(No Model.) 2 Sheets—Sheet 1.

A. DUIS.

WINDMILL.

No. 553,230. Patented Jan. 21, 1896.

Fig. 1.

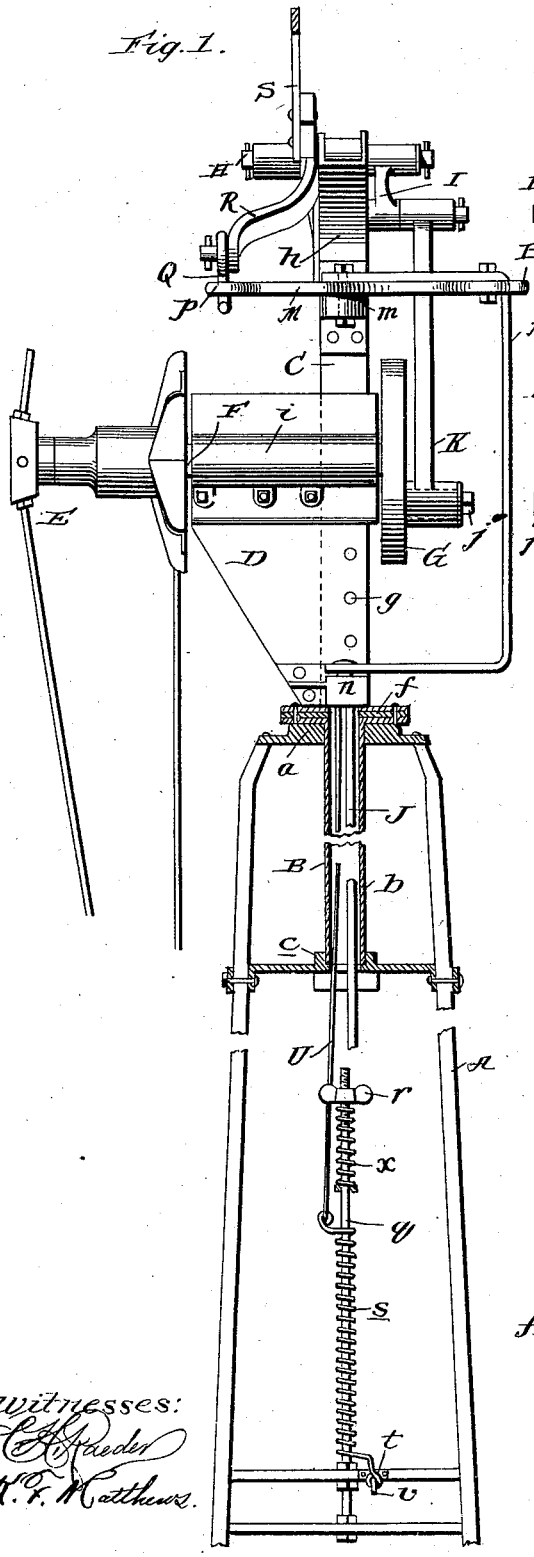


Fig. 2.

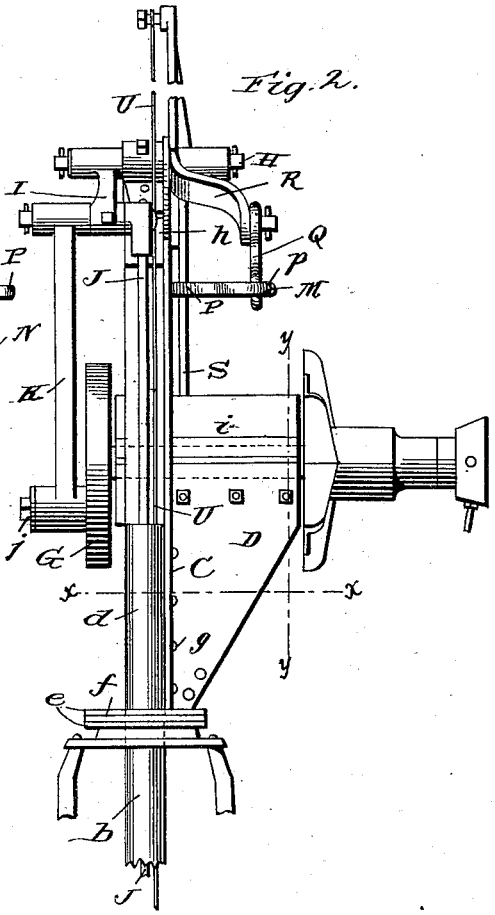


Fig. 4.

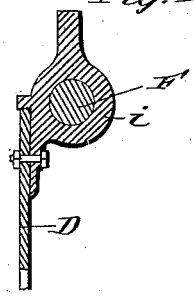
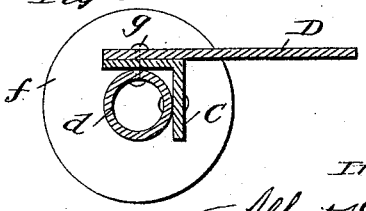


Fig. 3.



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(No Model.) 2 Sheets—Sheet 2.

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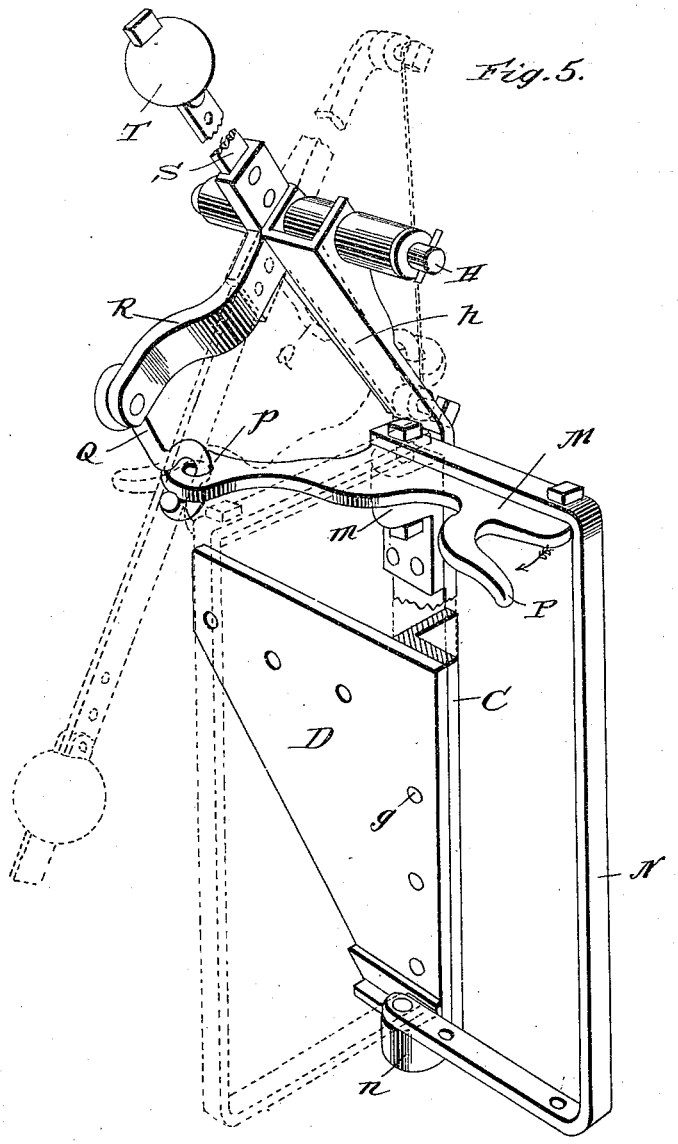
Fig. 5.



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UNITED STATES PATENT OFFICE.

ALBERT DUIS, OF STREATOR, ILLINOIS.

WINDMILL.

SPECIFICATION forming part of Letters Patent No. 553,230, dated January 21, 1896.

Application filed September 16, 1895. Serial No. 562,697. (No model.)

To all whom it may concern:

Be it known that I, ALBERT DUIS, a citizen of the United States, residing at Streator, in the county of La Salle and State of Illinois, have invented certain new and useful Improvements in Windmills; 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.

My invention relates to improvements in windmills, and its novelty will be fully understood from the following description and claims when taken in connection with the accompanying drawings, in which—

Figure 1 is a side elevation, partly in section, of so much of a windmill as is necessary to illustrate my improvements, the parts being shown in the positions which they assume when the wheel is in the wind or in a position to receive the impulse of the wind. Fig. 2 is a detail elevation of the side of the mill opposite to that shown in Fig. 1 with the parts in the position they assume when the vane-arm is locked and the wheel is out of the wind. Fig. 3 is a detail enlarged horizontal section taken in the plane indicated by the line *x x* of Fig. 2. Fig. 4 is a detail vertical section taken in the plane indicated by the line *y y* of Fig. 2; and Fig. 5 is a detail perspective view, on an enlarged scale, illustrating my improved mechanism through the medium of which the vane is adjusted and the wheel moved into or out of the wind.

Referring by letter to said drawings, A indicates a windmill-tower, which may be of the ordinary or any suitable construction, and is provided at its upper end with a bearing-plate *a*, and B indicates a rotatable steel tube, which comprises a lower portion *b*, journaled in the upper end of the tower A, and stepped in a bearing *c* below said upper end, and an upper portion *d*, as better shown in Fig. 1. The said tube B is provided with a flange, and the said flange is sprung on the tube B, as shown in Fig. 1, to form a collar *f* designed and adapted to bear upon the plate *a* of the tower, as illustrated.

C indicates a steel upright of right-angle form in cross-section, which is connected by rivets *g* to the upper end of tube B, and is provided at its upper end with the angularly-bent portion *h* to permit of a better connection of the vane-regulating and power-transmitting mechanism which it is designed to support, and D indicates a steel plate which is connected by the rivets *g* to the upright C and tube B, and is designed for the connection of the bearing *i*, in which the wheel-shaft is journaled, as will be presently described. The steel tube B, upright C, and plate D, connected as described, form a mast for the support of the working parts, which, while equally as strong as the well-known mast formed by heavy castings, is much lighter than the same and is more easily placed and secured in position on the tower, which is an important desideratum.

E indicates the wheel of my improved mill, which may be of the well-known solid type.

F indicates the shaft carrying the wheel, which is journaled in the bearing *i* on plate D.

G indicates a crank-wheel, which is fixed on the opposite end of the shaft F, with respect to wheel E, and is provided with a wrist-pin *j*.

H indicates a horizontal shaft, which is fixedly connected to the upright C, adjacent to the upper end thereof, as better shown in Fig. 5.

I indicates an arm which is mounted on said shaft on one side of the upright C, and is connected to the reciprocatory rod J, designed for connection to the piston-rod of a pump (not illustrated) or to other mechanism to be driven, and K indicates the pitman which connects the crank-wheel G and the arm I, so that when the wheel E is rotated by the wind the rod J will be reciprocated to work a pump-rod or other machinery.

M indicates a swinging arm which I will hereinafter term the "vane-arm" because it is designed for the connection of the vane, which is not illustrated. This vane-arm M is fulcrumed upon or pivotally connected to a bearing *m* on the upright C, so as to enable it to swing in a horizontal plane, and it is preferably provided with a frame-bar N, for the better connection of the vane, which frame-bar has its lower end pivotally connected to a bearing *n* on the upright C, as illustrated. At one end the vane-arm M is provided with a hook or keeper P, for a purpose presently described, and at its opposite

end it has an eye *p*, as better shown in Fig. 5 of the drawings. This eye *p* of the vane-arm is connected by a link Q with the outer end of the lateral arm R of the weight-lever S, which is fulcrumed on the shaft H, as better shown in Fig. 5. By reason of this construction it will be readily observed that when the end of the lever S, on which weight T is mounted, is uppermost, as shown by full lines in Fig. 5, the arm M and frame-bar N connected thereto, as well as the vane, (not illustrated,) will rest in alignment with the wheel-shaft F, and at right angles to the wheel, and in consequence the wheel will be held in the wind or in a position to receive the impulse therefrom. When the weighted end of the lever S is lowered to the position shown by dotted lines in Fig. 5, the arm M, frame-bar N, and the vane (not illustrated) connected thereto will be swung in the direction indicated by arrow so as to carry the vane to a position parallel or approximately parallel to the wheel, which will result in the wheel being moved out of the wind. When the arm M is moved in the direction indicated by arrow to the position shown by dotted lines in Fig. 5, its hook or keeper P will engage the lever S, as shown by dotted lines, and in consequence the vane will be locked in a position to hold the wheel out of the wind or in such a position that it will not receive the impulse of the wind. With the parts in the position shown by dotted lines in Fig. 5, when it is desired to move the wheel back into the wind it is simply necessary to lower the unweighted end of the lever S. When this is done the weighted end of the lever, by reason of the connection shown of the arm M, arm R, and link Q, will first be lifted out of engagement with the vane-arm M, and said arm will then be swung into the position shown in full lines in Fig. 5, so that the vane will rest in a position at right angles to the wheel, which will result in the wheel being moved into a position to receive the impulse of the wind.

In order that the wheel may be moved out of and into the wind by a person on the ground, I provide the cord or wire U, which is connected to the unweighted end of the lever S, and extends down through the tube B, as shown, and in order that the lever S may be held in the position shown in full lines in Fig. 5, I provide the rod *q*, which has threads at its upper end to receive a nut *r*, a spring *s*, which surrounds the rod *q* and has its upper end connected to the cord or wire U and has an eye *t* or other suitable means at its lower end whereby it may be connected to a stationary object. With this construction when the spring *s* is disconnected from the hook *v* or other device, the weighted end of the lever *s* will fall and the wheel will be moved out of the wind and will be locked in such position by the said lever engaging the vane-arm M. When the cord U is drawn down and the spring *s* fastened to a stationary object the wheel will be moved back into the wind and will be held in the wind so long as the same is moderate. If, however, the wind gets too high the wind will exert its force against the vane and through the medium of the vane-arm M and link Q will overcome the spring *s* and partly raise the unweighted end of the lever S. This will result in the wheel being moved partly out of the wind, and if the gale increases in force the spring *s* will be further expanded, the unweighted end of lever S will be further raised and the wheel will be moved further out of the wind. If the wind still increases, the force of the same exerted against the vane will result in the wheel being moved almost entirely out of the wind into a position where it cannot be injured by the force of the blow. The wheel is prevented from being moved automatically entirely out of the wind by the compression-spring *x* arranged on the rod *q* below the adjusting-nut *r* and above the spring *s*. This spring *x* is designed to be engaged by the spring *s* when the same expands, and it is adapted to increase the resistance against moving the wheel entirely out of the wind, so as to prevent the wheel from being so moved automatically, which is an important desideratum.

I have in some respects specifically described the construction and relative arrangement of my improved mill in order to impart a full, clear, and exact understanding of the same; but I do not desire to be understood as confining myself to such construction and arrangement, as such changes or modifications may be made in practice as fairly fall within the scope of my invention.

Having described my invention, what I claim is—

1. In a wind mill, the combination of a suitable rotatable support, a wind wheel mounted on a shaft carried by said support, a lever fulcrumed at an intermediate point of its length and having a lateral arm and also having one of its ends weighted, a vane arm pivotally mounted or fulcrumed on the support and having a keeper adapted to engage the lever, and a link connecting the vane arm and the lateral arm of the lever, substantially as and for the purpose set forth.

2. In a wind mill, the combination of a suitable rotatable support, a wind wheel mounted on a shaft carried by said support, a lever fulcrumed at an intermediate point of its length and having a lateral arm and also having one of its ends weighted, a vane arm pivotally mounted or fulcrumed on the support, and having a keeper adapted to engage the lever, a link connecting the vane arm and the lateral arm of the lever, a cord connected at one end to the unweighted end of the lever, and a spring connected to the opposite end of the cord and adapted to be detachably connected to a stationary object, substantially as specified.

3. In a wind mill, the combination of a suitable rotatable support, a wind wheel mounted on a shaft carried by said support, a lever ful-

crumed at an intermediate point of its length and having a lateral arm and also having one of its ends weighted, a vane arm pivotally mounted or fulcrumed on the support and having a keeper adapted to engage the lever, a link connecting the vane arm and the lateral arm of the lever, a cord connected at one end to the unweighted end of the lever, a rod *q*, a spring *x*, surrounding the same and a spring *s*, surrounding said rod below the spring *x*, and connected to the cord and adapted to be detachably connected to a stationary object, substantially as specified.

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

ALBERT DUIS.

Witnesses:
GEO. HOADLY,
A. P. WRIGHT.