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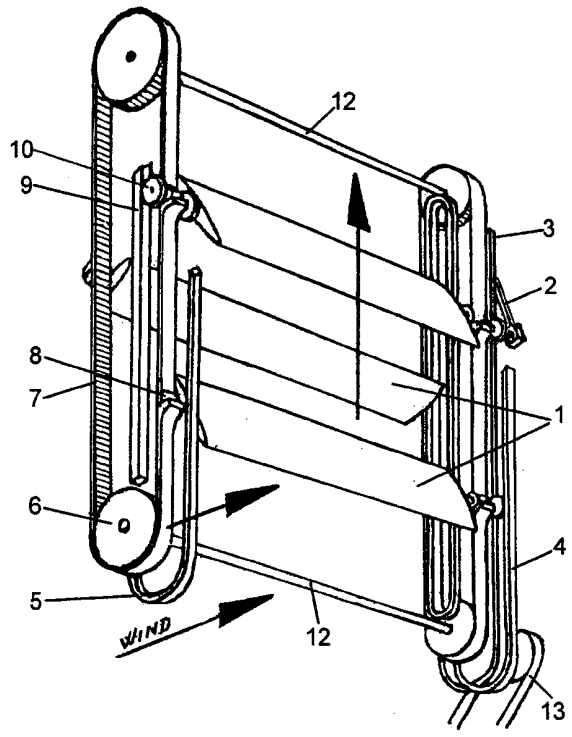
(54) Title: WIND POWER MACHINE



(57) Abstract: It is mentioned a device with a wind power machine for utilization of the energy in flowing fluid as air and water by that the device comprises transversal moving vanes which may yield a higher efficiency than e.g. traditional wind mills. Furthermore there is mentioned a regulation system for the pitch and a supporting system for the vanes which will make a wind power machine like this more efficient than those we find in literature. In the same way it is mentioned a construction which may be built on a tower and thus came to higher level which may increase the efficiency considerably as the air speed increases with about the power of four.

WO 01/27470 A1

WIND POWER MACHINE

This invention concern a device for utilization the energy in flowing fluida as air or water and which will utilize the energy by that the device in the following mostly called wind power machine includes vanes or blades which are fixed on a mobile element and in this way obtain a transversal (sideways, parallel) motion. The vanes are controlled by an organ in such a way that the area of the vane obtain an angle (attack angle or pitch) to the direction of the movement and when the flow of fluida is pressing on the vanes they will be moved sideways (parallel), figure 2, and the movement will through another organ be transferred to useful energy, i.e. rotating energy. The regulation of the machine is executed by changing the pitch or the angle of attack for the vanes , S, figure 3,. In this way it is possible to obtain an optimal utilization of the machine within a great range of wind speed.

Figur 1 shows a simplified sketch of the system. The machine is built up with the vanes, 1, as the main element. The vanes are mounted on a belt, 7, which can be a roller chain, a tooth belt or something similar, from now on called the carrying belt. On a model carried out it was used a tooth belt made from polyester whereon the bases for bearings, 8, was fastened with epoxy glue. In a eventual production it is recommended to use bases for the bearings which are moulded directly into the belt, figure 5. By use of roller chains the bearings can easily be built directly into the links of the chain.

The main purpose of the carrying belt is to transfer the energy from the vanes to the power output, 13, and to keep a correct distance between the vanes. The carrying belt is running over the wheels, 6, which are firmly mounted in couples through a shaft, 12, As the carrying belts are exactly of the same length and the wheels are firmly connected to eachother through the shaft, 12, the vanes will always run synchronous and correct.

If e.g. the vanes at "wind side" are going upwards, they obviously will run the opposite way (downwards) on the "back side" (The mashine can work in every posistion of the axis: horisontally, vertically or other orientation) the pitch will be oriented so that the angle on back side has opposite values of the first side, figure 2. In addition, the flow, W, of the fluida which has passed the vanes at the "wind side" will change the direction and in that way obtain an optimal angle of attack against the vanes at the "back side", figure 2. On the vane shafts there are mounted small supporting wheel, 10, which runs against the supporting rails, 4 and 9, (figure 4). The pressure of the fluida against the vanes will make a force, P, against

the supporting wheel, this force is taken up by the supporting rails, figure 5. There are supporting rails at the back on the vanes at both sides in order to take up the force from the wind. In addition there are supporting rails on the "wind side", but of a lighter construction in order to give the belt and the vanes a more steady running. The supporting rails can surround the wheel, 6, or they can only cover the straight part of the track and in this way be quite straight. The supporting wheels or the supporting rails or both can be covered with a noise absorbing material to reduce the noise between the wheels and the rails.This construction with supporting wheels and supporting rails make the vanes able to receive greate forces and thereby transfer great effects.

This construction involves that it is the supporting wheels and supporting rails which receives the force, P, from the vanes and in this way they really are supported here. The carrying belt has as purpose to transfer effect from the vanes to the wheels, 6, the power output, 13, and to keep correct distance between the vanes.

The control of pitch of the vane, S, figure3, is excecuted by a leading arm, 2, which is following a track in a guide rail, 3, and by moving the guide rail sideways in relation to the path of the vanes the pitch may be changed, figure 3. Because that the vanes shaft are plased at the centre line for the vanes the force will give small moments and small forces on the leading arms.

In this construction the guide rail path is of the same form as the vanes path, C, figure 3 and is eccentric, E, in relation to the this as shown in figure 3, where A is the centre line for the vanes path and B is the centre line for the guide rail path. By sliding the guide rail sideways i.e. change the eccentrisity, E, figure 3, in relation to the vane path the pitch for the vanes will be stepless changed. A servomotor, 15, in connection with an element i.e. a system of bars, 16, may by means of the slide, 14, move the guide rail sideways and thus adjust the pitch for the vanes. The total system may be controlled by anemometers placed in proper distance on the ground around the wind power mashine.

It may also be so that the air speed may vary from the “wind side” to the”back side” and due to this it may be rational to make a differense in pitch at the “wind side” and the “back side” in order to give optimal effect.By making the arcs in the guide rails a little elastic, the distanse, D, between the parallell parts of the rails can be varyed, figure 3, and thus the

leading arm, 2, will give a difference in pitch on the "wind side" and the "back side".

The wind power mashine may be mounted at the top of a tower, 18, which partly may be turned 360 degrees around the vertical axis by a servomotor, 24, which can be controlled by a proper number of anemometers, 25, placed on the ground around the tower. A central computer may collect the informations from the anemometers and estimate the best pitch and direction for the wind power machine.

The wind power mashine may be mounted at a tower by setting couples of inverted elements against eachother, figure 6, and thereby place them so that the controlsystem in each part is directed against the centre of the tower and thereby may be protected against the weather by a sharp wind shield, 26, which at the same time leads the wind against the vanes. In this way it is obtained that the wind energy not is lost and at the same time this shield will protect the steering mechanism against the weather and wind. In the same way it can be built wind collectors, 21, around outer border of the wind power machine and thus increase the effective wind area, figure 6. The output, 13, may be connected to the shafts for the wheels, 6, in the middle area of the system.

A survey of the figures:

Figur 1 shows a simplified sketch of the principle of the wind power machine.
Figur 2 shows the principle of the air flow.
Figur 3 shows the control system for the pitch for the vanes.
Figur 4 shows the principle with supporting wheels and supporting rails.
Figur 5 shows the bearing for the vanes axis on carrying belt and the force conditions on the support rails..
Figur 6 shows the mounting of a couple of inverted wind power aggregate.
Figur 7 shows a half cross section and a half projection of the wind power machine with the wind collectors mounted at the top of a tower with the turning mechanism for the wind directions.

Figur 8 is a simplified sketch of the wind power machine in the ground with the anemometers placed in the area around.

Table over the postions number:

1: Vane or blade
2: Steering lever
3: Guide rail
4: Support rail for the vane
5: Support rail for the vane
6: Wheel for the carrying belt
7: Carrying belt for the vanes
8: Base for the vanes bearing on the carrying belt
9: Support rail for the vanes
10: Support wheel for the vanes
11:
12: Shaft for wheels for the carrying belt
13: Output
14: Slide for controlling of the vanes
15: Servomotor for control of pitch
16: Bars for controlling the pitch of vanes.
17: Bearing for shaft for the vane
18: Tower
19: Bearing
20: Bearing
21: Wind collector
22: Frame
23: Trunk
24: Servomotor
25: Anemometer
26: Wind collector and shield for built-in of the controlsystem.

CLAIMS

1. A device with a wind power mashine for utilization energy in flowing fluida as water or air characterized by that the device include vanes or blades, 1, which are fixed on elements, 7, 8,10, which moves across the length direction of the vanes and the vanes will in that way get a transversal (parallel) movement and they are controlled by an organ, 2, which will turn them round the length axis of the vanes in such a way that the vane area is adjusted to a slope and thereby get an angle in relation to the moving direction (angle of attack, pitch) and when a fluid flows against the vanes they get a driving component causing the vanes to move sideways (parallel) and when the vanes at the backside have opposite pitch and opposite moving direction will the flow of fluida which has got a direction against these also give a contribution to the drive and when the vanes have supporting wheels which runs on supporting rails, 3, may the vanes be able to receive great forces and thereby give great output which can contribute to make the construction rather slender and thus suitable for mounting on i.e. a tower by setting couples of inverted elements against eachother with the control mechanism oriented against the vertical centre line of the tower and which then may be built inside the wind collector, 26, and it may be recommended to built wind collectors around the wind power mashine to enlarge the wind area.
2. A device according to the claim 1 characterized by that the wind power machine includes a regulation device for regulation of the vane pitch by a steering lever, 2, which follow a guide rail ,3, and which may be of the same shape as the path for the vanes but eccentric in relation to this and which may be moved sideways and change the eccentricity, E, and thus turn the steering lever which then turns the vanes and thus in turn adjust to a good pitch in relation to the wind conditions
3. A device according to the claim 1 an 2 characterized by that the wind power machine includes a servomotor, 15, and a element, 16, which moves the guide rail sideways by means of an element, 14 in order to regulate the pitch..
4. A device according to the claim, 1, characterized by that the wind power machine includes a supporting wheels,10, which run on supporting rails ,4,5,9, and in this way

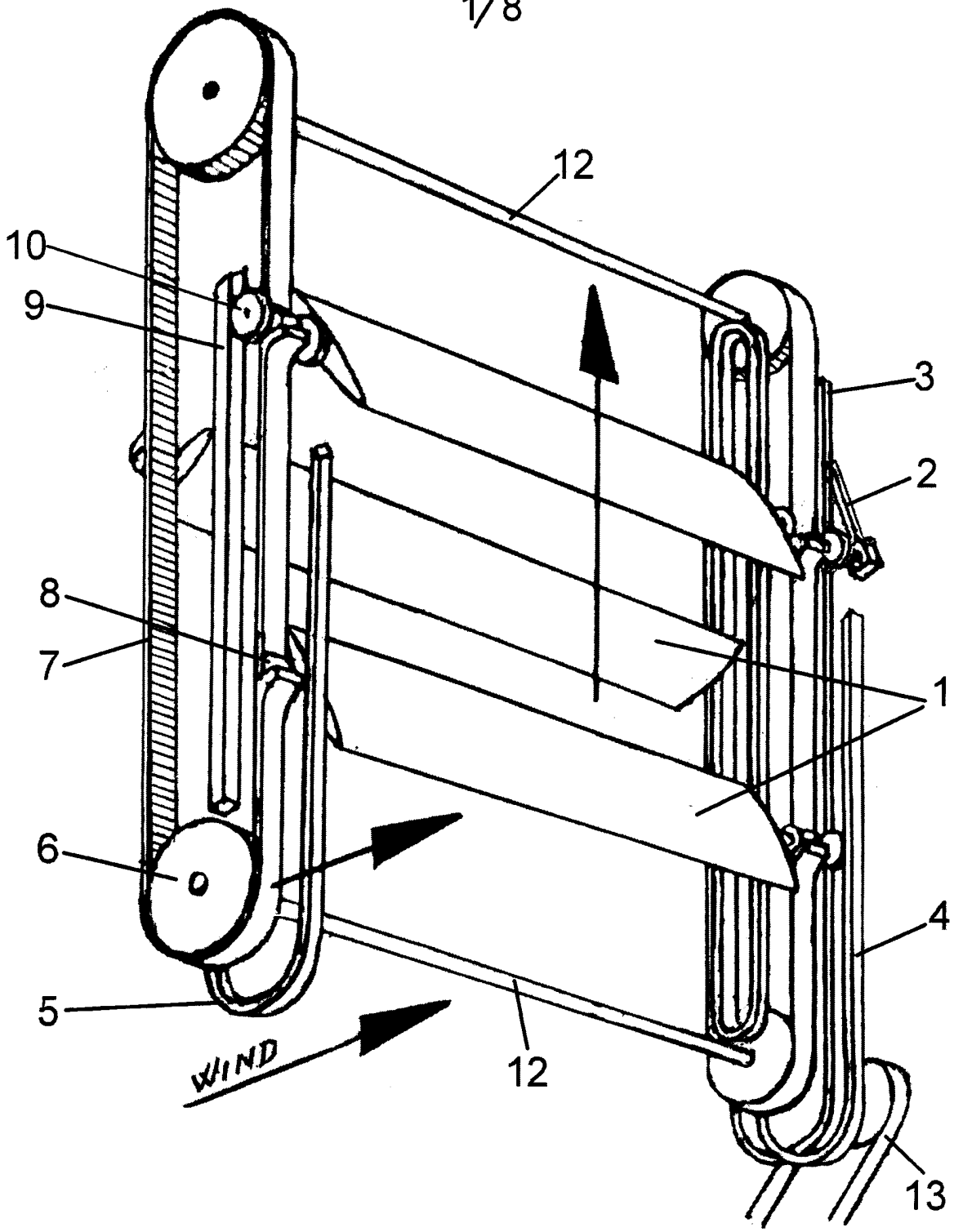


Fig 1

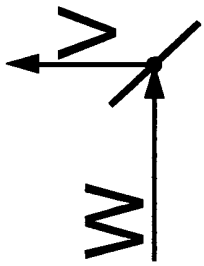


Fig 2

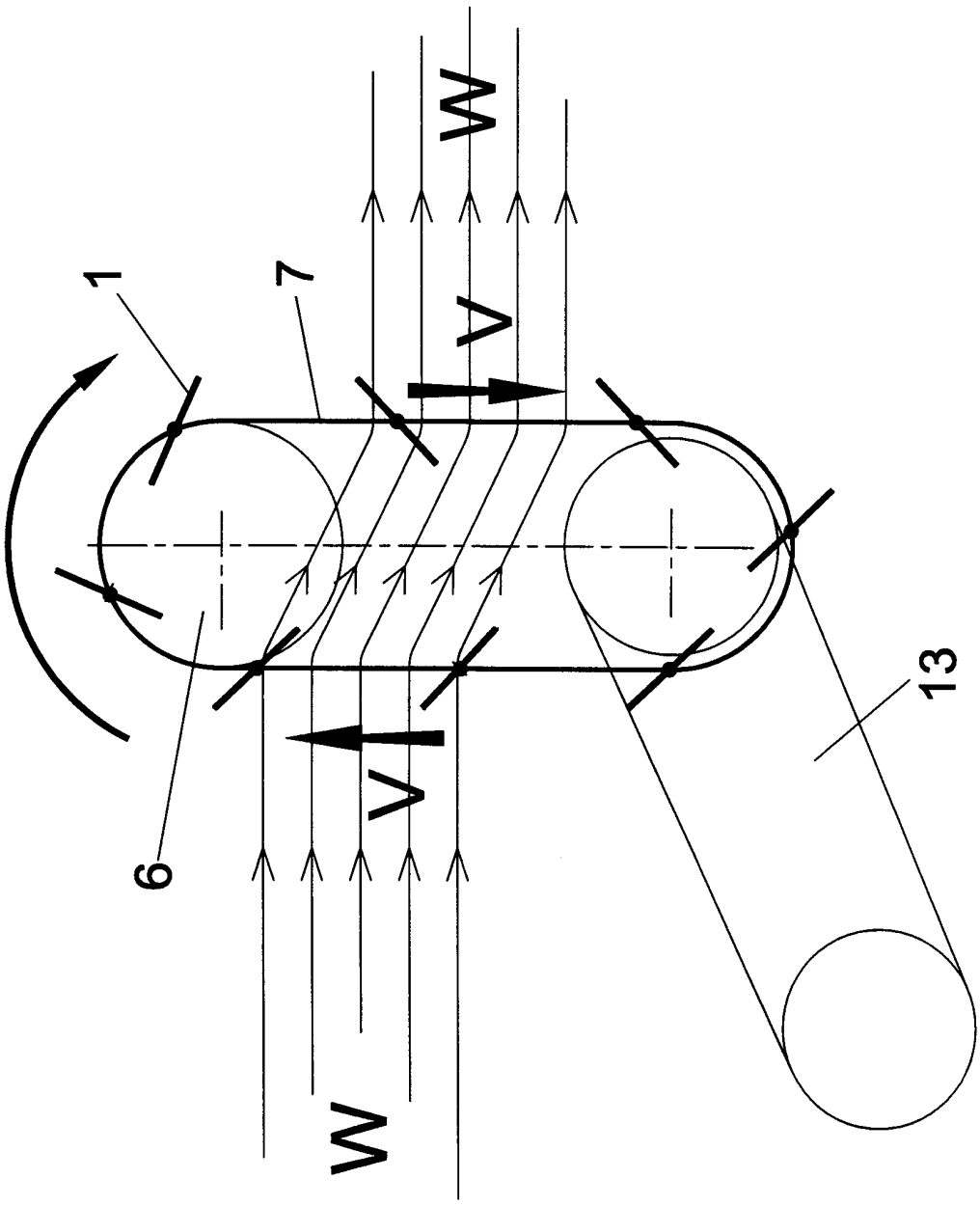
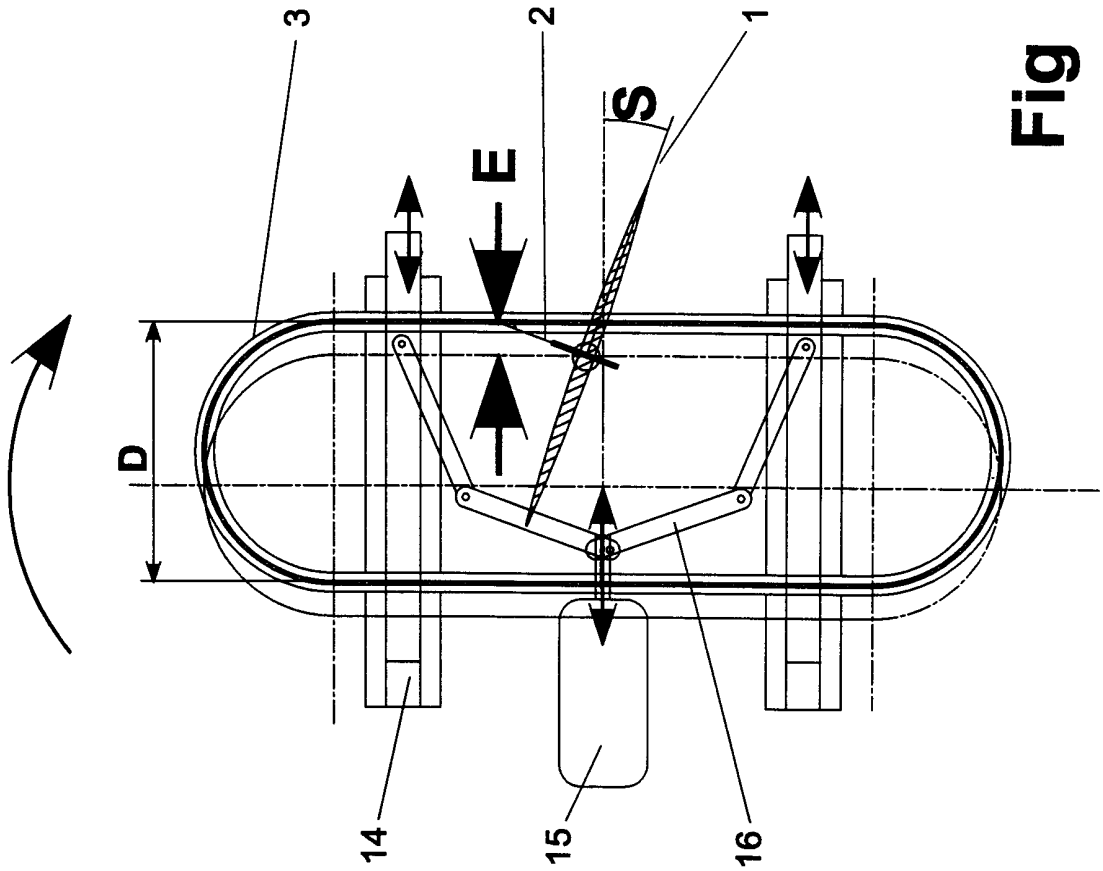


Fig 3



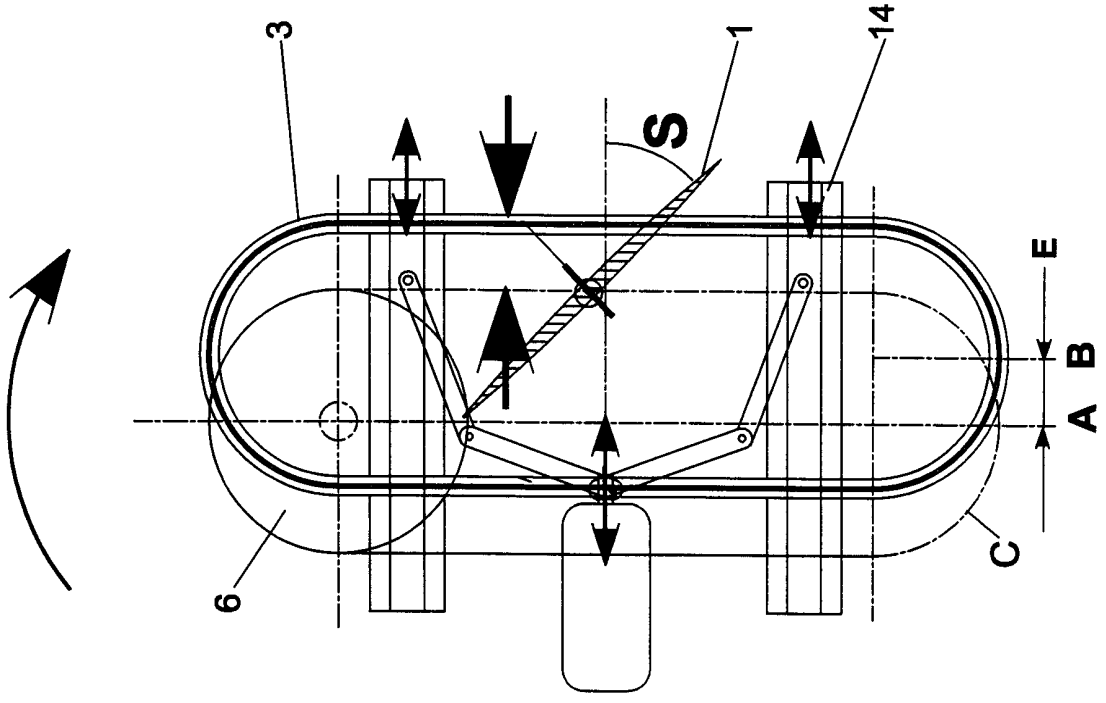


Fig 4

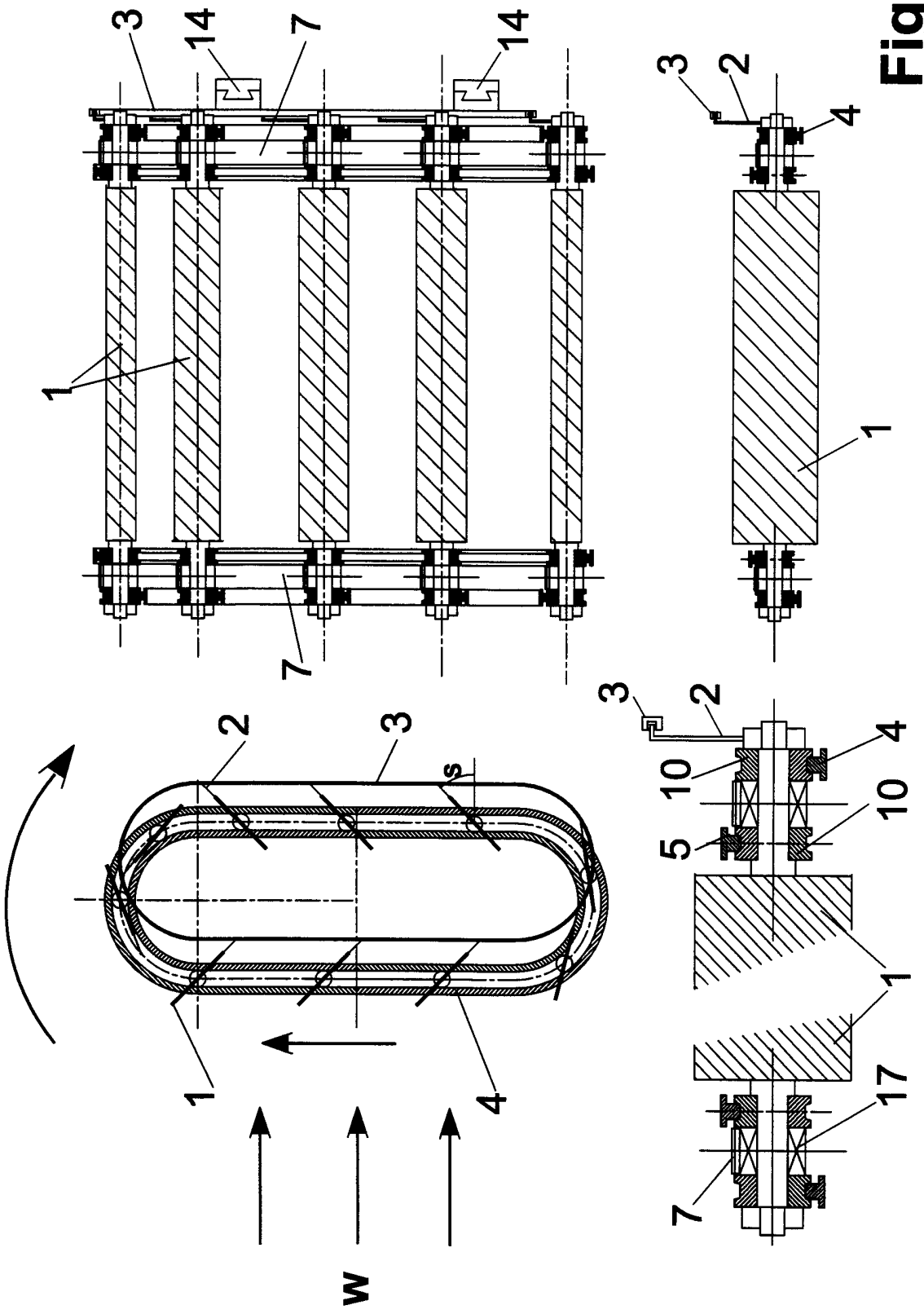
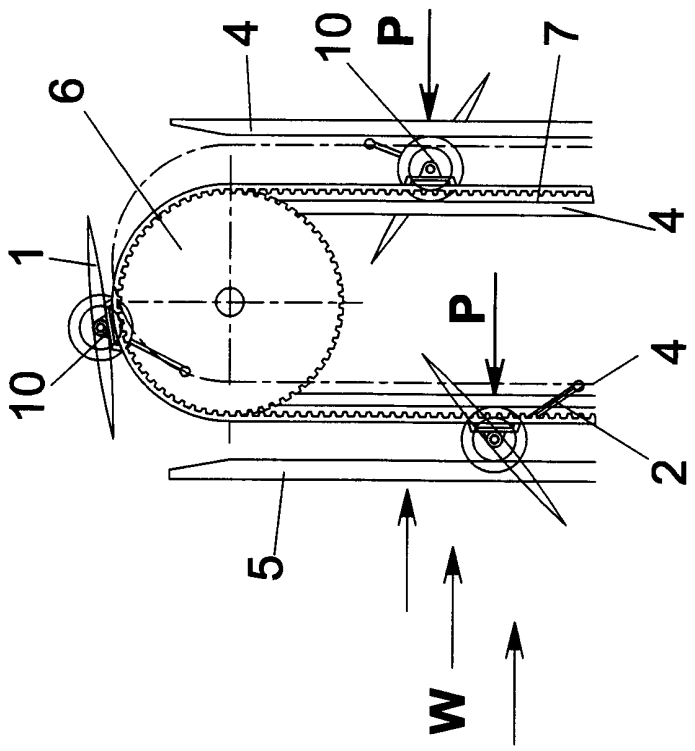
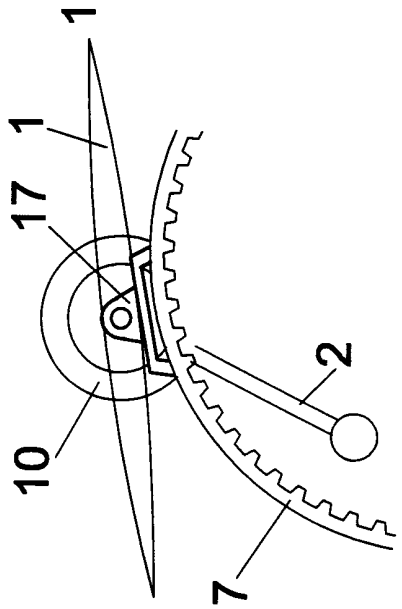
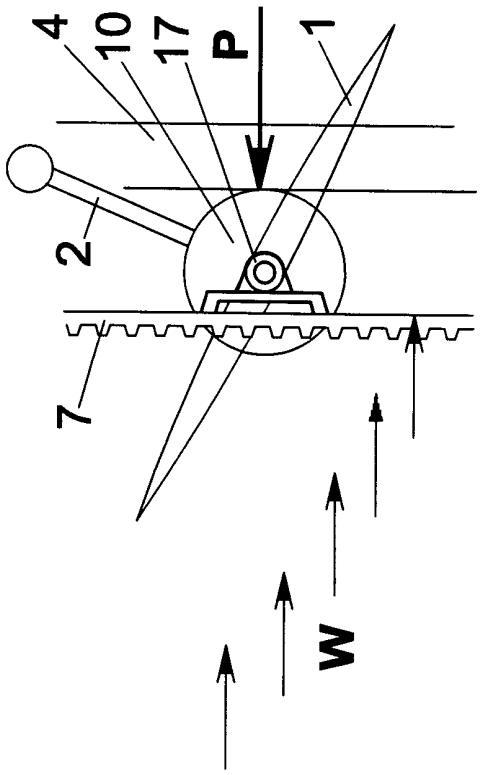


Fig 5







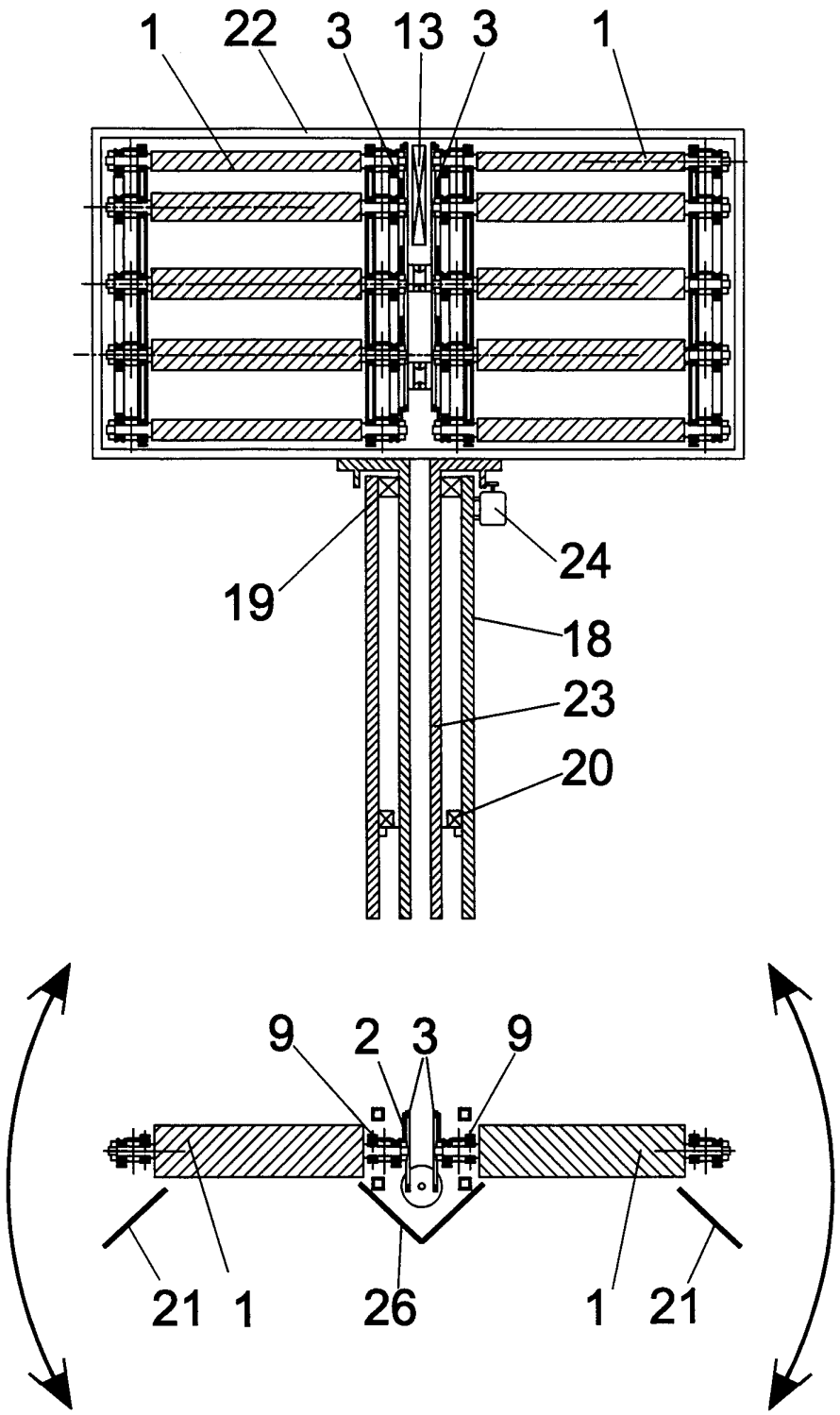


Fig 6

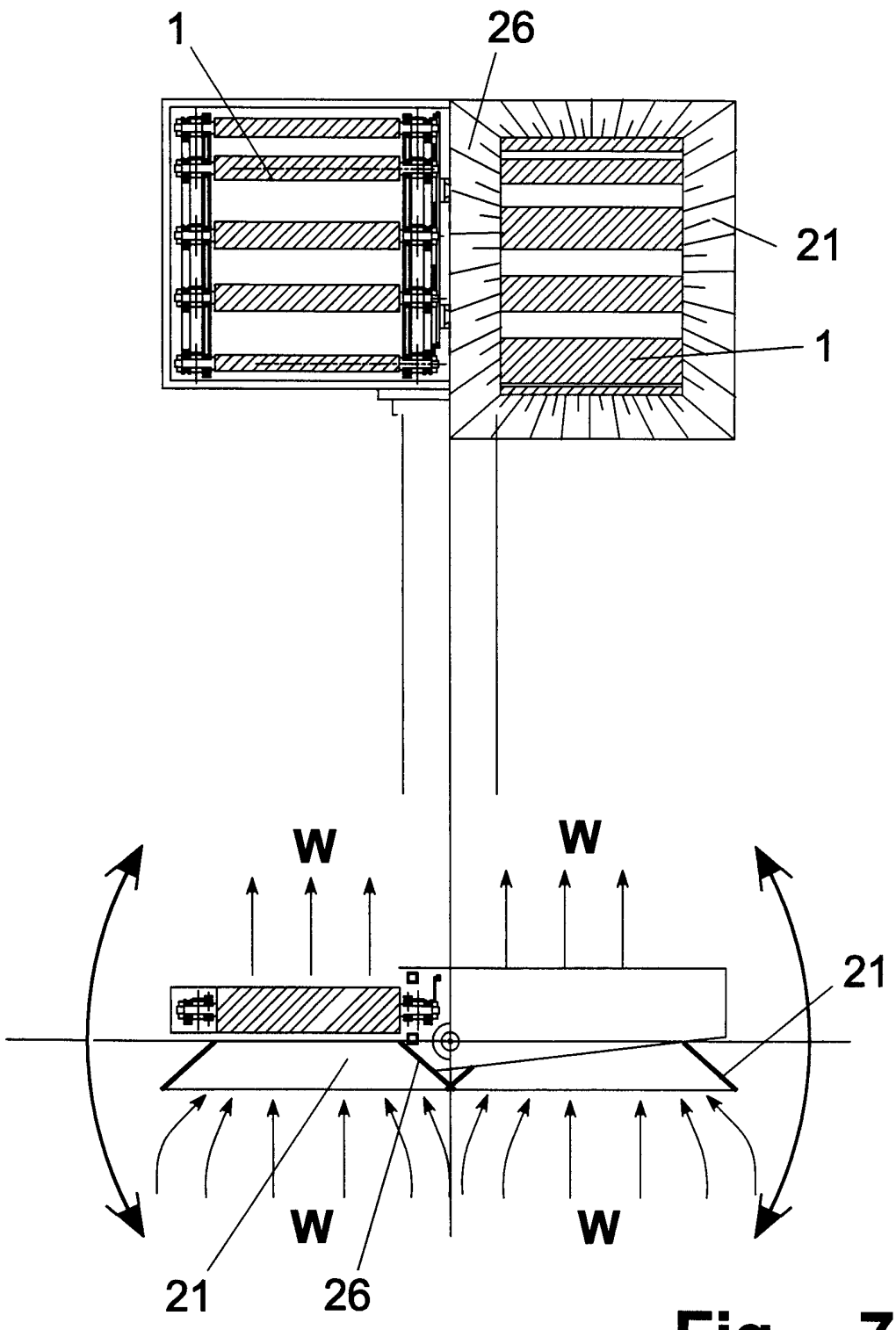


Fig 7

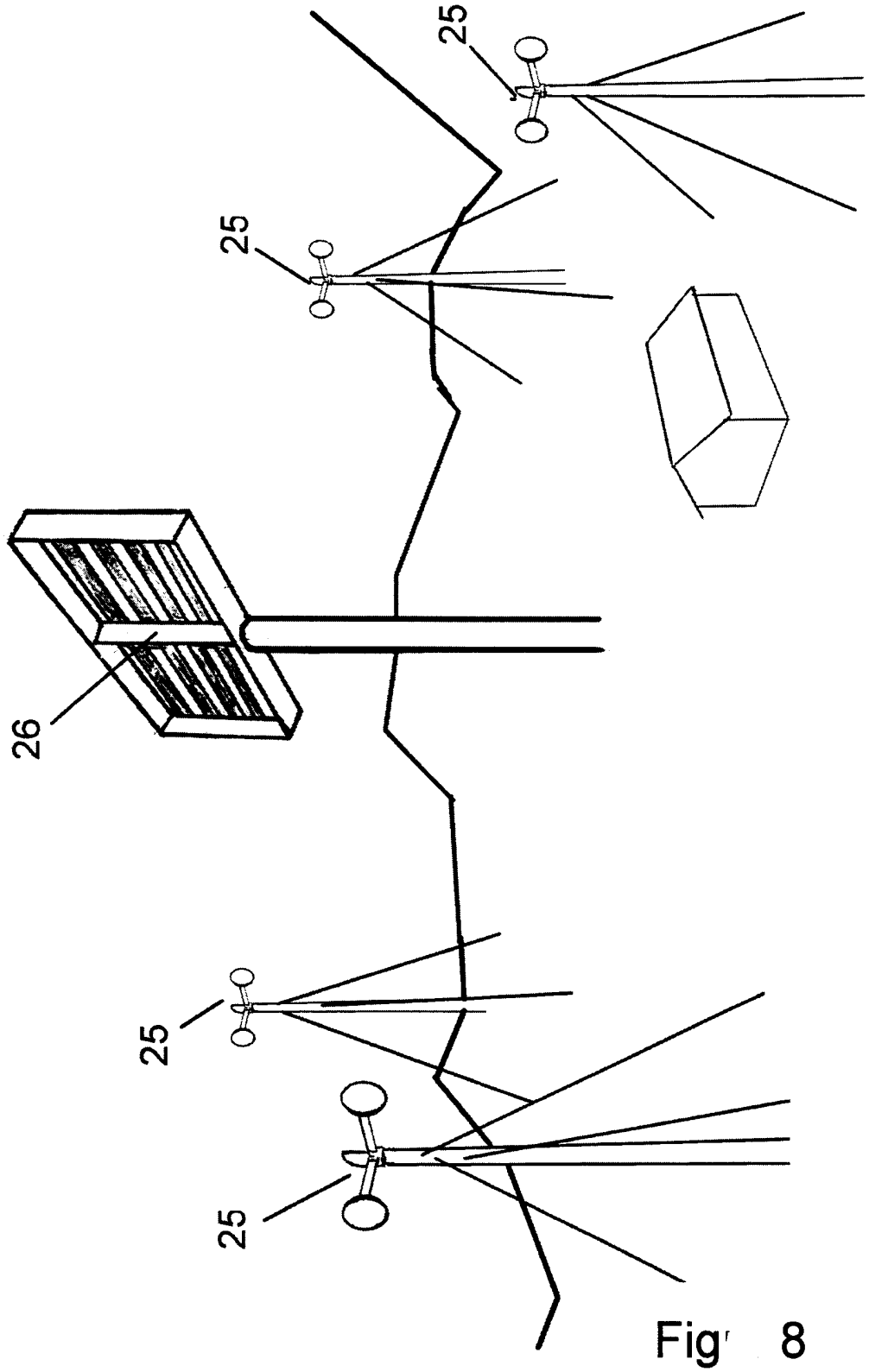


Fig 8

INTERNATIONAL SEARCH REPORT

International application No.
PCT/NO 00/00332

A. CLASSIFICATION OF SUBJECT MATTER

IPC7: F03D 5/02 // F01D 23/00, F03B 9/00
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC7: F01D, F03B, F03D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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X	FR 2297333 A1 (BERGES ROBERT), 6 August 1976 (06.08.76), page 2, line 2 - line 18, figures 1,2 --	1,2,4
X	US 3730643 A (DAVISON), 1 May 1973 (01.05.73), figures 1-17, claims 1-8, abstract --	1,4
X	Derwent's abstract, No 94- 33313/04, week 9404, ABSTRACT OF SU, 1786281 (ELESKIN V G), 7 January 1993 (07.01.93), abstract, details 12,15 --	1,4

[X] Further documents are listed in the continuation of Box C. [X] See patent family annex.

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Date of the actual completion of the international search	Date of mailing of the international search report
22 February 2001	26 -02- 2001
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INTERNATIONAL SEARCH REPORT

Inter. ional application No.
PCT/NO 00/00332

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

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INTERNATIONAL SEARCH REPORT

Information on patent family members

05/02/01

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