

(No Model.)

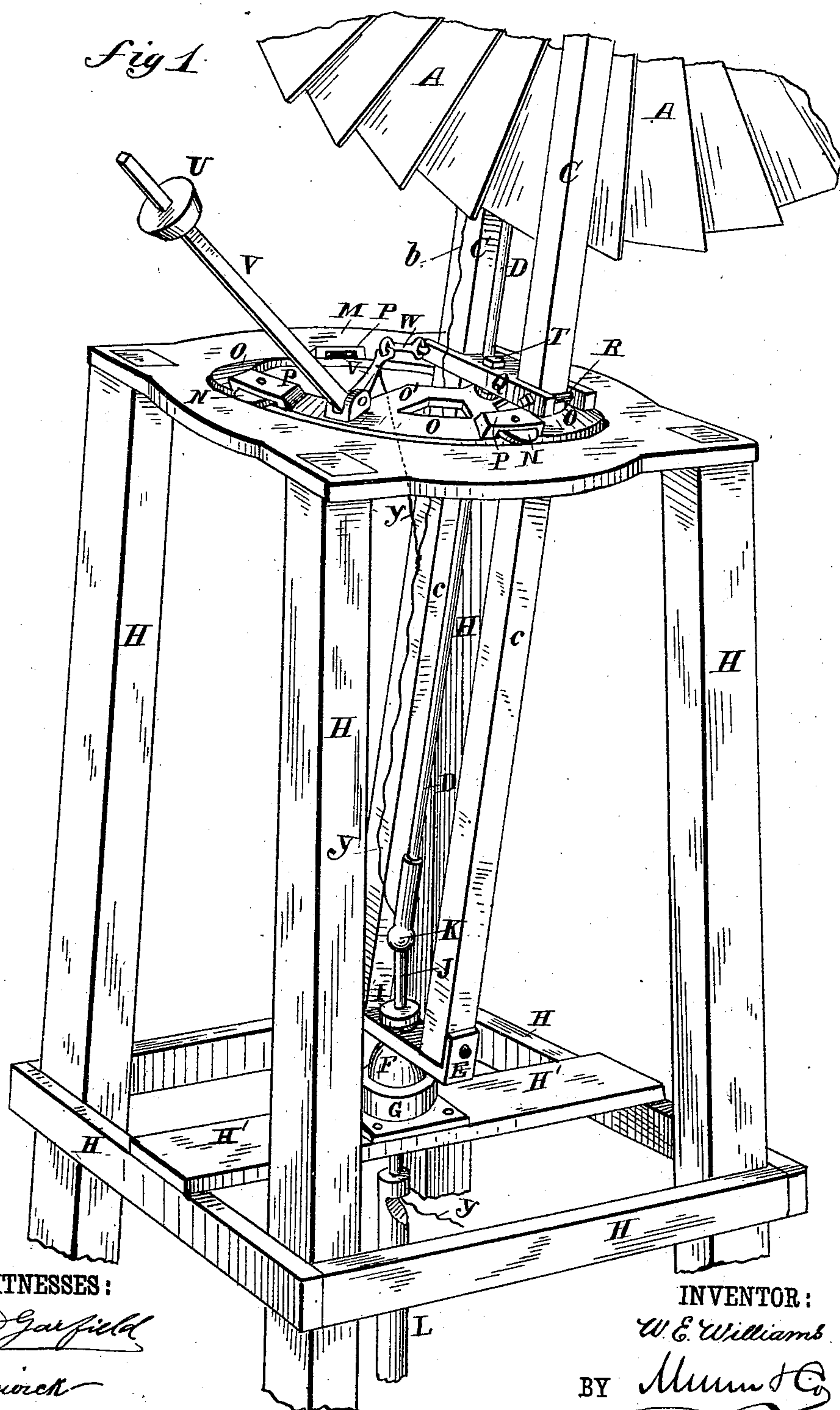
4 Sheets--Sheet 1.

W. E. WILLIAMS.

WINDMILL.

No. 272,821.

Patented Feb. 20, 1883.



**WITNESSES:**

J. D. Garfield  
to Sedgwick—

**INVENTOR:**

W. E. Williams

BY

Mum & Co

ATTORNEYS.

(No Model.)

4 Sheets—Sheet 2.

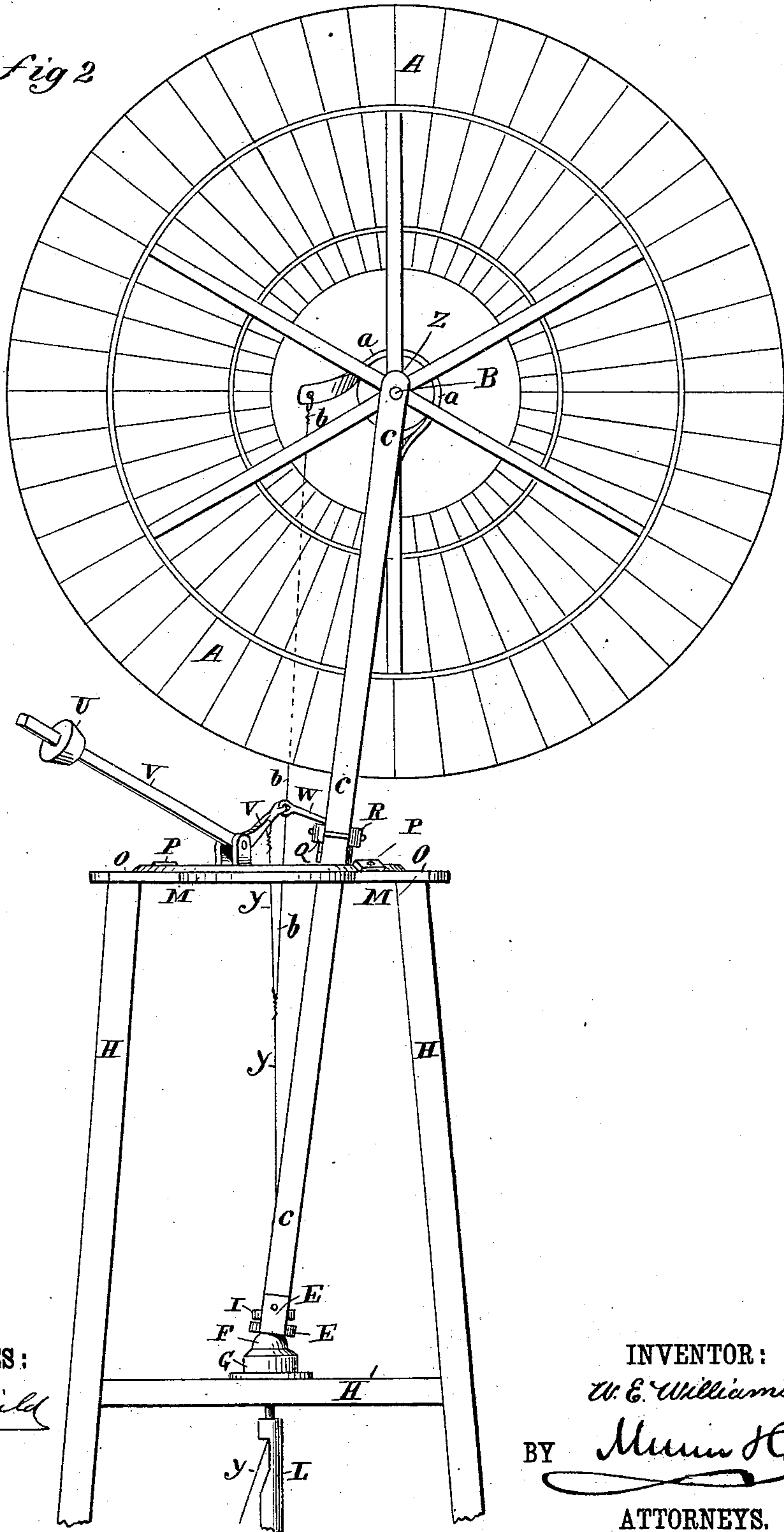
W. E. WILLIAMS.

WINDMILL.

No. 272,821.

Patented Feb. 20, 1883.

*Fig 2*



WITNESSES:

*J. D. Garfield*  
*L. Sedgwick*

INVENTOR:

*W. E. Williams*

BY

*M. H. G.*

ATTORNEYS.

(No Model.)

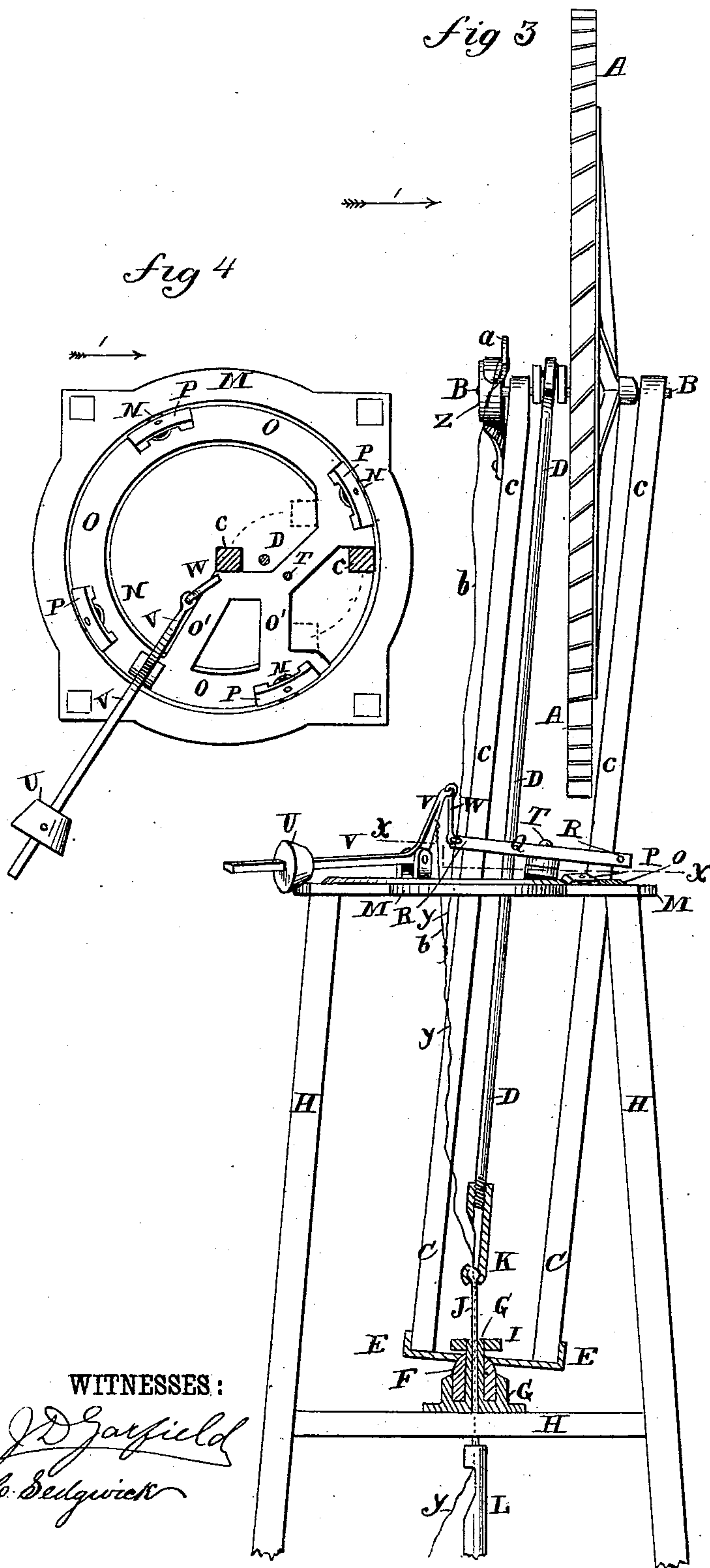
4 Sheets—Sheet 3.

W. E. WILLIAMS.

WINDMILL.

No. 272,821.

Patented Feb. 20, 1883.



**WITNESSES:**

J. D. Garfield  
C. Sedgwick

**INVENTOR:**

W. E. Williams

BY

ATTORNEYS.



(No Model.)

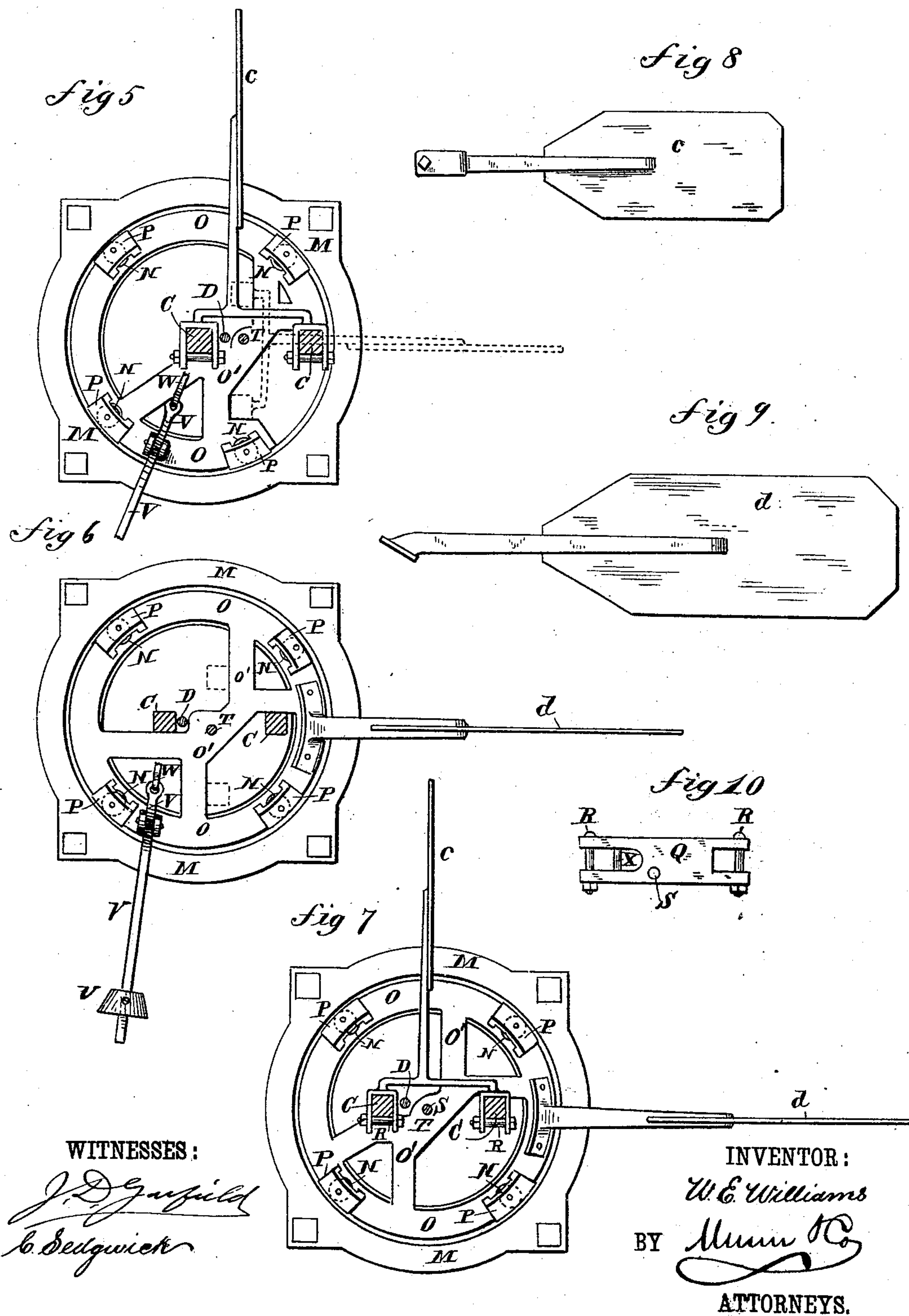
4 Sheets—Sheet 4.

W. E. WILLIAMS.

WINDMILL.

No. 272,821.

Patented Feb. 20, 1883.





# UNITED STATES PATENT OFFICE.

WILLIAM E. WILLIAMS, OF DODGEVILLE, WISCONSIN.

## WINDMILL.

SPECIFICATION forming part of Letters Patent No. 272,821, dated February 20, 1883.

Application filed December 7, 1882. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM ERASTUS WILLIAMS, of Dodgeville, in the county of Iowa and State of Wisconsin, have invented a new and useful Improvement in Windmills, of which the following is a full, clear, and exact description.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1, Sheet 1, is a perspective view of the upper part of the tower and its attachments. Fig. 2, Sheet 2, is a side elevation of the improvement, the wheel being out of the wind. Fig. 3, Sheet 3, is a side elevation of the same, the wheel being in the wind. Fig. 4, Sheet 3, is a sectional plan view of the same, taken through the line *x x*, Fig. 3. Figs. 5, 6, and 7, Sheet 4, are sectional plan views of the same, showing modifications. Fig. 8, Sheet 4, is a side elevation of the side vane. Fig. 9, Sheet 4, is a side elevation of the main vane. Fig. 10, Sheet 4, is a plan view of the pivoting-plate.

The object of this invention is to provide rigid-wheel windmills constructed in such a manner that they will be regulated by the varying force of the wind and without the use of vanes.

To the top of the tower is attached a plate having a circular opening in its middle part, within which is placed a circular frame, having friction-wheels rotating upon the inner edge of the outer plate. To the circular frame, between the wheel-supporting posts, is pivoted a cross-bar attached to the posts to adapt the wheel to be thrown out of the wind by an increased force of wind. With the wheel-supporting posts and the rotating frame is connected a weighted lever for throwing the wheel into the wind as the force of the wind decreases. The wheel-supporting posts and the circular rotating frame can be provided with vanes for the better control of the wheel under certain circumstances, as will be hereinafter fully described.

A represents an ordinary rigid wind-wheel, the shaft B of which revolves in bearings in the upper ends of two posts, C, and has a crank formed upon it to receive the upper end of the pitman D. The lower ends of the posts C are attached to the ends of a cross-bar, E, which

has an aperture formed in it, and concaved on the lower side to receive the convex upper part of the wooden bearing-block F, so that the posts C can turn and vibrate upon the said bearing-block F. The bearing-block is perforated vertically to receive the tubular upward projection of the step G, and rests in a ring-groove in the upper side of the said step. The step G is secured adjustably to a cross-bar, H', of the tower H, so that it can be raised to take up the wear of the tower H, and upon the upper end of its tubular projection is screwed a nut, I, to keep the cross-bar E from getting out of place.

J is a rod, which passes through the step G, and is connected at its upper end by a ball-and-socket joint, K, with the lower end of the pitman D. The lower end of the rod J is attached to the pump-rod L. The rod J is perforated longitudinally for the passage of the trip-cord, hereinafter described. By this construction the pump-rod L will be unaffected by the rotation of the posts C and pitman D as they are carried around by the wind, as it varies its direction.

To the top of the tower H is attached a plate, M, which has a circular opening formed through its middle part. The inner edge of the plate M is rabbeted to form a way or track for the small wheels N to roll upon. The wheels N are pivoted to a circular plate or frame, O, and to brackets or keepers P, attached to the said plate or frame. The wheels N are set at an inclination, so that they will firmly support the frame or plate O and its attachments, and at the same time allow the said frame or plate to turn easily. The plate or frame O can be made solid, with angular openings through it, forming angular bars O'; or it can be made in the form of a ring-plate with angular cross-bars O' attached to it. The posts C pass through the frame O upon the opposite sides of the bar O', which bar O' is so formed that the said posts C can turn upon the step G through a quarter of a revolution. With this construction, as the direction of the wind changes, the wheel-supporting posts C turn upon the step G, so as to keep the wheel A in proper position to receive the wind, and the posts C carry the frame O with them in their revolution.

Q is a plate or bar, the end parts of which are slotted to receive the posts C, and which



is secured to the said posts C by bolts R passing through the said slotted ends. In the bar Q, at one side of its central line, is formed a hole, S, to receive a pivot, T, to pivot the posts C to the cross-bar O' of the frame O. With this construction, when the wheel A is fully in the wind, the direction of the wind is in the plane of the posts C, as indicated by arrow 1 in Figs. 3 and 4, and the location of the pivot T at one side of the said plane, and the inclination of the said posts, gives an advantage in leverage to the wind, so that when the force of the wind increases beyond a fixed limit the posts C will turn upon the pivot T and step G, and take the wheel A out of the wind. As the force of the wind decreases the wheel A is drawn back into the wind by a weight, U, attached to the long arm of the bent lever V, which is pivoted at its angle to the frame O, and to the short arm of which is pivoted the end of a short connecting rod or link, W. The other end of the link W is pivoted to the post C upon the side of the bar O farthest from the pivot T, or to the end of the bar Q. The weight U is secured to the arm of the lever V adjustably, so that it can be moved out or in to hold the wheel to the wind with more or less power, as may be desired. By this construction the wind-wheel will be self-adjusting, and will be run at a uniform speed by a wind varying in power. In the bar Q, toward one end, is formed an opening, X, which may be an inward extension of one of the end slots, and through which passes the pitman D.

To the short arm of the lever V is attached the end of a trip-cord, Y, which passes down at the side of the post C and through the interior of the tubular connecting-rod J into such a position that its end can be conveniently reached and operated by an attendant to throw the wheel A out of the wind when desired.

To one end of the wheel-shaft B is attached a small wheel, Z, upon which rests a brake-lever, a, one end of which is pivoted to the post C. To the other or free end of the brake-lever a is attached the end of a cord, b, which passes down at the side of the post C, and its lower end is attached to the cord Y, so that when the said cord Y is drawn upon to throw the wheel A out of the wind the cord b is also drawn upon to apply the brake a to check the motion of the wheel A. With this construction, by drawing the cords Y b taut and securing the end of the cord Y to a belaying-cleat or other suitable fastening, the wheel A will be locked in place, so that it will not be revolved by gusts of wind in some other direction. In case the pivot T be placed in the central line between the posts C, and consequently in the plane of the wheel-shaft B, the wind will have no advantage of leverage, and will be unable, however hard it may blow, to turn the wheel out of the wind. In this case a side vane, c, must be used, which vane may be attached to the posts C, as shown in Figs. 5 and 7, or to the bar Q. The vane c should be at right angles with the plane of the posts

C, and in or parallel with the plane of the wheel A, so as to give the wind a leverage to turn the wheel out of the wind when the force of the wind exceeds a fixed limit, the weight U drawing the wheel A back into the wind when the force of the wind falls below the said limit. In case the posts C be vertical, bringing the center of the wheel over the center of the tower, and the pivot T be placed at one side of the central plane of the posts C, the wheel will be unstable and will turn into and out of the wind, according to the direction in which the wind may happen to blow. In this case a main vane, d, should be attached to the frame O in the plane of the posts C and at right angles with the plane of the wheel, to hold the said wheel to the wind and allow a variation in the force of the wind, in connection with the weight U, to turn the wheels A into and out of the wind. By using both the side vane, c, and the main vane d the posts C may be vertical or inclined, as may be desired. Even when the posts C are not vertical a small main vane, d, can be used to balance the friction of the wheels N and step G, and thus make the wheel more sensitive. The posts C can be made solid or tubular; or a single tubular post C can be used, connected at one side by a lug with the pivot T. In the latter case the pump-rod D can pass down through the interior of the said hollow post, and the wheel-shaft should be supported upon both sides of its crank by the sides of the said post, or by bearings attached to the said post, the wheel being placed at either side of the said post.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. A windmill constructed substantially as herein shown and described, and consisting of the tower H, the wheel A, the supporting-posts C, the pivoting cross-bar E, bearing-block F, and step G, the plate M, having circular central opening, the rotating circular frame O O', having friction-wheels, the cross-bar Q, and pivot T, as set forth.

2. In a windmill, the combination, with the wheel-supporting posts C and the tower H, of the cross-bar E, having aperture, the convex bearing-block F, and the step G, having central tubular projection, substantially as herein shown and described, whereby the bearing-posts can be rotated upon a single pivot and can be tilted in any direction, as set forth.

3. In a windmill, the combination, with the tower H and the wheel-supporting posts C, of the plate M, having central circular opening, the circular frame O O', having friction-wheels N, the cross-bar Q, and the pivot T, substantially as herein shown and described, whereby the wheel-supporting posts can be turned within the rotating frame to throw the wheel into and out of the wind, as set forth.

4. The combination, with the cross-bar E and block F, of the step G, having an end-threaded middle extension and a nut, I, thereon, as and for the purpose set forth.

5. The combination, with a plate, M, rab-



beted to form a track, and a circular plate, O, carrying keepers P, of the wheels N, pivoted on an incline to said plate and keepers, whereby said parts will be firmly supported and yet  
5 allowed to turn, as described.

6. The combination, with the wheel-supporting posts C C, of the turning frame O, having the cross-bar O', whereby said frame may be carried around by the posts a quarter-revolution, as described.  
10

7. The combination, with the posts C, having the described bearing at the bottom of its cross-bar E, of the slotted plate Q, bolted thereto, and having hole S, the pivot T, and the  
15 cross-bar O' of frame O, whereby said posts may incline and turn on the pivot, as and for the purposes specified.

8. The combination, with the frame O and the post C, which is on the inside of bar O', of the weighted lever V, pivoted at its angle to 20 frame O, and the link W, pivoted to said post, as well as to the lever, as and for the purpose specified.

9. The combination, with the shaft B, of the wheel Z, the brake-lever a, and the two cords 25 b Y, whereby the brake may be applied, as described.

WILLIAM ERASTUS WILLIAMS.

Witnesses:

W. L. RICHARDS,  
J. H. POWERS.