(No Model.)

2 Sheets—Sheet 1.

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WINDMILL.

No. 265,203. Patented Sept. 26, 1882.

Fig. 8.

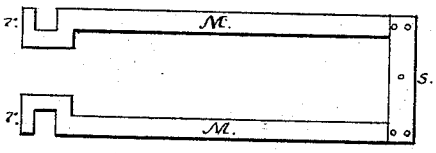

Fig. 7.

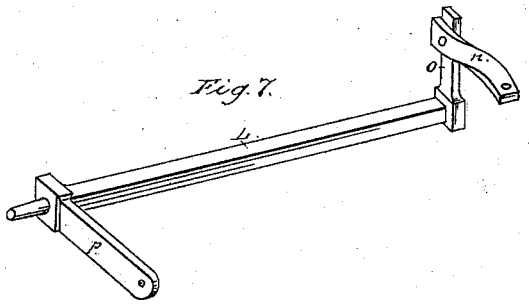

Fig. 1.

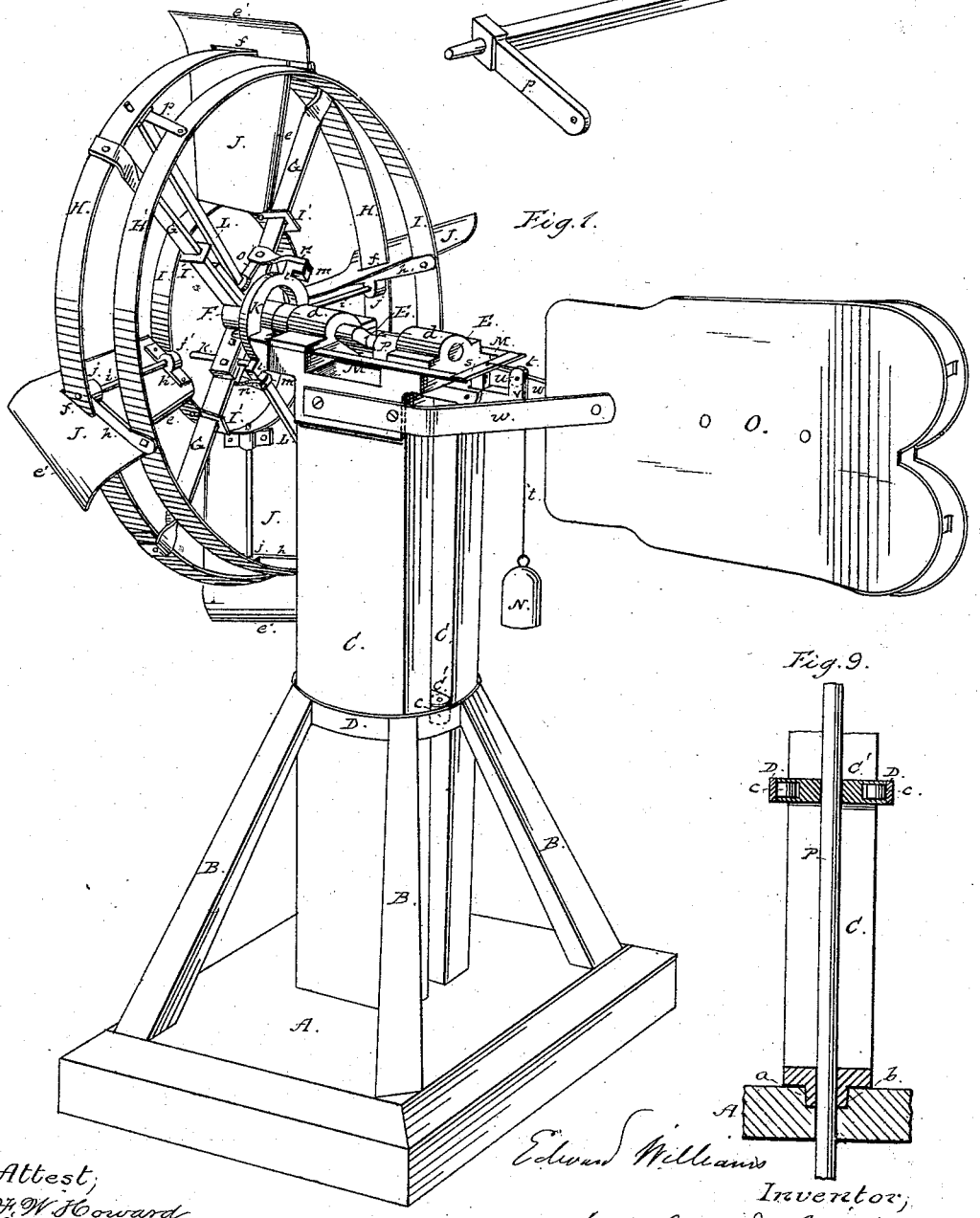

Fig. 9.

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John C. Schroeder

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per Dyer & Wilcox
Attys

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

(No Model.)

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Fig. 4.

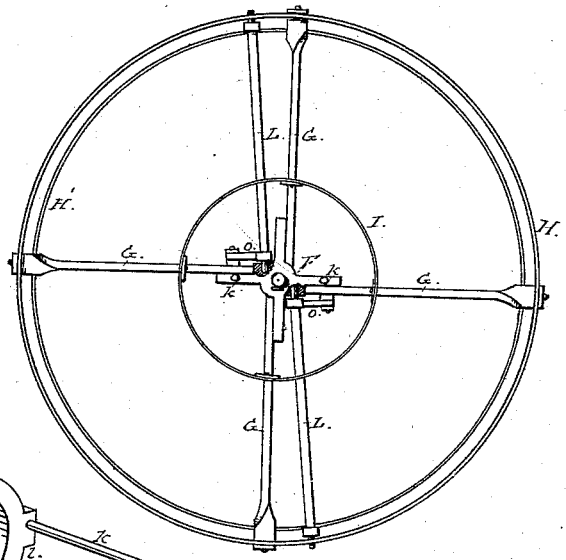


Fig. 6.

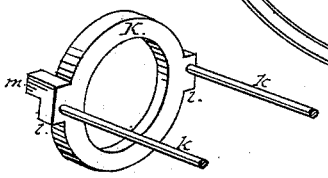


Fig. 2.

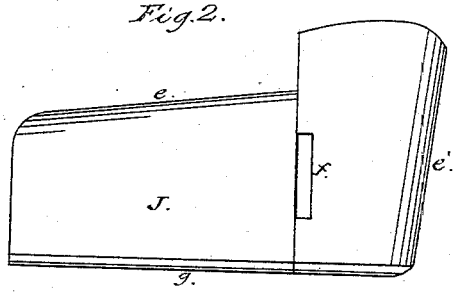


Fig. 5.

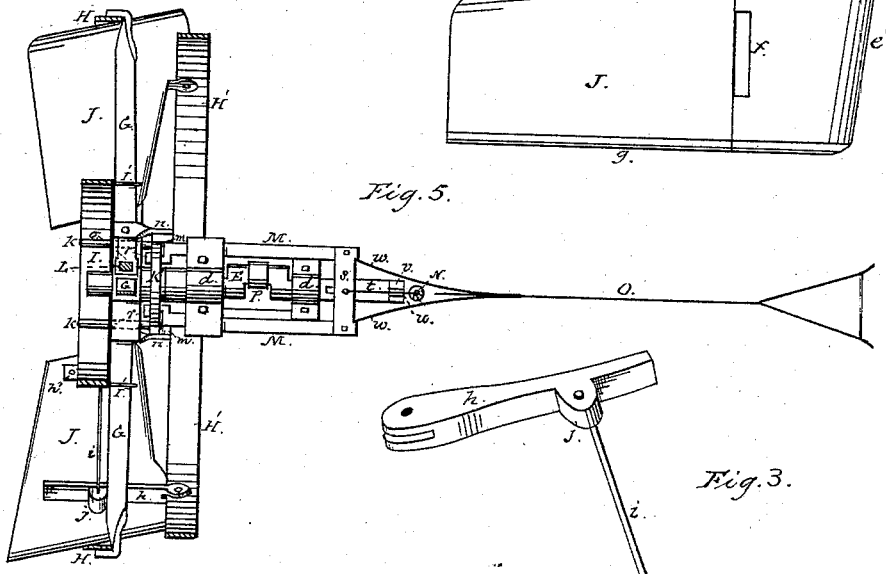
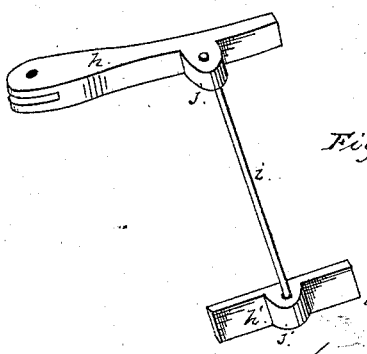


Fig. 3.



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UNITED STATES PATENT OFFICE.

EDWARD WILLIAMS, OF DUBUQUE, IOWA.

WINDMILL.

SPECIFICATION forming part of Letters Patent No. 265,203, dated September 26, 1882.

Application filed November 15, 1881. (No model.)

To all whom it may concern:

Be it known that I, EDWARD WILLIAMS, of Dubuque, in the county of Dubuque and State of Iowa, have invented a new and useful Improvement in Windmills; and I do hereby declare that the following is a full and exact description of the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

My invention relates to an improvement in windmills, the principal and essential object of which is to avoid the employment of the commonly-used hinged tail-vane and varying weight, and to construct a wheel whose component parts shall be of simple and effective construction and arrangement, and shall at all times be self-governing, regardless of the state of the weather.

To this end the invention consists principally in the employment of a governor which, in combination with certain suitable mechanism, will perform the operation of adjusting the sails to the wind automatically, and thus do away with the hinged tail-vane; further, in the employment of a stationary vane split and curved outwardly at its outer end and rigidly secured at its inner end to the beams composing the turn-table upon which the whole is mounted; further, in the peculiar construction of the sails and the manner and means employed in attaching them to the wheel and governor; and, finally, in the construction, arrangement, and combination of other certain mechanism, more fully hereinafter described, and designated in the claims.

To enable persons skilled in the art to which my invention appertains to know how to make and use the same, I will proceed to fully describe the same with reference to the accompanying drawings, in which—

Figure 1 is a perspective view of the entire mill; Fig. 2, a detail view, showing the construction of the sails; Fig. 3, a detail view of the parts composing the hinge employed for attaching the sails to the wheel and governor; Fig. 4, a plan view of the face of the wheel and hub with the sails removed; Fig. 5, a plan view of the mill with part of the wheel broken away; Fig. 6, a detail view of the ring or yoke K and rods or pins *k k* secured therein; Fig. 7, a detail of one of the arms L, with its levers or arms connecting the ring K with the wheel and governor; Fig. 8, a detail view of the clutch-rods M M, which clasp and reciprocate the ring K when operated on; and Fig. 9, a central vertical section taken through the beams C C, derrick B, and base or tower A.

Like letters denote corresponding parts in each figure of the drawings.

A represents any suitable base, provided at its center with a step or oil-cup, *a*, in which the turn-table has bearing and revolves. This turn-table is preferably composed of two upright beams or posts, C C, secured together at their upper ends by the lower half of the shaft bearings or boxes *d d*, composed of a solid piece of metal, and at their lower ends by a block provided with a journal-bearing, *b*, which rests in the step or oil-cup *a* of the base. At about the center, and between the two posts or beams C C, is secured another block, C′, provided with two friction-rollers, *c c*, which bear against a circular frame, D, in the top of the derrick B, and which is employed as a support and guide for the turn-table and to facilitate the easy revolution thereof.

The axis-shaft E of the wheel is mounted in the boxes or bearings *d d*, whose lower half fits over and secures the top of the turn-table, as shown in Fig. 1. On the outer end of this shaft is journaled the spider or hub F, with its usual radial arms, to each of which is secured an arm, G, of the wheel, extending outwardly to a band or tire, H, and bent over at its end and riveted thereto. An inner band or tire, I, to which the lower or inner ends of the sails are pivoted, is made secure to the arms G by means of a loop, I′, passed around said arms and riveted to the said inner band or tire, I, as shown in Fig. 1. The sails J, pivoted at their lower ends to the inner band or tire, I, just described, are curved at two of their edges in directions at nearly right angles to their face. The inner edge, or that attached to the band or tire H′, is curved outwardly, as shown at *e*, Fig. 2, and the upper edge or perimeter above the band H is curved outwardly, as shown at *e′*, same figure. The object of thus curving the edges of these sails is to afford a better exposure to the wind, or, in other words,

prevent the wind, in striking their faces, from glancing off too suddenly without producing a sufficient amount of force to give a good speed of rotation to the wheel. Therefore, by curving the edges as above described they act as an obstruction or stop to the wind, and thereby enable it to exert sufficient force on the sails to give a good speed of rotation to the wheel. These sails are also provided at their centers with an opening, *f*, as shown in Fig. 2, through which the band or tire H of the wheel passes. To strengthen these sails they are bent over at their outer edges, or those outside of the band H, as shown at *g* in Fig. 2, under which edges are inserted rods of metal or other strong material sufficient to prevent the wind, regardless of its force, from bending or breaking them.

To the back of the sails are secured two metal strips, *h h'*, which form, in connection with a metal rod, *i*, a suitable hinge, of T shape, for attaching the sails to the wheel. The construction of these devices is shown in Fig. 3. The strip *h* is firmly secured to the back of each sail, immediately under the opening *f*, and is provided a little to the right of its center with a projection, *j*, cast therewith, and which projects outwardly about two inches, the reason for this specified distance being to obtain a good leverage, as will be evident to those acquainted with the state of the art. This strip *h* is slit horizontally at its inner end for the reception of the governor band or tire H', to which it is attached, as shown in Fig. 1. The strip *h'* is secured to each sail at the lower end thereof, and has the same projection, *j'*, as strip *h'*, but does not project out quite such a distance. The metal rod *i* referred to passes through holes in these projections and through the bands H and F, and is secured at its ends by nuts or other means suitable to prevent its slipping through. These sails, so attached to the wheel, are permitted a lateral free and independent movement.

Around the shaft or axle of the wheel, and to the rear of the wheel, is suspended a ring or yoke, K, about twice the diameter of the shaft and hub. This ring or yoke is suspended around the shaft by two pins or rods, *k k*, secured into ears *l l*, cast on the perimeter of said ring, as shown in Fig. 6. These rods extend outwardly and pass through holes in the arms of the hub or spider, and reciprocate therein when actuated by the mechanism presently to be described. These ears *l l* of the ring or yoke K have cast therewith extensions *m m*, to which are pivoted levers or arms *n n*, which extend diagonally outward, and are pivoted at their opposite ends to levers *o o* of the two arms L L of the band or tire H. These arms L L are pivoted at their inner ends to the hub or spider F, and extend outwardly in opposite directions to the band or tire H of the wheel, where they are pivoted, so as to readily and freely turn when operated on.

To the outer end of each arm L, immediately inside of the band H, is firmly secured an arm, *p*, extending inwardly at right angles thereto, and pivoted to the governor band or tire H' of the wheel, as shown in Fig. 1. The connection of these levers and arms is shown in Fig. 7.

The ring K, with its levers and arms connecting the bands or tires therewith, is operated backward and forward by rods M M, having bearings in the shaft bearings or boxes *d d*, as shown, and connecting with a weight, N, by a rope or wire fastened to their inner ends, as shown in Fig. 1. The outer end of each of these rods M is formed into a clutch or hook, *r*, which clasp the ring or yoke K at points opposite each other. The inner ends next the tail-vane are connected together by a metal strap, *s*, to which is fastened at its center a rope or wire, *t*, passing over a pulley, *u*, mounted in an angular extension, *v*, of the shaft-bearings, and having attached at its lower end a dead-weight, N.

The tail-vane O, rigidly secured to the two upright beams C C of the turn-table by the arms *w w*, is split at its outer end and curved outwardly in directions opposite each other, the object of this being the same as set forth in the description of the sails.

The driving-rod P is attached to the crank-arm of the shaft E in the ordinary manner, and passes down between the two upright beams C C through holes in the block C', journal-bearing *b*, and step *a*, and is connected to the device the mill is intended to operate.

The operation is as follows: The wheel, being set with the sails at the most efficient angle of presentation to the wind, is held in position by the weight N. When the force of the wind is greater than the resistance offered by the weight its increased power tends to force the edges of the sails to the wind by getting a hold under the curved edges thereof, causing the governor band or tire H', to which the sails are attached, to turn backward, thereby transmitting a movement (to raise the weight) through the arms and levers connecting with the rim or yoke K, and the rods M M, with their hooks *r r*, clasping such ring or yoke. As the force of the wind abates the weight N falls to its normal position, thus drawing back the rods M M, which in turn draw back the ring or yoke K and the arms or levers *n n*, and pulling around the arms *o o*, they turn the two radial arms L L of the governor band or tire H' and the arms or levers *p p* and the band H', thus causing the sails to assume their normal angle of presentation to the wind by a complete reverse movement of the connecting mechanism.

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

1. In a windmill, the sails of the wheel, curved at their upper and inner edges and strengthened at their outer edge, substantially as described and shown.

2. In a windmill, the combination, with the

sails J and bands or tires H, H′, and I, constructed and arranged substantially as described and shown, of the T-shaped hinges, composed of the parts *h*, *h′*, and *i*, secured to the back of said sails, and attached to said bands or tires in the manner substantially as described, shown, and for the purpose set forth.

3. In a windmill, the combination, with the shaft E, hub or spider F, and arms G, rigidly secured to band or tire H, of the inner band or tire, I, provided with loops I′, through which pass the arms G, and by which the inner band or tire is secured to said arms, the several parts constructed and arranged substantially as described and shown.

4. In a windmill, the combination, with the shaft E, hub or spider F, and arms G, of the inner band or tire, I, provided with loops I′, passing around said arms, outer band or wheel, H, passing through opening *f* made in the sails, governing band or tire H′, attached to the inner edge of the sails, and the sails J, the several parts constructed, arranged, and operating substantially as described, shown, and for the purpose set forth.

5. In the windmill described, the combination, with the shaft E, hub or spider F, arms G, bands or tires H H′ I, and sails J, constructed and arranged substantially as described and shown, of the ring or yoke K, provided with the ears *l l* and extensions *m m*, and suspended around said shaft between the hub and shaft-bearings by means of the rods *k k*, passing into and through the arms of said hub or spider, substantially as described, shown, and for the purpose set forth.

6. In the windmill described, the combination, with the dead-weight N, means for suspending it, clutch-rods M M, and ring or yoke K, constructed and arranged substantially as described and shown, of the arms *n n*, levers *o o*, arms L L, having bearings in the bands or tires I and H, respectively, levers *p p*, governing band or tire H′, and sails J, the several parts constructed, arranged, and operating substantially as described, shown, and for the purpose set forth.

7. In the windmill described, the combination, with the turn-table C C, secured at its upper end, substantially as described and shown, of the tail-vane O, split and curved at its outer end, and rigidly secured at its inner end to the top of the turn-table by the arms *w w*, substantially as described, shown, and for the purpose set forth.

This specification signed and witnessed this 10th day of September, 1881.

EDWARD his × mark WILLIAMS.

Witnesses:
MONROE M. CADY,
FRANK STRINSKEY.