(No Model.)

# R. M. COSBY.

## WINDMILL.

No. 315,484. Patented Apr. 14, 1885.

*Fig. 1.*

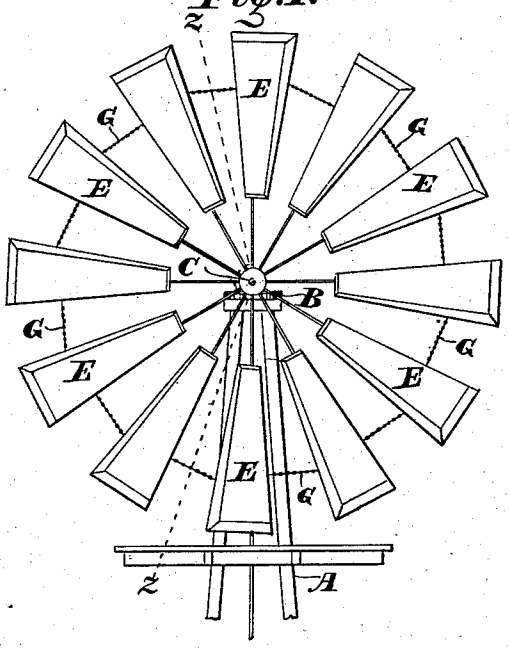



*Fig. 2.*

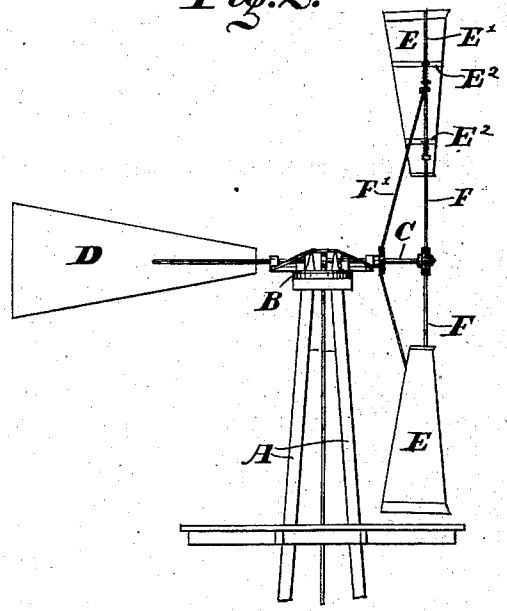



*Fig. 3.*

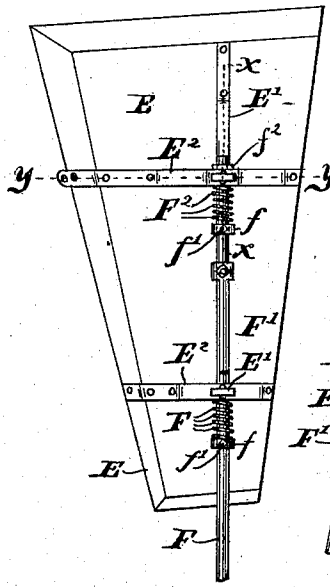



*Fig. 4.*

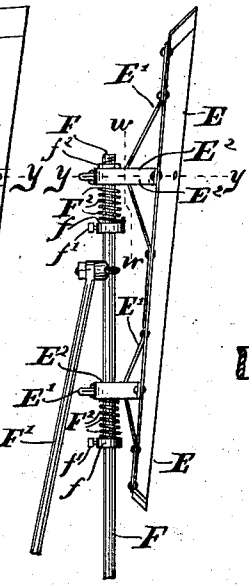



*Fig. 5.*

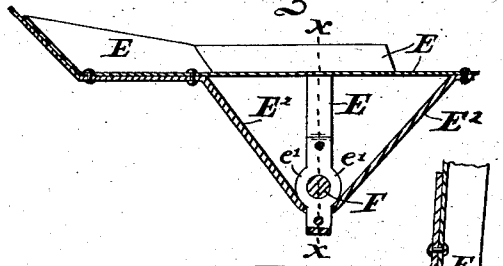



*Fig. 6.*

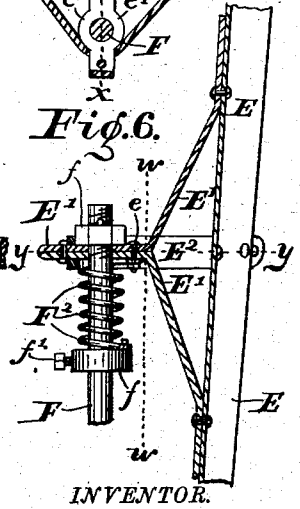
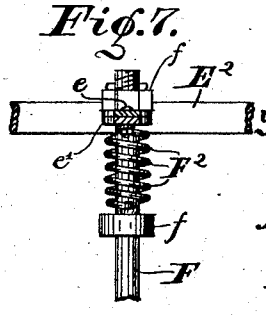



*Fig. 7.*




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# UNITED STATES PATENT OFFICE.

RICHARD M. COSBY, OF INDIANAPOLIS, INDIANA.

## WINDMILL.

SPECIFICATION forming part of Letters Patent No. 315,484, dated April 14, 1885.

Application filed October 3, 1883. (No model.)

*To all whom it may concern:*

Be it known that I, RICHARD M. COSBY, of the city of Indianapolis, county of Marion, and State of Indiana, have invented certain new and useful Improvements in Windmills, of which the following is a specification.

My said invention consists in an improved means for mounting the sails of windmills on their arms, whereby the angle at which said sails are presented to the wind is adapted to be automatically varied by the force of the wind exerted upon them, so that a substantially-uniform velocity of the mill is maintained at all times, regardless of the varying force or velocity of the wind.

It also consists in an improved means of bracing the sail both longitudinally and laterally, as will be hereinafter more fully described.

Referring to the accompanying drawings, which are made a part hereof, and on which similar letters of reference indicate similar parts, Figure 1 is a front elevation of a windmill embodying my said invention; Fig. 2, a view of the central portion of the machine as seen when looking to the right from the dotted line *z z;* Fig. 3, a rear elevation, on an enlarged scale, of one of the sails, showing my invention; Fig. 4, a side elevation of the same; Fig. 5, a horizontal sectional view on a still further enlarged scale, looking upwardly from the dotted line *y y;* Fig. 6, a vertical sectional view looking to the left from the dotted line *x x;* and Fig. 7, a detail sectional view looking to the left from the dotted line *w w.*

In said drawings, the portions marked A represent the frame-work on which the mill is mounted; B, the turn-table; C, the shaft on which the wind-wheel is mounted; D, the vane; E, the sails; F, the arms on which said sails are mounted, and G chains which connect the sails to each other.

The frame-work A, turn-table B, shaft C, and vane D are or may be of any ordinary or approved construction. As they form no part of my present invention, they will not be further described, except incidentally in the description of the other parts.

The sails E are formed of any suitable material (preferably of sheet metal) and in any approved form, but preferably with their edges, except that which meets the wind, bent forward, as shown, thus forming a sort of bucket, which affords greater resistance to the wind than the common straight sail. A strap of iron, E′, is riveted to the back of the sails longitudinally thereof, and forms both a brace for the sail and bearings for mounting the sail on the arm F. It is riveted at the ends, as shown, (see especially Figs. 4 and 6,) and is then bent up and brought along at an angle where it is desired to locate a bearing. It is then bent again to about a right angle with the back of the sail, or to substantially a horizontal position and extended out far enough to form the bearing, when it is doubled over and brought back, and the two parts firmly secured together by means of the rivet or bolt *e.* It is then carried forward at an angle and riveted to the back of the sail at about the same distance from this horizontal part as on the other side. In the horizontal part is formed a bearing, *e′*, by means of which the sail is mounted on the arm F. The strap is carried along and the other bearing is formed in the same manner. There are also straps $E^2$ riveted across the back of the sail, which pass up over the ends of the bearings, where they are provided with a slot through which said ends pass until they reach the shoulder of the bearing *e′* forming a stay for said bearing. Thus the sail is strengthened in both directions and a rigid bearing is formed at the same time.

The arms F are mounted in a hub on the end of the shaft C, as usual, and are braced by the braces F′, which run from near their ends back to another hub on the shaft C near the turn-table. They are provided with collars *f* the same distance apart as are the bearings *e′* on the sails. These collars are adjustably mounted, and are secured in position by set-screws *f′*. To the top of each of these collars is secured one end of the spring $F^2$, the other end of which is secured to that part of the brace or stay E′ in which is the bearing *e′*. These springs are so adjusted as to hold the sails in proper position to be acted on by the wind when the wind is of the usual force; but when the force of the wind is unusually strong the springs allow it to force the sails around so that they present their faces to the wind at a greater angle than when the wind is blow-

ing at a moderate velocity. Thus a substantially-uniform speed of the mill is generally maintained regardless of the velocity of the wind.

As will be readily seen, the location of the bearings at the outer ends of the braces a considerable distance from the sails permits the wind, as the sails are forced out of their normal position thereby, to act with a continually increasing force on the springs, as the sails are caused by this arrangement to not only move around the arms, but to one side thereof, and thus relieve said arms of much of the direct force, throwing said force more directly onto the springs, which enables the springs to be more readily overcome, and produces a wind-wheel much more sensitive to the force of high winds than one where the sails are mounted close to the arms.

The sails are mounted on the arms F in the following manner: The lower of the collars *f* is secured in position, and the arm is run through the lower bearing on the sail and through a collar on the end of the brace F′. The top collar *f* is then placed in position, and the end of the arm run through the upper bearing on the sail until these bearings rest on the top of the springs. The top ends of the springs are then secured to the horizontal portions of the brace E′, usually by the bolt *e*, and the nut $f^2$ is turned on. When it is desired to vary the tension of the springs, the set-screws *f′* can be loosened, and the collars then turned in the direction desired, and when the required tension is reached they can be secured in that position by again tightening the set-screw *f′*.

The sails are preferably connected, and thus kept uniform and steady while in operation, by the chains G, which are usually secured to the sails by being hooked into eyes formed in the ends of the cross-stays $E^2$, as shown.

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

1. In a windmill, the combination of the sail E, braces E′ on the back of said sail, said braces being bent out for a portion of their length and having bearings *e′* formed therein, the arm F, on which the sail is mounted, the collar *f*, mounted on said arm, and the spring $F^2$, mounted on said arm between the sail-bearing and said collar, one end being secured to each, substantially as described, and for the purposes specified.

2. In a windmill, sails provided on their backs with longitudinal stays or braces, said stays being extended out at suitable points and bearings for the sail-arms being formed in said extended-out portions, substantially as shown and specified.

3. The combination, with the sail E, of the strap E′, riveted to said sail and bent up at suitable intervals with bearings formed in said bent-up portions, and the straps or stays $E^2$, having slots which fit over the ends of the bearings, the ends of said stays being riveted to the edges of the sail, thereby strengthening said sail and securing a rigid bearing for the arm, substantially as set forth.

4. In a windmill, a sail provided on its back with longitudinal and lateral stays or braces in which are formed the bearings for mounting said sail on its arm, said longitudinal and lateral stays being bent out from the sail at the points of intersection and secured together, and said bearings being formed at said points, substantially as set forth.

5. In a windmill, the combination, with the sails, of a longitudinal stay or brace secured thereto having bearings for the arm of said sail formed therein, and lateral braces extending across and secured to said sail and said longitudinal stay at the points where said bearings are formed, substantially as set forth.

6. A sail for windmills, the upper and rear edges whereof are bent forward, said sail being thus adapted to offer greater resistance to the wind, and also thereby strengthened, substantially as shown and specified.

In witness whereof I have hereunto set my hand and seal at Indianapolis, Indiana.

RICHARD M. COSBY. [L. S.]

In presence of—
C. BRADFORD,
E. W. BRADFORD.