(No Model.)

J. F. FORD.

Wind Wheel.

No. 238,880. Patented March 15, 1881.

Fig. 1.

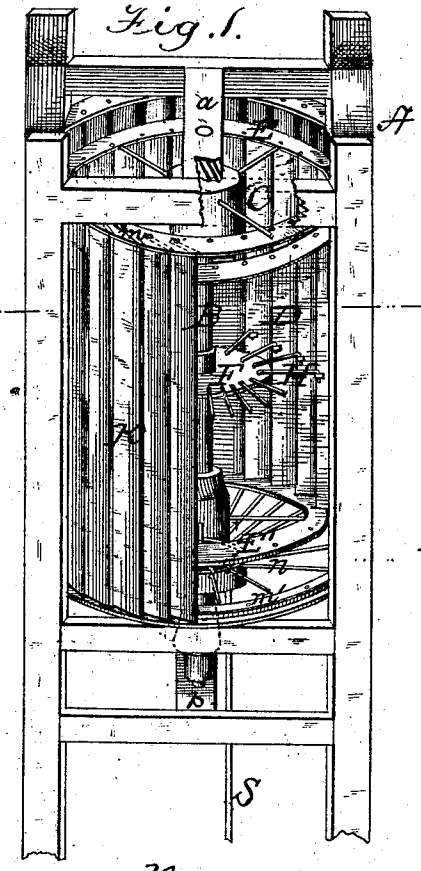


Fig. 4.

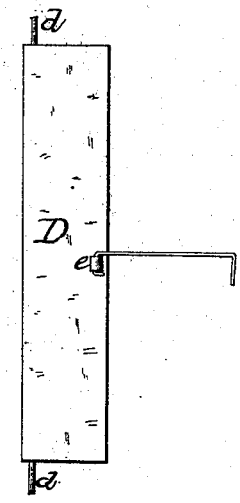


Fig. 3.

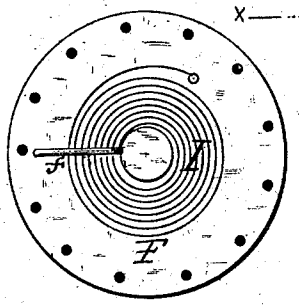


Fig. 5.

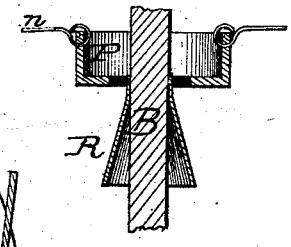
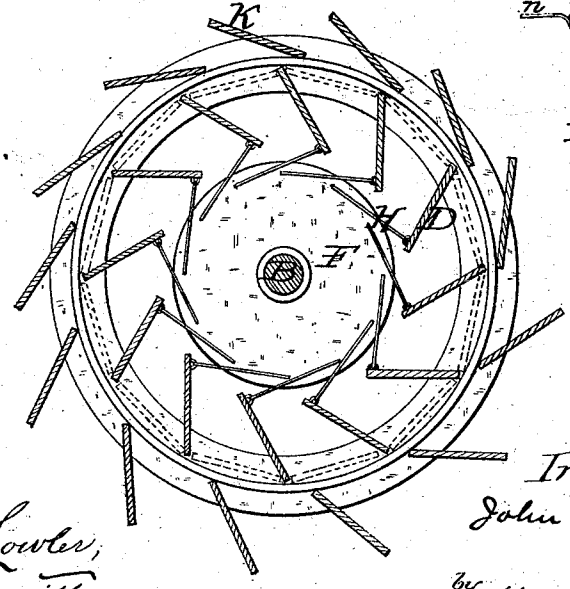


Fig. 2.



Witnesses:

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UNITED STATES PATENT OFFICE.

JOHN F. FORD, OF SPENCER, IOWA.

WIND-WHEEL.

SPECIFICATION forming part of Letters Patent No. 238,880, dated March 15, 1881.

Application filed July 10, 1880. (No model.)

To all whom it may concern:

Be it known that I, JOHN FLETCHER FORD, a citizen of the United States, residing at Spencer, in the county of Clay and State of Iowa, have invented certain new and useful Improvements in Wind-Wheels; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters or figures of reference marked thereon, which form a part of this specification.

This invention relates to that class of wind-mills in which the wind-wheel is mounted on a vertical shaft surrounded by a series of stationary shutters or blades, so arranged as to be opened and closed to constitute chutes for conducting and governing the admission of wind to the wheel arranged within, and the objects are to gain greater power and more regular motion.

The object of my invention is to construct a wind-wheel with the vanes so hinged at the top and bottom, near their outer edges, and held in their normal position by means of a coil-spring, or by a weighted lever attached to a governing-wheel through the agency of a cord working over pulleys, whereby, when the centrifugal force acting on the vanes of the wheel exceeds the force of pressure of the spring or gravity on the weight, the vanes will move forward and form a cylinder around the outer edge of the wheel. The wind having but little effect upon the body of that form, the weight or spring soon overcomes the centrifugal force and the vanes resume their normal position.

My invention therefore consists, first, in hinging the vanes at top and bottom near their outer edges, and connected with a governing disk or wheel through the instrumentality of pivoted rods, whereby the vanes are maintained in their normal position by means of a coil-spring or weighted lever attached to the governing-wheel; secondly, in the combination of the hinged vanes of the wind-wheel, a governing wheel or disk having a coil-spring or its equivalent, and the outer shutters pivoted at the top and bottom and capable of being opened to admit the wind to the vanes; thirdly, in a frustum of a hollow cone arranged on the vertical shaft of the wind-wheel, in combination with a ring connected to the shutters; and, finally, in the combination and arrangement of the parts, as will be hereinafter more fully set forth.

Figure 1 is a perspective view of my improved wind-wheel partly broken away to show the interior. Fig. 2 is a transverse sectional view taken through the line *x x* of Fig. 1. Fig. 3 is a bottom view of the governing-wheel, showing a coil-spring. Fig. 4 is a front view of one of the vanes.

In the annexed drawings I have shown my wind-wheel attached to an upright frame, A. This frame is provided with two transverse bars, *a b*, in which the vertical shaft B has its upper and lower bearings.

The letter C represents the wind-wheel rigidly mounted on the shaft B. This wheel is composed of a series of vanes, D, having their pivotal bearings in the upper and lower disks, E E′, and a governing-wheel, F, arranged intermediately between the disks and forming a connection with the vanes through the instrumentality of the connecting-rods H. This governing-wheel F, intermediately arranged, and the connecting-rods H, give a bracing action to the central or middle portion of the vanes, as seen in Fig. 1 of the drawings. The vanes are pivoted to the disks by the bearings *d*, located near their outer edges, and are formed with eyes or loops *e*, to receive the connecting-rods, as seen in Fig. 4 of the drawings. These vanes D, journaled to the disks and connected to the governing-wheel, are so arranged that whenever they are thrown outward they will form a cylinder, as indicated by dotted lines in Fig. 2 of the drawings.

The governing-wheel F, as shown in Fig. 3 of the drawings, is provided with a coiled spring, I, and a pin, *f*, for keeping the spring in place to maintain the vanes in position; but in practice weights attached to cords extending around the circumference of the governing-wheel over pulleys until they hang down alongside of the shaft may be employed. The function of this coiled spring attached to the under side of the governing-wheel, or the employment of the weights and cords, is, in case the centrifugal force acting on the vanes ex-

ceeds the force of pressure on the spring, or gravity on the weight, the vanes will move forward and form a cylinder around the outer edge of the wheel, as indicated by the dotted lines, as seen in Fig. 2 of the drawings. In this condition the wind has but little effect upon the wheel, and the pressure or weight soon overcomes the centrifugal force, and the vanes resume their normal position. Thus the speed of the wheel is regular, and can be made greater or less by increasing or diminishing the amount of pressure or weight.

The letter K indicates a series of shutters surrounding the wheel. These shutters are formed with pivots at the upper and lower ends of the inner edges, and are journaled in the upper and lower stationary disks, *m m'*, attached to the frame. These shutters are each connected at the lower end by a rod, *n*, to the ring P, encircling the shaft. This ring P fits around the frustum of a hollow cone, R, surrounding the shaft at a point below the lower disk of the shutters, and is operated by a lever-rod, S. The object of the frustum of a cone, as shown in Fig. 5 of the drawings, is threefold: first, to provide a rest for the movable ring P when it descends to its lowest point; second, to confine the point of contact between the ring and cone to the least possible surface, and entirely dispense with frictional contact in the ascending and descending movements of the ring; third, to avoid frictional contact with the shaft of the wheel. When the ring P is raised from its seat on the cone R by means of the lever-rod, the connecting-rods *n* assume a horizontal position, thereby pushing the shutters open for the admission of wind to the wheel within, and while the shutters are opened and the connecting-rods all lie horizontally, the wind drives the shutters partly to on the windward side of the mill and opens the leeward shutters correspondingly wider.

I claim the right to vary the construction of the parts herein described without departing from the spirit of my invention.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In a wind-wheel, the vanes pivoted at top and bottom near their outer edges, and connected with a governing wheel or disk having a coil-spring or its equivalent, through the agency of pivoted rods, substantially as described, and for the purpose set forth.

2. A governing wheel or disk having a coil-spring or its equivalent, in a wind-wheel, for maintaining the vanes of the wheel in their normal position while the wheel is in operation, substantially as described.

3. The combination, in a wind-wheel, of the pivoted vanes, a governing wheel or disk having a coil-spring or its equivalent, and the pivoted shutters, as described.

4. In a wind-wheel, a frustum of a cone arranged on the vertical shaft, in combination with a ring connected to the shutters, substantially as described.

5. In combination with the wind-wheel, the pivoted shutters, connecting-rods, ring, and frustum of a cone, operating substantially in the manner and for the purpose set forth.

6. In a wind-wheel, the combination of a series of vanes, D, having pivotal bearings *d* near the inner edges, and provided with the intermediate pivotal rods, H, the upper and lower disks, E E', affording bearings to the vanes, and the centrally-arranged governing-wheel F, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

JOHN F. FORD.

Witnesses:
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A. C. PARKER.