2 Sheets—Sheet 1.

H. N. HILL.
Wind-Engine

No. 204,221. Patented May 28, 1878.

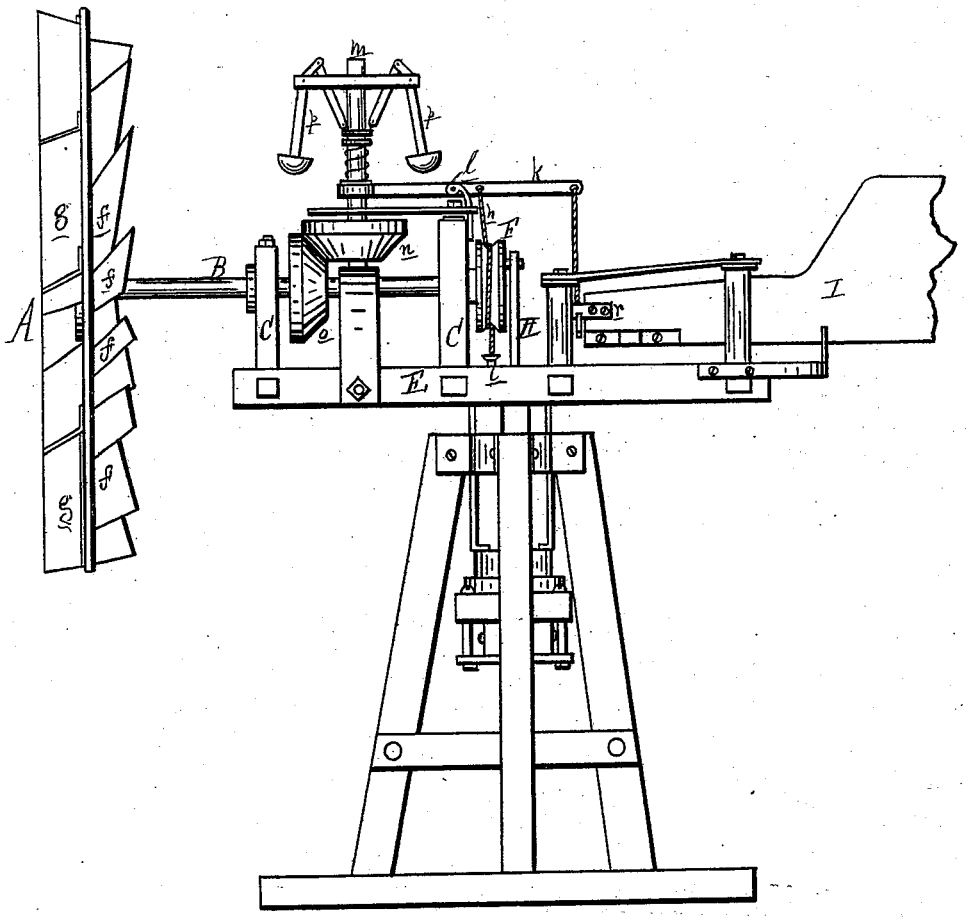

Fig. 1.

Witnesses:
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C. R. Hulett

Inventor:
H. N. Hill
By Atty
Thos. S. Sprague

2 Sheets—Sheet 2.

H. N. HILL.
Wind-Engine

No. 204,221. Patented May 28, 1878.

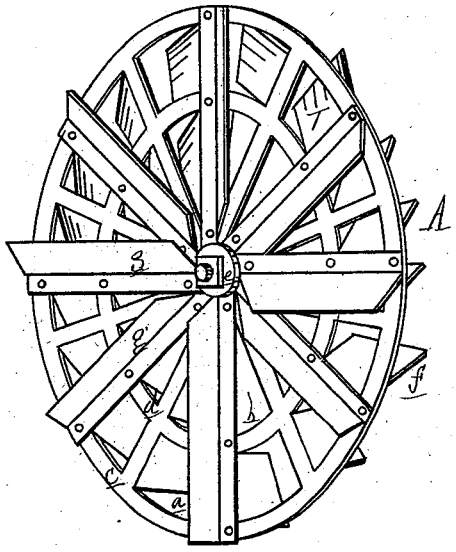

Fig. 2.

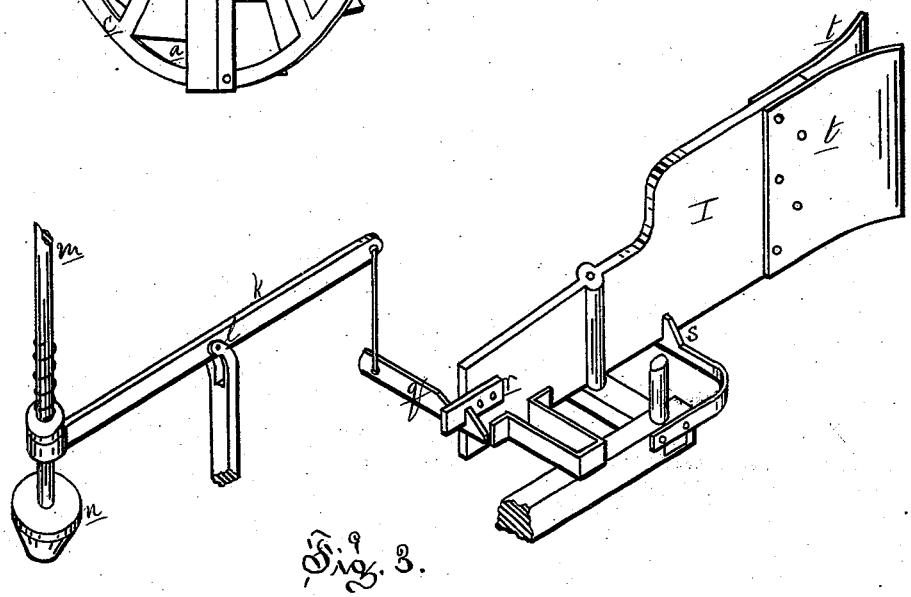

Fig. 3.

Witnesses:
H. L. Aulls
Charles J. Hunt

Inventor:
H. N. Hill
By Atty
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UNITED STATES PATENT OFFICE.

HARVEY N. HILL, OF PONTIAC, MICHIGAN.

IMPROVEMENT IN WIND-ENGINES.

Specification forming part of Letters Patent No. **204,221**, dated May 28, 1878; application filed March 7, 1878.

To all whom it may concern:

Be it known that I, HARVEY N. HILL, of Pontiac, in the county of Oakland and State of Michigan, have invented an Improvement in Windmills, of which the following is a specification:

The nature of my invention relates to new and useful improvements in windmills; and the invention consists in the peculiar construction and combination of the various parts and devices, as more fully hereinafter set forth.

Figure 1 is a side elevation of my improved mill. Fig. 2 is a perspective view of the wind-wheel. Fig. 3 is a perspective and detached view of devices by means of which the tail-vane is secured and operated.

Like letters indicate like parts in each figure.

In the drawings, A represents the wind-wheel, which is made of sheet metal, cut so as to leave openings *a b*, with the rings *c d* and hub or center *e*, the portions so cut being bent to the rear to form the sails *f* and disclose the openings through which the wind passes to act upon the sails, care being taken to have the latter all stand at the same angle to the front vertical plane of the wheel. Each segment of the wheel presented in the drawing is made with a single sail near the center of the wheel, and two smaller sails near the periphery, as shown, and bolted on or otherwise secured to the front face of the wheel, dividing the segments, and at the same time stiffening the wheel, are the wind-guides *g*, which are designed to prevent slippage of the wind over the face of the wheel, and guide it through the openings and to the sails. This wheel is secured, in any convenient or desired manner, to the end of the main driving-shaft B, which is journaled in suitable bearings C upon the frame E, and has secured to its inner end the crank-wheel F, to which the pitman H is fastened by a wrist-pin of the usual construction. This crank-wheel may be grooved, as shown, in which case a rope or chain, *h*, is wound around it, one end of said rope being secured to the frame, as at *i*, and the other end to the lever *k*, which is fulcrumed at *l*. One end of this lever is sleeved on the governor-shaft *m*, the lower end of which is provided with a bevel-gear wheel or friction bevel-wheel, *n*, which engages with a like wheel, *o*, upon the main driving-shaft B, from which the ball-governor *p*, which is secured to the upper end of the shaft *m*, receives motion.

A cord or chain connects the free end of the lever *k* with the latch *q*. This latch is notched to engage with the detent-plate *r* on the inner end of the tail-vane I, which is pivoted to the frame E, which is also provided with a stop, *s*, so placed that when in impact with the side of said tail-vane it will hold the latter at right angles to the face of the wind-wheel.

When the speed of the wind-wheel is so great as to extend horizontally the arms and balls of the governor, the friction-brake is compelled to act upon the crank-wheel, and the outer or free end of the lever *k* is elevated, thereby disengaging the latch *q*, which allows the tail-vane to be thrown out of its right-angle position to the wheel, so that the wind, acting upon it, will throw the wind-wheel out of the wind.

The tail-vane, in order to prevent the wind from slipping off the end when the tail-vane is presented at an obtuse angle to the direction of the wind, terminates at its free end in an outwardly-curved plate, *t*, as shown in a detached plan view of the top, one upon each side of the end of the vane.

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

1. In a windmill, and in combination therewith, the wheel A, cut from sheet metal, provided with openings *a b*, the cut metal being turned to the rear to disclose the openings, and to form the wind-sails *f* in series, substantially as shown.

2. In a windmill, and in combination with a wheel constructed substantially as shown, the wind-guides *g*, substantially as and for the purposes set forth.

3. In a windmill, the combination, with the horizontal main shaft B, having grooved crank-wheel F and bevel-wheel *o*, of the vertical governor-shaft *m*, placed at right angles to the main shaft, and provided with bevel-wheel *n*, the lever *k*, pivoted to the frame and sliding on the governor-shaft, and the rope or chain *h*, secured at one end to the frame and at the other end to the said lever, and wound

intermediately around the grooved crank-wheel, constructed and arranged substantially as described and shown.

4. In a windmill, and in combination therewith and with a pivoted tail-vane, constructed substantially as described, a detaining-latch operated by the motion of a ball-governor, substantially as and for the purposes specified.

HARVEY N. HILL.

Witnesses:
CHAS. J. HUNT,
H. S. SPRAGUE.