# W. H. WHEELER.

## Wind-Mills.

No. 156,195. Patented Oct. 20, 1874.

*Fig. 1.*

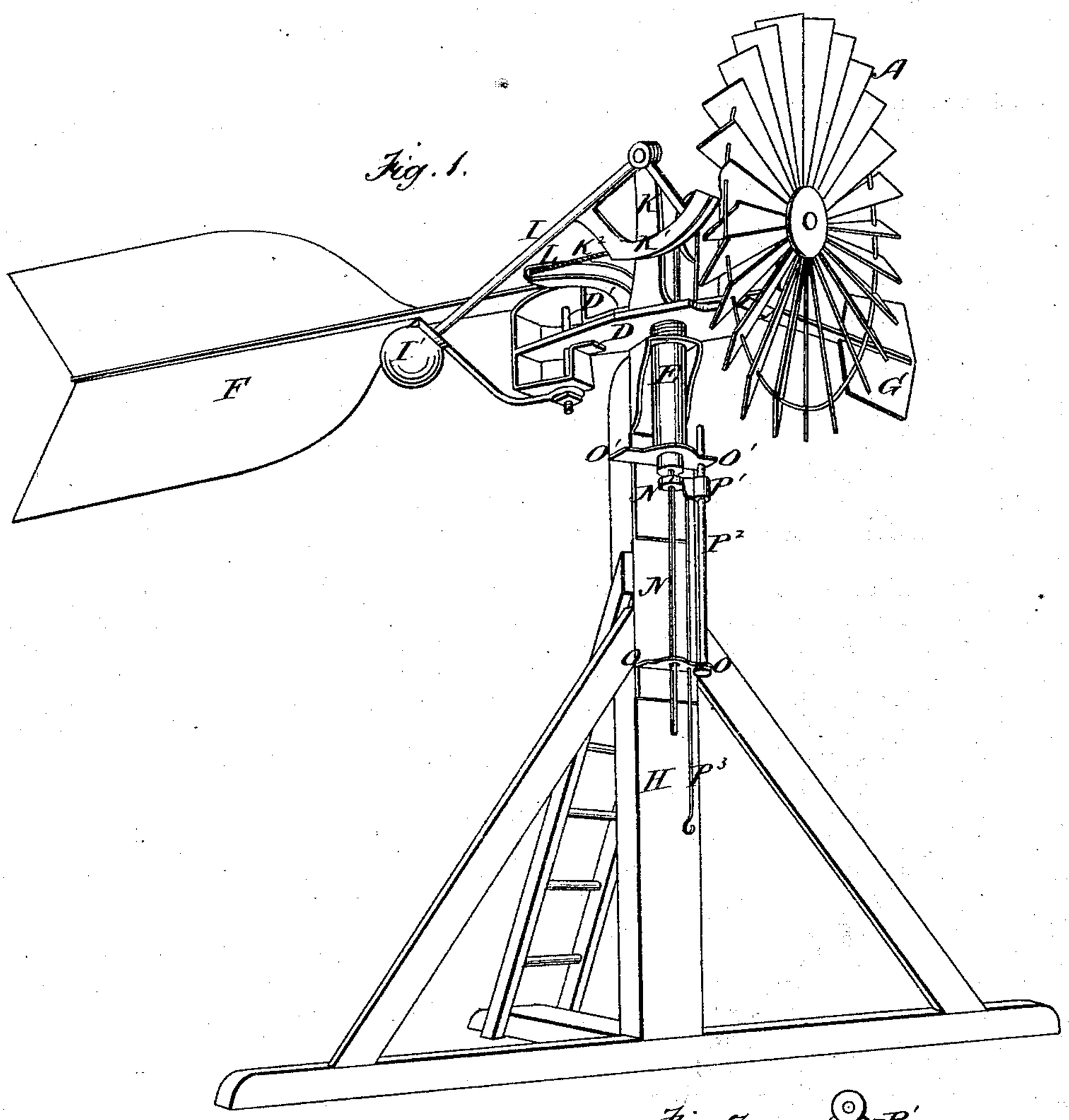



*Fig. 2.*

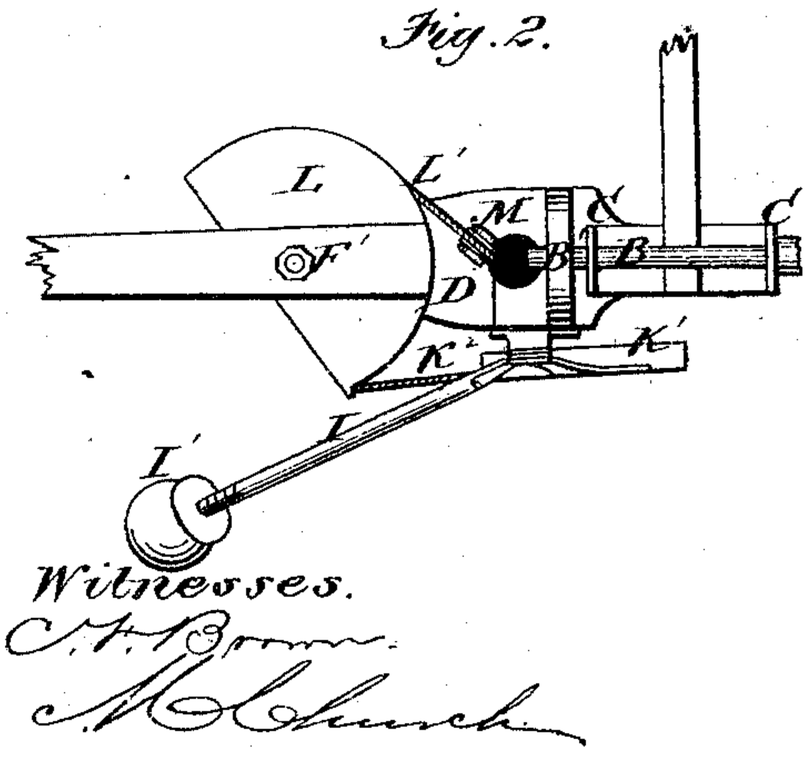
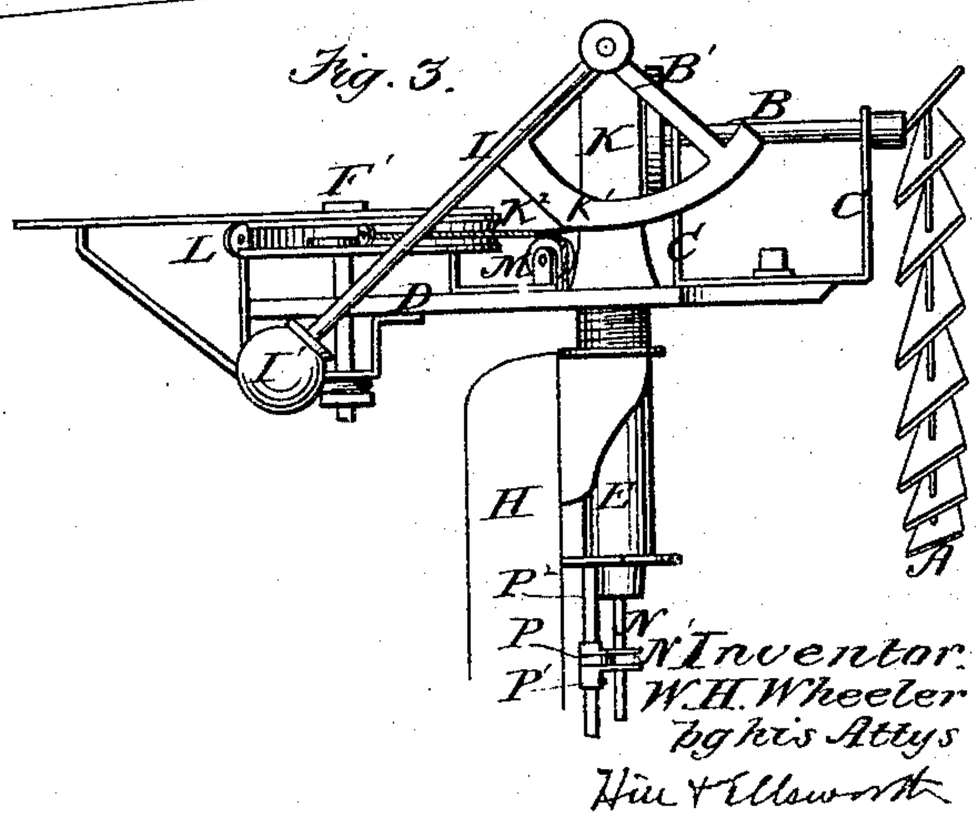



*Fig. 3.*

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# UNITED STATES PATENT OFFICE.

WILLIAM H. WHEELER, OF BELOIT, WISCONSIN.

## IMPROVEMENT IN WINDMILLS.

Specification forming part of Letters Patent No. **156,195**, dated October 29, 1874; application filed October 16, 1874.

*To all whom it may concern:*

Be it known that I, WILLIAM H. WHEELER, of Beloit, in the county of Rock and State of Wisconsin, have invented certain new and useful Improvements in Windmills; and I do hereby declare the following to be a full and exact description of the same, reference being had to the accompanying drawings forming part of this specification, in which—

Figure 1 is a perspective view of the apparatus complete; Fig. 2, a partial top view, showing chiefly the counter-weight; Fig. 3, a partial side view.

Similar letters of reference in the accompanying drawings denote the same parts.

My invention has for its object to improve the operation and efficiency of that class of windmills in which a flexible tail-vane or rudder is employed to carry the wind-wheel more or less out of the wind, as the velocity of the latter increases or diminishes, for the purpose of maintaining the mill at a uniform rate of speed or of stopping its operation entirely. To the accomplishment of these results the invention consists, first, in combining with the flexible tail-vane a weight or weighted arm arranged at one side of the vertical and horizontal axis of the wind-wheel for the purpose of counteracting the lateral strain upon the vertical axis of the wind-wheel when the latter is carried obliquely to the wind; secondly, in increasing the force of the counterbalancing-weight in proportion as the strain upon the vertical axis of the wind-wheel is increased; lastly, in the construction and combination of devices to be hereinafter described.

In the accompanying drawings, the vertical axis of the wind-wheel is shown composed of a head, D, with a tube, E, projecting from its under side. It is supported upon the tower or standard H, so as to rotate freely, by inserting the tube in the lateral brackets O′, the upper bracket serving as a guide and the lower one as a step for the tube. A is the wind-wheel, and B its shaft, having bearings in the upright C of the vertical axis in front of the tube. G is the wind-vane or wind-gage, projecting laterally from the vertical axis; and F is the main vane or rudder, pivoted or hinged to the head in rear of the tube E, as shown, and provided with a grooved segment, L, at its pivoted point, above the head. The segment is provided with stops upon its under side, one to arrest its lateral movement toward the side vane when it has reached a position parallel therewith, as hereinafter described, and the other to arrest its return movement when its longer axis is in line with the axis of the wind-wheel. N is the pitman for transmitting the power of the wheel, connected by a wrist-pin to the disk B′ of the wheel-shaft. It is made angular transversely, and extends down through the tube E, being guided in its movements by a bracket, O′, attached to the tower, and an angular opening formed in the bottom of the tube. It is jointed within the tube, so that its upper portion shall conform to the movements of the disk B′, and its lower portion moves in a straight line. L′ is a cord secured to that corner or edge of the grooved segment next the side vane, which, after passing over a grooved pulley, M, mounted upon the vertical axis, extends down through the tube E, and is fastened to a grooved collar, N′, adapted to slide freely upon the pitman. The cord also passes through an opening in the bottom of the table, near the opening through which the pitman works. By constructing the pitman in angular form transversely and guiding it through a corresponding opening in the bottom of the tube, and by connecting the operating-cord to a collar adapted to slide, but not to rotate upon the pitman, such cord is prevented from being twisted or wound upon the pitman by the rotation of the vertical axis. $P^3$ is the operating-rod, extending upward through the lower bracket, and provided with a lateral forked clutch, P, to embrace the grooved collar. This rod is guided by an eye, $P^1$, running loosely upon a vertical rod, $P^2$, connecting the two lower brackets. I is a weighted lever, pivoted at one end to an upright, K, arranged upon the head D at one side of both the tube E and horizontal axis of the wind-wheel. This arm is provided at its pivoted point with a grooved sector, $K^1$, and to its front end a cord, $K^2$, is secured, so as to extend back within the groove and fasten to the corner or edge of the segment. By this means the weighted arm is connected to the tail-vane eccentrically to its major axis, and is also arranged eccentrically to the vertical and hori-

zontal axis of the wind-wheel. The arc of the sector is so arranged with reference to the weighted arm and standard K as to guide the cord or chain $K^2$ within the groove of the arc and segment of the tail-vane, as such arc and segment are turned on their pivots.

When the mill is in operation the wind-wheel stands obliquely to the wind, being carried to such position by the side vane, thereby throwing the tail-vane slightly against the wind. If the velocity of the latter increases, the wind-wheel and tail-vane approach each other, the latter being moved against the gravity of the weighted arm. By this means the angle of the wind-wheel with respect to the wind is varied in proportion to the velocity of the latter, and the wind-wheel is therefore maintained at a uniform rate of speed. If the velocity of the wind becomes too great the wind-wheel and vane are carried around so as to stand parallel, or nearly so, to each other, in which position the wheel presents its edge to the wind and ceases to operate. When the wind decreases in force the weighted arm carries the tail-vane back to or toward its normal position and throws the wind-wheel again into the wind, such movement being greatly facilitated by the eccentric position of the weighted arm. The weight 1′ is made adjustable upon its arm in any convenient manner, for the purpose of regulating the force of the wind required to swing the tail-vane, and therefore determining the speed at which the wheel shall rotate for transmitting its power to the mill or other machinery. When the horizontal axis of the wind-wheel is carried out of line with the axis of the tail-vane the two stand at an angle to each other upon that side of the vertical axis or tube E opposite to the eccentric weight. The effect of this is to produce a lateral strain upon the vertical axis and the parts connected therewith, because the force of the wind is exerted laterally upon the wheel and vane. The eccentricity of the weighted arm counteracts this strain and prevents injury to the vertical axis and the parts mounted thereon. As the angle of the wheel and vane decreases under a stronger wind the lateral strain becomes greater upon the vertical axis; but the decrease of such angle raises the weight higher, and therefore increases its leverage to counteract the strain.

By operating the rod $P^3$ the tail-vane may be swung around to a greater or less degree while the wheel is in operation, or it may be swung around parallel to the wheel to bring the latter to a state of rest. The parts for effecting this operation by hand, and for preventing the twisting of the cord K, however, form the subject-matter of another application for a patent filed by me and now pending, and are not claimed by me herein.

Having thus described my invention, what I claim is—

1. A weight of varying resistance, pivoted at one side of the horizontal axis of the tail-vane and at an angle with it, in combination with the flexible tail-vane or rudder and wind-wheel, substantially as described, and for the purpose set forth.

2. The combination of the sector $K^1$ with the weighted arm and tail-vane, for increasing the force or leverage of the weighted arm in proportion to the increased strain upon the vertical axis of the wind-wheel, substantially as specified.

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Witnesses:

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