

No. 835,667.

PATENTED NOV. 13, 1906.

J. J. DONNELLY,
WIND MOTOR.

APPLICATION FILED MAR. 30, 1906.

2 SHEETS—SHEET 1.

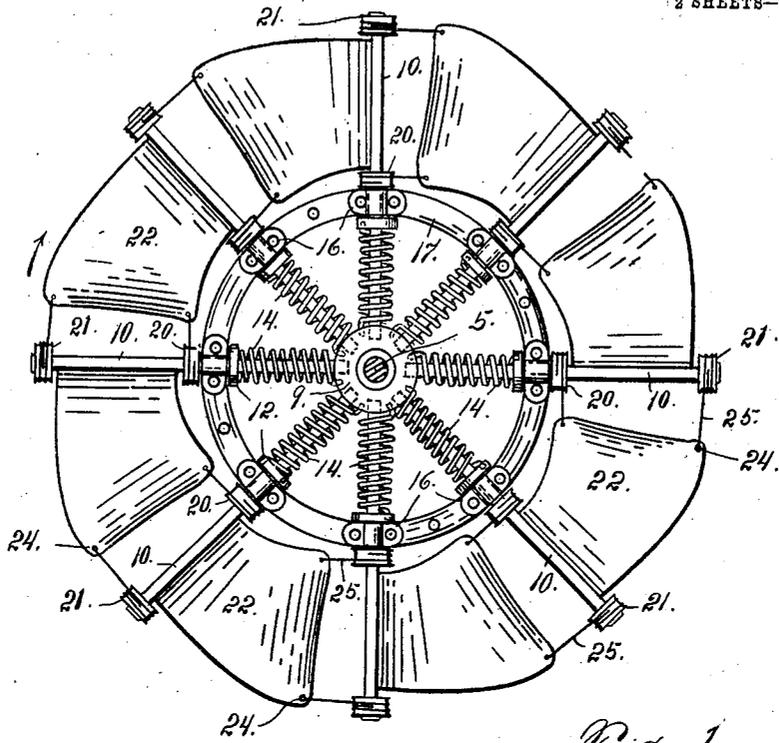


Fig. 1.

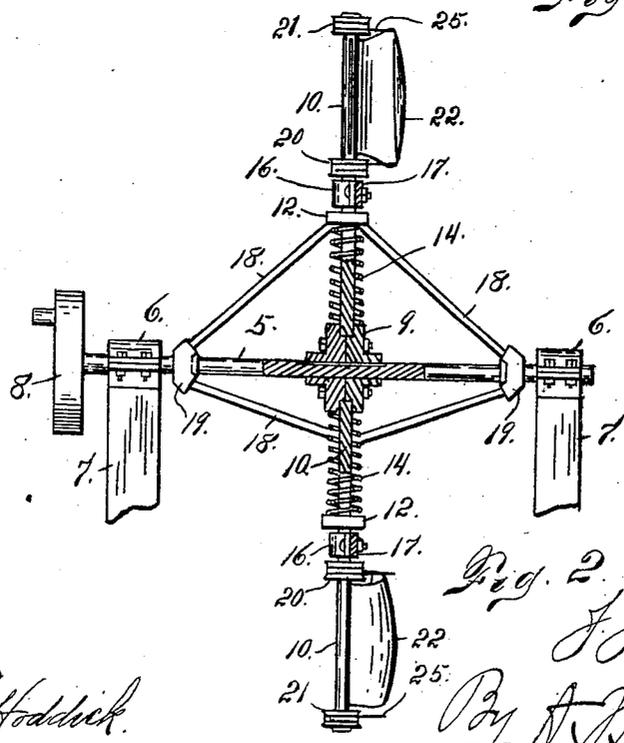


Fig. 2.

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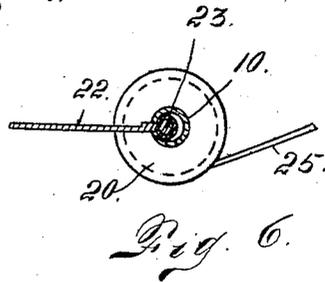
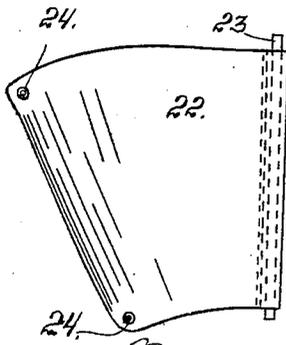
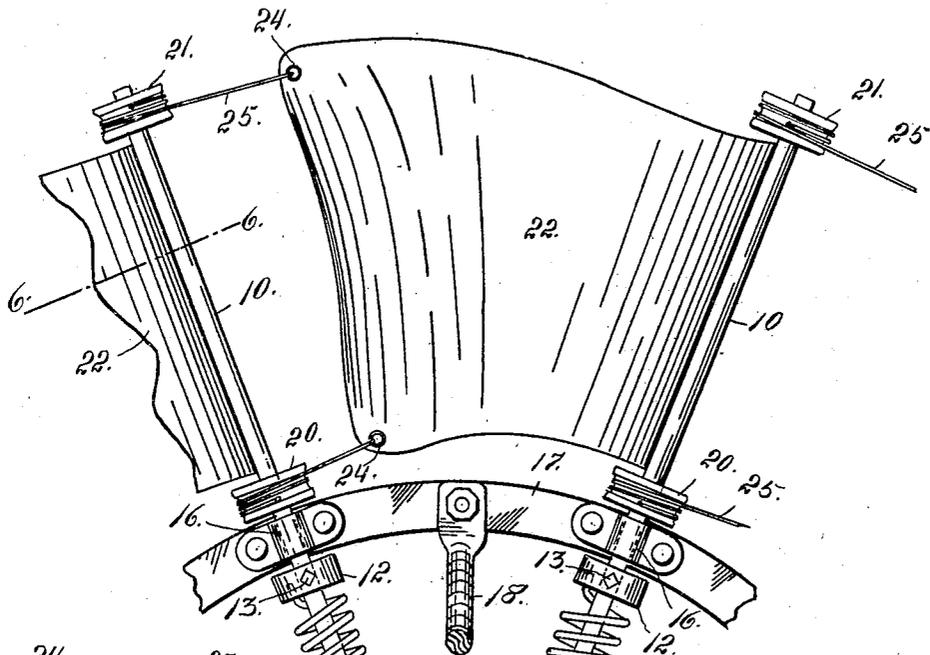
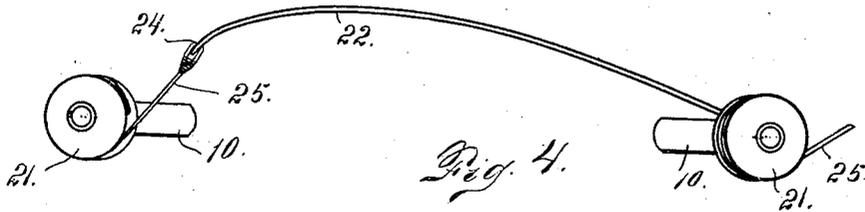
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2 SHEETS—SHEET 2.



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UNITED STATES PATENT OFFICE.

JOHN J. DONNELLY, OF DENVER, COLORADO.

WIND-MOTOR.

No. 835,667.

Specification of Letters Patent.

Patented Nov. 13, 1906.

Application filed March 30, 1906. Serial No. 308,975.

To all whom it may concern:

Be it known that I, JOHN J. DONNELLY, a citizen of the United States, residing in the city and county of Denver and State of Colorado, have invented certain new and useful Improvements in Wind-Motors; and I do 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 the figures of reference marked thereon, which form a part of this specification.

My invention relates to improvements in wind-motors, my object being to provide a simple and effective construction of motor adapted to perform work of all kinds.

My improved construction is provided with a number of arms radiating from a driving-shaft, the said arms being mounted to rotate. Sails or flexible devices made of canvas or other suitable material are connected with the outer portions of the revoluble arms, each sail being also connected with the arm of the adjacent sail, whereby as the power of the wind becomes sufficiently great to require less area of sail the wind acts on the sail, causing each sail to automatically act to wind up the adjacent sail on its revoluble arm. Each revoluble shaft is provided with a torsional tension-spring, the said spring being placed under tension by the winding up of the sail, while the tension of the spring acts to return the arm to its normal position when the force of the wind decreases, thus requiring an increase in the surface area of the sail.

Having briefly outlined my improved construction, as well as the function it is intended to perform, I will proceed to describe the same in detail, reference being made to the accompanying drawings, in which is illustrated an embodiment thereof.

In the drawings, Figure 1 is a side elevation of my improved wind-motor, showing the driving-shaft in cross-section. Fig. 2 is a view looking at right angles to Fig. 1, showing the driving-shaft and two of the revoluble arms partly in section. Fig. 3 is a fragmentary view from the same point as Fig. 1, the parts, however, being shown on a much larger scale. Fig. 4 is a detail view illustrating the manner of connecting the sails with the pulleys of the revoluble arms. Fig. 5 is a detail view of one of the sails. Fig. 6 is a sectional detail view taken on the line 6 6, Fig. 3.

The same reference characters indicate the same parts in all the views.

Let the numeral 5 designate a driving-shaft journaled in boxes 6, mounted on upright supports 7. Upon this shaft is mounted a crank-wheel 8, which may be suitably connected with any apparatus which it is desired to operate by my improved construction. Centrally mounted on this shaft and secured to rotate therewith is a two-part hub 9, provided with sockets formed in its periphery and in which are journaled revoluble arms 10, provided with stops 12, which are made fast to the arms by set-bolts 13. Between the stops 12 and the hub 9 are located coil-springs 14, whose inner extremities are secured to the hub, as shown at 15, and whose outer extremities are made fast to the respective stops 12. The springs 14 are so arranged that as the arms 10 rotate in the performance of their function the springs will be placed under torsional tension and will act automatically to return the arms to their normal position as the force of the wind diminishes. Each shaft 10 beyond the stop 12 passes through a box or bearing 16, mounted on a ring 17. This ring is connected with the hub by braces 18, whose inner extremities are secured to hubs 19, fast on the outer portions of the driving-shaft. These braces give strength and security to the ring 17, whereby the bearings 16 for the revoluble arms are held in a uniform plane and in proper position to perform their respective functions. Beyond the ring 17 each revoluble arm 10 is formed hollow, and its opposite extremities are provided with pulleys 20 and 21. Each sail 22 is provided at one extremity with a rod 23, to which the edge of the sail is sewed or secured in any suitable manner. In attaching the sail to a revoluble arm the edge of the sail, together with the rod to which it is attached, is inserted in the hollow of the arm, the arm being slotted to allow the sail to pass through, as shown in Fig. 6. Before applying the sail the inner pulley 20 is put in place. After the sail is applied the outer pulley 21 is attached to the arm. It must be understood that these pulleys are fast on the arm 10 to rotate therewith. The edge of the sail opposite the arm 23 is provided with reinforced eyes or openings 24, with which are connected flexible devices, as cables 25, the said flexible devices being wound upon a pair of pulleys 20 and 21, made fast to a revoluble

arm 10, as heretofore explained. Each sail or flexible vane 22 is attached in like manner—that is to say, one edge of it is detachably connected with one revoluble arm, while
 5 its opposite edge is connected with the adjacent revoluble arm by means of the flexible devices which pass around the pulleys mounted on the last-named arm.

From the foregoing description the use and
 10 operation of my improved wind-motor will be readily understood.

When mounted as shown in Figs. 1 and 2, it may be operated from the wind blowing from either direction in a line parallel or in
 15 the direction of the axis of the driving-shaft or at practically any angle thereto upon either side. As the wind acts upon the sails or flexible vanes the wheel composed of the driving-shaft, the several radially-disposed
 20 revoluble arms, their connections, and the said sails or flexible vanes is rotated and power may be transmitted from the said shaft by suitable connections with any desired mechanism. If the force of the wind
 25 becomes too strong or blows with sufficient force to endanger the structure in the absence of regulating means, its force acting on the sails throws their edges connected with the cables or flexible devices outwardly, thus
 30 applying increased power to the flexible devices and rotating the adjacent revoluble shafts, whereby each sail is reefed or wound upon its revoluble arm until the area exposed to the action of the wind has become suffi-
 35 ciently reduced to permit normal action of the wheel. During this reefing of the sails the springs 14 are placed under torsional tension, whereby as soon as the force of the wind decreases the recoil or return torsional action
 40 of the springs will reverse the movement of the revoluble arms, unwind the sails, and also take up the slack by stretching them to more nearly close the space between the adjacent portions of the revoluble arms. It will there-
 45 fore be understood that the construction is absolutely self-regulating.

It may be stated that my improved wind wheel or motor will be rotated by the force of the wind when blowing from either side—
 50 that is to say, from the right or left, referring to Fig. 2. The wheel will also rotate in the same direction whether the wind blows from one side or the other. This is an important advantage where it is desired that the axis
 55 of the wheel shall occupy a definite predetermined position. It must be understood, however, that my improved construction of wind wheel or motor may be employed in other relations without departing from the
 60 spirit of the invention.

It is evident that the normal tension of the springs 14 may be such that the shafts or radial arms 10 will not be rotated until a pre-
 65 determined force or stress of wind has acted on the sails. The force that may require a

diminution of sails, surface, or area may be determined in the first instance by experiment.

It must be understood that I do not limit the invention to the details of construction
 70 herein shown, as I am aware that many modifications may be made without departing from the spirit of the invention and within the scope of the claims.

Having thus described my invention, 75 what I claim is—

1. A wind-motor comprising a driving-shaft suitably journaled, a number of radially-disposed revoluble arms connected with the shaft and suitably journaled, torsional
 80 springs applied to the arms, and sails each fixedly attached to one of the revoluble arms and flexibly connected with the other arm.

2. A wind-motor comprising a driving-shaft suitably journaled, radially-disposed
 85 revoluble arms mounted on the driving-shaft, propelling-sails, each sail having one edge fixedly connected with one of the arms, whereby it is adapted to be wound thereon, and a suitable flexible connection between
 90 the opposite edge of the sail and the adjacent arm.

3. A wind-motor comprising a driving-shaft and a propelling-wheel mounted thereon and fixedly connected therewith, the said
 95 wheel comprising radially-disposed arms, a hub fast on the shaft in which the inner extremities of the arms are journaled, sails connected with the outer portions of the arms, a bearing-ring supported intermediate the driv-
 100 ing shaft and the sails in which the radial arms are also journaled, and springs connected with the arms and arranged to be placed under torsional strain by the rotation of the arms in one direction, each sail being
 105 fixedly connected with one arm having a flexible connection with the other arm.

4. A wind-motor comprising a wheel mounted to rotate and including a hub, radially-disposed arms journaled in the hub at
 110 their inner extremities, means for connecting the arms intermediate their extremities whereby they are held in operative relation, pulleys fast on the arms, sails each attached at one edge to one arm, and a flexible connec-
 115 tion between the opposite edge of each sail and the pulleys of an adjacent arm, whereby as the edge to which the flexible connections are attached is carried outwardly when acted on by the force of the wind, the flexible
 120 connection acts on the pulleys of each shaft to impart independent rotation to the latter and wind the sail thereon.

5. A wind-motor comprising a wheel mounted to rotate, said wheel being provided
 125 with radially-disposed arms mounted to have independent rotation, propelling-sails, each sail having one edge fixedly connected with a radial arm, flexible devices connecting the opposite edge of the sail with an adjacent
 130

arm, the latter being provided with pulleys fast on the arm and to which the flexible devices are attached to facilitate rotation, and means for automatically returning the revoluble arms to their normal position after each act of rotation imparted by the sails.

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10
15
6. A wind-wheel provided with radially-disposed, independently-revoluble arms, sails connected with the respective arms to wind thereon, the sails being also flexibly connected with adjacent arms to rotate the same under the influence of wind stress, and means for automatically returning the revoluble arms when the wind stress is reduced to a pre-determined limit.

7. A wind-wheel having radial arms mounted to rotate independently of its body

rotation, and sails connected with the arms to rotate the same when acted on by predetermined wind stress, each sail being connected with an arm to be wound thereon by the stress acting on an adjacent sail. 20

8. A wind-wheel provided with radially-disposed, independently-revoluble arms, sails connected with the arms to be wound thereon, each sail being connected with an adjacent arm to rotate the same simultaneously with the winding act to which it is subjected. 25

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

JOHN J. DONNELLY.

Witnesses:

DENA NELSON,
A. J. O'BRIEN.