(No Model.)

R. MONDAY.

WINDMILL.

No. 454,372. Patented June 16, 1891.

Fig. 1.

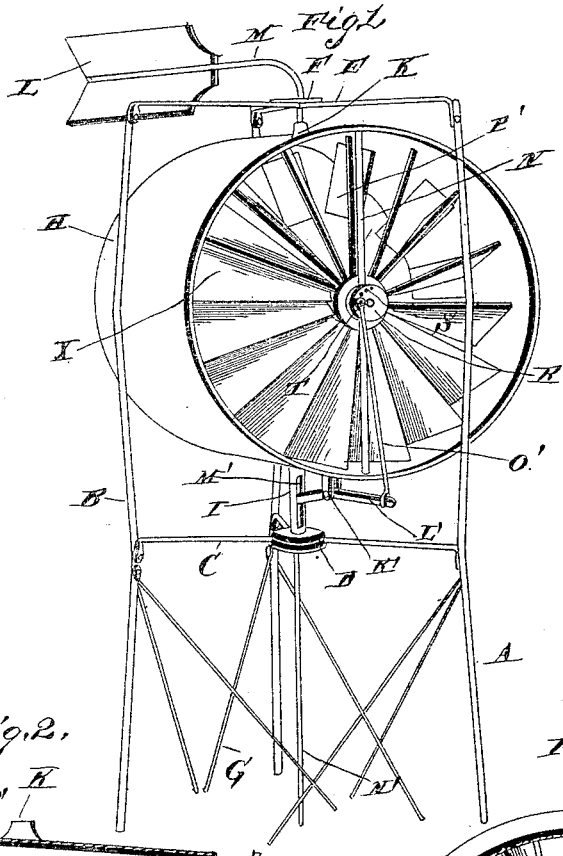


Fig. 2.

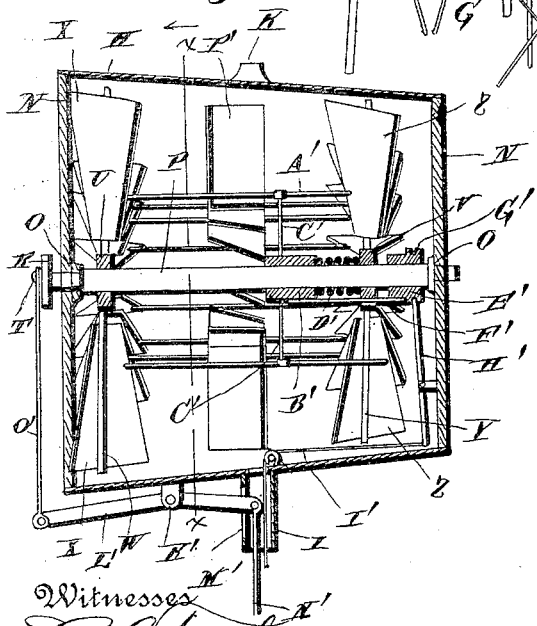
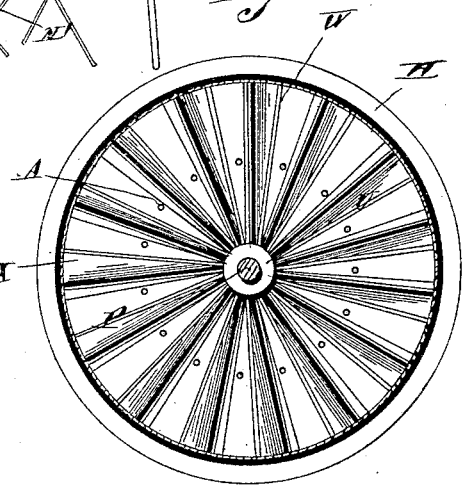


Fig. 3.



Witnesses
P. B. Taylor,
J. C. Garner

Inventor
Robert Monday.

By his Attorneys
C. A. Snow & Co.

UNITED STATES PATENT OFFICE.

ROBERT MONDAY, OF LAMPASAS, TEXAS, ASSIGNOR TO W. L. ABBOTT, OF SAME PLACE.

WINDMILL.

SPECIFICATION forming part of Letters Patent No. 454,372, dated June 16, 1891.

Application filed September 20, 1888. Renewed March 28, 1891. Serial No. 386,859. (No model.)

To all whom it may concern:

Be it known that I, ROBERT MONDAY, a citizen of the United States, residing at Lampasas, in the county of Lampasas and State of Texas, have invented a new and useful Improvement in Windmills, of which the following is a specification.

My invention relates to an improvement in windmills; and it consists in the peculiar construction and combination of devices that will be more fully set forth hereinafter, and particularly pointed out in the claims.

In the accompanying drawings, Figure 1 is a perspective view of a windmill embodying my improvements. Fig. 2 is a vertical longitudinal sectional view of the same. Fig. 3 is a vertical transverse sectional view taken on the line *x x* of Fig. 2.

A represents three supports, which are made of gas or water pipe or metallic rods of suitable length and thickness and form the corner-posts of the tower B. The said corner posts are arranged at angles of one hundred and twenty degrees apart, converge toward each other near their upper ends, and beyond the upper ends of the inclinations are bent outwardly, as shown.

C represents horizontal connecting-rods, which have their outer ends bolted to the corner-posts A at the bent portions of the latter, and have their inner ends rigidly secured to a central circular plate or casting D of suitable size.

E represents similar radial connecting-rods which have their outer ends bolted to the extreme upper ends of the corner-posts A and have their inner ends rigidly secured to the circular plate or casting F, which is similar to the plate or casting D. The corner-posts A are connected together in pairs on the three sides of the tower by means of crossed brace-rods G.

H represents a casing which is circular in cross-section, is larger at its front end than at its rear end, is provided on its lower side at its center with a depending trunnion or arm I, which has its bearing in a central opening in the plate or casting D, and is provided on its upper side at its center with a similar trunnion or arm K.

L represents a vane or rudder, which is provided with a supporting rod or arm M. The front end of said arm or rod is bent downward at right angles, passes through and has its bearing in a central opening in the plate or casting F, and is rigidly secured to the trunnion, stud, or arm K. The vane or rudder is arranged in line with the longitudinal axis of the truncated conical casing H, and is thereby adapted to keep the larger end of the latter always presented to the wind, as will be readily understood.

Arranged across the front and rear sides of the casing H are vertical standards N, which are rigidly secured to the casing, and in the centers of the said standards are bearings O, in which is journaled a shaft P. To the front end of the shaft is attached a crank-wheel R, which has a series of openings S, adapted to be engaged by a crank-pin T, the said openings being arranged tangentially in the crank-wheel, and thereby adapting the crank-pin to be secured to the crank-wheel at any desired distance from the center thereof, for the purpose to be hereinafter described.

U represents a collar, which is secured to the shaft P near its front end, and V represents a similar collar, which is secured to the said shaft near its rear end. A series of radial arms W have their inner ends secured in the collar U and their outer ends extending to within a suitable distance of the inner side of the casing H, and to each of the said radial arms is pivoted or hinged a wing or sail X, the latter having their major portions extending behind the arms W.

Y represents a series of radial arms, which are similar to the arms W, have their inner ends secured in the collar V, and have their outer ends proximate to the inner side of casing H near the rear end of the said casing, and to each of the said arms is hinged a wing or sail Z, which is similar to the wings or sails X, and are likewise arranged on their radial arms in such manner that the major portions of said wings or sails project from the rear sides of the said arms. Inasmuch as the sails or wings are pivoted to the arms the wings or sails are adapted to turn axially and to be feathered—that is to say, they may be

presented at any desired angle to the wind, so that a maximum or minimum extent of their surfaces may be presented to the action of the wind, according to the force of the wind or to the speed of the windmill. The front and rear wings or sails are connected together in pairs by means of longitudinal rods A′, as shown in Fig. 2, the said rods being arranged parallel with the shaft P.

B′ represents a sleeve, which is fitted on the shaft P, is movable longitudinally thereon, and is provided with a series of radial arms C′, the outer ends of which are rigidly secured to the rods A′.

D′ represents a coiled extensile spring, which is arranged on the shaft P and bears between the collar V and the sleeve B′, the function of the said spring being to normally move the sleeve forward and cause the rods C′ and A′ to turn the wings or sails to a position in which a maximum amount of their surfaces will be presented to the wind.

E′ represents a sleeve, which is arranged on the rear portion of the shaft P, and is connected to the spring-actuated sleeve B′ by means of a rod or arm F′, which is guided through an opening in the collar V. Thereby the sleeve E′ is movable with the sleeve B′. Said sleeve E′ is provided with an annular groove G′.

H′ represents a lever, which is fulcrumed near its center on a stud that projects from the front side of the rear standard N. The upper end of this lever engages a groove G′, and to the lower end of the lever is attached an operating cord or chain I′, which passes over a guiding-roller K′ in the lower side of casing H, near the center thereof, passes downward through the hollow trunnion or pivot I of the said casing and extends to within a suitable distance of the base of the tower. By drawing upon this cord or chain the lever may be caused to draw the sleeves E′ and B′ rearward on the shaft P, so as to cause the rods C′ and A′ to turn the feathering wings or sails in the direction of the wind and thereby expose a smaller amount of their surfaces to the action thereof and consequently reduce the speed of the windmill. When said cord or chain is drawn sufficiently to arrange the feathering wings or sails directly in line with the wind, the operation of the mill will cease.

It will be understood from the foregoing that the wings or sails cause the shaft P to rotate in its bearings within the casing H, and that the latter has no movement other than in a horizontal direction on its pivots I K to enable the wings or sails to be always presented to the wind.

When the wind increases in force to such an extent as to rotate the shaft P at a dangerous or undesirable rate of speed, the feathering wings or sails will, by reason of their major portions being in rear of their radial arms or axes, turn in the direction of the wind, and thereby automatically present a smaller amount of surface to the action of the wind, and hence decrease the speed of the windmill. When the wind diminishes in force, the spring D′ will move the sleeve B′ forward, and thereby cause the sails or wings to be restored to their normal position.

From the lower side of the casing H depends a bracket K′, to which is fulcrumed a lever L′. The rear end of the said lever enters the vertical slot M′ in the front side of the hollow trunnion or pivot I, and is attached to the upper end of a pump-rod N′, which extends downward and is arranged in the center of the tower. A pitman O′ has its upper end pivoted on the wrist or crank pin T and has its lower end pivoted to the lever L′. Consequently the rotation of the shaft P causes the crank-wheel and pin to impart reciprocating motion to the pitman O′, and the same is communicated through the lever L′ to the pump-rod N′.

In order to increase the efficiency and power of the windmill, I provide a number of converging blades P′, which are arranged o the inner side of the casing H midway between the front and rear series of feathering wings or sails, and the said blades are arranged at opposite angles to the normal position of the said feathering wings or sails. These blades P′ are stationary and serve the purpose of deflecting the wind after it has operated upon the front set of wings or sails and directing it squarely against the rear set of sails or wings.

By reason of the rear end of the casing H being contracted and of less diameter than the front end thereof, the velocity of the wind is increased as it passes through the said casing, and hence the wind is caused to act upon the rear set of wings or sails with as much force as it exerts upon the front set of wings or sails.

The casing H, the wings or sails, and the blades are preferably made of plate or sheet metal, so as to render the windmill as light and strong as possible, and, as before stated, the corner-posts of the tower are made of pipes or rods.

A windmill thus constructed is very strong and durable, is of great power, is cheap, and may be readily transported.

Having thus described my invention, I claim—

1. The combination, with the casing H, of the revolving shaft within the said casing, the wings or sails radiating from said shaft and arranged at the front and rear ends thereof, and the blades P′, secured to the inner side of the casing and rigid therewith, the said blades being arranged in the opposite direction to the sails or wings and between the front and rear sets thereof, for the purpose set forth, substantially as described.

2. The combination, in a windmill, of the revolving shaft P, the radial arms W Y projecting therefrom, the feathered wings or sails X Z on the said arms, having their major

portions extending in rear thereof, the rods A′, connecting the said wings or sails X Z in pairs, and thereby causing the same to turn axially in unison, the sleeve B′, movable longitudinally on the shaft, and having the radial arms C′ attached to rods A′, and the spring D′, bearing against the sleeve, for the purpose set forth, substantially as described.

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

ROBERT MONDAY.

Witnesses:
JNO. W. COVINGTON,
J. W. COVINGTON.