turbine wheel (3). The blades (4) are substantially L-shaped, wherein the longer limb (41) of the blade (4) is curved preferably in a manner corresponding to the radius of the turbine casing, and the shorter limb (42) lies within the surface line of the turbine.

(57) **Zusammenfassung:** Die Erfindung betrifft eine Turbine, insbesondere zur Energiegewinnung in strömender Luft oder in Fliessgewässern, die an unterschiedliche Einsatzbedingungen in einfacher Weise anpassungsfähig ist und die einen vergleichsweise hohen Wirkungsgrad ermöglicht. Dies ist dadurch gelöst, die Turbine in ihrer Grundform zylinderförmig ist und mit Schaufeln (4) versehen ist, die parallel zu einer Achse (2) der Turbine angeordnet sind, wobei die Schaufeln (4) schwenkbar in Gelenken (6) am Aussenumfang

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[Fortsetzung auf der nächsten Seite]

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mindestens eines Turbinenrades (3) angeordnet sind. Die Schaufeln (4) sind im Wesentlichen L-förmig, wobei ein langer Schenkel (41) der Schaufel (4) bevorzugt entsprechend des Radius des Turbinenmantels gebogen ist und ein kurzer Schenkel (42) innerhalb der Mantellinie der Turbine gelegen ist.

TURBINE

The invention relates to a turbine, in particular a water turbine for generating energy in flowing waters, or a wind turbine.

Turbines for generating energy, in particular also turbines in hydroelectric power plants are known. In most cases, they have a rotor arranged perpendicular to the direction of flow of the water with a rotatable turbine blade attached to it. The angle of attack of the turbine blades can be adjusted within limits, if necessary, and remains unchanged during operation.

Also known are drive wheels for grinding mills, hammer mills and drive wheels for riverboats, each with fixed blades.

Windmills with pivotable or adjustable blade elements are known from US 3,938,907 and US 4,468,169.

WO-A-2010063131 shows a water turbine which, in its basic shape, is cylindrical and provided with blades arranged parallel to an axis of the turbine. These blades are arranged to be pivotable in joints between turbine wheels at the outer circumference thereof. In another turbine according to EP 2370691 B1, the outer edges of blades are provided with a buoyancy-promoting, in particular, inflatable element, and according to CH 707729 A2 or CH 706300 A2, the blades may also be provided with a counterweight on their inner side.

Furthermore, it is known from CH 704066 A2 for such a turbine to couple the turbine blades with an additional mechanical operative connection. Said mechanical operative connection is achieved by means of a rod which is guided along the longitudinal axis of the

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turbine and which accordingly guides a pair of blades coupled together. A pair of blades is formed in each case by the blades facing each other on a diameter line. The rods are intended to support the opening and closing movement of the blades.

The object underlying the invention is to improve such a turbine, in particular a turbine for generating energy in flowing waters or flowing air, compared to the prior art and to enable a comparatively high degree of efficiency by simple means.

The object is achieved with the features of patent claim 1.

The individual blades of a turbine are arranged in a jointed manner on the outer circumference of a turbine wheel. They pivot radially outwards under the influence of the flowing or streaming medium (water or air) and fold back inwards in the opposite direction (the side facing away from the direction of flow), preferably forming the shell of the turbine wheel(s). The blades are substantially L-shaped, with a long leg of the blade preferably bent corresponding to the radius of the turbine shell. The short leg is located within the shell and points against the direction of rotation of the turbine. It is arranged in such a manner that it corresponds with at least one stationary element arranged within the shell when the turbine is rotating. According to the invention, tilting up/folding out the blades when contacting the stationary element is supported by the short leg.

Preferred embodiments of the turbine are disclosed in the dependent claims.

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Preferably, the at least one stationary element is formed as a pawl and arranged in a range of approx. 11.00 o'clock and/or 09.30 o'clock.

The angle of attack of the blades is 0° to approx. 90° to the tangent to the shell surface. Depending on the substantial flow direction or flow height, the blades can pivot out in the upper and/or lower part of the turbine.

Furthermore, an inflatable element, e.g. in the form of a hose or individual balls, can be arranged at the outer edge in the axial direction of the turbine, at least on some blades. At the beginning or during the pivoting out of the blades, the inflatable element can be filled with air or other gases, optionally inert gases, to accelerate the pivoting out.

An inert gas filling could be, e.g., helium, in particular when the invention is used as a wind turbine.

In the opposite direction, folding in the blades is supported by releasing the air. It is also possible to arrange the inflatable element only in the region of the outer edges (close to the turbine wheel) and not over the entire length of the blades.

Instead of a gas filling, the elements can be configured in the form of weights and accelerate opening of the blades in the lower region.

The outer shape of the long legs of the blades corresponds to a part of the shell surface of a cylinder. On the inside, the legs can also have guide vanes, which are either adjustable or fixed.

Preferably, the turbine has 4-16 blades.

It is also conceivable to arrange a plurality of turbines side by side and/or one above the other, e.g. in larger flowing waters or in the sea.

However, the invention is also usable as a pump, water pump, ship engine or the like, preferably including auxiliary aggregates.

The invention is described below in more detail by an exemplary embodiment based on a drawing. In the figures,

Fig. 1: shows a turbine according to the invention in a side view, and

Fig. 2: shows details of a blade of the turbine according to Fig. 1.

A turbine according to the invention, designed as a water turbine, is accommodated in a bearing 1, not illustrated in more detail, to be rotatable about its axis 2 and supported therein (Fig. 1). The direction of the axis 2 is approximately parallel to the water line of flowing water (and transverse to the direction of flow 8 of the flowing water), the turbine being arranged horizontally and completely submerged under water.

The turbine is cylindrical in its basic shape, with one turbine wheel 3 at each end face of the cylinder. The shell of the turbine is formed by twelve blades 4 (in folded position), which are arranged pivotably in pivot joints 6 of the turbine wheels 3. Accordingly, the pivot joints 6 are attached close to the circumference of the turbine wheels 3.

The blades 4 are substantially L-shaped (Fig. 2), a long leg 41 of the blade 4 being preferably bent corresponding to the radius of the turbine shell. The short leg 42 is located within the shell surface line and points against the direction of rotation of the turbine. The short leg is arranged in such a manner that when the turbine is rotating, it corresponds with at least one fixed pawl 9 located within the shell.

According to the invention, tilting up/folding out the blades 4 when contacting the pawl 9 is supported by the short leg 42. (Fig. 1). In the example, the pawl 9 is arranged such that its tip points to about 11.00 o'clock, like a clock hand.

In the example, the blades 4 are provided on their inside with a guide vane 5. At the outer edge of each blade 4 in the example, there is also arranged a hose 7 or similar element that runs in the axial direction and can be inflated with air. In this case, the air is supplied and discharged by means of a supply unit, which is not illustrated.

The blades 4 pivot out as soon as their position is approximately parallel to the direction of flow 8 and the short leg 42 contacts the pawl 9.

After a rotation to approx. 270°, one blade 4 is completely folded in again. The water level can be arbitrary and the respective upper blade can also be located just above the water surface when the turbine rotates.

Reference list

1 bearing
2 axis
3 turbine wheel
4 blade
5 guide vane
6 pivot joint
7 hose
8 direction of flow
9 pawl
41 long leg
42 short leg

PATENT CLAIMS

1. A turbine, in particular for generating energy in flowing air or in flowing waters, which is cylindrical in its basic shape and which is provided with blades arranged parallel to an axis (2) of the turbine, wherein the blades (4) are pivotably arranged in pivot joints (6) on the outer circumference of at least one turbine wheel (3),

   characterized in that the blades (4) are substantially L-shaped, wherein a long leg (41) of the blade (4) is preferably bent corresponding to the radius of the turbine shell and a short leg (42) is located within the shell surface line of the turbine.

2. The turbine according to claim 1, characterized in that at least one pawl (9) is arranged stationary in the shell of the turbine.

3. The turbine according to claim 1 or 2, characterized in that the at least one pawl (9) is arranged pointing at about 11:00 o'clock and/or at about 9:30 o'clock and is arranged in such a manner that it can be contacted by the short leg (42) of the blades (4) when the turbine is rotating.

4. The turbine according to any one of claims 1 to 3, characterized in that it comprises 4 to 16 blades (4).

5. The turbine according to any one of claims 1 to 4, characterized in that at least one blade (4) is provided along its outer edge parallel to the axis

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(2) with an inflatable element in the region of the blade ends.

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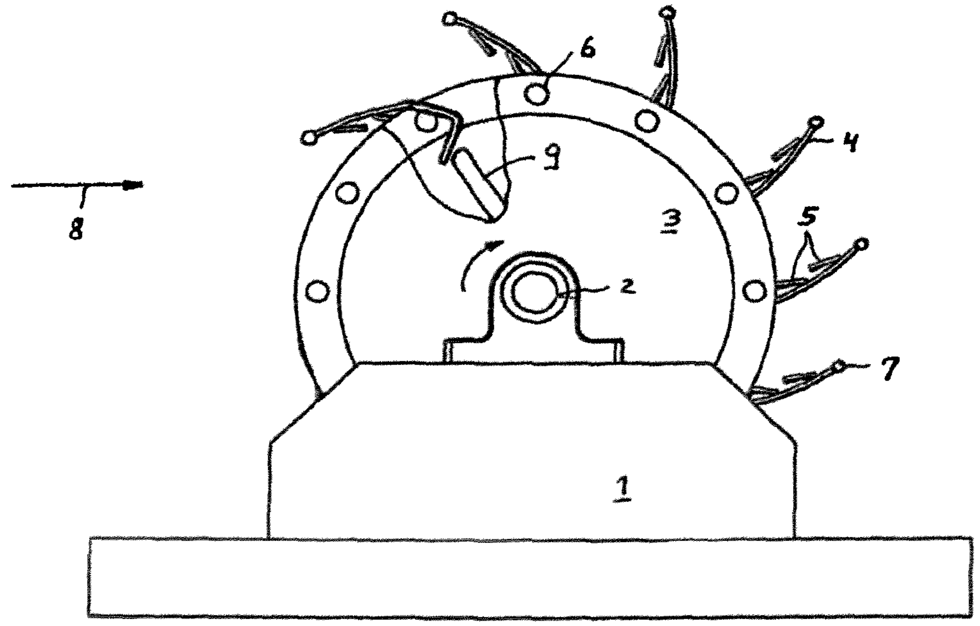

Fig. 1

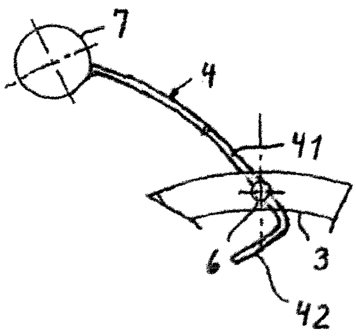

Fig. 2

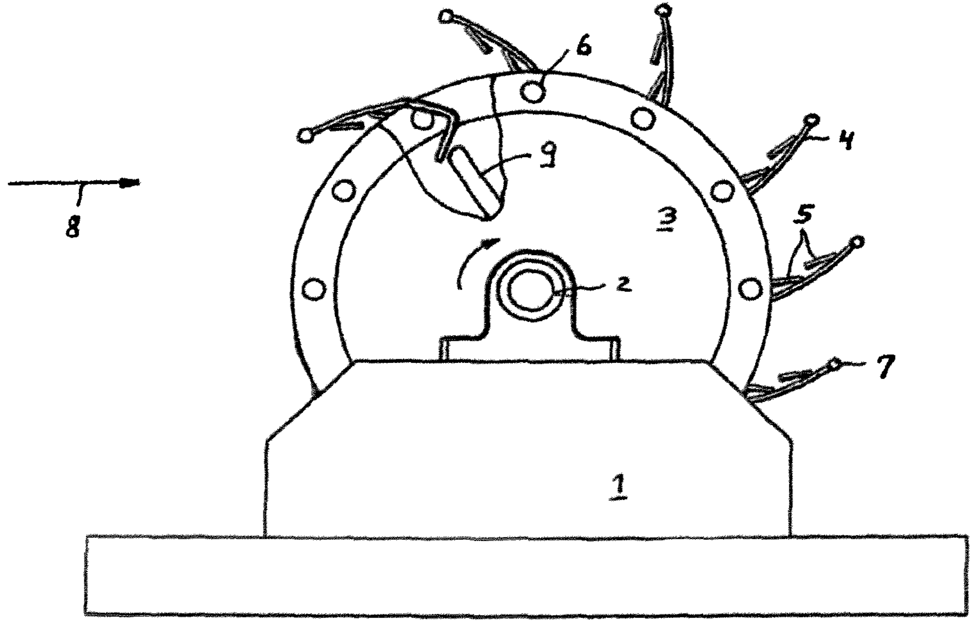

Fig. 1