

(No Model.)

2 Sheets—Sheet 1.

F. H. EVARTS.
WINDMILL.

No. 465,172.

Patented Dec. 15, 1891.

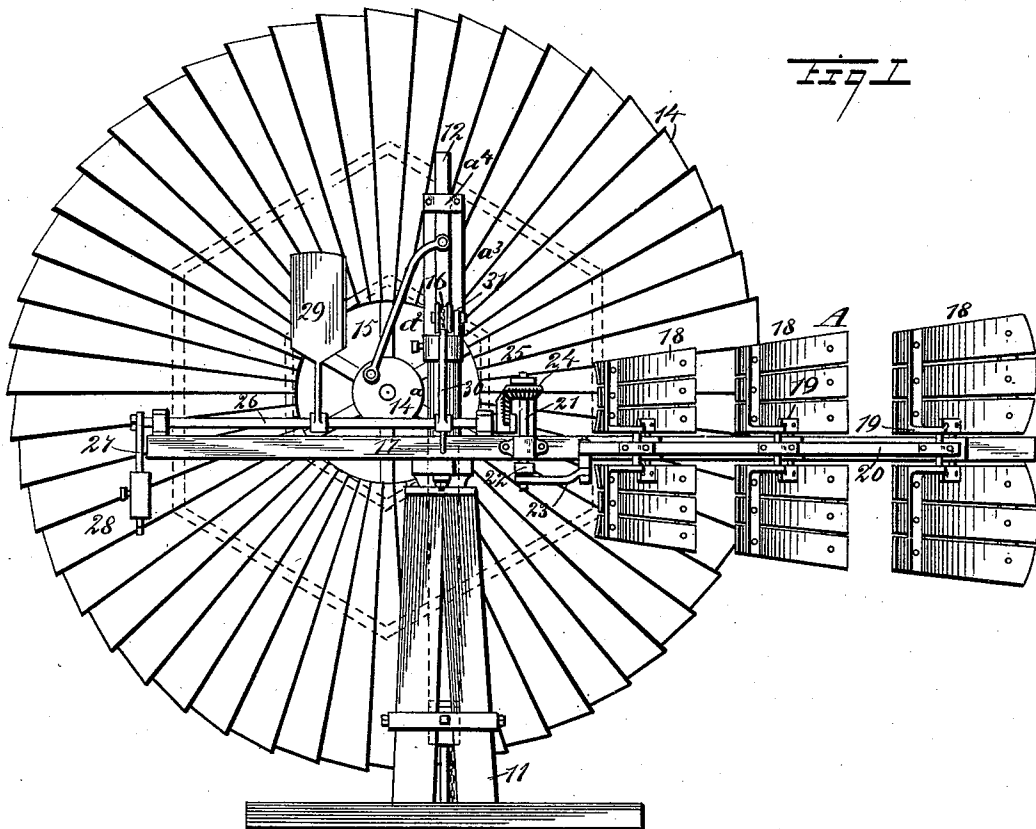


Fig. 1

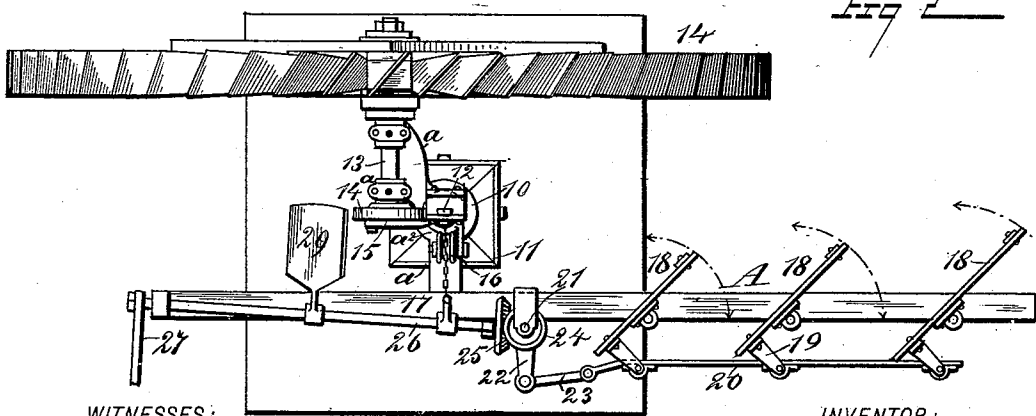


Fig. 2

WITNESSES:

W. Walker
C. Sedgwick

INVENTOR:

F. H. Evarts
BY Munn & Co

ATTORNEYS

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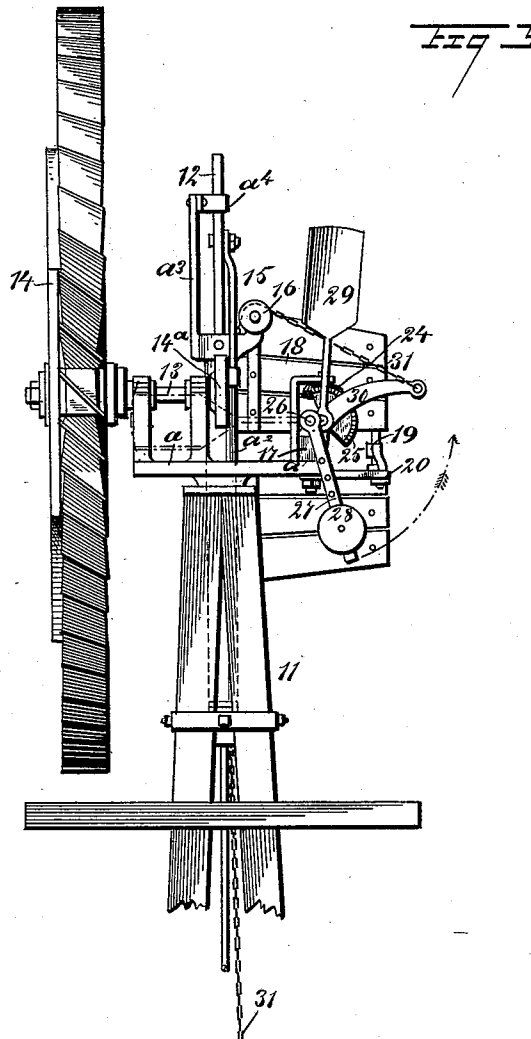


Fig 3

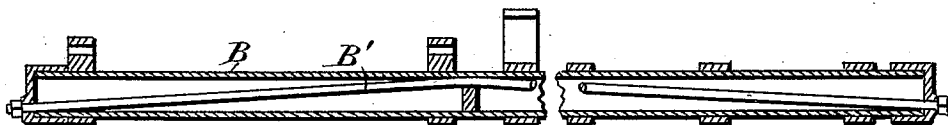


Fig 4

WITNESSES:

H. Walker
C. Sedgwick

INVENTOR:

F. H. Everts
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ATTORNEYS

UNITED STATES PATENT OFFICE.

FRANK H. EVARTS, OF ARLINGTON, KANSAS.

WINDMILL.

SPECIFICATION forming part of Letters Patent No. 465,172, dated December 15, 1891.

Application filed March 26, 1891. Serial No. 386,479. (No model.)

To all whom it may concern:

Be it known that I, FRANK H. EVARTS, of Arlington, in the county of Reno and State of Kansas, have invented a new and useful Improvement in Windmills, of which the following is a full, clear, and exact description.

My invention relates to an improvement in windmills, and has for its object to provide the mill with a sectional vane which in a high wind will be acted upon in a manner to automatically carry the wind-wheel edge to the wind and so hold it until the force of the wind abates.

Another object of the invention is to so construct the vane that it will act to throw the wind-wheel out in a moderate wind or in a gale, as desired, and to so place the wind-wheel and the vane that one cannot be forced in engagement with the other.

A further object of the invention is to perfectly balance the turn-table upon the tower and to render the several parts so light and so perfect in action that the mill may be stopped or started by even a child.

The invention consists in the novel construction and combination of the several parts, as will be hereinafter fully set forth, and pointed out in the claims.

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

Figure 1 is a side elevation of the upper portion of a windmill having the invention applied thereto. Fig. 2 is a plan view of the portion of the mill shown in Fig. 1. Fig. 3 is an edge view of the wheel and an end view of the vane, the other portions of the mill being in side elevation; and Fig. 4 is a detail sectional view of a modified form of the vane-stem or body-bar.

The turn-table 10 is mounted upon the tower 11 in any suitable or approved manner. The turn-table is provided with two arms a and a' , which are projected horizontally outward in opposite directions from opposite sides, and the turn-table is further provided with a vertical tubular extension or casting a^2 , having a perpendicular extension-arm a^3 , provided with a guide staple or strap a^4 at its upper end. The pump-rod 12 has movement in the guide-strap a^4 and the tubular casting a^2 , and in bearings erected upon the arm a of

the turn-table a shaft 13 is journaled, upon one end of which the wind-wheel 14 is securely fastened. The opposite end of the wheel-shaft 13 is provided with the usual crank-disk 14^a, united with the pump-rod through the medium of a pitman 15. At the upper end of the tubular casting a^2 of the turn-table a guide-pulley 16 is journaled, for a purpose hereinafter described.

Upon the outer end of the turn-table arm a' the body bar or stem 17 of the vane is securely fastened. The connection of the body bar or stem of the vane with the turn-table is effected at or near the central portion of the former, and the said stem or body bar extends beyond opposite sides of the turn-table in a horizontal position, and by thus locating the vane it is positively removed from the wind-wheel; but the wind-wheel and vane are held one in front of the other and cannot by any possibility be brought into engagement. One end of the vane extends some distance outward beyond the edge of the wind-wheel, and upon this portion of the vane a series of vertical plates 18 is pivoted, the plates being so pivoted that they may be separated and made to stand at a right angle to the longitudinal axis of the stem or body bar or may be closed so as to stand parallel with the said longitudinal axis of the stem, and when in the latter position the contiguous edges of the blades abutting, or practically so. The direction in which the blades are turned is illustrated by arrows in Fig. 2. Each blade upon the face thereof removed from the wind-wheel is provided with a central yoke 19, and the yokes of the several blades are connected with a pitman 20, the said pitman being located, preferably, parallel with the stem or body-bar.

Near the inner end of the inner blade of the vane a shaft 21 is vertically journaled in the body-bar, the lower end of which shaft has attached thereto a horizontal crank-arm 22, which is connected to the inner end of the pitman by a suitable link 23. Upon the upper end of the shaft 21 a bevel-pinion 24 is secured, and a mutilated bevel-gear 25 meshes with said pinion, which gear is fast upon one end of a line-shaft 26, horizontally journaled upon the stem or body-bar 17 of the vane. The shaft 26 extends beyond the end of the body-bar or stem, and to its projecting extremity an arm 27 is secured, provided with

an adjustable weight 28. A fan 29 is also secured to the line-shaft 26, the blade of the fan being located diagonally to the shaft, and the shaft is further provided with a curved arm 30, to the upper end of which a chain or cable 31 is secured, and the said chain or cable is passed over the guide-pulley 16 down through the tubular casting of the turn-table to within convenient reach of a person standing at the base of the tower or upon a platform or other support connected therewith. By means of the cable or chain 31 the wind-wheel may be thrown in or out of the wind and the windmill may be stopped or started thereby.

In practice the gearing described is housed, so as to protect it from the weather, and the fan 29 is so attached to the line-shaft 26 that when the blades 18 upon the vane A are open or stand at a right angle to or transversely of the vane-stem the said fan will be in a vertical position. When the blades 18 are closed, the fan assumes a horizontal position at one side of the wheel-shaft.

While I have described the position of the fan as horizontal when the blades 18 are closed, the blade of the fan actually inclines downward and outward, so as to present its full face to the wind when the edge of the wheel is likewise so presented.

When the chain or cable 31 is loosened at its lower end and the weight 28 upon the arm 27 turns the line-shaft 26 in such manner as to bring the fan in a vertical position, (shown in Fig. 1,) then the blades 18 are in an open position, and when the blades of the vane are in this position the wind-wheel is swung around in a position to be driven by the wind. The weight 28 may be adjusted upon the arm 27 in such a manner that a moderate wind striking against the upright fan will more than counterbalance the weight, or the weight may be so adjusted that a gale of wind will be required to accomplish such a result.

If, for instance, the weight is adjusted in a manner to require a high wind to automatically operate the vane, when such a wind strikes the upright fan 29 the fan is blown down to a horizontal position and the blades 18 are closed, whereupon as the edges of the blades are presented to the wind the wind-wheel will be swung around so as to present its edge, and the mill will be stopped. If the wind has not sufficient force to blow the fan entirely downward, thus only partially closing the blades, the speed of the wind-wheel will be slackened; but the wheel will not be stopped.

In the event it is desired to start the windmill, the same having been stopped and the wind being favorable, it is accomplished by simply releasing the lower end of the cable or chain 31, whereupon the weight 28 will act, as heretofore stated, to open the blades of the vane. When it is desired to stop the mill, the cable or chain 31 is drawn down until the fan is carried to a horizontal position, and the

chain or cable is then made fast. As the weight just slightly more than counterbalances the weight of the blades, the attached mechanism, and fan, it requires but little strength to close the blades, and the wind-wheel is so placed upon the turn-table that almost an equal weight is brought to bear at each side of the center of the turn-table, thus imparting thereto an easy poise and a perfect balance and enabling the upper structure of the mill to respond quickly to the action of the vane.

The body-bar or stem 17 of the vane is preferably made of wood, but may be made of metal, if desired, in which event the body or stem is constructed of a tube, as shown at B in Fig. 4, and the tube is strengthened by an internal spring-brace B'.

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

1. The combination, with the turn-table, the vertical wind-wheel journaled thereon and connected with the pump-rod, of the vane A, consisting in a horizontal bar fixedly secured between its ends to the turn-table parallel with the said wheel, a shaft 26, journaled along the short arm of the vane, provided at its outer end with a weighted arm 27, a blade 29 between its ends, an arm 30 near its inner end, and a gear-wheel 25 at its inner end, the vertical shaft 21 on the vane and provided with a gear-wheel 24, meshing with gear 25, and a crank-arm 22, a series of vertical blades 18, pivoted on the long arm of the vane, a pitman 21, connecting said blades and connected at its inner end with the crank-arm 22, and a chain or cable extending downward from the arm 30 for operating the same by hand, substantially as set forth.

2. A windmill comprising the tower, the turn-table 10, having oppositely-projecting horizontal arms a and a' , vertical tubular extension a^2 , a vertical arm a^3 on upper end of said extension, provided with a guide a^4 at its upper end and pulley 16 at its lower end, the pump-rod 12, the shaft 13, journaled on arm a and provided with a crank, at its inner end connected with the pump-rod and at its outer end with a vertical wind-wheel, the vane-beam secured fixedly between its ends to the arm a' parallel with the wheel and provided with longitudinal shaft 26, having a weighted arm 27, blade 29, operating-arm 30, provided with a chain passing over pulley 26 and down through the tubular extension, and a gear-wheel 25, the vertical shaft 21, geared to the said wheel 25 and having a crank 22, the vertical blades 18 on the long arm of the vane, and a pitman 20, connecting the said blades and operated by said crank 22, substantially as set forth.

FRANK H. EVARTS.

Witnesses:

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CLAUDE EATON.