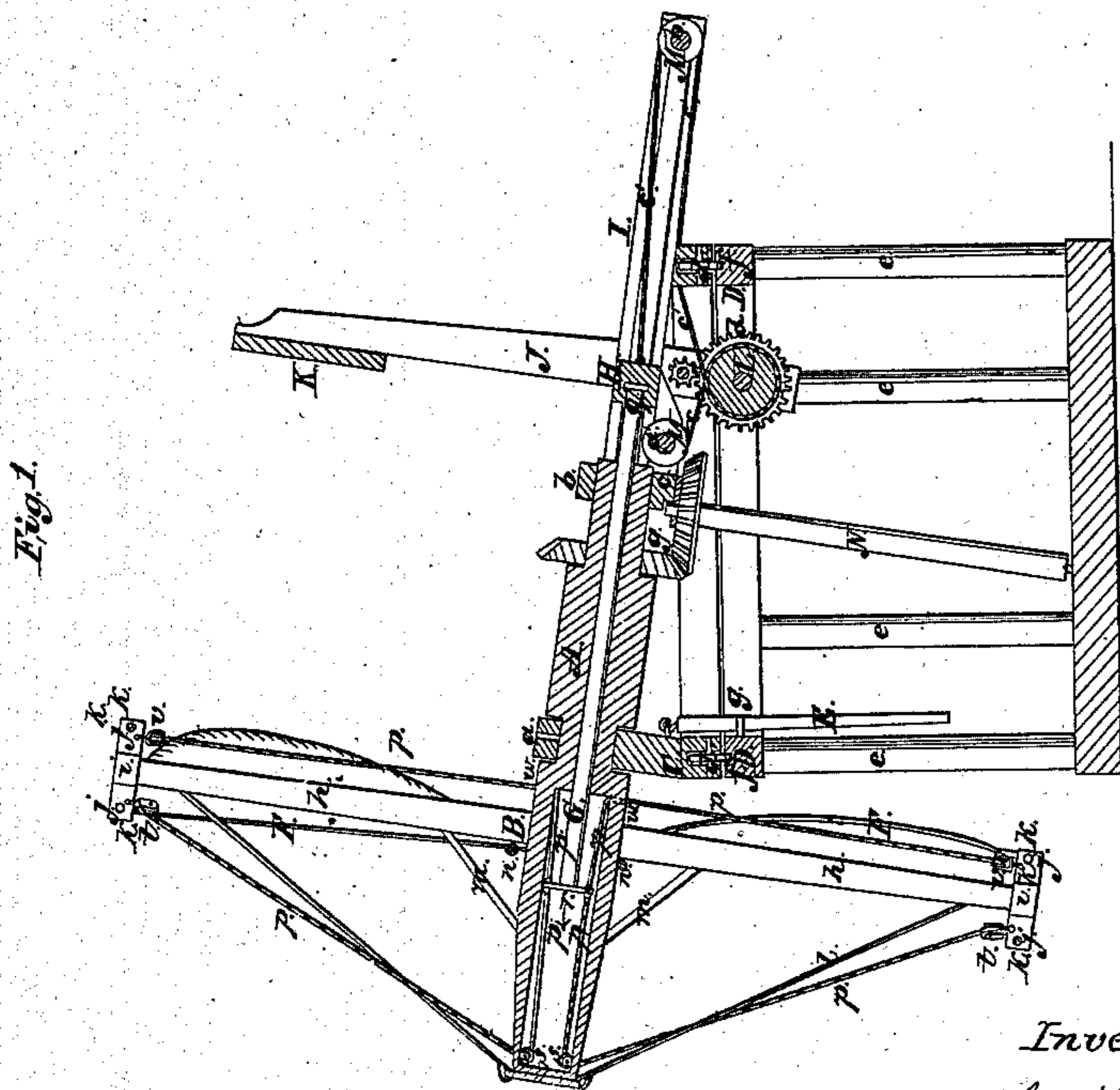
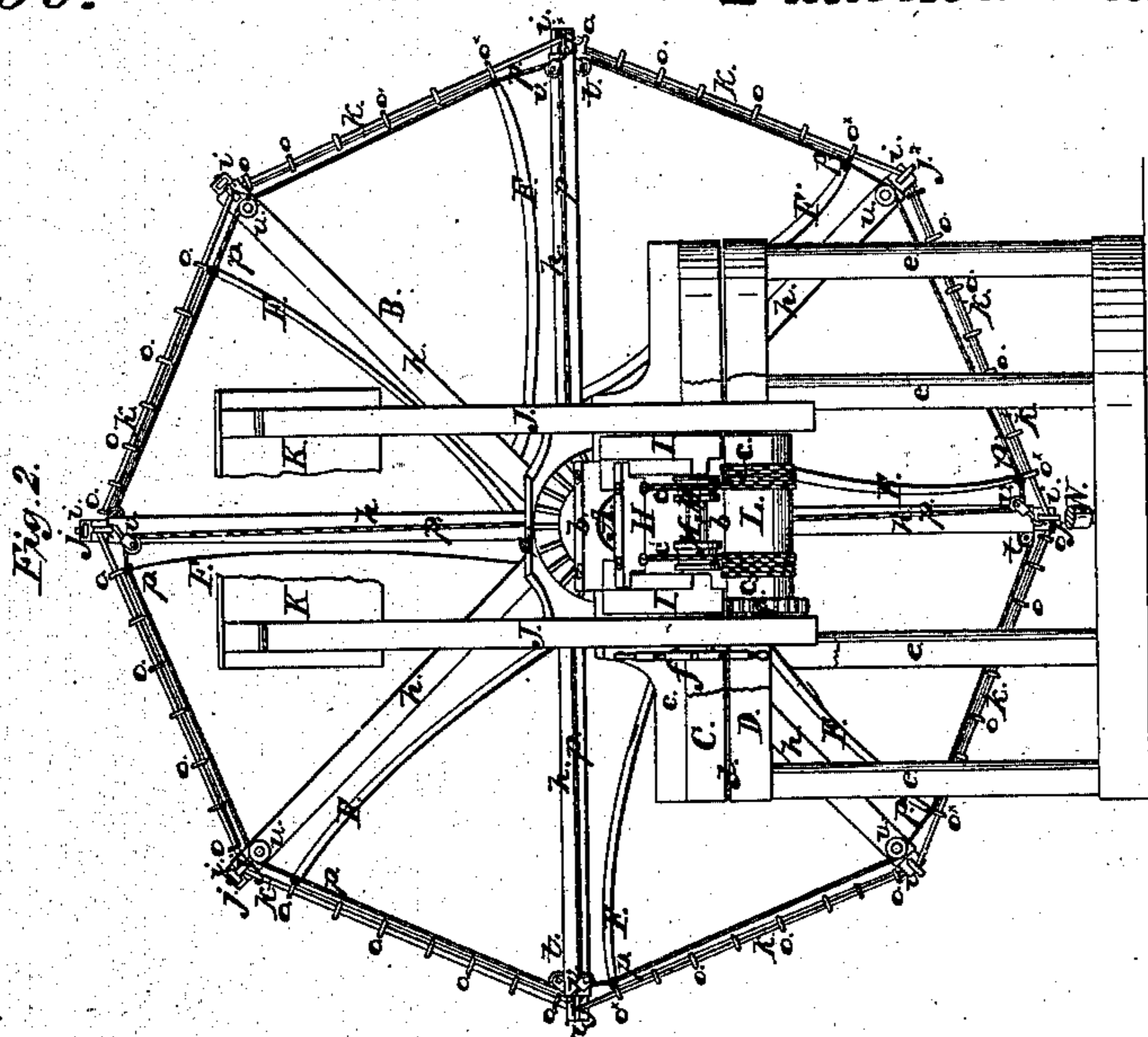


Patented May 13, 1862.

N^o 35,236.



W. Brown
Gle. Reed

W. Rappert
per M. M. H. C.

UNITED STATES PATENT OFFICE.

WILLIAM HOPPER, OF UNION GROVE, IOWA.

IMPROVEMENT IN WIND-WHEELS.

Specification forming part of Letters Patent No. 35,236, dated May 13, 1862.

To all whom it may concern:

Be it known that I, WILLIAM HOPPER, of Union Grove, in the county of Cedar and State of Iowa, have invented a new and Improved Wind-Wheel; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming a part of this specification, in which—

Figure 1 represents a longitudinal vertical section of my invention. Fig. 2 is a rear elevation of the same.

Similar letters of reference in both figures indicate corresponding parts.

This invention consists in the arrangement of a longitudinally-sliding rotary rod connecting with a cross-head, to which motion is imparted either by hand or by the action of a wind-board and by an endless chain, in combination with ropes or lines leading from the outer end of said sliding rod to the sails in such a manner that by imparting to the rod a longitudinally-sliding motion the sails are either drawn in or drawn out, as the case may be, and that by combining the wind-board with said rod the speed of the wind-wheel is regulated by the force of the wind.

To enable those skilled in the art to make and use my invention, I will proceed to describe it with reference to the drawings.

The shaft A, to which the wind-wheel B is secured, is journaled in boxes *a b*, the box *a* being secured to the rim of the circle C, and the box *b* being attached to a bridge-tree, *c*, both ends of which are firmly fastened to the circle C. The two boxes *a b* are arranged in such relation to each other that the shaft A is in an inclined position, as clearly shown in Fig. 1 of the drawings, and the circle C rotates by means of friction-wheels *d* on an annular platform, D, which is supported by pillars *e*, said annular platform being provided with a groove, *f*, to guide and retain the friction-wheels *d*. A lever, E, catching on pins or studs *g*, serves to turn the circle C on the annular platform D for the purpose of setting the wind-wheel in the wind.

The wheel B has eight (more or less) arms, *h*, each provided with a cap, *i*, each of which has two arms or flanges, *j j**, one to connect to the next preceding and the other to the next succeeding arm by means of rods *k*, as clearly

shown in Fig. 2. The arms *h* are braced by rods *l m*, and from the rods *k* the sails F are suspended. Said sails are triangular and their lower corners or points are firmly connected to a rope or ring, *n*, on the shaft A. Their upper edges are secured by means of rings *o* to the rods *k*, and by sliding said rings on the rods the sails are either taken in or drawn out, as may be desired. One of the rings *o* on one corner of each sail is fastened to the arm *h* to which the sail is attached, and the rings *o** on the loose corners are secured to ropes *p*. Each of these ropes serves to operate two sails, as will be presently explained.

The shaft A is hollow, and a rod, G, passes through its longitudinal center. This rod rotates with the shaft, but it is connected with the same in such a manner that it can freely move in a longitudinal direction. Its rear end is provided with a projecting ring or shoulder, *q*, that is retained by and turns in the cross-head H, and to its front end a disk, *r*, is attached, to which the ropes *p* are fastened. Each of said ropes passes from the disk over a small pulley, S, near the front end of shaft B and over a sheave, *t*, on the outer arm or flange, *j*, of each alternate cap *i* to the ring *o** on the loose corner of the corresponding sail, and from said ring over a pulley, *u*, secured to the inner side of each alternate arm *h* to a sheave, *v*, on the inner flange, *j**, of each alternate cap and down to a pulley or hole, *w*, in the shaft A behind the arms *h*, and through said hole to the disk *r*. By moving the rod G in the direction of arrow 1, Fig. 1, the several sails are simultaneously drawn out, and by moving the rod G in the opposite direction the sails are drawn in.

The cross-head H, which carries the rear end of rod G, slides in two ways, I, which extend from the bridge-tree *c* in a direction opposite to the shaft A. To the outside of said ways a stirrup, J, is pivoted, which raises up to the same height as the wind-wheel, and to the upper ends of which the wind-board K is rigidly attached. The lower ends of said stirrup extend below the ways I, and they form the bearings for a drum, L, from which two ropes, *c'*, extend over pulleys M M', as clearly shown in the drawings. The pulleys M are secured to an arbor, *a'*, journaled in the ways

I close to the bridge-tree *c*, and the pulleys *M'* are fastened to an arbor, *b'*, near to the rear end of the ways *I*, and the two ends of each of the ropes *c'* are firmly attached to the cross-head *H*. By turning the drum *L* in one direction, therefore, the cross-head *H*, with rod *G*, is moved toward the rear ends of the ways *I* and the sails are taken in, and by turning the drum in the opposite direction the sails are drawn out.

The drum *L* connects by gear-wheels *d'* *e'* with a hand-wheel, *f'*, so that it can be rotated by hand or when the hand-wheel is fastened by means of a pin the head *H* is moved by the action of the wind on the wind-board *K*. A sudden gust of wind will force the wind-board back, and thereby the cross-head *H* is moved toward the rear end of ways *I*, and a certain amount of sail is taken off before the speed of the wind-wheel changes. If the wind moderates, a weight that may be suspended from the lower ends of stirrups *J*

throws the same back to their original position. The motion of the wind-wheel is transmitted to the upright arbor *N* by bevel-gear *g'*. The action of this wind-wheel is perfectly sure, its motion is uniform and self-regulating, and it can be easily adjusted, according to the power of the existing wind.

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

The arrangement of the longitudinally-sliding rotary rod *G* and ropes *p*, connecting with the sails *F* in the manner herein described, in combination with the cross-head *H*, pivoted stirrup *J*, ropes or chains *c'*, and wind-board *K*, all constructed and operating substantially as and for the purpose set forth.

WILLIAM HOPPER.

Witnesses:

G. O. BUTTON,

LEWIS PHELPS.