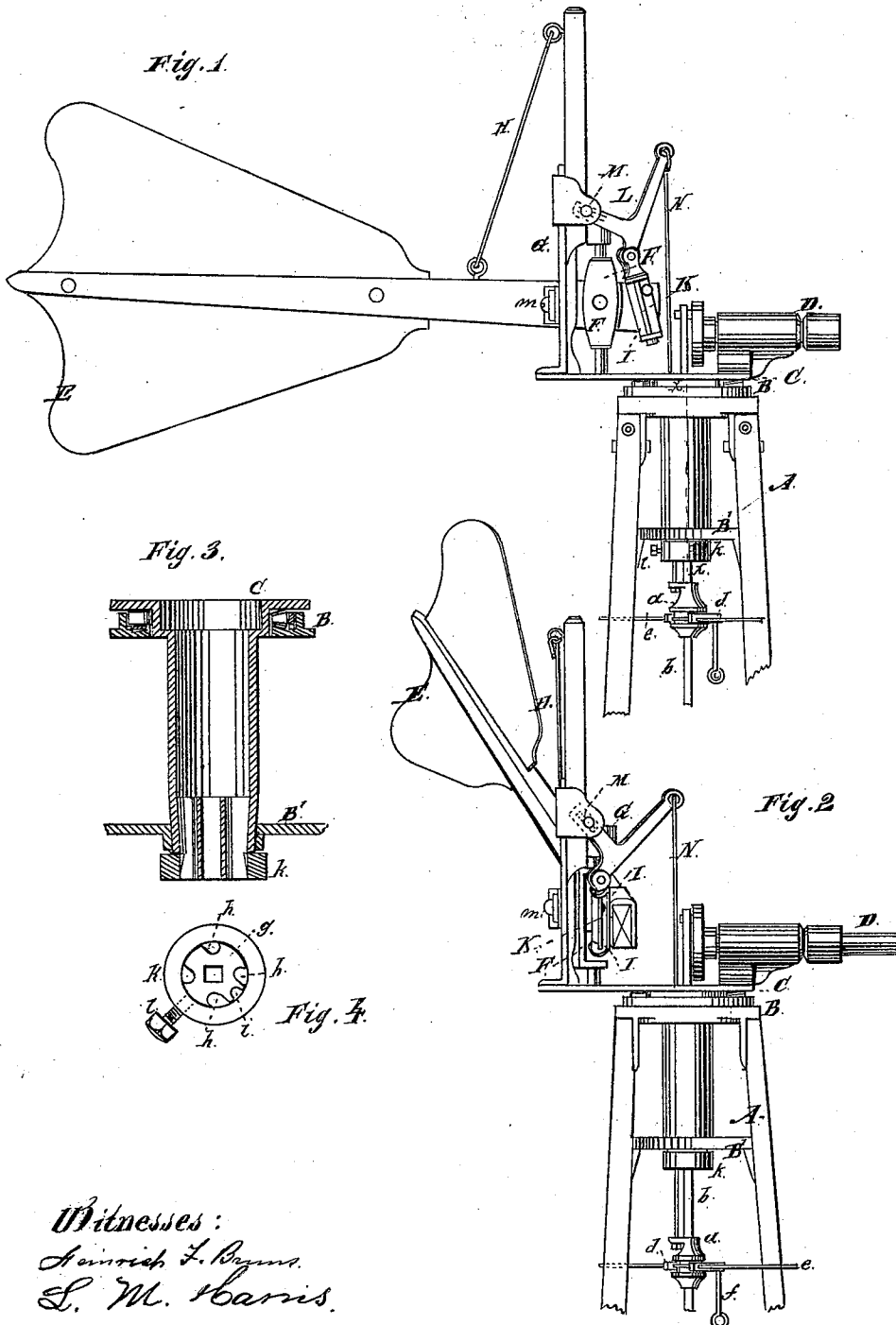


D. HALLADAY.
WIND-MILL.

No. 179,109.

Patented June 27, 1876.



Witnesses:
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UNITED STATES PATENT OFFICE.

DANIEL HALLADAY, OF BATAVIA, ILLINOIS.

IMPROVEMENT IN WINDMILLS.

Specification forming part of Letters Patent No. **179,109**, dated June 27, 1876; application filed March 13, 1876.

To all whom it may concern:

Be it known that I, DANIEL HALLADAY, of Batavia, in the county of Kane and State of Illinois, have invented a new and useful Improvement in Windmills, which is fully set forth in the following specification, reference being had to the accompanying drawings, in which—

Figure 1 is a side elevation of a mill with the wind-wheel removed and the lower part of the tower broken away. Fig. 2 is a similar view, showing the relative position of the parts when the wheel is turned out of the wind. Fig. 3 is a sectional view of the turn-table, taken on the line *xx* in Fig. 1; and Fig. 4 is a bottom view of the tubular portion of the turn-table.

My invention relates to mechanism for regulating the wheel, which is automatic in its action in turning the wheel out of and into the wind.

My invention consists in pivoting the vane to the turn-table at an angle to the drive-shaft, so that the wheel is gradually turned out by any increased force of the wind, and when so turned out of the wind the weight of the vane acts to turn it into the wind again, and also in various devices, which will be hereinafter more fully described.

In the drawings, A represents the supporting-frame or tower. B B' are plates, upon which the turn-table C is mounted. The turn-table consists of two parts—an upper plate, which rests upon the plate B, and a tubular portion, which extends downward and is journaled upon the plate B'. Between the upper plate of the turn-table and the plate B is placed a ring of peculiar construction, carrying two sets of anti-friction rollers. This device is fully described and claimed in another patent, however, and further description is not necessary here. Upon the upper portion of the turn-table the main driving-shaft D is mounted, to the outer end of which the wind-wheel is attached. The vane E is pivoted to a yoke, F, which, in turn, is pivoted to the turn-table, and to a lug upon a post, G, which is attached to the rear end of the turn-table. A rod, H, is hinged to the upper end of the post G, and to the vane E, in rear of its connection with the yoke F; and as the post G is at one

side of the vane, the point of attachment of the rod to said post is eccentric to the pivotal bearings of the yoke F. A yoke, I, is pivoted to one side of the forward end of the vane, in front of its attachment to the yoke F, and to this yoke I a pin, K, is journaled. An angular lever, L, is pivoted at its angle to the upper end of the pin K, and the outer end of one of its arms is pivoted to the post G, the arm being slotted, to admit of its sliding upon its pivotal pin M. A rod, N, is attached to the outer end of the other arm of the angular lever, and extends down through the tubular portion of the turn-table, and is attached at its lower end to a slide, *a*, which is placed upon the connecting-rod *b*. This slide is constructed with a groove, *c*, extending around it, and is grasped by a forked piece, *d*, the arms of which enter the groove in the slide. A rod, *e*, is passed through the outer ends of these arms, and is extended in both directions, so that its ends will rest against two opposite posts of the supporting-frame, and prevent the forked piece from turning with the slide *a*. A short rod, *f*, depends from the other end of the forked piece *d*, to the lower end of which a cord or wire is attached, by means of which the angular lever is made to act upon the vane, to turn the wheel out of the wind.

In the lower end of the tubular portion of the turn-table a guide, *g*, is fixed. The connecting-rod *b* passes through a hole in the center of this guide, and grooves *h* are made in its side, to permit any water that enters the tubular portion of the turn-table to flow out, and a smaller groove, *i*, is provided for the passage of the lever-rod N. A ring, *k*, is attached to the projecting lower end of the guide by means of a set-screw, *l*, which serves to hold the turn-table down in position, being larger than the opening in the supporting-plate B', which forms the bearing for the lower end of the turn-table.

The pivoted connection between the vane E and the turn-table is directly in line with the axis of the drive-shaft; but the vane itself is arranged out of such line by turning it slightly away from the post G, so that the axis of the vane will form an angle with the axis of the drive-shaft, and the greater portion of the wheel will be at one side of the vane. There

is a stop, *m*, on the post *G*, which is adjustable thereon by means of a slot, so as to regulate the position of the vane by setting it more or less away from the post, according as the stop is moved back and forth thereon.

The operation is as follows: The vane being arranged as described with reference to the wind-wheel, the force of the wind will have a tendency to turn the wheel still farther around toward the vane, and therefore, as the force of the wind increases, the wheel will be turned more and more out of the wind, until it is finally thrown entirely out of action, if the wind is sufficiently strong. The turning around of the wheel, described above, causes the outer end of the vane to rise as the post *G* is carried away from it, by reason of the strain brought upon the rod *H*, which is hinged to the post and vane. The weight of the vane, therefore, will constantly operate to carry it back toward the post, and thus bring the wheel back into the wind again, and retain it in this position. It will be seen, therefore, that the apparatus will be self-regulating. Whenever it is desired to turn the wheel out of the wind and stop it, it may be accomplished by pulling down the slide *a*, which depresses the outer end of the free arm of the angular lever *L*, and thereby applies force to the forward end of the vane, which will tend to throw this end around toward the post *G*; but as the vane is held in position by the wind, the actual effect will be to rotate the turn-table, and thereby turn the wheel out of the wind, the swiveling connection between the lever and the vane and the slotted lever-arm permitting this movement. The wheel may be held in this position by fastening down the slide *a* by means of the cord or wire attached to it; but whenever it is released, the wheel will be automatically turned back into the wind, as described above.

The forked piece *d* distributes the force acting upon the slide *a*, so that when it is pulled down there is no binding upon the connecting-rod, and the cross-bar *e* prevents this forked piece from turning around, and thus twisting the cord about the connecting-rod.

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

1. The combination of a turn-table, having a wind-wheel mounted thereon, a vane attached to the turn-table by a swiveling joint, and mechanism which raises the outer end of the vane when the wheel is turned out of the wind, so that the weight of the vane will operate to bring the wheel into the wind again, substantially as described.
2. The combination of the vane *E*, pivoted to the turn-table, the post *G*, and the rod *H*, substantially as described.
3. The combination of the turn-table and the vane *E*, attached thereto by a swivel-connection, to admit of the horizontal movement of the turn-table, and the raising of the outer end of the vane, substantially as described.
4. The combination of the vane *E*, the yoke *F*, and post *G*, the vane being pivoted to the yoke and the turn-table, substantially as shown and described.
5. The combination of the vane *E* and angular lever *L*, attached to the forward end of the vane by a swiveling connection, and to the post *G* by a sliding connection, substantially as described.
6. The combination of the angular lever *L*, the pin *K*, and yoke *I*, pivoted to the forward end of the vane, substantially as described.
7. The guide *g*, grooved as described, and inserted in the tubular portion of the turn-table, as and for the purposes specified.
8. The combination of the guide *g*, the ring *k*, set-screw *l*, and the tubular portion of the turn-table, substantially as described.
9. The combination of grooved slide *a*, connecting-rod *b*, the forked piece *d*, and extended cross-bar *e*, substantially as and for the purposes described.
10. The combination of a wind-wheel and vane, the latter arranged out of line with the drive-shaft, but hinged to the turn-table by a pivot in line with the axis of said shaft, so as to make the wheel self-regulating.
11. The combination of the hinged vane *E* and adjustable stop *m*, substantially as described.

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Witnesses:

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