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(73) Patenthaver: **Wepfer Technics AG, Thurtalstrasse 40, 8450 Andelfingen, Schweiz**

(72) Opfinder: **WEPFER, Hans, Eichenweg 5, CH-8471 Berg-Dägerlen, Schweiz**

(74) Fuldmægtig i Danmark: **Zacco Denmark A/S, Arne Jacobsens Allé 15, 2300 København S, Danmark**

(54) Benævnelse: **VINDTURBINE**

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Technical field

The present invention relates to a wind turbine installation as claimed in claim 1.

Prior art

Wind turbines have already been known for a long time as power generators. Powerful wind turbines follow one simple rule, that is to design the hub height and rotor circle to be as large as possible. Visibility, noise and shadow coverage are enormous. This fact means that wind turbines are always erected further away from civilian areas, whether on-or offshore. The very long access routes resulting therefrom, including service and maintenance costs, are anything but resource- and cost-effective.

It is an object of the invention to design a wind turbine installation such that it can be built close to civilian areas and thus saves on resources and costs. This is achieved by a flat, rotor-circle-reduced and modular construction.

Examples of wind turbines are known from the documents GB 2 443 886 and DE 10 2009 040 648.

Summary of the invention

One aspect of the present invention relates to a wind turbine installation comprising a turbine carrier on tower supports. At least two wind turbines are provided on the turbine carrier. The wind turbines are mounted rotatably by means of a rotating pedestal on a tower console.

In one particular embodiment, the wind turbine installation is designed such that the turbine carrier can rotate about the vertical axis via the rotating pedestal.

In one particular embodiment, the turbine carrier is designed such that it can control a rotation about the vertical axis for yaw adjustment in relation to the

wind direction. This embodiment furthermore preferably has a wind sensor for detecting the wind direction and a position motor for rotating the turbine carrier via the rotating pedestal.

In one particular embodiment, the turbine carrier with the turbine is designed such that it can be lowered by means of a drive. In this embodiment, the tower supports are designed in an articulated manner and as a parallelogram.

In one particular embodiment, a pitch axis of the turbine is designed to be adjustable by means of a length adjuster via the tower support.

In one particular embodiment of the present invention, turbine carrier, tower supports and turbines are designed to be modular according to the modular principle.

In one particular embodiment, the tower supports are arranged in the interspace of the rotor circles of the wind turbines.

In one particular embodiment, the wind turbine installation is designed in such a way that the wind force itself undertakes the yaw adjustment via a point of rotation. In a further, particular embodiment, the wind turbine installation has three offset turbines, namely a left turbine, a right turbine and a central turbine. The central turbine is arranged at the point of rotation and is the foremost turbine. The left and the right turbines flank the central turbine and are offset rearwardly in the wind direction.

In one particular embodiment, the wind turbine installation is designed such that it can be used on-and offshore via the tower console.

In one particular embodiment, the wind turbine installation is designed such that it can be used on a ship via the tower console. A further aspect of the present invention relates to the use of a wind turbine installation as described above on a ship.

Brief description of the drawings

Further advantageous embodiments and combinations of features of the invention will become apparent from the detailed description given below and from all the patent claims.

In the drawings used to illustrate the exemplary embodiment:

Figure 1 shows a wind turbine installation according to the invention with one possible arrangement of two wind turbines in front view.

Figure 2 shows a wind turbine installation according to the invention in side view.

Figure 3 shows a wind turbine installation according to the invention in side view with a lowering mechanism.

Figure 4 shows a wind turbine installation according to the invention with one possible arrangement of seven wind turbines in front view.

Figure 5 shows a wind turbine installation according to the invention in plan view.

In principle, identical parts are provided with identical reference signs in the figures.

Figure 1 shows a turbine installation, where, according to one embodiment, two wind turbines 7, 7' are mounted on a horizontal turbine carrier 5. A tower support 4, 4' is used to connect a turbine carrier 5 to a rotating pedestal 2. The rotating pedestal 2 rotates on a stable tower console 1 and is wind-direction-controlled (yaw) via a wind sensor 8 and by means of a position motor 3. Therefore, a rotor circle 6, 6' is always placed optimally in relation to the wind direction.

Figure 2 shows the wind turbine 7 with a generator 9, a rotor blade 10 with a rotor circle 6, mounted on the horizontal turbine carrier 5. The horizontal tower carrier 5 is connected via a tower support 4 to a rotating pedestal 2 which is mounted on a stable tower console 1.

Figure 3 shows a lowerable wind turbine 7 which is advantageous in very severe weather conditions or for servicing. The lowering operation takes places in parallel with the tower supports 4, 4' by means of a drive 11. The position of the wind turbine 7 can be varied by a length adjuster 12.

Figure 4 shows a turbine installation, where, according to one embodiment, seven wind turbines 7, 7', 7", 7"', 7"", 7""', 7""" are mounted on a horizontal turbine carrier 5. This can advantageously be achieved with a modular construction according to the modular principle 13.

Figure 5 shows a turbine installation, where, according to one embodiment, three wind turbines 7, 7', 7" are mounted on a horizontal turbine carrier 5. A left wind turbine 7 and a right wind turbine 7" are offset rearwardly in the wind direction with respect to a central wind turbine (7'). A point of rotation 15 in the central wind turbine 7' contributes to the fact that this turbine installation can be positioned in relation to the wind direction automatically and only with wind force.

Patentkrav

1. Vindturbineanlæg med en turbinebærer (5), som bæres på tårnstøtter (4, 4', 4", 4"'), **kendetegnet ved, at** der på turbinebæreren (5) er tilvejebragt mindst to turbiner (7, 7', 7", 7"', 7"", 7""', 7"""), og tårnstøtterne (4, 4', 4", 4"') er anbragt drejeligt med et drejestel (2) på en tårnkonsol (1).

2. Vindturbineanlæg ifølge krav 1, **kendetegnet ved, at** turbinebæreren (5) er drejelig om den vertikale akse via drejestellet (2).

3. Vindturbineanlæg ifølge krav 1 eller 2, **kendetegnet ved, at** turbinebæreren (5) kan styres drejeligt om den vertikale akse i forhold til krøjningen yaw ved hjælp af en vindsensor (8) via et drejestel (2) med en positionsmotor (3) i forhold til vindretningen på en sådan måde, at turbinerne (7, 7', 7", 7"', 7"", 7""', 7""") altid har en rotorakse, som forløber vinkelret på vindretningen.

4. Vindturbineanlæg ifølge et af kravene 1 til 3, **kendetegnet ved, at** turbinebæreren med turbinerne (7, 7', 7", 7"', 7"", 7""', 7""") er udformet på en sådan måde, at den kan nedsænkes med en drivanordning (11) via tårnstøtter (4, 4', 4", 4"'), der er ledmæssigt udformet som parallelogram.

5. Vindturbineanlæg ifølge krav 4, **kendetegnet ved, at** en hældningsakse af turbinerne (7, 7', 7", 7"', 7"", 7""', 7""") er udformet på en sådan måde, at den kan indstilles ved hjælp af en længdeindstilling (12) via tårnstøtten (4').

6. Vindturbineanlæg ifølge et af kravene 1 til 5, **kendetegnet ved, at** turbinebærer (5), tårnstøtter (4, 4', 4", 4"') og turbiner (7, 7', 7", 7"' , 7"", 7""', 7""") er modulært udformet i henhold til et byggeklodsprincip (13).

7. Vindturbineanlæg ifølge et af kravene 1 til 6 eller kravene 1, 4, 5 og 6, **kendetegnet ved, at** tårnstøtterne (4, 4', 4", 4"') er anbragt i et mellemrum (14) mellem turbinernes (7, 7', 7", 7"', 7"", 7""', 7""") rotorcirkler (6, 6', 6", 6"', 6"", 6""', 6""").

8. Vindturbineanlæg ifølge et af kravene 1 til 7, **kendetegnet ved, at** vindkraftturbinen er udformet på en sådan måde, at vindkraften selv overtager krøjningen yaw, især via et drejepunkt (15) ved en midterturbine (7').

9. Vindturbineanlæg ifølge krav 1 til 7, **kendetegnet ved, at** vindturbineanlægget kan anvendes on- og offshore via tårnkonsollen (1).

10. Vindturbineanlæg ifølge krav 1 til 7, **kendetegnet ved, at** vindturbineanlægget kan anvendes på et skib via tårnkonsollen (1).

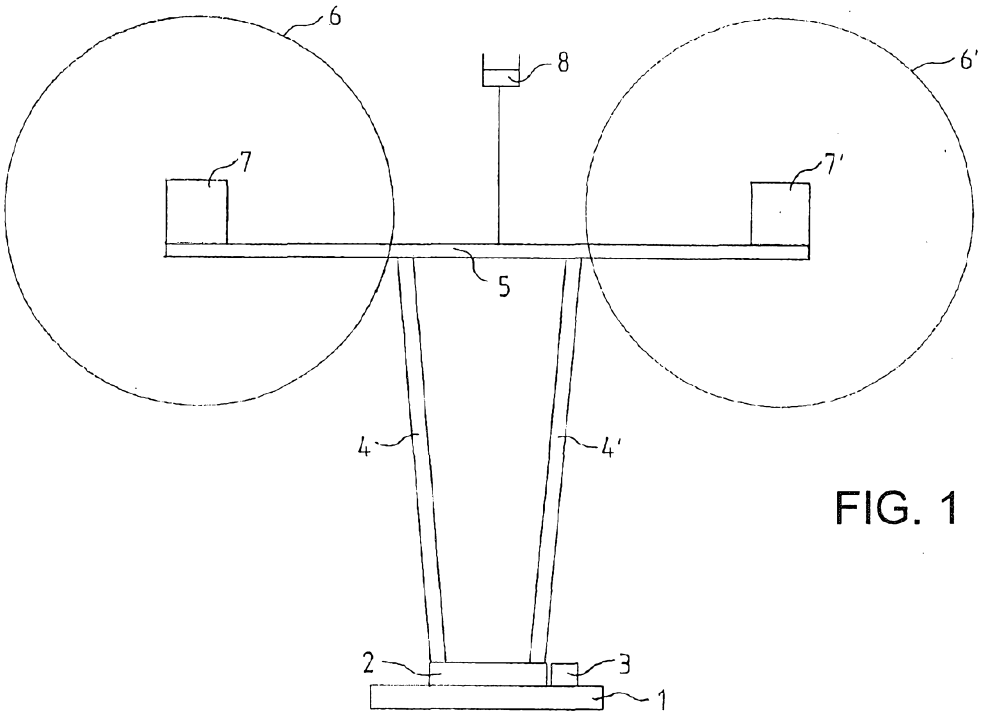


FIG. 1

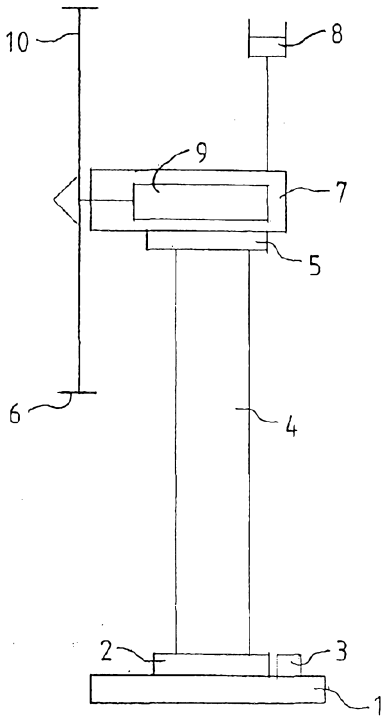


FIG. 2

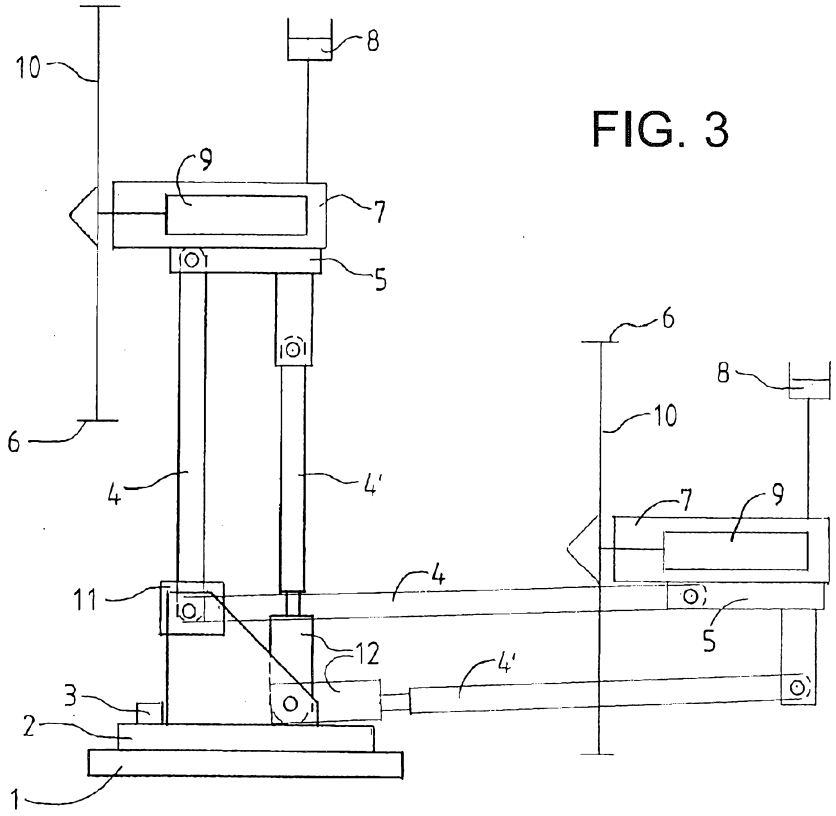


FIG. 3

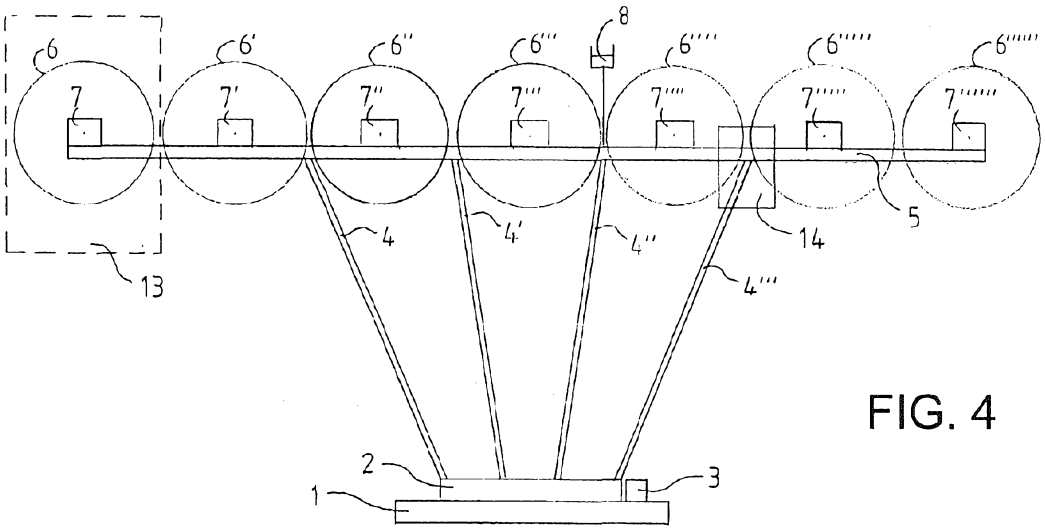


FIG. 4

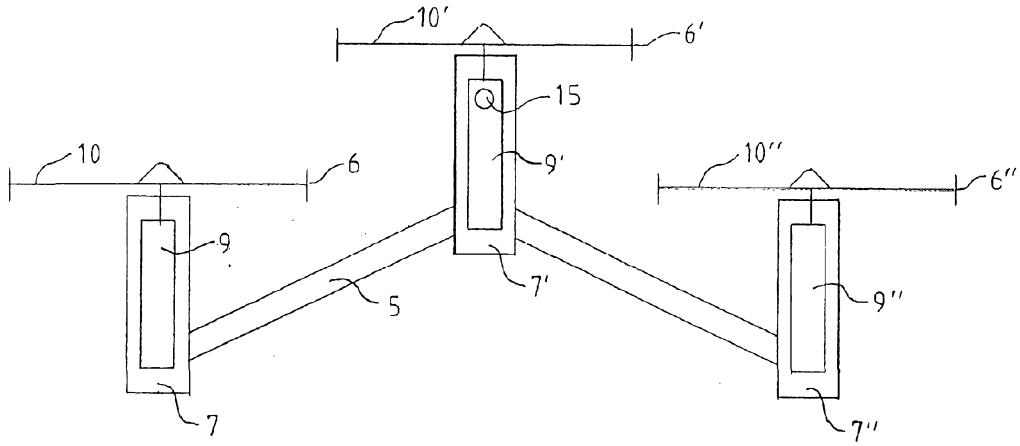


FIG. 5