

F. G. Fowler, Wind Wheel.

N^o 43,843.

Patented Aug. 16, 1864.

Fig. 1,

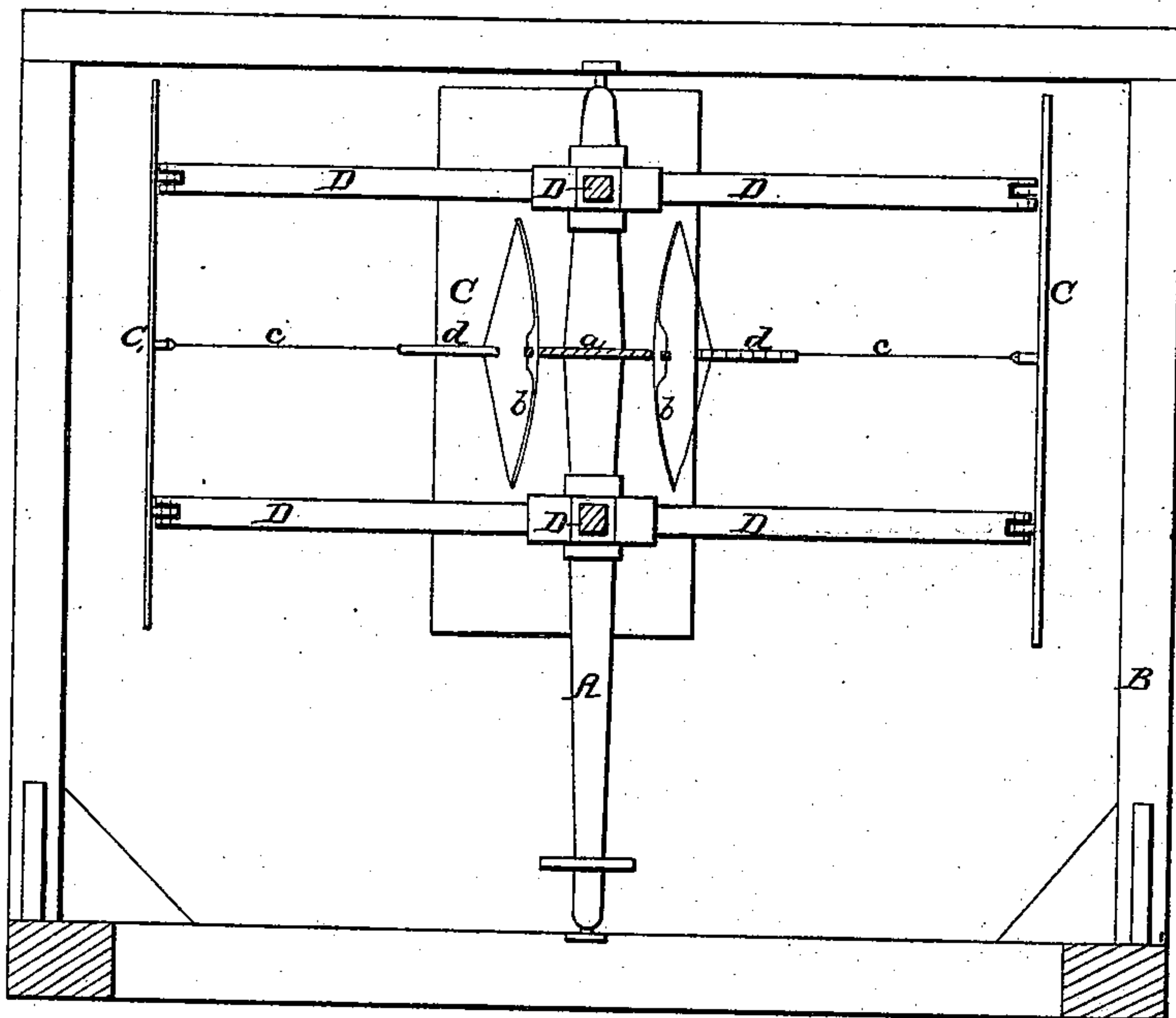
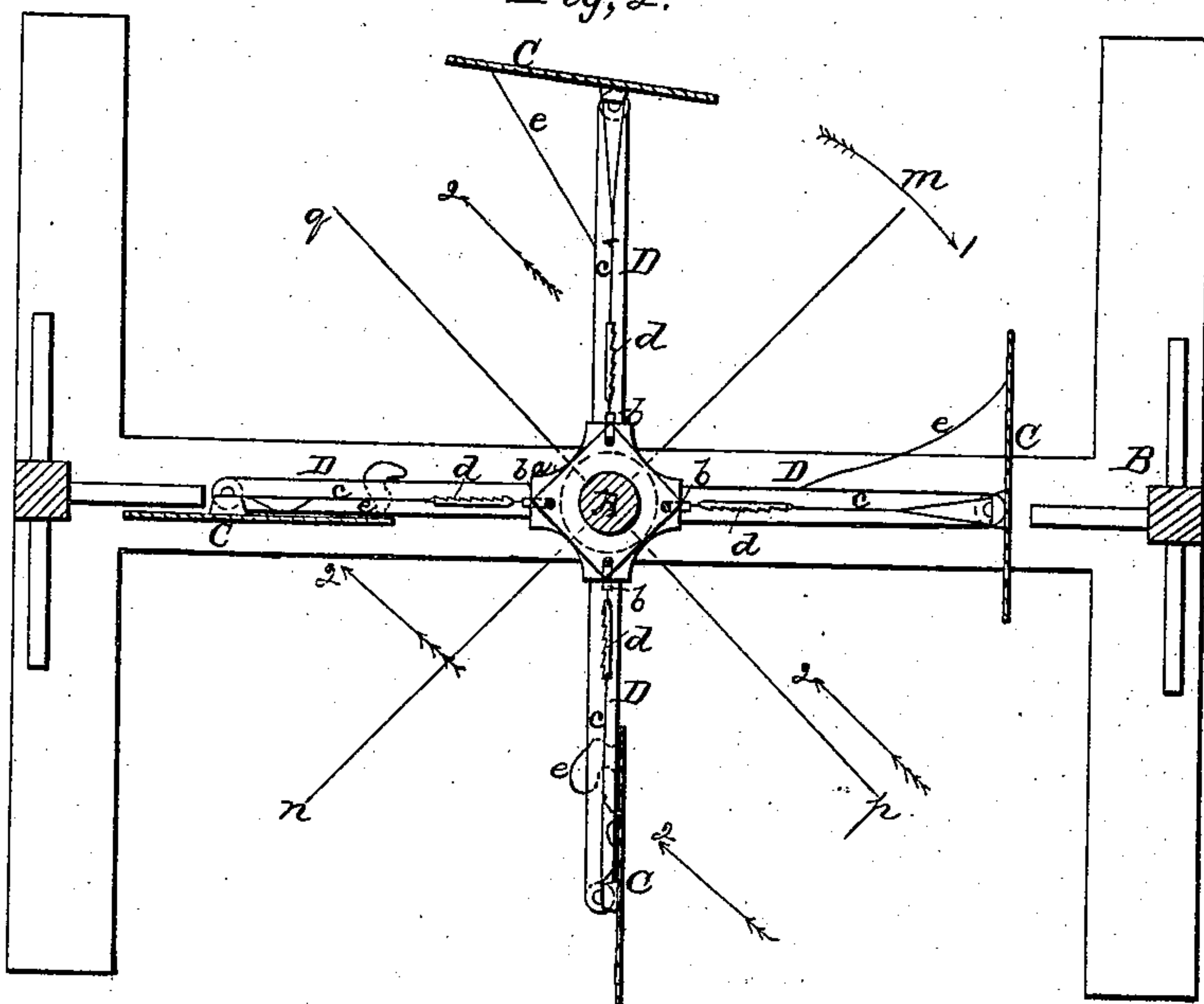


Fig. 2.



Witnesses;
Henry Morris
G. W. Reed.

Inventor;
F. G. Fowler
per *[Signature]*
Attorneys

UNITED STATES PATENT OFFICE.

F. G. FOWLER, OF MECHANICSBURG, ILLINOIS.

IMPROVEMENT IN WIND-WHEELS.

Specification forming part of Letters Patent No. 43,843, dated August 16, 1864.

To all whom it may concern:

Be it known that I, F. G. FOWLER, of Mechanicsburg, in the county of Sangamon and State of Illinois, have invented a new and Improved Wind-Wheel; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to make and use the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 represents a sectional side elevation of my invention. Fig. 2 is a horizontal section of the same.

Similar letters of reference indicate corresponding parts.

This invention relates to an improvement in that class of wind-wheels which are provided with a series of vertical vanes hung to horizontal arms which extend from a vertical central arbor in such a manner that said vanes will readily accommodate themselves to the direction in which the wind strikes them as the wheel revolves.

The nature of my invention and its peculiar advantages will be readily understood from the following description:

My wheel consists of a vertical shaft, A, secured in a light strong frame, B, and provided at both ends with cranks, belt-wheels, or any kind of gearing that may be necessary to communicate or transmit motion or power. It is provided with four (more or less) vanes, C, hinged to arms D, which extend in a horizontal direction from the shaft, two (or more) in a set, according to the length of the vanes. Said vanes are rectangular in form, made out of light material, and secured with ledges and rivets. Two of these ledges are placed transversely across the vane and two obliquely in the form of the letter M. The pivots or hinges which secure the vanes to the ends of the arms D are not placed in the vertical center line of the vane, but to a distance of about one-third the width of said vanes from their outer edges, and small brass washers may be placed underneath the pivots to diminish the friction as the vanes turn on their axes. Opposite to each vane, and secured to the shaft A by means of a collar, a, or in any other desirable manner, is a spring, b, which may be flat or spiral, or made of india-rubber or any other suitable material, and each spring con-

nects with one of the vanes by means of a cord, c, having diverging strands, which are fastened to the inner surface of the vane on either side of the line of its axis. This cord has attached to it a device, d, by which the force of the spring may be increased or diminished, and which is so adjusted that the elastic force of the spring tends to retain the vane at right angles with the arms to which it is hinged. Attached to the sides of the vanes and to the arms are other cords, e, which arrest the motion of the vane in one direction, but allow it to turn freely in the opposite direction. The foot of the shaft is stopped in a suitable box made of or lined with some suitable material, which diminishes the friction and at the same time resists any great degree of wear. If the wheel is in motion in the direction of arrow 1, Fig. 2, with the wind blowing in the direction of arrows 2, each vane in passing the point m stands edgewise to the wind, and the force of its spring holds it at right angles with the arms to which it is hinged. As it passes this point its external surface is gradually presented to the wind and several different forces begin to act on it. The first force is that of the wind acting on the largest portion of the vane as the same is divided by the line of its axis, which force has a tendency to close the wider portion of the vane toward the arms D. Opposing that force is the elastic force of the spring, the centrifugal force of the largest portion of the vane, the friction of the vane upon its axis, and its inertia, and these forces are so balanced that the vane is held to the wind at the proper inclination, and that the wind is enabled to exert a propelling power on the same. As the vane passes the point p, the force of the wind, acting on its largest portion, will generally be sufficient to overcome the forces opposed and the vane will lie alongside the arm, as shown in Fig. 2, and in this position the vane will pass the point n, giving the wind a chance to exert its full power on the wheel. As the vane passes from the point n to the point q, the wind exerts the same amount of force on the same as it does while the vane passes from p to n, the distance through which the vane passes and its inclination to the wind being the same in both cases. After passing the point q the vane is quickly reversed, changing in position, as clearly shown in the drawings. There are three forces com-

bined to produce this motion of the vane—viz., the elastic force of the spring, the centrifugal force of the largest portion of the vane, and the force of the wind on its inner side. After the vane has turned ninety degrees upon its axis, the spring tends to retard it; but if the force of the spring proves insufficient, the vane is effectually arrested by the cord *e*. In this position the vane passes from *q* to *m*, giving to the wind a chance to exert on it a propelling force until it arrives at its starting-point *m*, where the same is turned edgewise to the wind, as above stated. By increasing the tension of the springs by means of the tension-regulators *d* the operation can be somewhat modified. In that case the vanes will not turn down alongside the arms in passing from *p* to *n* and the wheel will not exert the same degree of power as before, but it will revolve with proportionally-increased velocity. Yet, should any great resistance be presented, the vanes will turn down broadside to the wind and exert their full force till the obstruction is overcome. Thus the springs tend to regulate the inclination of the vanes to suit different circumstances.

In practice the wheel will be strengthened by suitable braces and stays, but these parts

are not represented in the drawing because they have no bearing on or connection with those parts which constitute my invention.

By the peculiar combination of the adjustable springs with the vanes the wind is enabled to exert a propelling power on each vane throughout its entire circuit except the one dead point, and my wheel gives a much larger power than other wheels with hinged adjustable vanes of a similar construction.

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

1. The springs *b*, connecting with the vanes *C* at points on either side of the line of their axes, in combination with said vanes hung on pivots at points outside their longitudinal centers and revolving with the shaft *A* in the manner and for the purpose substantially as herein specified.

2. The tension-regulators *d*, in combination with the springs *b* and vanes *C*, hung as described, and applied in the manner and for the purpose substantially as set forth.

F. G. FOWLER.

Witnesses:

WILLIAM SHORT,
WESLEY BULLARD.