(No Model.)

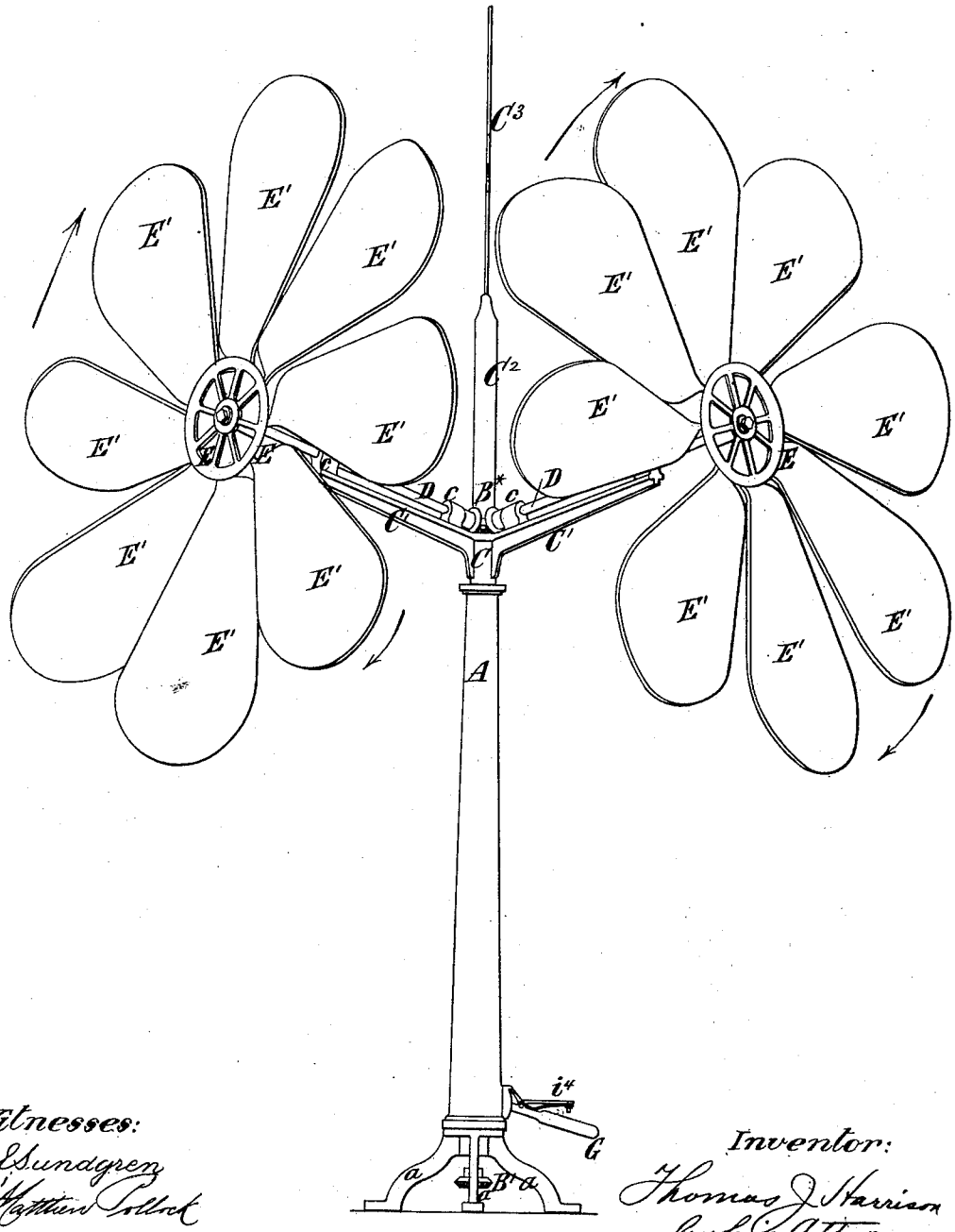
3 Sheets—Sheet 1.

T. J. HARRISON.

WIND MOTOR.

No. 320,654. Patented June 23, 1885.

Fig. 1.



Witnesses:
C. L. Sundgren
Matthew Pollock

Inventor:
Thomas J. Harrison
by his Attys.
Brown & Hall.

(No Model.)

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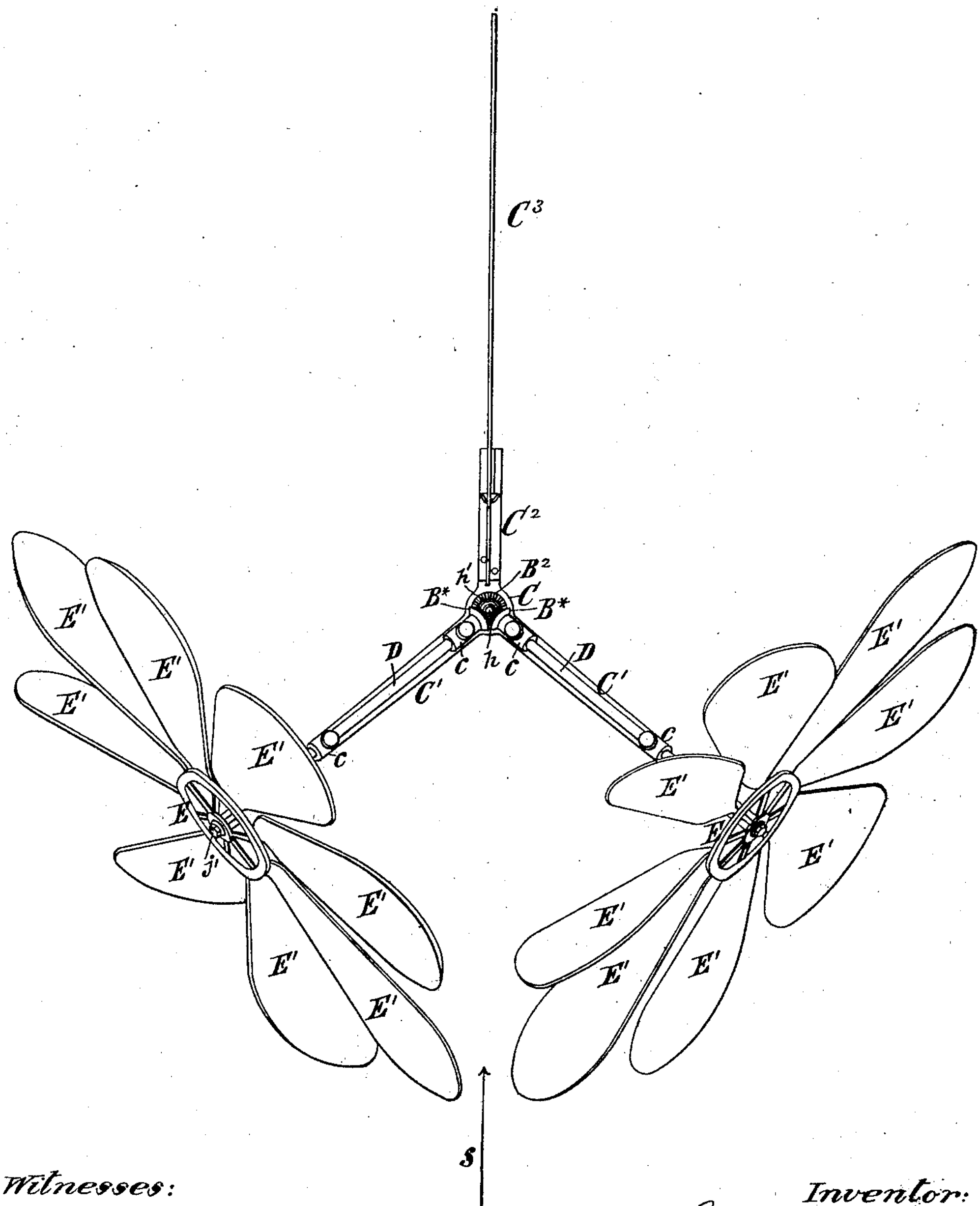
Fig. 2.



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N. PETERS, Photo-Lithographer, Washington, D. C.

(No Model.)

3 Sheets—Sheet 3.

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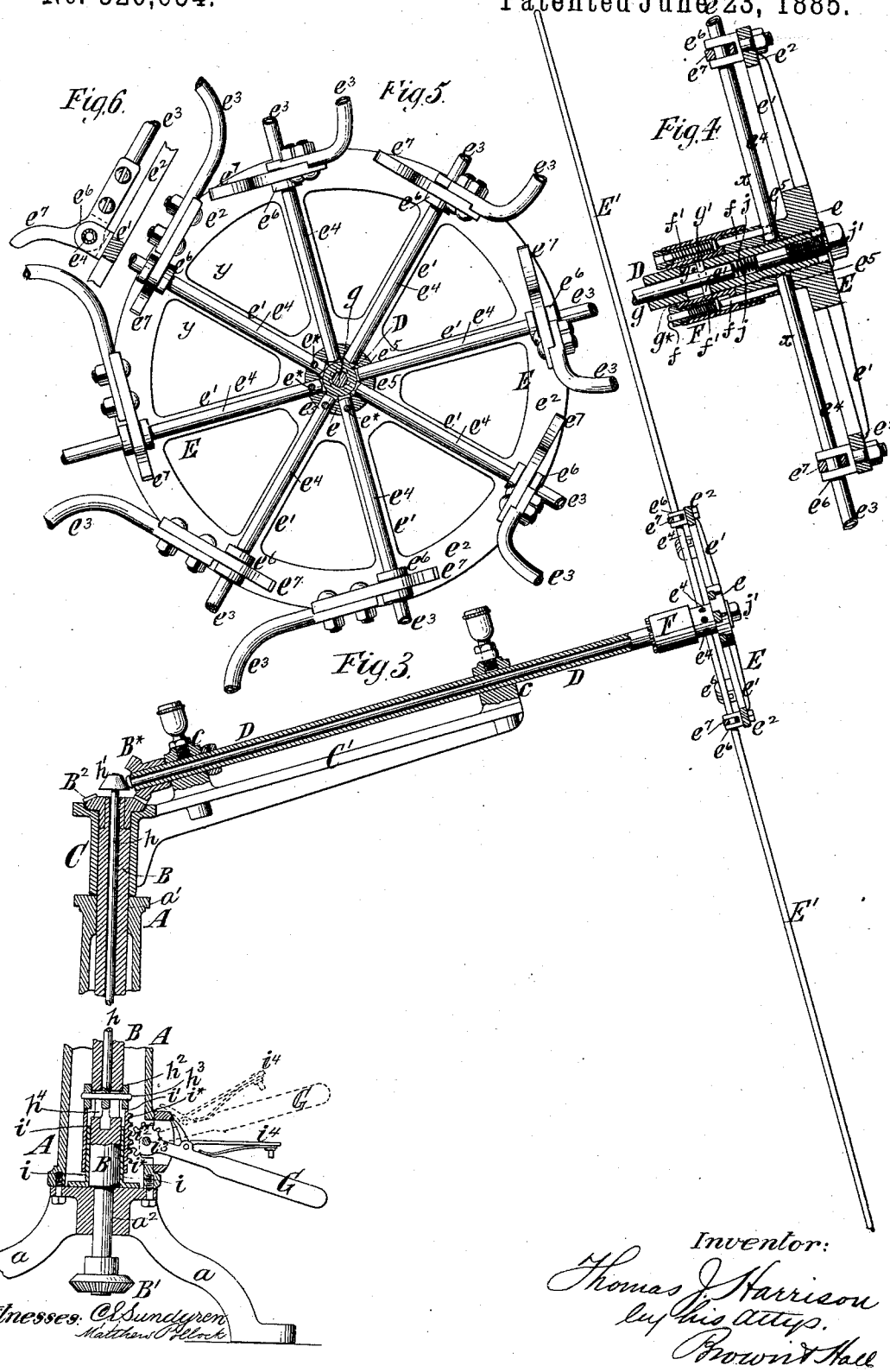

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UNITED STATES PATENT OFFICE.

THOMAS J. HARRISON, OF BROOKLYN, NEW YORK.

WIND-MOTOR.

SPECIFICATION forming part of Letters Patent No. 320,654, dated June 23, 1885.

Application filed February 24, 1885. (No model.)

To all whom it may concern:

Be it known that I, THOMAS J. HARRISON, of Brooklyn, in the county of Kings and State of New York, have invented a new and useful Improvement in Wind-Motors, of which the following is a specification.

The object of my invention is to provide a wind-motor or windmill which shall be very effective and easily controlled, and in which the sails may be adjusted to an inoperative position and there locked positively in order to stop the motor or mill quickly when working, and may be with equal facility unlocked whenever it is desired to start the motor or mill, the locking and unlocking of the sails being performed from a point distant from the motor or mill itself—as, for example, within a building upon the top of which is erected the motor or mill.

In carrying out my invention I employ two wheels upon two shafts, which are arranged at angles to each other, and which are preferably inclined downward from their wheels to their converging ends, which are geared with an upright shaft supported in bearings in an upright column or post, and through which motion is transmitted from the wheel-shafts to the machinery which it is desired to operate. The wheels, being thus arranged, are presented to the wind, which strikes them obliquely to their axes, the wheel-shafts forming equal angles with the direction of the wind; and with the wheels and their shafts and the supporting-frame of the shafts I combine a vane, which always insures the proper presentation of the wheels to the wind, however it may change in direction. This arrangement of the two wheels and their shafts constitutes an important feature of my invention. The wheels each consist of a spider or circular skeleton frame or disk fixed to the end of the wheel-shaft, and the sails have pivots arranged radially and free to turn in bearings in said spider or frame. The sail-pivots have stops upon them, and as the wheels turn the sails feather automatically, so that they are presented edgewise to the wind, and as the wind "catches" them their pivots turn and the sails shift into positions oblique to the plane of rotation until arrested by the stops or arms on their pivots striking against their supporting spider or frame.

The invention consists in novel features, in the construction of the several parts, and in the manner of combining them together, as more fully hereinafter described, and pointed out in the claims.

In the accompanying drawings, Figure 1 is an elevation of a motor embodying my invention. Fig. 2 is a plan of the machine. Fig. 3 is a vertical section thereof in the plane of the wheel-shaft and on a larger scale than Figs. 1 and 2. Fig. 4 is an axial section of a portion of one wheel, its shaft and appurtenances for locking and unlocking the sails on a still larger scale. Fig. 5 is a transverse section on the dotted line x x, Fig. 4; and Fig. 6 is a sectional view of one of the sail-pivots and a portion of the wheel frame or spider on the plane of the dotted line y y, Fig. 5, looking radially outward.

Similar letters of reference designate corresponding parts in all the figures.

A designates a vertical hollow column or post having suitable feet or a base, a, and which here represents the fixed frame of the machine. This frame may be modified in any way desired to adapt it for the situation in which the machine is to be used, and within the hollow column A is a shaft, B, through which the motive power derived from the motor is transmitted. The shaft B is hollow, for a purpose hereinafter described, and is fitted to a bearing, a', in the upper part of the column, and to a bearing, a^2, in the base thereof, as best shown in Fig. 3, the shaft being shouldered above the bearing a^2.

I have here shown a bevel gear-wheel, B′, upon the lower end of the shaft B, and a bevel gear-wheel, B^2, on its upper end, which projects considerably above the top of the column A.

To the shaft B above the column is fitted a sleeve or hub, C, which rests upon the top of the column A and is free to turn on the shaft B, and, as here shown, this sleeve or hub also receives within it the hub of the wheel B^2.

From the sleeve or hub C extend arms C′, which are arranged radially and stand at angles of about ninety or one hundred degrees relatively to each other, as shown in Fig. 2. This angle may of course be varied, as found necessary or desirable. From the sleeve or hub C also projects an arm, C^2, to the upper

end of which is secured a vane, C^3, standing about midway between and above the arm C'. This vane will point to the wind, and as the direction of the wind shifts the vane, hub, or sleeve C and arms C' will all turn on the shaft B, so that the wind will strike between the arms C'.

Each arm C' has bearings *c*, to which is fitted a shaft, D, here shown as hollow, for a purpose to be described, and the two shafts D have at their inner ends wheels B*, which gear with the wheel B^2 on the shaft B.

Each wind-wheel consists, essentially, of a central skeleton frame or spider, E, which may be made of cast metal, and sails E' arranged radially thereto. Each frame or spider E consists of a hub, *e*, arms *e'*, and a rim, e^2, and the frame E is screwed or otherwise firmly secured on the outer end of a shaft, D. The sails E' may be of any suitable construction; but as here shown they consist of a frame, e^3, which may be a bent rod or tube, and which is prolonged to form a pivot, e^4, fitted to inner and outer bearings, e^5 e^6, in the spider or frame E. These pivots e^4 are radial to the spider or frame E, and are free to turn in the bearings, and on each pivot is an arm or toe, e^7, which stands at an angle to the plane of the sail, and which, by striking against the spider or frame E, forms a stop to limit the turning of the sail-pivot in its bearings.

The sail proper may advantageously consist of canvas provided with eyelet-holes, and thereby secured to pins or hooks on the frame e^3. I have here shown each sail-pivot e^4 as having a transverse hole, e*, (see Fig. 5,) to receive a locking-bolt, as hereinafter described.

The mechanism for locking the sails in the plane of rotation of the wheel will be best undestood from Figs. 3, 4, and 5, and will now be described.

On the shaft D, just behind the hub of the spider E of the wheel, is fitted a sleeve, F, which may be slid on the shaft, and in this sleeve and projecting into sockets in the hub of the spider are a number of locking pins or bolts, *f*, equal to the number of sails, eight being here shown. Within the tubular shaft D is a sliding rod, *g*, which is attached at its outer end to the sleeve F by a pin, *g'*, which works in a slot, g*, in the shaft D, and projects at the inner end slightly beyond the end of the shaft D. The vertical shaft B is also hollow, and therein is arranged a sliding rod, *h*, having at the upper end a cone or conical head, *h'*, against which the ends of the rods *g* bear. Near the lower end of the shaft B is a sliding collar, h^2, secured to the rod *h* by a cross-pin, h^3, which works in a slot, h^4, in the shaft B. In the lower end of the column A is fixed a sleeve or tube, *i*, and on the exterior thereof is a tube or sleeve, *i'*, capable of vertical movement, and on the upper end of which the collar h^2 bears and turns. The sleeve *i* is provided with a rack, i*, with which engage gear-teeth or a gear-segment, i^2, on the inner end of a lever, G, which is pivoted at i^3, and may be depressed by the foot. This lever G is provided with a spring-actuated catch, i^4, adapted to engage a notch or shoulder on the column A and hold the lever down. In the outer end of each shaft D I have shown a spring, *j*, secured in place by a screw or plug, *j'*, and, bearing against the end of the sliding rod *g*, presses it inward against the conical head *h'*. It will therefore be seen that when the rod *h* is raised by the lever G the conical head *h'* presses the rods *g* outward, and that when the lever is released by depressing its spring-catch the rod *h* falls, and the rods *g* are moved inward by the springs *j*.

As best shown in Fig. 4, each locking pin or bolt, *f*, has applied to it a spring, *f'*, and when the rod *g* and attached sleeve are moved outward the locking pins or bolts *f* will shoot into the holes e* in such of the sail-pivots e^4 as are turned to a position to receive the locking pins or bolts, while the remaining locking pins or bolts *f* will be arrested by the other sail-pivots, and their springs *f'* being compressed, the locking pins or bolts will shoot forward into the holes e* as soon as the sail-pivots e^4 turn to admit of such locking action.

The direction of the wind is represented by the arrow *s*, shown in Fig. 2, and it will be observed that it strikes the two wheels obliquely and acts effectively on the sails which are on their adjacent sides, thereby turning the wheels in the directions indicated by the arrows in Fig. 1. As the sails successively come into operative position they turn on their pivots and are presented edgewise to the wind, and hence offer no appreciable resistance to the turning of the wheels.

During the operation of the motor the lever G is in its upward position, (shown by dotted lines in Fig. 3,) and the sails are all unlocked, the springs *j* keeping the sleeves F and their locking pins or bolts *f* pushed back.

When it is desired to lock the sails and stop the motor all that is necessary is to push down the lever G. The sleeves F on the two shafts D will thereby be moved on their shafts, and the locking-pins *f* will all be pushed forward, and, as fast as the sails turn on their pivots after the wind has acted upon them and they come edgewise into the wind, the bolts *f* will enter their holes, e*, and lock them in the plane of rotation of the wheels. By releasing the lever the locking-pins will withdraw themselves from engagement with the sail pivots e^4 and allow the sails to swing into operative position.

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

1. The combination, in a wind-motor, of two shafts and bearings wherein said shafts are arranged at an angle to each other, as described, two wheels on said shafts, each wheel having sails supported by pivots which are radial to its shaft, a frame supporting said wheels and shafts, and a central shaft with which the two wheel-shafts are geared and to

which they transmit motion, substantially as herein described.

2. The combination, in a wind-motor, of two shafts and bearings wherein said shafts are arranged at an angle to each other, as described, two wheels on said shafts, each wheel having sails supported by pivots which are radial to its shaft, a vane arranged midway between said angular shafts, a central shaft with which the wheel-shafts are geared, and a frame supporting said wheels and their shafts and said vane, and which is mounted to turn on a vertical axis, substantially as herein described.

3. The combination, in a wind-motor, of a wheel consisting of a frame or spider, and sails having radial pivots supported in said frame or spider, a shaft for said wheel, a sliding sleeve on said shaft provided with bolts or pins for locking the sail-pivots, and connections through which said sleeve may be moved to lock the sails while the motor is in operation, and also moved to unlock the sails, substantially as herein described.

4. The combination, in a wind-motor, of a wheel consisting of a spider or frame, and sails, each composed of a frame which is prolonged to form a pivot radially supported in the said spider or frame, and a covering for the said frame, and locking devices consisting of sliding bolts arranged transversely to the said pivots and engaging with said pivots to lock the sails, substantially as herein described.

5. The combination, in a wind-motor, of a wheel comprising pivoted sails, a shaft therefor, a hollow upright shaft with which the wheel-shaft is geared, a sleeve upon the wheel-shaft provided with spring-actuated pins or bolts for locking the sail-pivots, a sliding rod within the upright shaft, and connections between the upper end of said rod and the sliding locking-sleeve, whereby the same may be moved to lock and unlock the sail-pivots, substantially as herein described.

6. The combination, in a wind-motor, of a wheel-shaft, a wheel having sails supported by pivots radial to said shaft, a sliding rod, *g*, extending lengthwise of the shaft, and the sleeve F, with its spring-actuated locking-bolts *f*, adapted to engage with the said pivots, and which is connected with the said rod, whereby the sails may be locked and unlocked by a lengthwise movement of said rod, substantially as herein described.

7. The combination, in a wind-motor, of a hollow wheel-shaft, D, a wheel having sails supported by pivots radial to said shaft, a sleeve, F, sliding upon said shaft and provided with spring-actuated locking-bolts *f* for engaging the said pivots, a rod, *g*, within the shaft and connected with the sleeve, and a spring, *j*, for moving the rod and sleeve to unlock the sails, substantially as herein described.

THOMAS J. HARRISON.

Witnesses:
ALEXANDER WOOD,
CHANDLER HALL.