

No. 681,181.

Patented Aug. 27, 1901.

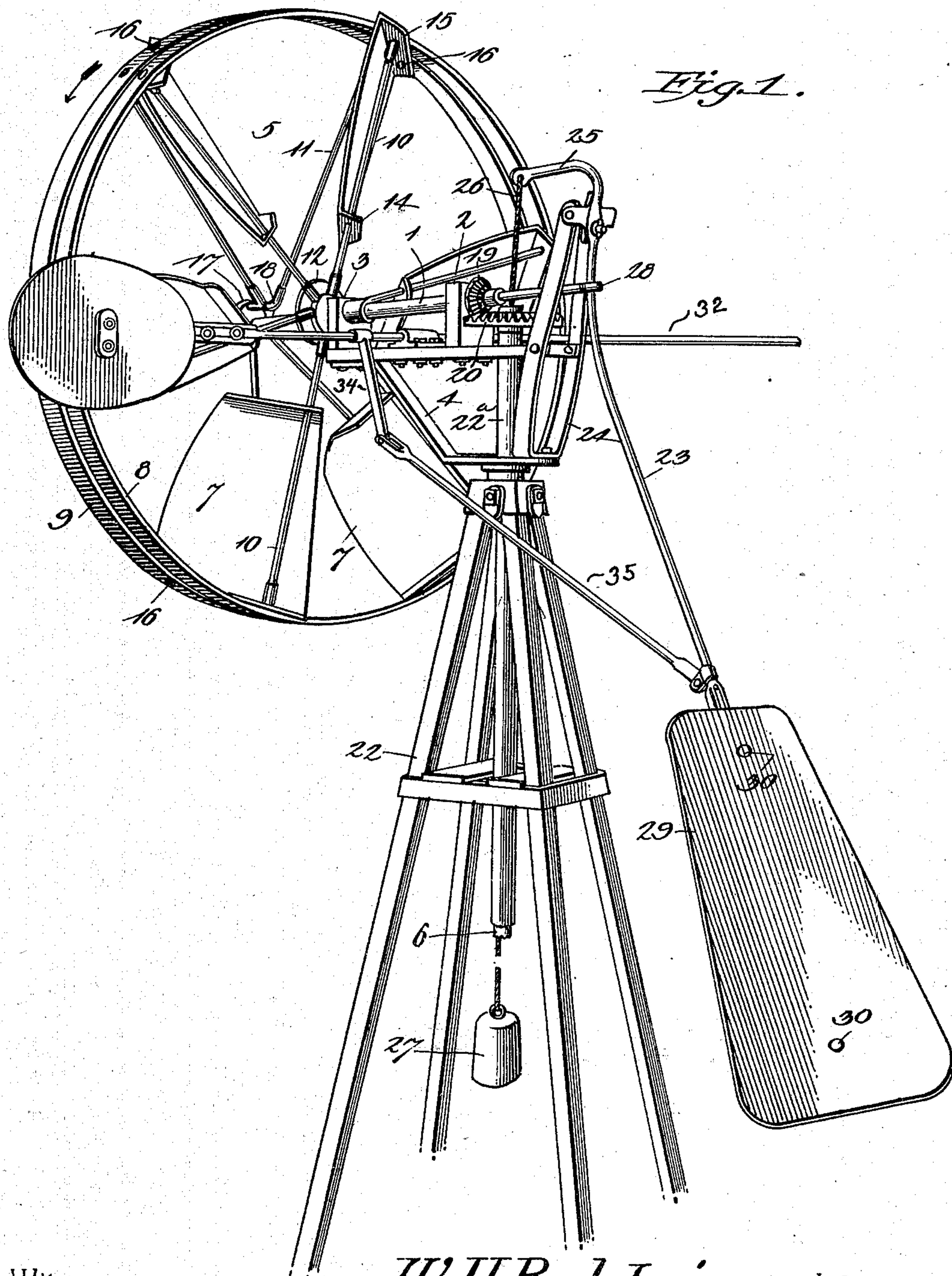
W. H. BALDWIN.

WINDMILL.

(Application filed Feb. 11, 1901.)

(No Model.)

2 Sheets—Sheet 1.



Witnesses

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H. J. Riley

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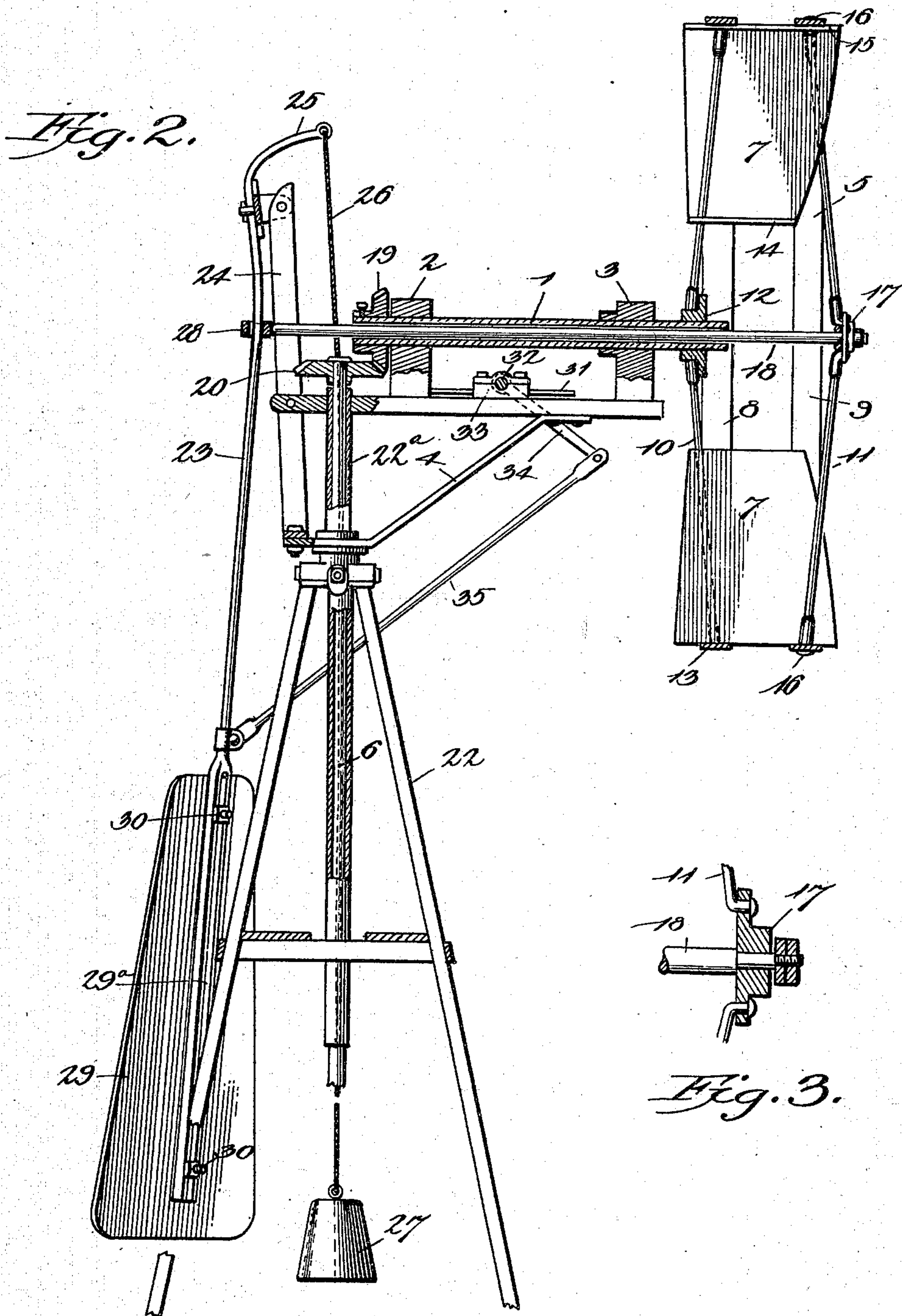
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UNITED STATES PATENT OFFICE.

WILLIAM H. BALDWIN, OF AINSWORTH, NEBRASKA.

WINDMILL.

SPECIFICATION forming part of Letters Patent No. 681,181, dated August 27, 1901.

Application filed February 11, 1901. Serial No. 46,914. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM H. BALDWIN, a citizen of the United States, residing at Ainsworth, in the county of Brown and State of Nebraska, have invented a new and useful Windmill, of which the following is a specification.

The invention relates to improvements in windmills.

One object of the present invention is to improve the construction of windmills and to provide a simple and comparatively inexpensive one of great strength and durability, adapted to govern itself automatically, so as to travel at a uniform speed in heavy winds and also to prevent it from being broken or otherwise injured by the same.

A further object of the invention is to provide a device for preventing the wind-wheel where the wind-wheel shaft is connected by gearing with the vertical shaft from creeping around the horizontal gear-wheel and partially getting out of the wind.

The invention consists in the construction and novel combination and arrangement of parts hereinafter fully described, illustrated in the accompanying drawings, and pointed out in the claims hereto appended.

In the drawings, Figure 1 is a perspective view of a windmill constructed in accordance with this invention. Fig. 2 is a vertical sectional view of the same. Fig. 3 is a detail sectional view illustrating the manner of swiveling the outer frame of the wind-wheel.

Like numerals of reference designate corresponding parts in all the figures of the drawings.

1 designates a horizontally-disposed tubular wind-wheel shaft journaled in suitable bearings 2 and 3 of a rotary frame 4 and connected at its outer end to a wind-wheel 5 and at its inner end by suitable gearing with a vertical shaft 6. The wind-wheel, which is provided with pivoted blades 7, consists of inner and outer or front and rear frames 8 and 9, having spokes 10 and 11. The inner frame, which is fixed to the tubular wind-wheel shaft, is provided with a hub 12, and it has an outer rim 13, and the spokes 10, which are preferably enlarged at their ends, as shown, pass through suitable perforations at the inner and outer ends of the blades 7

at the front thereof and are preferably extended through the rim; but they may be secured to the rim in any other suitable manner. The rear spokes, which are arranged at an angle to the front spokes, form braces for the wind-wheel, and they are also enlarged at their ends. The enlargement of the ends of the spokes of the wind-wheel may be omitted, if desired; but they are preferable, as they prevent the spokes from being injured by the vibration of the wheel. The blades 7 are provided at their inner and outer ends with transverse flanges 14 and 15, which are provided with the said perforations for the front spokes, and the outer flanges 14 are also provided with perforations for the reception of pivots 16, which connect the blades with the rim of the rear frame of the wind-wheel.

The hub 17 of the rear frame of the rear wheel is swiveled to a horizontal rod 18, which passes through the tubular wind-wheel shaft, as clearly shown in Fig. 2, and which is adapted to be moved longitudinally by the means hereinafter described to draw the rear frame of the wind-wheel toward the front frame and to carry it therefrom to swing the blades to present more or less fan-surface to the wind and also to arrange them edgewise to the wind to allow the latter to pass through the wind-wheel without rotating the same.

The inner end of the horizontal wind-wheel shaft carries a vertical pinion 19, which meshes with a horizontal gear-wheel 20, which is secured to the upper end of a tubular shaft 6, extending from the top of the windmill to the base of the tower 22 and adapted to be connected by suitable gearing to the machine or device to be operated by the windmill. The rotary frame, which may be of any desired construction, is preferably provided with a vertical tube 22^a, which is journaled in suitable bearings of the tower to permit the rotary frame to turn on the latter.

The front end of the horizontal reciprocatory rod 18 is connected with the lower arm of a substantially upright lever 23, fulcrumed near its upper end on a suitable support 24 of the rotary frame and having an approximately horizontal upper arm 25, extending inward over the rotary frame and secured to the upper end of a wire 26 or other suitable flexible connection which extends downward

through the tubular shaft 21 to the base of the tower. The lower end of the wire 26 is detachably secured to a weight 27, which may be changed for the purpose of holding the windmill into the wind with greater or less force. The weight swings the upper arm 25 of the lever 23 downward and holds the blades 7 of the wind-wheel at an angle to present their surfaces to the wind for causing the rotation of the wind-wheel. The front end of the rod 18 is provided with an eye or opening 28, through which the lower arm of the lever 23 passes, and the said lever 23 carries a blade or vane 29, having one of its faces presented to the wind and adapted to be operated on by the same, whereby when the force of the wind exceeds the power of the weight the vane or blade 29 and the lower arm of the lever 23 will be swung inward from the position shown in Fig. 1 to that illustrated in Fig. 2 to raise the weight and move the longitudinal rod rearward to open the blades of the wind-wheel and stop the same. As soon as the force of the wind abates sufficiently for the weight to act the blades of the wind-wheel will be automatically returned to their initial position and the wind-wheel will be rotated. The blade 29 of the lever is adapted to be moved inward to a greater or less extent, and the windmill will be controlled and caused to rotate at a uniform speed and at the same time it will be prevented from being broken or otherwise injured by high winds. The lower portion of the lever 23 is provided with a longitudinal opening or slot 29^a, receiving fastening devices 30, preferably consisting of bolts and nuts and adjustably securing the blade 26 to the lever.

It has been found by experience that in windmills where the horizontal wind-wheel shaft is connected by gearing with a vertical shaft there is a tendency for the wind-wheel to creep around the horizontal gear-wheel and thereby turn to a greater or less extent out of the wind. The wind-wheel 5 is rotated in the direction of the arrow in Fig. 1, and in order to prevent the same from creeping around the gear-wheel 20 a supplemental side blade or vane 31 is provided. This side blade or vane, which is arranged at one side of the rotary frame, projects slightly beyond the periphery of the wind-wheel, and it is mounted on an adjustable horizontal rod or shaft 32, slidingly mounted in a bearing 33 of the rotary frame and provided with a depending arm 34, which is connected by a rod 35 with the lever 23, whereby the side vane is controlled by the said blade or vane 29. The horizontal rod or shaft 32 is adapted to be adjusted by hand, and as there is no tendency of the rods to move longitudinally in either direction accidentally fastening devices for holding the rod against such movement are unnecessary. The hinge connections between the rod 35, the arm 34, and the lever 23 have sufficient play to permit the longi-

nal adjustment of the rod or shaft 32. When the said blade or vane 29 is swung inward to the position shown in Fig. 2 of the drawings, the arm 34 is oscillated, and the side vane will be rotated a quarter of a revolution to arrange it edgewise to the wind to avoid offering any obstruction to the passage of the same. When the blade 29 is swung outward by the weight, the side blade or vane is rotated to return it to the position illustrated in Fig. 1 of the drawings. The adjustable rod or shaft 32 is adapted to be moved longitudinally to vary the distance between the side blade or vane and the rotary frame, to move the said side blade or vane inward and outward to vary its power and to adjust it to the wind-wheel, and to adapt it for effectively counteracting any tendency of the wind-wheel to creep around the horizontal gear-wheel.

When the windmill is in operation, the pressure of the wind on the side vane or blade creates sufficient lateral strain on the rod or shaft 32 to cause the latter to frictionally engage the bearing 33, and such engagement will prevent any accidental longitudinal movement of the rod; but any suitable means may be employed for positively holding the rod or shaft 32 in its adjusted position.

It will be seen that the windmill is exceedingly simple and inexpensive in construction, that it possesses great strength and durability, and that it is capable of automatically governing itself to regulate its speed and to prevent it from being injured by high winds. It will also be apparent that the wind-wheel will be prevented from creeping around the horizontal gear-wheel, and that the side blade or vane may be readily adjusted, and that when it is desired to vary the weight for holding the windmill in operation the weight may be changed at the base of the tower.

What I claim is—

1. In a windmill, the combination of a wind-wheel shaft having a vertical gear, a rotary frame receiving the wind-wheel shaft and provided with a bearing, a side blade or vane arranged to prevent the wind-wheel from swinging horizontally out of the wind, a horizontal gear-wheel meshing with the vertical gear, a shaft 32 arranged in the said bearing and carrying the side blade or vane, and means for partially rotating the shaft 32, substantially as described.

2. In a windmill, the combination of a rotary frame, a wind-wheel shaft arranged horizontally and journaled in suitable bearings of the rotary frame, a wind-wheel mounted on the shaft and having pivoted blades, gearing connected with the wind-wheel shaft, a lever connected with the pivoted blades of the wind-wheel and provided with a blade arranged to be operated on by the wind, means connected with the lever for holding the blades of the wind-wheel normally in position to be acted on by the wind, and a mov-

able side blade or vane, arranged to prevent the wind-wheel from creeping around the gearing and connected with the said lever, whereby it is turned edgewise to the wind when the windmill is thrown out of the same, substantially as described.

3. In a windmill, the combination of a rotary frame, a horizontal wind-wheel shaft mounted thereon and provided with a vertical gear, a wind-wheel, a horizontal gear-wheel meshing with the vertical gear, a side blade or vane movably mounted at one side of the rotary frame and arranged to prevent the wind-wheel from creeping around the horizontal gear-wheel, and governing mechanism connected with the side blade or vane and arranged to turn the same edgewise to the wind when the windmill is thrown out of operation, substantially as described.

4. In a windmill, the combination of a rotary frame, a horizontal wind-wheel shaft mounted on the frame, a wind-wheel provided with pivoted blades, the vertical gear mounted on the wind-wheel shaft, the horizontal gear-wheel meshing with the vertical gear, the side blade or vane arranged at one side of the rotary frame and arranged to prevent the wind-wheel from creeping around the horizontal gear-wheel, and a governing device connected with the pivoted blades of the wind-wheel and having a blade and adapted to operate the side blade or vane to turn the same edgewise to the wind when the pivoted blades of the wind-wheel are opened, substantially as described.

5. In a windmill, the combination of a rotary frame, a horizontal wind-wheel shaft, a gear-wheel mounted on the shaft and arranged vertically, a wind-wheel also mounted on the shaft, a horizontal gear-wheel meshing with the vertical gear-wheel, a horizontal rod adjustably mounted on the frame and capable of longitudinal movement, a side blade or vane mounted on the rod and adapted to be moved inward and outward, and arranged to prevent the wind-wheel from creeping around the gear-wheel, and a lever having a blade

and connected with the rod and with the wind-wheel, substantially as described.

6. In a windmill, the combination of a rotary frame, a horizontal wind-wheel shaft, a wind-wheel, gearing connected with the shaft, a rod slidingly mounted on the frame and provided with an arm and having a side blade to prevent the wind-wheel from creeping around the gearing, and a lever having a blade arranged to face the wind, said lever being connected with the wind-wheel and with the arm of the rod, substantially as described.

7. In a windmill, the combination of a rotary frame, a wind-wheel having pivoted blades, a horizontal wind-wheel shaft, gearing connected with the shaft, a rod journaled on the frame and provided with a blade arranged at one side of the frame to prevent the wind-wheel from creeping around the gearing, a governing-blade arranged to face the wind and connected with the pivoted blades and with the rod, and means for holding the blades normally closed, substantially as described.

8. In a windmill, the combination of a rotary frame, a horizontal tubular wind-wheel shaft, a wind-wheel having pivoted blades, a rod extending through the tubular shaft and connected with the pivoted blades, gearing connected with the wind-wheel shaft, an upright lever having a blade and connected with the rod, said lever being adapted to be moved inward, a rod extending from one side of the frame and provided with a blade to prevent the wind-wheel from creeping around the gearing, and having an arm connected with the lever, and means connected with the lever for holding the blades normally closed, substantially as described.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

WILLIAM H. BALDWIN.

Witnesses:

W. P. SCOTT,
F. A. BALDWIN.