

(No Model.)

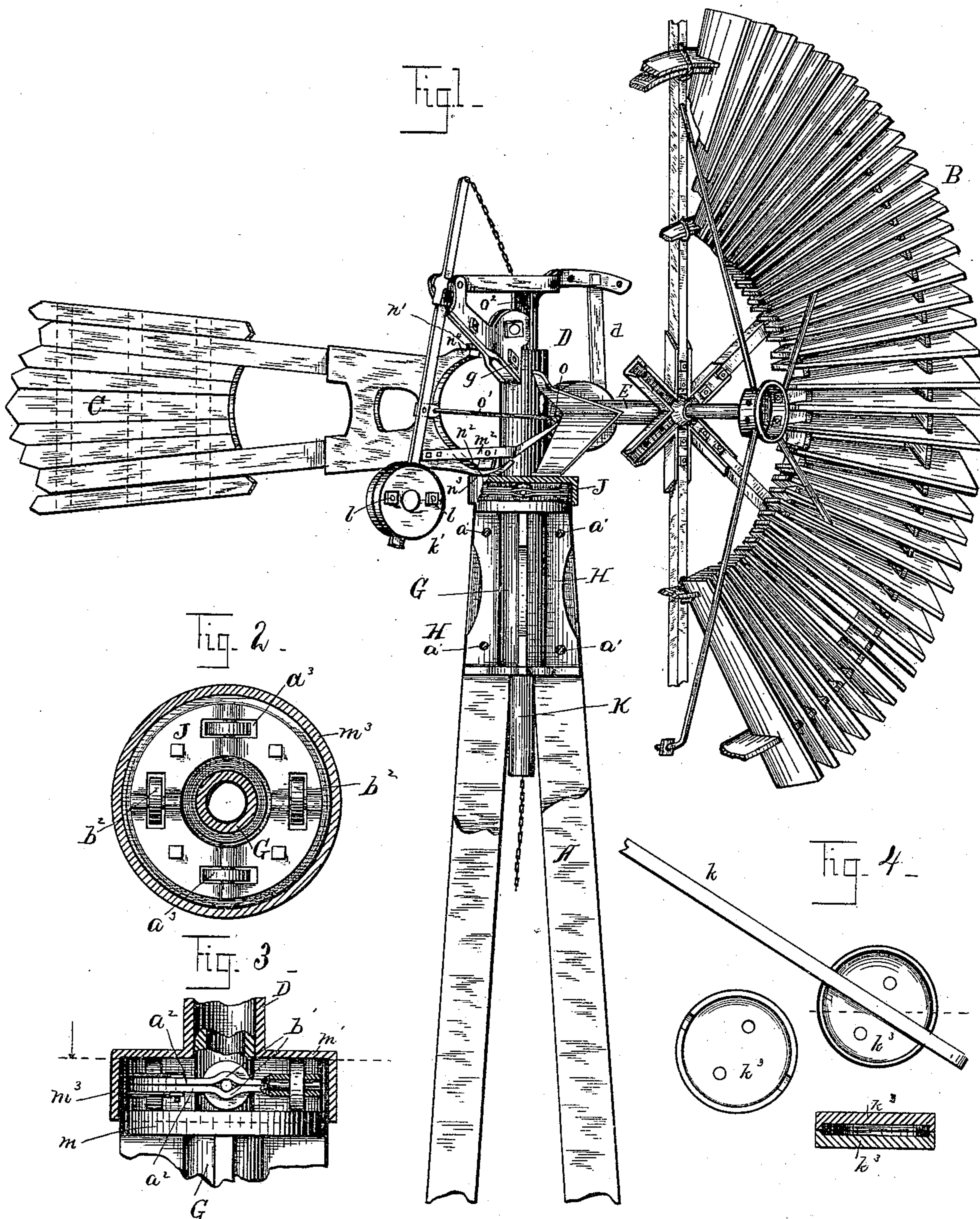
2 Sheets—Sheet 1.

D. J. HOWENSTINE.

WINDMILL.

No. 396,489.

Patented Jan. 22, 1889.



Witnesses,

C. B. Nash.  
E. J. Climo

Inventor

D. J. Howenstine  
By his Attorney  
Thos. D. Hall



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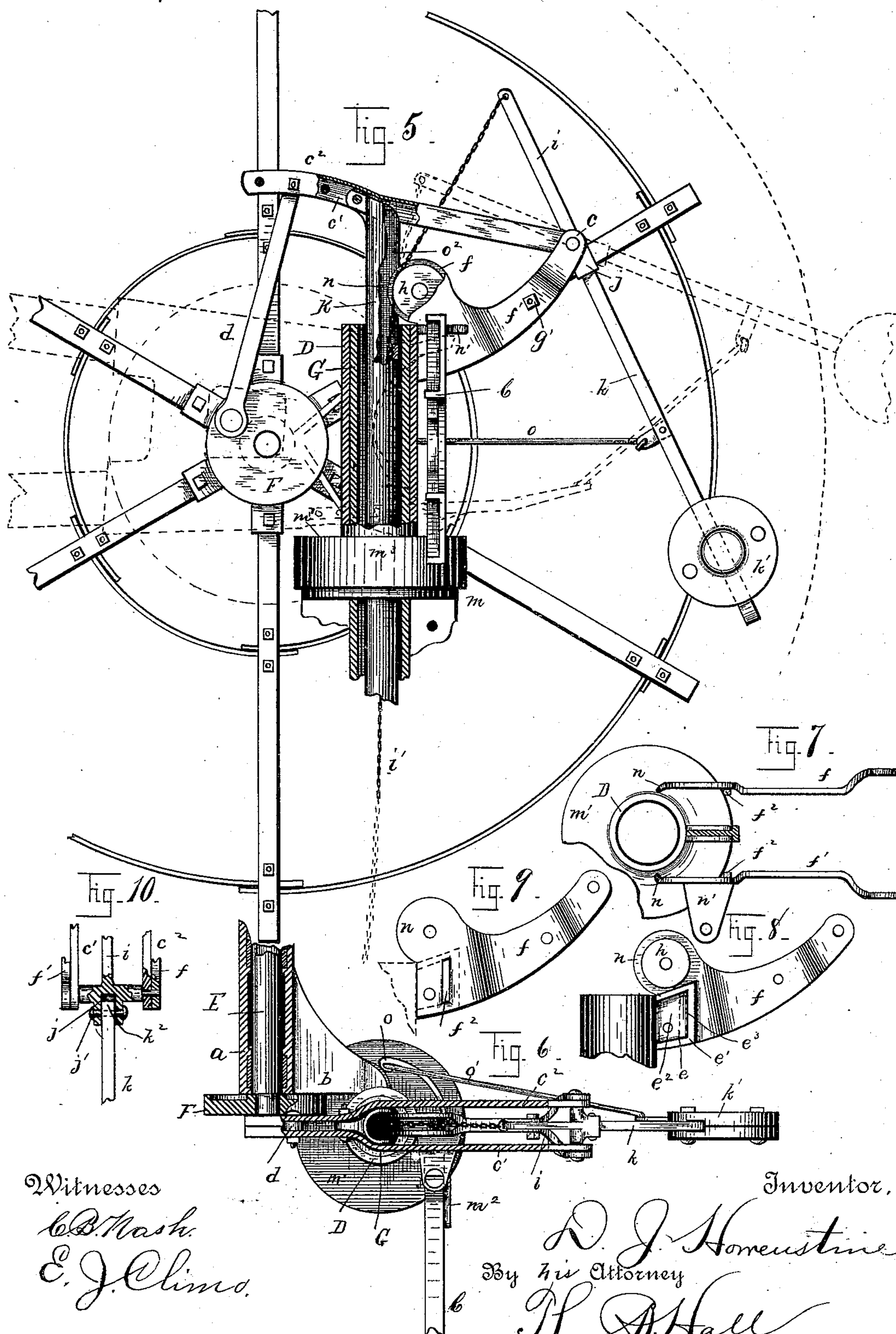
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# UNITED STATES PATENT OFFICE.

DAVID J. HOWENSTINE, OF CANAL FULTON, OHIO.

## WINDMILL.

SPECIFICATION forming part of Letters Patent No. 396,489, dated January 22, 1889.

Application filed October 19, 1887. Serial No. 252,788. (No model.)

*To all whom it may concern:*

Be it known that I, DAVID J. HOWENSTINE, a citizen of the United States, residing at Canal Fulton, county of Stark, and State of Ohio, have invented certain new and useful Improvements in Windmills; and I do hereby declare the following to be a description of the same and of the manner of constructing and using the invention in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it appertains to construct and use the same, reference being had to the accompanying drawings, forming a part of the specification, the principle of the invention being herein explained and the best mode in which I have contemplated applying that principle, so as to distinguish it from other inventions.

My invention relates to windmills.

The object of the invention is to produce a mill with the least number of parts possible and with much greater force than mills now used of the same diameter.

In the drawings, Figure 1 is a perspective view of my improved windmill, parts being broken away. Fig. 2 is a plan view of the turn-table, certain parts being omitted. Fig. 3 is a side view of the same, certain parts being sectioned and omitted. Fig. 4 are views of the weight. Fig. 5 is a rear view of the mill, parts being omitted, the hollow shaft being vertically sectioned. Fig. 6 is a plan view, parts being broken away and in section. Fig. 7 is a plan view of the hollow shaft and arms. Fig. 8 is an inside view of one of the arms, with part of the hollow shaft in elevation. Fig. 9 is an inner view of one of the arms. Fig. 10 is a detail view of the weight-socket, parts being in section.

Referring more particularly to the parts, A is the standard or frame-work of the mill; B, the wheel or sail.

D is a hollow spindle, which supports the bearing *a* by brackets *b*, rigid with said spindle. The crank-shaft E, on which the wheel B is rigid, passes through said bearing *a* into the crank F, said crank being provided with pitman *d*, the same being pivoted at one end to lever-arms *c' c²*. The hollow spindle D has integral with it a lug, *e*, to which the arms *f f'* are fastened by bolt *g*, said arms being secured together by bolt *g'*. The lug *e* is pro-

vided with a rib, *e'*, which passes around three sides, as shown in Fig. 8, leaving a web, *e²*, in the center.

In Fig. 9 is shown the arm *f*, provided with an ear, *f²*. A similar ear, *f²*, is also on the inner side of arm *f'*. These ears fit against the rib at *e³*, and, being secured by bolt *g*, hold the arms firm and keep them from dropping out of place. Above the lug *e* is an extension, *n*, on both arms, between which is pivoted the sheave *h*. Said extension and sheave extend over the center of the spindle D and enter a hollow rod, K, through an opening, *o²*, thus allowing the chain *i'* to pass through the center of said rod, which has vertical play through both the spindle D and main shaft G. At the point *c* of the arms *f f'* is pivoted the lever-arms *c' c²* and weight-lever *i*, chain *i'* being secured to the free end of said lever, while at the pivoted end is a socket, *j*, for the purpose of securing the lever *k*, provided with weight *k'*. The end *k²* of the lever *k*, is inserted in the socket *j* and is held by bolt *j'*. The weight *k'* is formed of two parts, *k³*, and is secured together and in place by bolts *l*.

Passing through the hollow spindle D is a hollow shaft, G, which forms the upper part of the frame, or to which the frame is secured by bolts *a'* through flanges H', rigid with said shaft. About the center of said shaft is a disk, *m*, on which rests a turn-table, J, being formed of two plates, *a²*, cast with openings *a³* and bearings *b'*, in which are journaled rollers *b²*, the plates being secured together by bolts.

The spindle D is provided with a disk, *m'*, which rests upon the rollers *b²*, enabling the spindle to revolve with the slightest breeze that may turn the vane. The disk *m'* is provided with a flange, *m³*, projecting downward, inclosing the turn-table, and keeping out the snow and sleet or any dirt that may tend to stop the progress of the rollers. This flange may or may not be used.

On the outside of the arm *f'* is a projection, *n'*, cast integral therewith and forming an upper bearing for the vane C, said vane being also provided with an extension, *n²*, and supported by a pivot at *n³* on the disk *m'* of the spindle D. The upper support, *n⁴*, of the vane may be fastened by bolt or pivot, as I may see fit. These bearings form a double support for the vane and secure it against storms.



Bolted to the lower part of the vane is an arm,  $m^2$ , circular in form, the end  $o$  passing partly around the spindle D. The rod  $o'$  connects the weight-arm  $k$  and the arm  $m^2$  at the point  $o$ .

The operation is as follows: When the mill is set up, as shown in Fig. 1, it is ready for work, the lower end of rod K being attached to a pump in the usual manner. Should it be desired at any time to stop the mill, the chain  $i'$  is drawn downward and fastened. The weight thereby being lifted swings the vane about, and it is held parallel with the wheel B, as shown by dotted lines in Fig. 5. The crank-shaft of the wheel is so arranged that it sets to one side of the upright hollow spindle, which answers the purpose of a side vane to force its edge to the wind in case of storm, and also to arrange for a pitman to be connected with a crank-shaft, and a lever which is hinged to arms  $f f'$  on the opposite side, giving it a leverage on the pump-rod K, which is connected to the lever directly over the center of the hollow spindle D, giving it a reciprocating motion, without any slides or guides to squeak or freeze fast with ice or sleet. The regulator-weight, being hinged to the arms  $f f'$  on the main shaft, always keeps the mill in balance whether in gear or not.

The main castings are made hollow and very light, and yet so strong that they cannot be broken by any storm. In this respect it differs from all other mills, as it turns on an upright spindle which is high enough to hold the mill very firm and also to provide a wide

space between the lugs and ears which support the vane, and also an extra brace for the arms or bearings which support the wheel.

In raising the weight to turn the vane and stop the rotation of the wheel I may use any suitable mechanism for the purpose—such as chain, rope, or wire.

I claim—

1. In a windmill, the combination of hollow rotary spindle D, provided with lug  $e$ , having rib  $e'$ , and arms  $f f'$ , provided, respectively, with ears  $f^2$ , engaging with rib  $e'$ , said arms each provided with extensions  $n$ , projecting over the opening in the hollow spindle, and a sheave journaled between said extensions, substantially as set forth.

2. In a windmill, the combination of hollow rotary spindle D, provided at its upper portion with lug  $e$ , having rib  $e'$ , and arms  $f f'$ , provided, respectively, with ears  $e^2$ , engaging, respectively, with rib  $e'$ , said arms each provided with the extension  $n$ , projecting over the opening in the hollow spindle, one of said arms provided with lug  $n'$ , and a sheave pivoted between said extensions, and vane C, pivoted at its upper portion to said lug  $n'$ , substantially as set forth.

In testimony that I claim the foregoing to be my invention I have hereunto set my hand this 17th day of October, A. D. 1887.

DAVID J. HOWENSTINE.

Witnesses:

J. B. FAY,

E. J. CLIMO.