C. V. STEVENS.
Wind-Wheels.

No. 212,822. Patented Mar. 4, 1879.

Fig. 1.

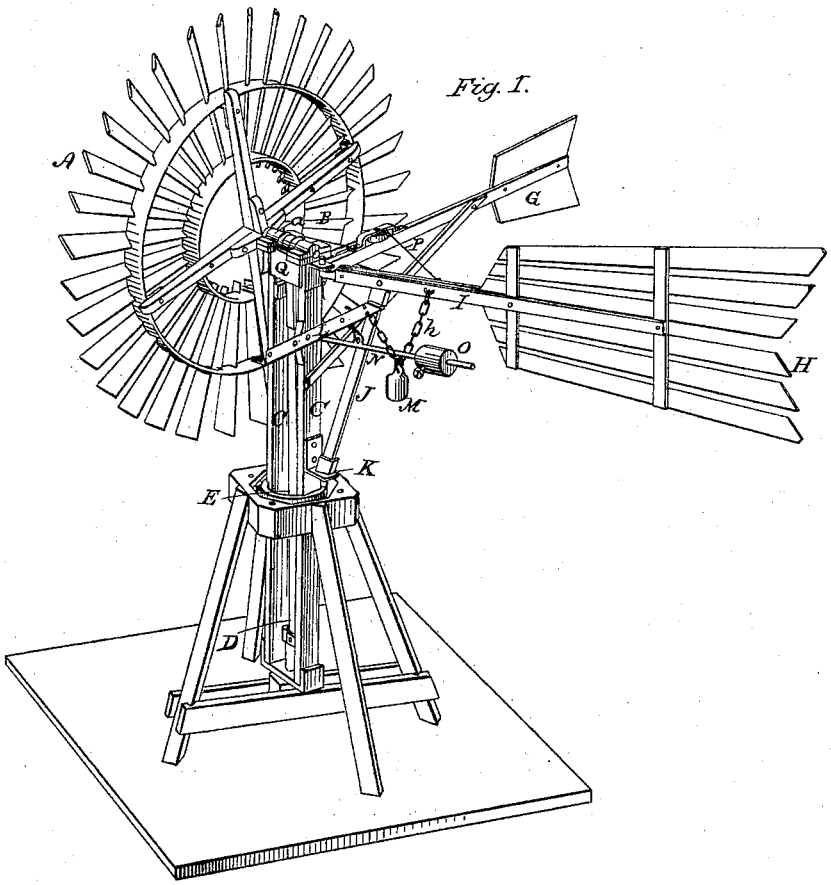
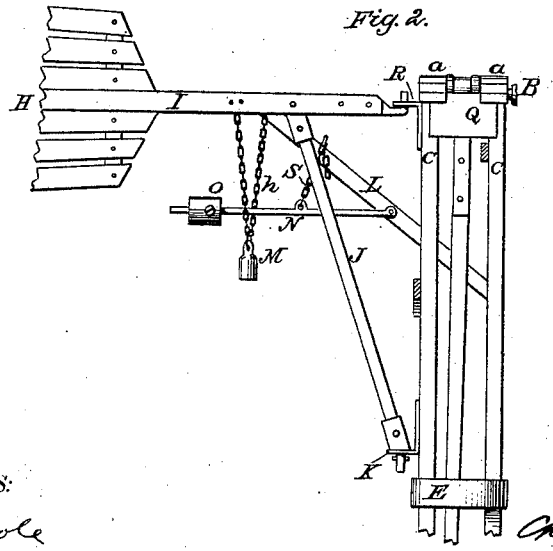


Fig. 2.



WITNESSES:
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UNITED STATES PATENT OFFICE.

CHARLES V. STEVENS, OF SOMONAUK, ILL., ASSIGNOR OF FOUR-FIFTHS OF HIS RIGHT TO JOHN CLARK AND HARRISON WRIGHT, OF SAME PLACE.

IMPROVEMENT IN WIND-WHEELS.

Specification forming part of Letters Patent No. **212,822**, dated March 4, 1879; application filed October 7, 1878.

To all whom it may concern:

Be it known that I, CHARLES V. STEVENS, of Somonauk, De Kalb county, State of Illinois, have invented a new and useful Improvement in Wind-Wheels, which improvement is fully set forth in the following specification and accompanying drawings.

This invention relates to that class of wind-wheels which have pivoted tail-vanes and fixed lateral vanes, whereby the wheel is governed by being turned edge to the wind; and it consists, first, in a pivoted brace under the shaft of the tail-vane, whereby it is supported and prevented from sagging under the influence of the governing weight; second, in a supplementary adjustable weight, with which the tail-vane can be loaded at any desired degree of deflection for the purpose of counterbalancing the increasing deflecting force of the wind as the wheel departs from its position of maximum effectiveness toward a position edge to or parallel with the wind.

I am aware that the flexible tail-vanes of wind-wheels have heretofore been provided with weighted connections between said vane and the supporting frame-work to counterbalance the deflecting effect of the wind upon the rigid guide-vane, and that said weight has been made adjustable upon a lever, so as to be adapted to offer resistance in various degrees, as may be desired; but such devices do not embody my invention, the object of which is to interpose a cumulative resistance to a cumulative deflecting power, for it is evident that the power of the wind to turn the wheel on its vertical axis and bring it edge to the wind is a power constantly increasing as the wheel moves from its position directly facing the wind, and therefore with its force balanced on the vertical axis, to the position edge to the wind, and entirely at one side of said axis; and it is equally evident that the control of the wheel requires a correspondingly cumulative resistance to the said deflection; otherwise, when the wheel once commenced to move away from its position facing the wind it would continue to move away from that position until it came edge to the wind, when it would cease to revolve.

A flexible connection between the vane and some stationary part of the frame, and supporting a weight about midway between the two points of support, has been used. The resisting power of this weight increases as the flexible connection is drawn up and approximates a straight line; but in practice this has not been found to afford the required amount of cumulative resistance, and hence I apply any supplemental weight to be adjusted to be taken up at any desired point of wheel-deflection.

That others may fully understand my improvement, I will more particularly describe it.

Figure 1 is a perspective view of my wheel; Fig. 2, an elevation of the same.

A is the wind-wheel, built as usual with those which have fixed vanes. The axis-shaft B of the wheel A is mounted in boxes *a a* upon the upper end of a revolving post or frame. This post or frame I prefer to construct of two timbers, C C, secured to blocks at top and bottom, and to a circular frame near its central part. The lower end is provided with a tubular step, through which the reciprocating rod D passes. The circular frame E bears against friction-rollers set in the frame F to support and guide the pivotal post C. The side vane, G, projects laterally, or in a direction parallel with the plane of the wheel's rotation, to secure a certain preponderance of pressure at one side of the wheel, and thereby insure its deflection in the proper direction.

The hinged tail-vane H is mounted at the rear end of the tail I, the forward end of which is hinged or jointed to the post C at its upper end, the hinge being constructed so that said tail may swing around toward the said vane rather more than ninety degrees therefrom, so as to counteract the said vane in light winds and bring the wheel square to the wind.

Heretofore the joint between the tail and the supporting post or frame has been sufficiently strong to support the weight of the tail and vane. This requires much extra strength and weight of parts, and is objectionable. I therefore support the tail and vane H much more efficiently and securely by means of a pivoted brace, J, which, at its upper end, is attached to said tail I at some convenient point in front of the vane H, and at its lower end

seated in a step, K, secured to the revolving post or frame C. This permits the tail to swing with less friction and without strain upon any of the moving parts.

An arm, L, is rigidly secured to the post or frame C in a position at right angles to the lateral vane, the upper end of said arm being about level with the tail I. A flexible connection, preferably a light chain, *h*, is placed between the end of the arm L and the proximate portion of the arm I, and to the center of this connection a weight, M, is suspended, the gravity of which tends constantly to pull the vane H against the wind, and thereby pull the wheel A also toward the wind; but the power of the weight M is inadequate to balance the force of the wind upon the wheel as the latter swings around to a position where its surface is all, or nearly all, at one side of its vertical pivotal axis, and I therefore have attached a hinged arm, N, which may be jointed to the arm L or to the frame C. This arm N extends over the chain *h*, so that when, by the separation of the arm L and the tail I, the chain *h* and weight M are raised up a certain distance, they will engage with the arm N, and the gravity of said arm is then added to that of the weight M, and the resistance to the deflecting force of the wind is thereby increased.

The arm N is provided with an adjustable weight, O, so that its effective weight or leverage can be regulated at will. The arm N is made adjustable, so as to come into engagement sooner or later, as may be desired, by any suitable means, but preferably by a sling, S. The tail I is provided with the ordinary cord and pulley P, whereby the tail-vane H may be pulled around parallel with vane G to swing the wheel edge to the wind whenever it is desired to have it stop.

The top of the frame C is formed of a cast-metal plate, Q, with suitable flanges to receive the tops of the frame-post C, and with seats for the boxes *a a*.

The same casting may also be constructed with a bracket, R, for the hinge attachment of the tail I.

Having described my invention, what I claim as new is—

1. The flexible tail-vane H and flexible connection *h*, with its weight M, combined with a supplemental or cumulative weight, substantially as and for the purpose set forth.

2. The tail-vane H, with its flexible connection *h* and weight M, combined with the hinged arm N, to add a supplemental weight, substantially in the manner set forth.

3. The tail-vane H, with its flexible connection *h* and weight M, and the hinged arm N, combined with an adjustable weight, O, thereon, for the purpose set forth.

4. The tail I and vane H, hinged to the top of the rotating frame C, combined with the brace J, set upon the bracket K and jointed to the tail I, for the purpose of supporting the same, as set forth.

C. V. STEVENS.

Witnesses:
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