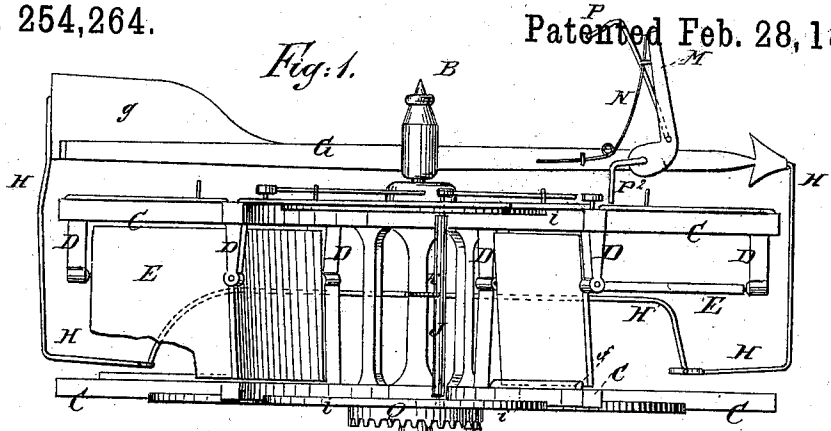
(Model.)

C. C. BOMBERGER.

WINDMILL.

No. 254,264. Patented Feb. 28, 1882.

Fig: 1.



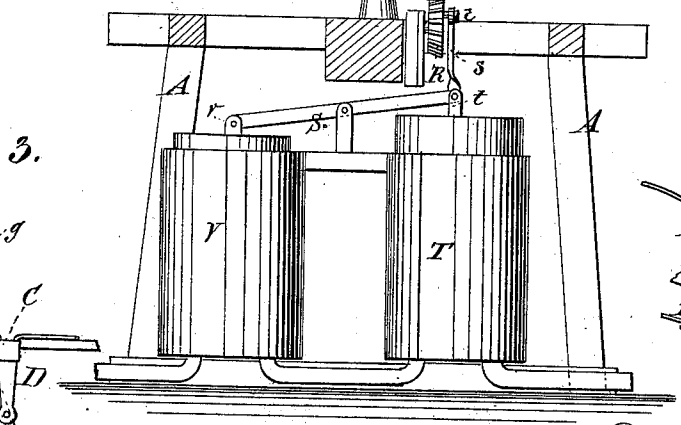


Fig: 3.

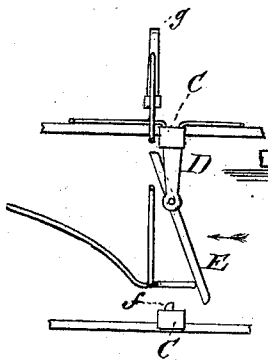


Fig: 4.

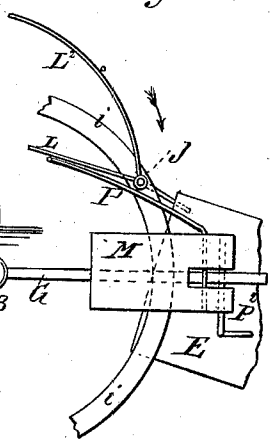
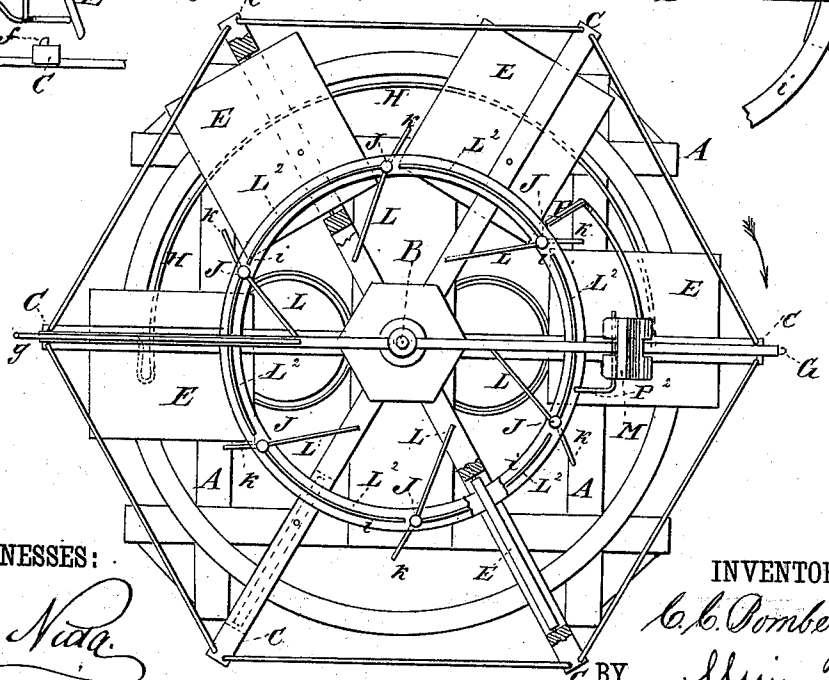


Fig: 2.



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UNITED STATES PATENT OFFICE.

CHRISTOPHER C. BOMBERGER, OF CROCKER STATION, MISSOURI.

WINDMILL.

SPECIFICATION forming part of Letters Patent No. 254,264, dated February 28, 1882.

Application filed May 4, 1881. (Model.)

To all whom it may concern:

Be it known that I, CHRISTOPHER C. BOMBERGER, of Crocker Station, in the county of Pulaski and State of Missouri, have invented a new and useful Improvement in Windmills, of which the following is a specification.

My invention consists in certain novel details of construction, arrangement, and combination of the various parts connected with a windwheel working on a vertical shaft, whereby provision is made for holding the sails horizontally during their return movement, and for automatically adjusting their positions by the variations in the force of the wind.

In the accompanying drawings, Figure 1 is a side view of an apparatus embodying my improvements. Fig. 2 is a top view of the same. Fig. 3 is an edge view of the end of one of the sails and the tail end of the vane. Fig. 4 is a detail top view of the front portion of the vane and some of its connections, showing the parts in different positions from what is shown in Fig. 2.

Similar letters of reference indicate corresponding parts.

A represents the frame-work which supports the working parts of the apparatus.

B is a vertical shaft extending upward from the frame-work and forming the bearing for the windwheel. The wheel is composed of a hub and two sets of radial spokes, C. From the upper spokes hangers D extend downward, and in these hangers are pivoted the sails E. The pivots of the sails extend outward from a line above their centers, so that the gravity of each sail will keep it in a vertical position, except as hereinafter described.

The vane consists of a horizontal bar, G, provided with a tail-piece, *g*. The bar has its bearings on the same shaft, B, on which the wheel rotates.

To the head of the vane is attached one end of an iron rod, H, which from thence extends downward nearly as far as the level of the lower spokes C, thence inward toward the center of the wheel, thence upward nearly as high as the level of the pivots of the sails, thence horizontally in a circular direction, contrary to the direction of rotation of the wheel, to a point near the tail of the vane; thence diagonally downward to a point immediately under the tail of the vane, thence radially outward, and thence vertically upward to the tail of the vane, where its other end is secured.

Between the head and tail of the vane, in the direction of rotation of the wheel, the sails E hang vertically, and the backward movement of their lower edges is arrested by ribs or shoulders *f* on the lower spokes C. As each sail E reaches a point immediately under the tail of the vane (see Fig. 3) its lower portion rides up the inclined portion of the rod H, and then along the horizontal portion thereof, until it reaches the head of the vane, where it drops of its own gravity to a vertical position, and is again ready to receive the force of the wind.

The wheel is provided with two rings, *i*, concentric with the hub, one of which rings connects the upper and the other the lower spokes. In these rings are journaled a number of vertical shafts, J, each of which is about midway between two of the spokes C. About midway of the height of each shaft is an arm, *k*, extending toward the periphery of the wheel.

At the upper end of each shaft J is rigidly attached a rod divided into two branches, L L^2. The branch L is straight, and under ordinary conditions of the wind it extends radially toward the center of the wheel. The branch L^2 is curved, and under ordinary conditions of the wind it lies parallel with the ring *i*.

To the vane G, between its head and its center of rotation, a fan, M, is pivoted transverse to the direction of the wind. A spring, *n*, bears against the rear side of this fan with a tendency to keep it in a vertical position. Through this fan, transversely above its pivot, runs a rod which is formed into two arms, P P^2, extending from their center at an angle of about forty-five degrees with relation to each other. Under ordinary conditions of the wind the fan M (see Fig. 1) maintains an upright position, and in such case the arm P^2 engages with the outer side of the curved branch L^2, and holds the shaft J in such a position as to keep its arm *k* out of the way of the sails E as the wheel rotates; but when the force of the wind is too great it blows the fan M backward and downward, (see Fig. 4,) so as to cause the arm P to engage with the inner side of the straight branch L, and turn the shaft J in such a position as to throw the arm *k* under the sail E

and hold it horizontally, so as to offer no resistance whatever to the wind. When the force of the wind diminishes, the spring *n* raises the fan M to its upright position and the parts resume their former positions.

The wind-wheel constructed and operating as above described may be connected in any suitable manner with machinery of any suitable description. As shown herein, the lower side of the wheel carries a crown-wheel, Q, meshing into a pinion, R, provided with a crank-pin, *r*. The crank-pin *r* is connected by a link or pitman, *s*, with a piston-rod, *t*, working in a cylinder, T, and also with one end of a working-beam, S, the other end of which is connected with a piston-rod, *v*, working in a cylinder, V. One of these cylinders may represent an air-pump, and the other may represent a chamber or reservoir for storing condensed air or steam, and they may be connected at the bottom by means of pipes, as shown.

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

1. The combination of the upper spokes C, the hangers D, carried by said upper spokes, the sails E, pivoted in said hangers, and the lower spokes C, provided with the ribs or shoulders *f*, as herein shown and described.

2. The vane G and the rod H, arranged as shown and described, in combination with the pivoted sails E, substantially as and for the purpose herein set forth.

3. The fan M, spring *n*, and arms P P^2, in combination with the branches L L^2 and shaft J, as shown and described, for the purpose specified.

4. The combination of rings *i*, the shaft J and its arm *k*, branches L L^2, and arms P P^2 with the pivoted sails E, as shown and described, for the purpose specified.

CHRISTOPHER COLUMBUS BOMBERGER.

Witnesses:
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