J. T. VERNOR.

WIND-MILL.

No. 175,530. Patented March 28, 1876.

Fig. 1.

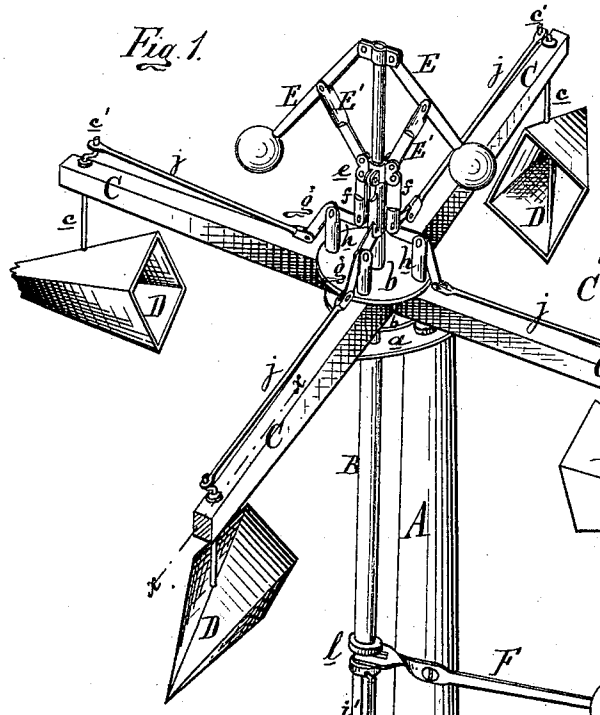


Fig. 2.

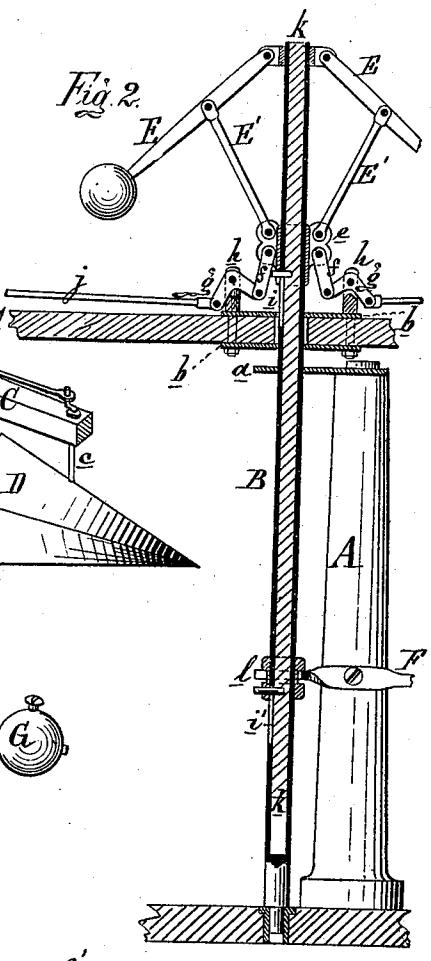
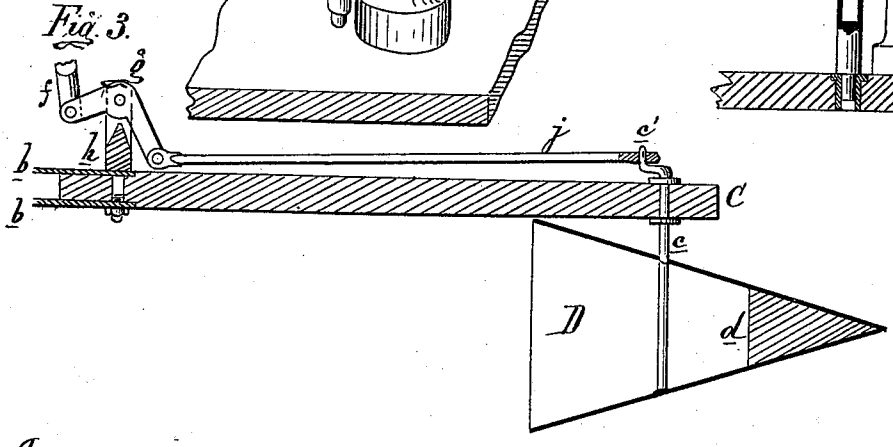


Fig. 3.



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JOHN T. VERNOR, OF MARSHALL, MICHIGAN.

IMPROVEMENT IN WINDMILLS.

Specification forming part of Letters Patent No. **175,530**, dated March 28, 1876; application filed February 21, 1876.

To all whom it may concern:

Be it known that I, JOHN T. VERNOR, of Marshall, in the county of Calhoun and State of Michigan, have invented an Improvement in Windmills, of which the following is a specification:

The nature of my invention relates to certain improvements in windmills of the horizontal variety; and consists, first, in the employment, in lieu of sails, of pyramidal or conical anemometer-cups, one at the extremity of each radial arm; secondly, in the manner of hanging the cups so that their mouths or bases can be turned into or out of the plane of direction of the wind; and, thirdly, in a means for governing or regulating the speed of the mill, as more fully hereinafter set forth.

Figure 1 is a perspective view. Fig. 2 is an enlarged sectional elevation of the hollow standard and the regulating devices. Fig. 3 is a section through an arm and cup at *x x*.

In the drawing, A represents a post, having at its top a bracket, *a*, forming a bearing for a tubular vertical shaft, B, whose lower end is stepped in a bearing, *a'*, at the side of the foot of the post. C are radial arms, whose inner ends are inserted between collars *b b* on the tubular shaft, above the bracket *a*. D are elongated hollow pyramids—or, if preferred, cones—each hung by a shaft, *c*, to the outer extremity of an arm, C, in such a manner as to be free to rotate in a horizontal plane. The apex of each conical or pyramidal cup D has permanently secured in it a weight, *d*, which makes that end between the shaft *c* and the apex heavier than the end or part between the said axis and the base. The upper end of each shaft *c* has a crank, *c'*, turned in it. E E are the arms of an ordinary centrifugal governor, connected by links E' E' with the sleeve *e* sliding on the tubular shaft. The sleeve *e* is cast with a pair of lugs opposite and above each arm, to receive the upper end of a link, *f*, pivoted between them. The lower end of this link is pivoted to one arm of a bell-crank, *g*, pivoted at its angle to a post, *h*, erected on the upper collar, while the other arm of the bell-crank is connected by a long rod, *j*, with the crank *c'* of the shaft *c* of each cup D.

It will, then, be seen that as the arms of the governor expand by the centrifugal force developed in the rotation of the mill, the sleeve *e* will rise and, through its connections, rotate the cups on their axes, turning their mouths or bases more or less out of the wind, and in this manner the speed of the mill can be regulated, or at least the speed of rotation can be kept within a certain limit; but it will also be seen that a governor having sufficient power to turn all the cups simultaneously under the pressure of a high wind must necessarily be very heavy, expensive in cost, and productive of great friction on the step of the shaft, thereby absorbing or wasting power that might otherwise be utilized.

To overcome these objections, I make use of a light governor, having only power or leverage enough to return the bases of the cups into the wind as the latter dies away, or has but little velocity; and I make the cups self-regulating by weighting the apex, as hereinbefore described, so that in the rapid rotation of the mill the apices of the cups will be thrown outwardly by the centrifugal force developed, and thereby regulate or govern the speed of the mill, the governor proper being only used to return their bases into the wind.

To stop the rotation of the mill, a rod, *k*, is inserted in the tubular shaft, the upper end of which rod is connected with the governor-sleeve by a pin which passes through a long slot, *i*, in said shaft. The lower end of this rod is in like manner connected by a pin with a collar, *l*, on the shaft near the ground, the pin passing through a slot, *i'*, in the shaft, which thus allows of a vertical movement of the rod, sleeve, and collar.

A lever, F, is pivoted to the post, with a fork at its shorter extremity, which embraces a groove in the collar *l*. A weight, G, on said lever, being run out on its long arm, raises the sleeve *e*, and, through its connections, turns the bases of the cups out of the wind, when the mill will be motionless.

The mouths of the cups may be closed up to prevent accumulations of snow and ice during the winter season, and it is evident that they can be arranged upon or above the arms, if preferred.

What I claim as my invention is—

1. In a horizontal windmill, substantially as described, a conical or pyramidal cup, pivoted

by a transverse axial shaft to the outer end of each radial arm, substantially as described.

2. In a horizontal windmill, substantially as described, the conical or pyramidal wind-cups, pivoted to the radial arms and weighted in their apices, substantially as and for the purpose set forth.

3. In a horizontal windmill, substantially as described, the conical or pyramidal wind-cups, each weighted in its apex and pivoted to a radial arm, and the combination with said cups of a centrifugal governor adapted to turn their bases into the planes parallel with the radii of their respective arms, substantially as described.

JOHN T. VERNOR.

Witnesses:
H. F. EBERTS,
H. S. SPRAGUE.