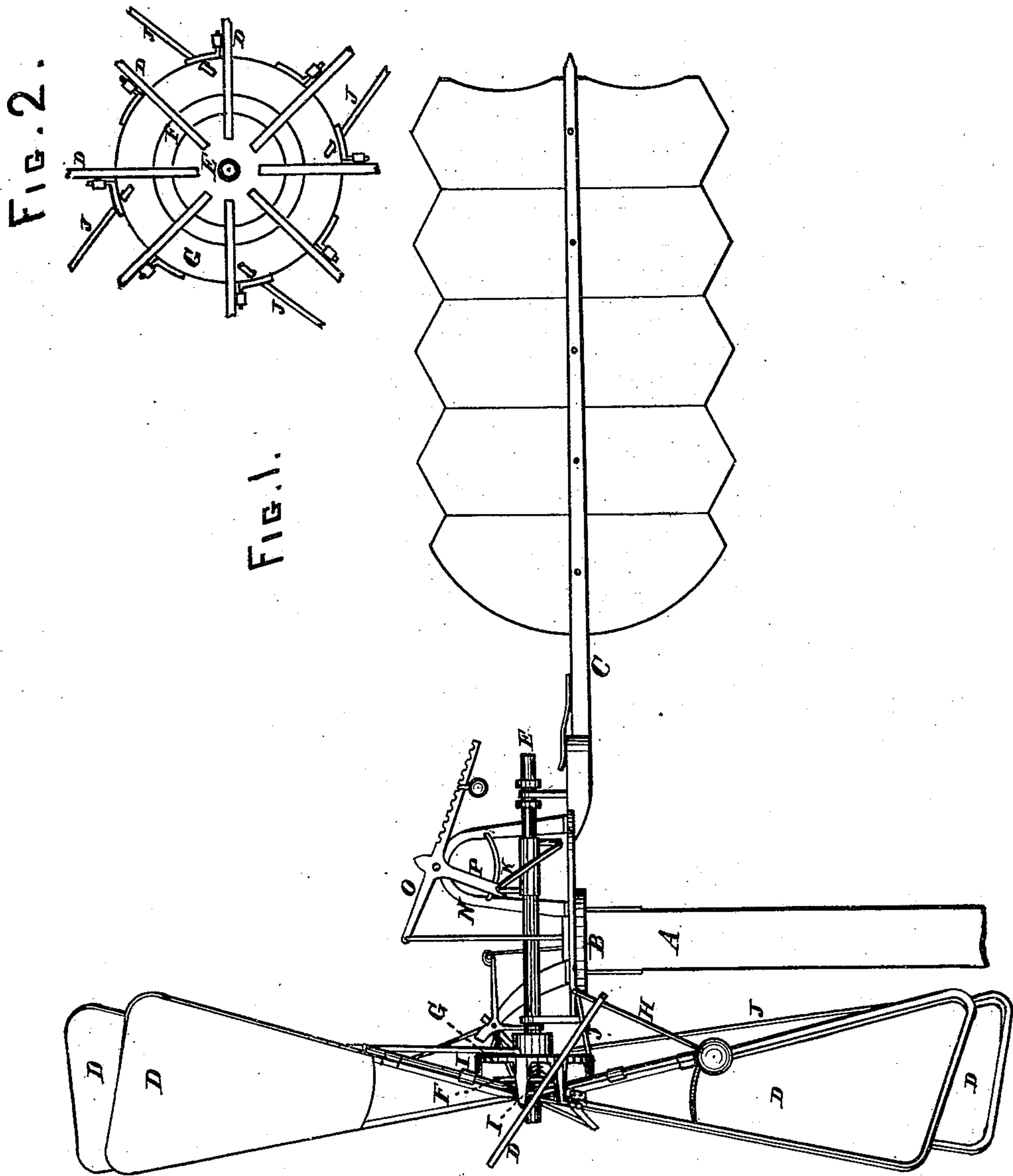


D. BULL.  
WIND-MILL.

No. 187,351.

Patented Feb. 13, 1877.



ATTEST:  
O. H. Adix  
Lucas, Barton

INVENTOR:  
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Atty.

# UNITED STATES PATENT OFFICE.

DANIEL BULL, OF AMBOY, ILLINOIS, ASSIGNOR TO HIMSELF AND WILLIAM L. BEALS, OF SAME PLACE.

## IMPROVEMENT IN WINDMILLS.

Specification forming part of Letters Patent No. **187,351**, dated February 13, 1877; application filed January 17, 1876.

*To all whom it may concern :*

Be it known that I, DANIEL BULL, of Amboy, in the county of Lee and State of Illinois, have invented a new and useful Improvement in Windmills, of which the following is a specification :

The nature of the present invention consists in a sliding head provided with arms or bars extending to the face of the wind-wheel, and pivoted to the edges of the wings or sails of the said wheel, some little distance from their pivoted centers, whereby the wings, when thrown out of the wind and turned edgewise to it, are brought flat against said arms, which serve as stops and prevent the sails from oscillating past a line parallel to the main shaft.

The sliding head, in its movement, is turned spirally on the shaft by the swinging of the sails.

In the drawings, Figure 1 is a side elevation of a windmill embodying my improvement, showing also other parts not claimed in this application. Fig. 2 is a face view of the sliding head and attachments, the wings or sails being broken away.

A represents the top of the tower or frame which supports the turn-table B of the windmill, in the usual manner. E represents the main shaft of the mill, which is supported by bearings on the turn-table, and C is the tail or vane, attached to the turn-table in the ordinary manner. F represents a collar attached to the shaft E, and provided with bearings or sockets for the inner ends of the radial wings or sails to turn in. Back of this collar, and between it and the turn-table D, and on the shaft E, is placed a sliding head, G, which

is provided with arms I, extending to the front thereof, and parallel with the shaft E, as shown in Fig. 1. The sails project laterally from their supporting radial rods J, and to their outer edges are jointed the arms I, so that when the sails are turned edgewise to the wind they are brought flat against the said arms, which prevent the sails from being thrown past lines parallel to the main shaft, and in this position have a firm support. The sliding head is placed loosely on the shaft E, so that the turning of the sails on their radial rods will allow the head to have a spiral movement; otherwise the wings could not turn.

In practice, a spring or weight can be made to bear against the sliding head to regulate the resistance which the sails are to sustain by the wind before turning. H represents a centrifugal governor, pivoted to the sails D, and connected to the sliding head by rods J, to hold the sails against the wind automatically. More centrifugal governors may be employed, if desired.

I claim and desire to secure by Letters Patent—

The windmill-vane provided with a fixed arm at one edge and a movable arm at the other, combined with the sliding head G, the arm I whereof is jointed to said movable vane-arm, whereby the movement of said head G back and forth causes said movable vane-arm to move correspondingly, and shift the inclination of the vane to the axis of the wind, as set forth.

DANIEL BULL.

Witnesses :

C. D. VAUGHAN,  
J. J. MORRIS.