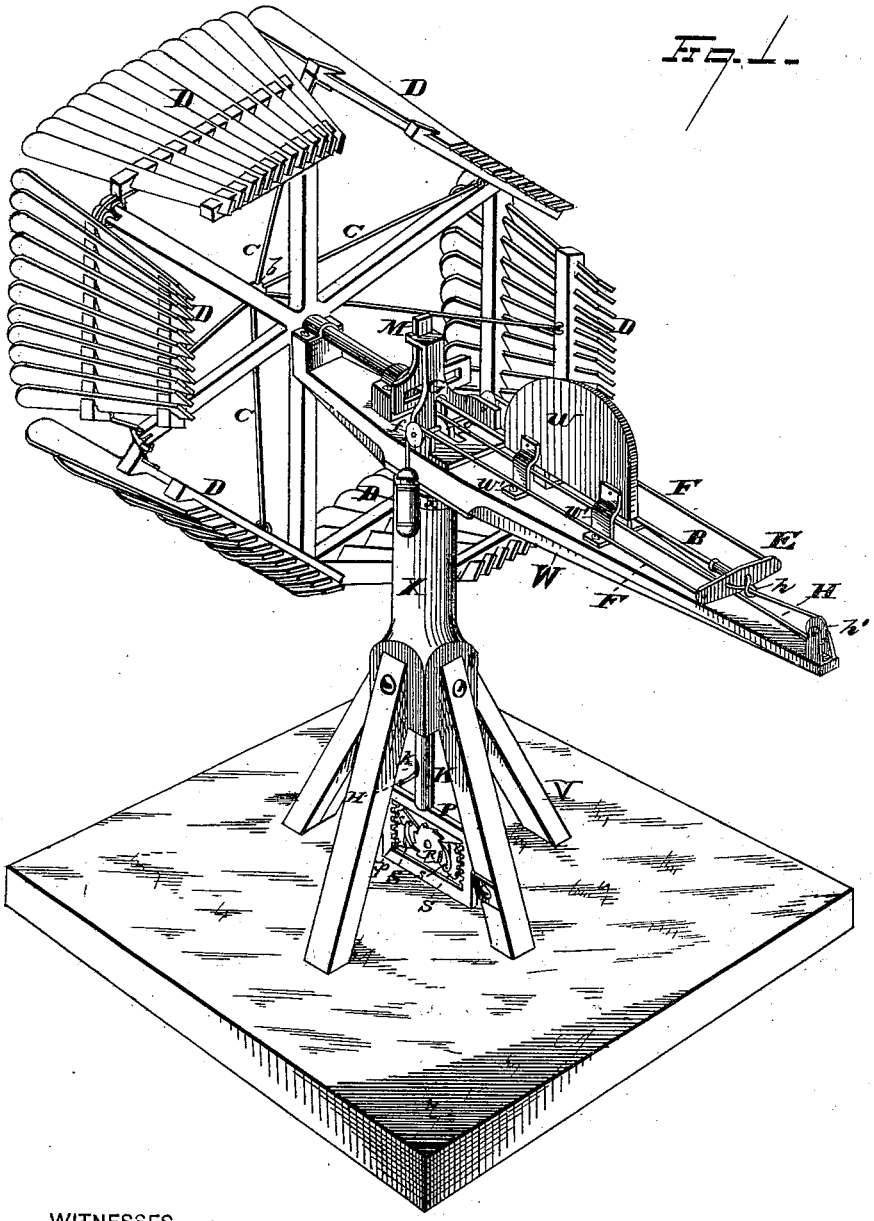
2 Sheets—Sheet 1.

G. HODGES.

Windmill.

No. 199,345. Patented Jan. 15, 1878.

Fig. 1.



WITNESSES

Ed. J. Nottingham

A. M. Bright

INVENTOR

George Hodges.

By Leggett and Leggett.

ATTORNEYS.

2 Sheets—Sheet 2.

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Fig. 2.

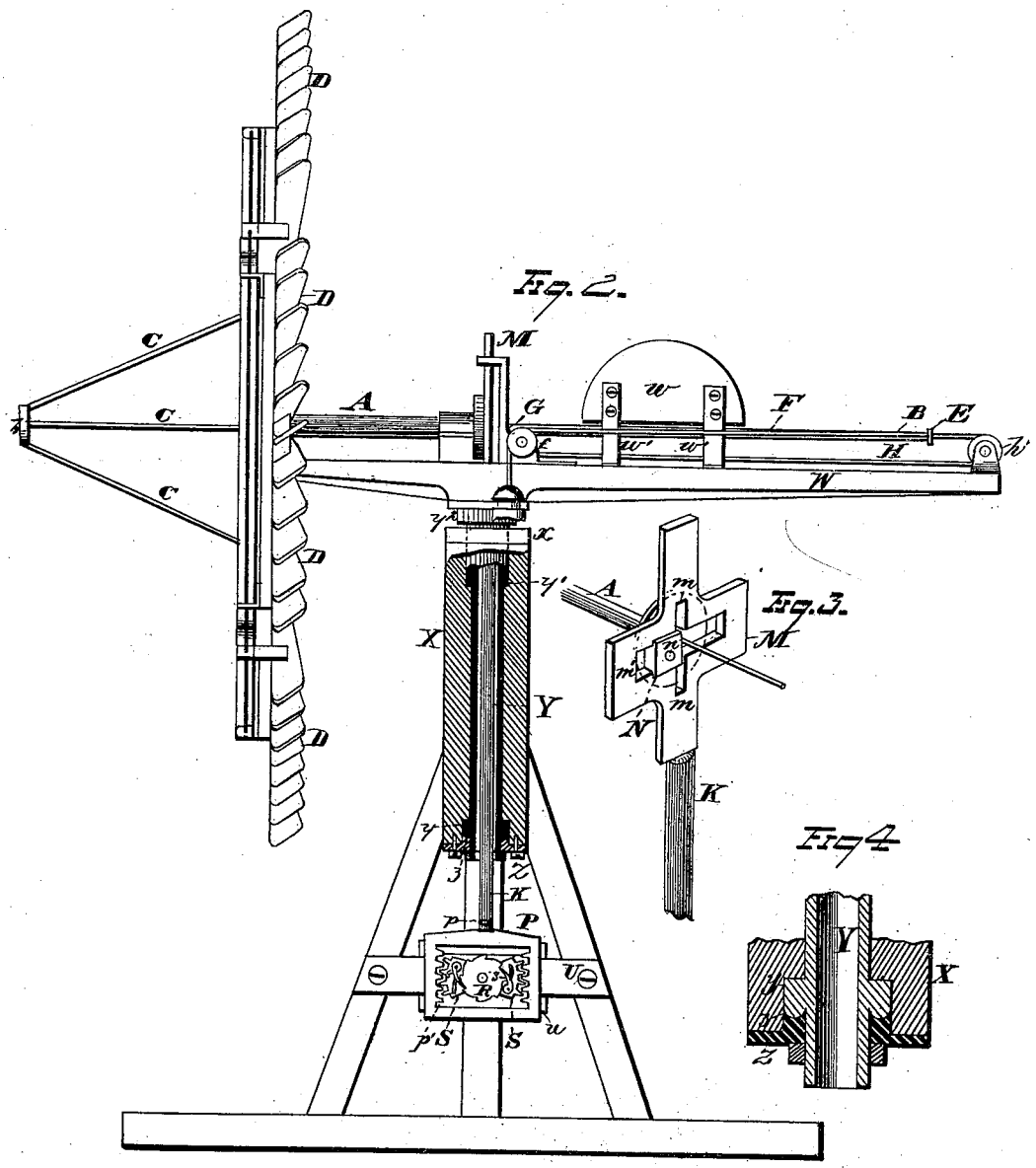

Fig. 3.

Fig. 4

WITNESSES

E. F. Nottingham

A. W. Bright.

INVENTOR

George Hodges.

By Duggett & Duggett

ATTORNEYS

UNITED STATES PATENT OFFICE.

GEORGE HODGES, OF RACINE, WISCONSIN, ASSIGNOR TO EUGENE B. WINSHIP AND THERON S. WINSHIP, OF SAME PLACE.

IMPROVEMENT IN WINDMILLS.

Specification forming part of Letters Patent No. **199,345**, dated January 15, 1878; application filed December 11, 1877.

To all whom it may concern:

Be it known that I, GEORGE HODGES, of Racine, in the county of Racine and State of Wisconsin, have invented certain new and useful Improvements in Windmills; and I do hereby 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 pertains to make and use it, reference being had to the accompanying drawings, which form part of this specification.

My invention relates to improvements in windmills; and consists of four main parts: first of the sliding rod, whose outer head connects by braces directly with the fans, slides through a tubular axle-shaft, and is provided at its opposite extremity with a cross-bar pivoted thereon. An arrangement of cords, weighted and without weight, respectively connect with this swinging cross-piece, and regulate the angle of the fan's relation with the breeze blowing and the strength of mill-power desired.

The second feature consists in a slotted frame attachment on the upper extremity of the pitman-rod, made with two centrally-vertical slots communicating with the main horizontal slot, which, by means of the crank, converts rotary into a reciprocating vertical movement. These two vertical slots are to allow the sliding horizontal rod connecting with the fans to be free from interference with the pitman-frame attachment, so that the latter may rise and fall about it, as a vertical center, without hinderance, the rod passing freely into the upper or lower vertical slot, as the instance may be. In connection with this feature I provide a loose block, in which the wrist-pin of the crank-disk centrally works, and which, by reason of its size, passes the vertical slots or openings in the frame attachment without tendency to enter therein.

The third point of my invention is found in providing a rectangular frame, at the lower extremity of the pitman, with inner vertical rack sides, with which toothed segments engage. These segments work between the respective rack sides of the frame and the central pinion fixed on the main actuating-shaft which drives the parts connected with the mill. Spring-pawls on the inner side of each of these segments serve to alternately engage with and revolve the said pinion-wheel, and the rack-frame vertically slides in guides formed on a cross-bar secured to the main supporting-frame of the mill.

The fourth feature of the invention consists in providing mechanism, as hereinafter set forth, for allowing the turn-post to revolve easily, and with as little friction as possible, so that the wheel may turn into the wind when the latter is light, or when the wheel is caught with its edges to the wind.

Referring to the drawings, Figure 1 is a view in perspective of a mill made according to my invention. Fig. 2 is a view, part in elevation and part in section. Fig. 3 is a detached view, representing the upper pitman-frame attachment and connecting mechanism; and Fig. 4 is a detached view of the lower end bearing of the turn-post.

The revolving or axle shaft A is made tubular, through which the sliding rod B passes. The head *b* of this sliding rod has the pivoted braces C connecting directly with the fans D. Its opposite extremity is provided with the cross-bar E, loosely secured thereon, to either end of which are, respectively, secured the two weighted cords F. These cords pass forward over the sheaves or pulleys *f*, which latter are secured to the metallic frame-piece G. A loop attachment, *h*, connects the cross-bar with the draw-cord H, which latter, after passing rearward over the anti-friction pulley *h'*, returns forward, passes over the small sheave *g* on the lower central portion of the frame G, and thence downward through the tubular pitman K, and out through the opening *k* therein. The slotted frame M, secured to the pitman, is formed with the upper and lower vertical slots *m*, communicating with the main horizontal slot *m'*. As the sliding box N, in which the crank-pin *n* works, moves in slot *m'*, the said frame M is not affected in its vertical movement, inasmuch as the slots *m* allow the rod B to pass freely in and out thereof. At the same time the size of the box A prevents the crank-pin from entering these vertical slots. To the lower extremity of the pitman is also detachably secured by key *p* the mo-

tion-frame P, provided with the two inner vertical rack sides *p'*. Between these sides and the pinion-wheel R work the toothed segments S, provided each with the spring-pawl arm *s*. These pawls are secured, one to the lower, and one to the upper side, each, respectively, of the two toothed segments, so that they alternately engage with the pinion-wheel in revolving the latter upon the main driving-shaft. The motion frame slides freely in vertical guides *u* secured to cross-bar U, which latter is suitably secured to the main frame V supporting the mill.

The beam W is provided with the segmental wind-board *w*, mounted in bearings *w'* upon the top of the rear body of the beam, and lengthwise therewith, its object being to aid in bringing the wheel into the wind under adverse circumstances, such as when but a slight breeze prevails, or when the wheel is caught with its edge to the wind. The main instrumentality, however, for effecting the purpose is formed as follows: The turn-post Y, which passes vertically through the tubular mast X, is provided with the annular collar *y* on its lower extremity, which is formed with its bottom slightly convex, so as to fit into the corresponding annular groove formed in the top of the ring-formation *z* of the plate Z. This plate Z is of suitable metal, and secured to the bottom of the mast by any desired means, the same being sufficiently strong to bear the weight of the mill, as the latter is brought in full force upon the plate. The extreme lower extremity of the turn-post may be tapped and provided with a fastening-nut, while the opposite extremity is formed with the two annular shoulders y^1 and y^2. These latter formations serve to allow the turn-post to rotate over the cap-piece *x* of the mast with very little friction, as the bearing-collar *y* and seat *z* are so formed with relation to the remaining parts that all weight of the mill is borne thereby, and the cap-piece *x* does not serve as a bearing for the mill, as the shoulder y^2 is slightly raised therefrom.

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

1. The rod sliding through the tubular axle-shaft, and provided at its one extremity with braces connecting directly with the fans, while its opposite end connects with the pivoted cross-bar and double-weighted cord, substantially as described.

2. The combination, with the pivoted cross-bar on the sliding-rod extremity, formed with the loop attachment, of the draw-cord running rearward over a sheave, thence in return and down through the tubular pitman, substantially as described.

3. The combination, with the wrist-pin and sliding block, of the slotted frame engaging the pitman, and made with the two vertical slots communicating with the main horizontal slot, substantially as described.

4. The combination, with the motion-frame, secured to the lower extremity of the pitman, and provided with the vertical rack sides, of the toothed segments engaging therewith, and the actuated pinion-wheel, substantially as described.

5. The combination, with the motion-frame, segmental gears, and pinion, located between the latter, of the spring-pawls formed thereon, and alternately engaging the said pinion, substantially as described.

6. The combination, with the motion-frame, of the vertical guides and cross-bar, supported upon the lower main frame-work of the mill, substantially as described.

7. The combination, with the tubular turn-post passing through the mast, and formed with the collar on its lower extremity, of the metallic plate secured to the bottom of the mast, and provided with the annular groove in the ring-formation thereon, substantially as described.

8. In a windmill having a tubular mast, the combination, with the beam provided with the described wind-board, of the turn-post, adapted to have entire vertical bearings by means of the collar on its lower extremity seating into the metallic plate, which latter is secured to the bottom of the mast, said collar having a convex edge, which corresponds to the annular groove or concavity formed in the raised projection on the said bearing-plate, substantially as described.

In testimony that I claim the foregoing I have hereunto set my hand this 9th day of November, 1877.

GEORGE HODGES.

Witnesses:

M. J. SMOLLEN,

J. B. WINSLOW.