2 Sheets—Sheet 1.

W. H. WHEELER.

WIND-MILL.

No. 187,439. Patented Feb. 13, 1877.

Fig. 1.

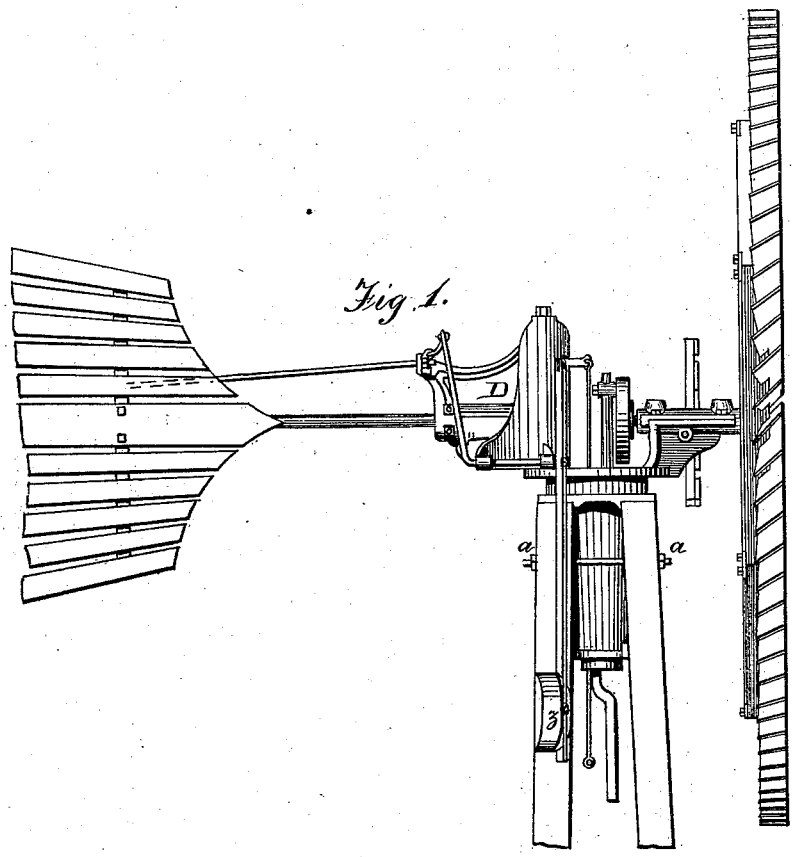


Fig. 2.

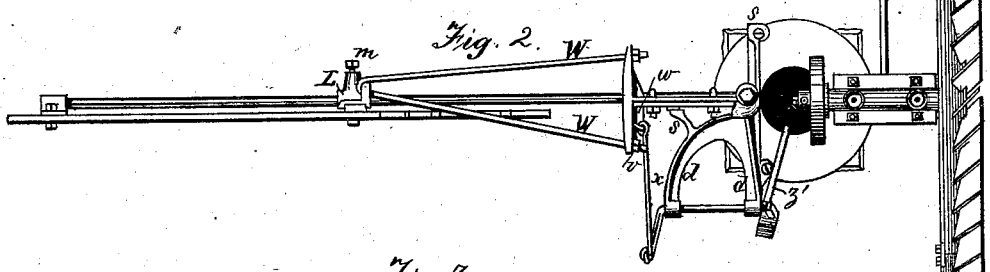
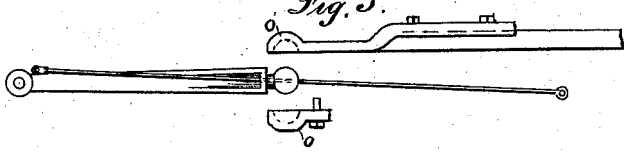


Fig. 3.



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2 Sheets—Sheet 2

W. H. WHEELER.

WIND-MILL.

No. 187,439. Patented Feb. 13, 1877.

Fig. 4.

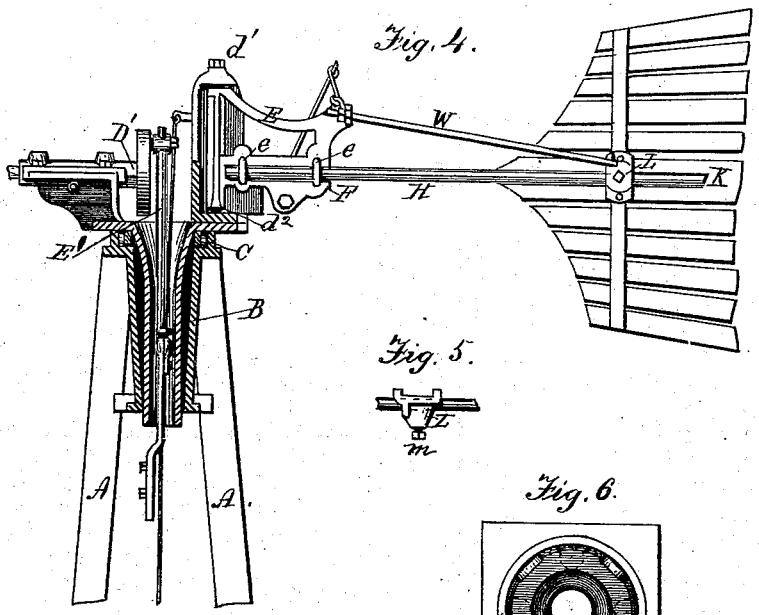


Fig. 5.

Fig. 6.

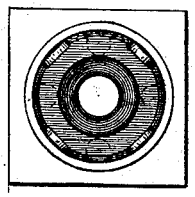


Fig. 7.

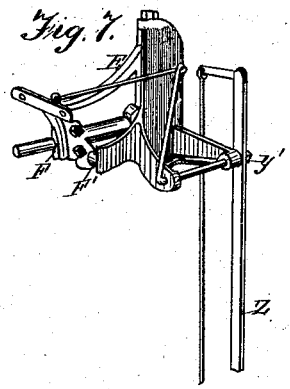


Fig. 8.

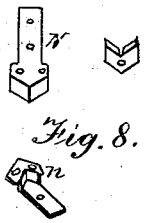


Fig. 9.

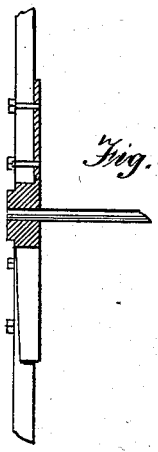
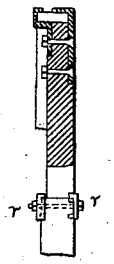


Fig. 10.



Witnesses
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UNITED STATES PATENT OFFICE.

WILLIAM H. WHEELER, OF BELOIT, WISCONSIN.

IMPROVEMENT IN WINDMILLS.

Specification forming part of Letters Patent No. **187,439**, dated February 13, 1877; application filed April 11, 1876.

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 a new and useful Improvement in Windmills; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a side elevation of a windmill, showing the vane or rudder and its connections, together with the pitman. Fig. 2 is a top-plan view of the same. Fig. 3 is a detached view of a pitman. Fig. 4 is a sectional view, showing the lower thimble and the construction, with reference to each other, of the hollow cylindrical stem of the vertical axis, and the ball-and-socket joint of the pitman; also, showing the anti-friction device in the top of the tower-thimble, upon which the turn-table revolves. Fig. 5 is an end elevation of one of the flanged loops for connecting the shafts of the vanes to the wind-receiving surfaces. Fig. 6 is a plan view of the tower-thimble and anti-friction device. Fig. 7 is a detached view, showing more particularly the arrangement of the rock-shaft, weight-bar, and operating-rod. Fig. 8 is a detached view, showing the rim fastenings or clips. Fig. 9 is a detached view, showing the method of connecting and securing the sections of the wind-wheel to the arms.

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

My invention has for its object to improve the construction and operation of wind-wheels, and more especially those of that class which are provided with flexible or hinged rudders; and to this end it consists, first, in the means employed for attaching said shafts to the wind-receiving surfaces of the two vanes; second, in the construction of the hinge upon which the rudder turns; third, in the method of attaching the rudder-shaft and its connecting parts to the vertical axis of the wind-wheel; fourth, in the construction of a ball-and-socket joint for connecting the pitman and pump-rod, and in adapting said joint to the vertical axis of the wind-wheel, as well as for the passage of the cord or rod by which the rudder is operated; fifth, in the arrangement of a rock-shaft and weight, with reference to preserving a balance as the vane swings from its normal position; sixth, in the employment of a link or pitman as a connecting device from the weight-bar to the operating-rod, so arranged as to maintain the operating-rod always over the center, or nearly so, of the vertical axis; seventh, in the peculiar construction and arrangement of the anti-friction device; and, lastly, in the construction and arrangement of the fastenings by which the rims of the wheels are connected to the arms or spokes.

In the accompanying drawings, A A represent the four posts of the tower-frame, carrying between them the tower-thimble B, which receives the vertical axis of the mill. This tower-thimble is formed at its lower end with corner flanges projecting outwardly, so as to form a corner socket for the posts of the tower. The upper end of the thimble is provided with similar flanges depending from a horizontal plate, which covers and rests upon the upper ends of the posts. The thimble is secured between the posts by the bolts *a a a a*, which, by forming a continuous connection of the posts, tend to draw them to a common center. In the upper end of the thimble B is formed a chamber for the reception of the anti-friction roll device, consisting of upright and horizontal rollers, held in position by a loosely-fitting ring, provided with suitable guide-chambers for the reception of the rollers, as shown, which rim and rollers revolve with the turn-table. This ring lies flat, and is recessed on the outer edge for the vertical rollers, and on the under face for the horizontal rollers, as shown in Figs. 4 and 6.

C is the vertical axis or turn-table of the mill, its lower end forming a cylindrical way for the back of the piston-socket, and formed at its upper end with a horizontally-projecting flange, which sets upon the upright rollers, and projects over the anti-friction device to protect it from sleet. The lateral pressure of the vertical axis is resisted at the top by the horizontal rollers, and at the bottom by a guide formed in the lower thimble.

D is a standard, attached to the rear edge

of the turn-table flange, having horizontally-projecting rock-shaft bearings *d d*, stops *s s* to limit the swing of the vane, screw or pin d^1, and socket d^2, by means of which the hinge or axis for the vane to swing on is formed.

H and I are the shafts of the tail-vane and side vane, respectively. They are each formed of metal tubing, and secured to the wind-receiving surfaces K K by means of the flanged eyes L L and set-screws *m m*, as shown in Figs. 2 and 4.

E is a triangular vane-support, with a pin at its lower end to engage with the socket d^2, and a socket at its upper end to receive the screw or pin d^1. F is a socket formed in the vane-support to receive the end of the rudder-stem, which is secured therein by the eyebolts or staples *e e*. This socket may be constructed in the form of a hollow cylinder and the rudder-stem fastened therein by means of set-screws through the shell of the cylinder, or a half-box and bolt may be employed to hold the stem in the socket F. The vane-support E is further formed near its rear corner with a cross-head to receive the tension-rods W of the vane-stem, and an offset, *w*, to which the link *x* is connected by means of the link-pin *v*; also with a stop, F′, projecting from its base to restrict the lateral swing of the vane by contact with the stops *s s*, formed upon the standard D. The opposite end of the link *x* is joined to an arm of the rock-shaft, which is supported in the bearing *d d*, as shown in Fig. 2. The rock-shaft terminates in a socket, *y*′, which carries a transverse weighted bar, Z. To the outer end of the weighted bar the weight *z* is adjustably attached. To the inner end of the weight-bar the link *z*′ is hinged or jointed so as to project inwardly to a point over or nearly over the center of the vertical axis of the mill, where it is joined by a swivel to the vertical operating rod or cord. In the ascent of the weight *z* the link *z*′ ranges downward into the hollow cylindric stem of the vertical axis, and by being hinged at the weight-bar it carries the operating rod in nearly a vertical line, without much lateral vibration. This feature I regard as of great importance, as by it the use of chains and pulleys is avoided and the operating-rod is allowed to range freely up and down without cramping, as would be the case if attached directly to the weight-bar.

E′ is the pitman connected eccentrically at its upper end to the shaft D′, and having a hollow ball at its lower end which is embraced between the two semi-spherical half-boxes *o o*, one of which halves having at its lower end an offset socket to receive the pump-rod, the object of said offset being to hold the pump-rod in such a position as not to interfere with the vertical working of the operating rod or cord. When the operating rod or cord is drawn it causes the vane to swing from its normal position (at right angles with the face of the wind-wheel) through the medium of the weight-bar, rock-shaft, and link, the gravity of the weight increasing proportionately to the degree of deflection of the vane, this movement of the vane and rock-shaft carrying the weight further from the center of the vertical axis of the mill, in a direction opposite to that of the vane's deflection, and thereby maintaining a uniform balance which would otherwise be disturbed by the deflection to one side. On releasing the operating rod or cord the gravity of the weight will return the vane to its normal position. N *n* are fastenings for the outer rims of the wheel, and are provided at their outer ends with flanges, which, being bolted to the arm or spokes in inverse position to each other, form a socket to receive the ends of outer rims of wheels between them. These fastenings are connected by bolts passing transversely through the rims, and are secured to the arm or spoke in the manner as shown in Fig. 10. For additional security the inner ends are provided with side flanges to fit over the arm. The inside rims of wheel are secured by flanged slips, *r r*, as shown in Fig. 10, with a bolt passing centrally through them and the arm at the point of intersection of the rims.

Having thus described my invention, what I desire to secure by Letters Patent is—

1. The flanged clasp L, embracing the cross-bar to which the slats are secured, the said clasp perforated for the tubular bar, and provided with a set-screw, as set forth.

2. The triangular vane-support E, with pin at its lower end and socket above, and fitted to the standard, as set forth.

3. The vane support E, adapted to receive the rudder-stem, in combination with the staples connecting the parts, substantially as set forth.

4. The vane-support E, formed with a cross-head to receive the tension-rods W, and in combination therewith, as set forth.

5. The vane-support, in combination with the rod *x* and bell-crank, and with the bar and weight attached thereto, substantially as described.

6. The bell-crank, connected to the vane-support, as described, in combination with the weighted bar Z, arm *z*′, and vertical rod connected therewith, as described.

7. The standard D, formed to hold the vane-support and bolted to the rear edge of the turn-table flange, as set forth.

8. The standard D, having the rock-shaft bearings *d d*, substantially as described.

9. The stops *s s* on the standard D, in combination with the vane support, provided with corresponding projections, as set forth.

10. The pitman-connection E′, having the ball at its lower end, in combination with the half-boxes *o o* and their connections, as set forth.

11. The pitman E′, having the perforated ball, half-boxes *o o*, with the offset connections

and vertical rod passing through the ball, as set forth.

12. The flanged outer-rim fastenings N *n*, constructed and arranged as and for the purpose set forth.

13. The flanged clips *r r* for the inner rims, constructed and arranged as set forth.

14. In a windmill, the guide-rings, having vertical and horizontal recesses, in combination with vertical and horizontal friction-rollers, the construction and adaptation of the parts being such that the rings carry and retain the rollers without pivots, and the ring and rollers being adapted to the other parts of the wind-mill, as set forth.

15. In a windmill, a tubular iron vane-shaft, in combination with the clamps and bars which hold the wind-receiving surfaces, as set forth.

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

WILLIAM H. WHEELER.

Witnesses:

EDWARD P. WHEELER,

R. TATTERSHALL.