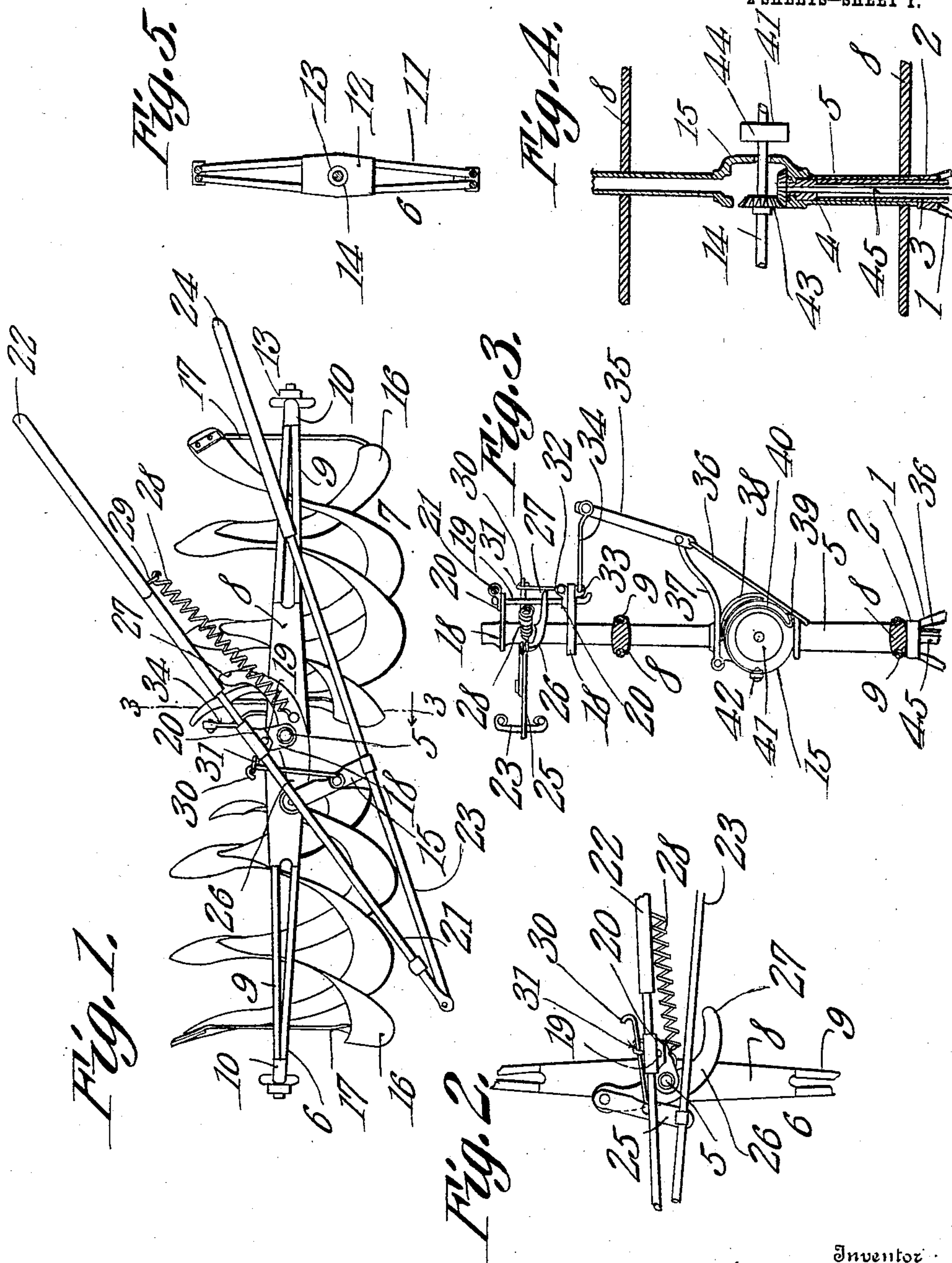


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WINDMILL.  
APPLICATION FILED AUG. 17, 1909.

969,522.

Patented Sept. 6, 1910.

2 SHEETS—SHEET 1.



Witnesses

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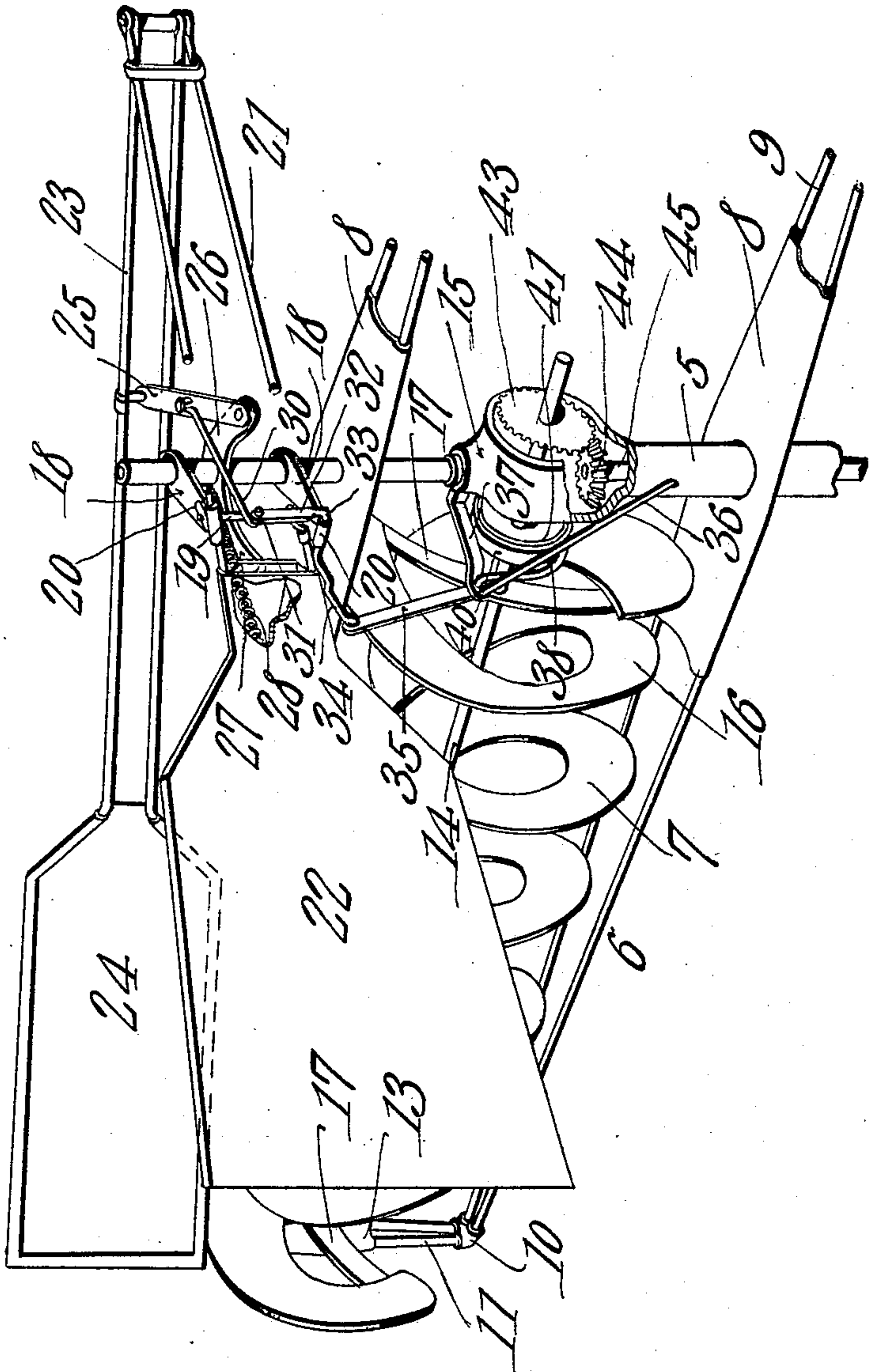
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2 SHEETS—SHEET 2.

Fig. 6.



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# UNITED STATES PATENT OFFICE.

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WINDMILL.

969,522.

Specification of Letters Patent.

Patented Sept. 6, 1910.

Application filed August 17, 1909. Serial No. 513,286.

*To all whom it may concern:*

Be it known that I, JOHN A. CARLSON, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new and useful Windmill, of which the following is a specification.

This invention relates to wind mills and has special reference to improvements in the device shown in Letters Patent Number 893,052, granted to me July 14, 1908.

The object of the present invention is to provide an improved regulating device whereby the wheel will be held in proper position to be acted on by the wind and by which the motion of the wheel may be arrested should the wind be too high.

A further object of the invention is to improve the construction of the frame in which the wheel is supported so as to maintain the bearings in proper alinement.

These objects are attained by the use of the device illustrated in the accompanying drawings, and the invention consists in certain novel features of the same which will be hereinafter fully described and claimed.

In the annexed drawings, which fully illustrate my invention, Figure 1 is a plan view of a wind mill embodying the present improvements showing the position assumed when the mill is at work. Fig. 2 is a similar view of the central portion of the apparatus showing the inoperative position. Fig. 3 is a vertical section on the line 3—3 of Fig. 1. Fig. 4 is a detail longitudinal section showing the gearing and the support for the same. Fig. 5 is a detail view of one end of the frame. Fig. 6 is a perspective view of the entire mill.

The tower 1 may be of the usual or any preferred construction and is provided at its upper end with a rigid head 2 from which a tubular stem 3 rises, the upper end of the said stem bearing against a bushing or ring 4 secured within the tubular standard 5 which carries the frame 6 in which the wheel 7 is mounted, the described construction furnishing a support upon which the wheel may turn with very little friction. The frame 6, within which the wheel 7 is supported, comprises castings 8 secured to the lower end of the tubular standard 5 and near the upper end of the standard, and upper and lower rods 9 fitted in grooves in the side edges of the said castings and con-

verging toward their ends which are connected by couplings 10. The extremities of the end portions of the frame are carried by the said couplings and the said end portions are similar in construction to the top and bottom of the frame, being composed of bowed rods or tubes 11 having their central portions engaging the grooved edges of castings 12 in which are secured the bearings 13 for the ends of the shaft 14. The shaft 14 carries the wind wheel and its central portion passes through a head or bracket 15 provided on the tubular standard 5. The wheel consists of spiral blades 16 carried by radial rods 17 which are secured to the shaft 14, the blades being so shaped as to present inclined or concave surfaces to the wind so that the wind striking upon the said inclined faces will rotate the wheel and thereby transmit motion and power to the operating parts. The tubular standard 5 is reduced above the head or bracket 15, and extends through the upper casting 8, horizontal arms 18 being rigid with and projecting from the standard above the said casting. In the ends of the said arms 18 is mounted a vertical pivot pin 19 which also passes through lugs or offsets 20 on the inner side of the supporting arm 21 which carries the large vane 22 whereby the said vane will be supported by the standard. The arm 21 projects laterally in both directions from the standard and its forward extremity is pivotally connected to the extremity of a similar arm 23 which carries a small vane 24. This vane-carrying arm 23 extends rearward past the standard 5 and is connected by a link 25 with a lever or crank arm 26 which is secured to the standard, the link 25 being pivotally attached to the arm 23 at a point between the standard and the pivoted end of the arm. The lever 26 is secured rigidly to and extends past the standard and its free end is turned laterally, as at 27, to bear against the inner side of the large vane while a spring 28 has its opposite ends secured to the said lateral arm 27 and a lug 29 on the vane to hold the arm and vane normally in contact.

Pivoted upon the link 25 and extending from the same through the vane-supporting arm 21, is a hook 30 which engages an eye 31 at the upper end of a crank arm 32 rising from a rock shaft 33 which is journaled in a bearing provided therefor on the lower arm or bracket 18. From the end of the



rock shaft 33 opposite the crank arm 32, a second crank arm 34 extends outward, the free end of the latter crank arm being pivoted to the upper end of a pitman 35 to the lower end of which is attached the furling wire or cable 36 which passes through a suitable opening in the side of the standard above the bushing 4 and then down through the stem 3 and the tower to a point near the ground where it may be readily grasped for manual operation. Near the lower end of the pitman 35, I pivot the end of a brake lever 37 which is mounted in a suitable bearing on the head 15 and is provided with a depending finger 38 which engages the lip or hook 39 at the free end of a brake spring 40 which partly incloses a brake disk 41 on the shaft 14 and is secured to a projection 42 on the head 15, the arrangement being such that a downward movement of the brake lever will cause the brake spring to frictionally engage the disk 41 and bind around the same so as to arrest the motion of the shaft 14 and thereby stop the machine.

A beveled pinion 43 is secured on the shaft 14 and meshes with a similar pinion 44 on the upper end of a transmitting shaft 45 which extends downward through the tower and is connected by suitable gearing with the machinery to be driven.

The frame herein shown and described will hold the bearings of the shaft 14 in proper alinement and will possess great strength so as to prevent collapse of the mill in high winds, while at the same time it will permit the wheel to rotate freely and transmit the full force of the wind to the machinery to be operated. The vanes 22 and 24 are arranged in diverging planes and are intended to be acted upon by the wind so as to hold the shaft 14 at the proper angle to the direction of the wind to cause the wind to strike the inner concave faces of the wheel and thereby rotate the wheel at a high speed with little friction and loss of power as the slip or side displacement of the wind is reduced to a minimum. Should the velocity of the wind exceed the predetermined limit or furnish more power than is required to operate the driven machinery, the vane 24 will be swung toward the vane 22 and the link 25 will be thereby caused to push against the lever or crank arm 26 and the standard will consequently be rotated so as to bring the wheel into a position across the path of the wind whereupon the speed of the machinery will be reduced. As the strength of the wind decreases, the spring 28 will draw upon the arm 27 of the lever 26 and consequently return the wheel to its operative position. During these movements, the hooked arm 30 plays freely through the eye 31. The mill is arranged to start up on the release of the furling rod which is manually operated to set or release the brake.

When the furling rod is drawn downward, the force is applied directly to the brake lever so that it is swung downward and the brake spring carried against the disk 41 on the wheel shaft 14 and the rotation of the said shaft halted. When the brake lever is thus swung downward, the pitman 35 is actuated so that the rock shaft 33 will be moved in unison with the brake lever whereupon the upper crank arm of said shaft will be brought into engagement with the hooked end of the arm 30 and a pull consequently exerted on the link 25 and the lever 26 which will result in a rotation of the standard to swing the wheel into the inoperative position. When the furling rod is released, the resiliency of the brake spring automatically releases the brake and the wind returns the wheel to its working position by playing on the vane, as will be understood.

The wheel works easily and may be operated in winds of different velocities within a wide range, the vanes automatically holding the wheel at the proper angle to produce the power necessary to drive the machinery coupled thereto.

Having thus described my invention, what I claim is:

1. The combination of a rotary standard, a wheel supported thereon, a vane carried by the standard and movable relative thereto, a second vane pivotally connected to the first vane and diverging therefrom, a link pivoted to the second vane and connected with the standard, a crank arm extending from the standard and bearing against the first mentioned vane and a yieldable connection between said vane and the said crank arm.

2. The combination of a standard, a wheel mounted thereon, a pair of divergent vanes pivotally connected, the larger of said vanes being pivotally supported on the standard, a rock shaft mounted on the standard, a brake on the shaft of the wheel, connections between said brake and the rock shaft, and connections between the rock shaft and the smaller vane.

3. The combination of a standard, upper and lower castings secured to and projecting laterally to both sides of the standards, rods fitting in the edges of said castings and converging beyond the ends thereof, bowed rods extending between the ends of the rods fitted in the upper and the lower castings, end castings fitted between the bowed portions of said rods, and a wheel having its shaft extending between and journaled in said end castings.

4. The combination of a rotary standard, a horizontally disposed wheel carried thereby, a pair of vanes above the wheel, one being supported by the standard, said vanes being pivoted together at their front ends and diverging therefrom past the standard on opposite sides thereof, connections be-



tween one of said vanes and the standard to rotate the standard, and yieldable connections between the standard and the other vane.

5 5. The combination of a rotary standard, lateral arms thereon, a vane supported by the said arms, a second vane pivoted to the first mentioned vane and diverging therefrom, a link pivoted to the last mentioned  
10 vane, a crank arm pivoted to the said link and secured to the standard and provided with an extension bearing against the first mentioned vane, a spring secured to the said vane and the said extension, and a furling  
15 rod connected with the said link.

6. The combination of a standard, lateral arms thereon, a vane carried by the said arms, a rock shaft journaled upon the lower arm and having an upstanding crank arm  
20 at one end and an outstanding crank arm at its opposite end, a furling rod connected with the said outstanding crank arm, a vane pivoted to the first mentioned vane and diverging therefrom, a link pivoted to the last  
25 mentioned vane and connected with the standard, and a hook pivoted to the said

link and slidably engaging the upstanding crank arm on the rock shaft.

7. The combination of a standard, a wheel mounted thereon, a pair of pivotally con- 30 nected diverging vanes supported by the standard above the wheel, connections between one of said vanes and the standard to rotate the standard, a rock shaft mounted on the standard, a brake disk secured on the 35 shaft of the wheel, a brake band fitting around the said brake disk and provided with a hook at its free end, a brake lever pivoted upon the standard and provided with a depending arm engaging the hook at the 40 free end of the brake band, connections between the said brake lever and the rock shaft, and connections between the rock shaft and the vane arranged to actuate the standard. 45

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

JOHN A. CARLSON.

Witnesses:

AUGUST CARLSON,  
CLAES JOHAN SVENSON.