

(No Model.)

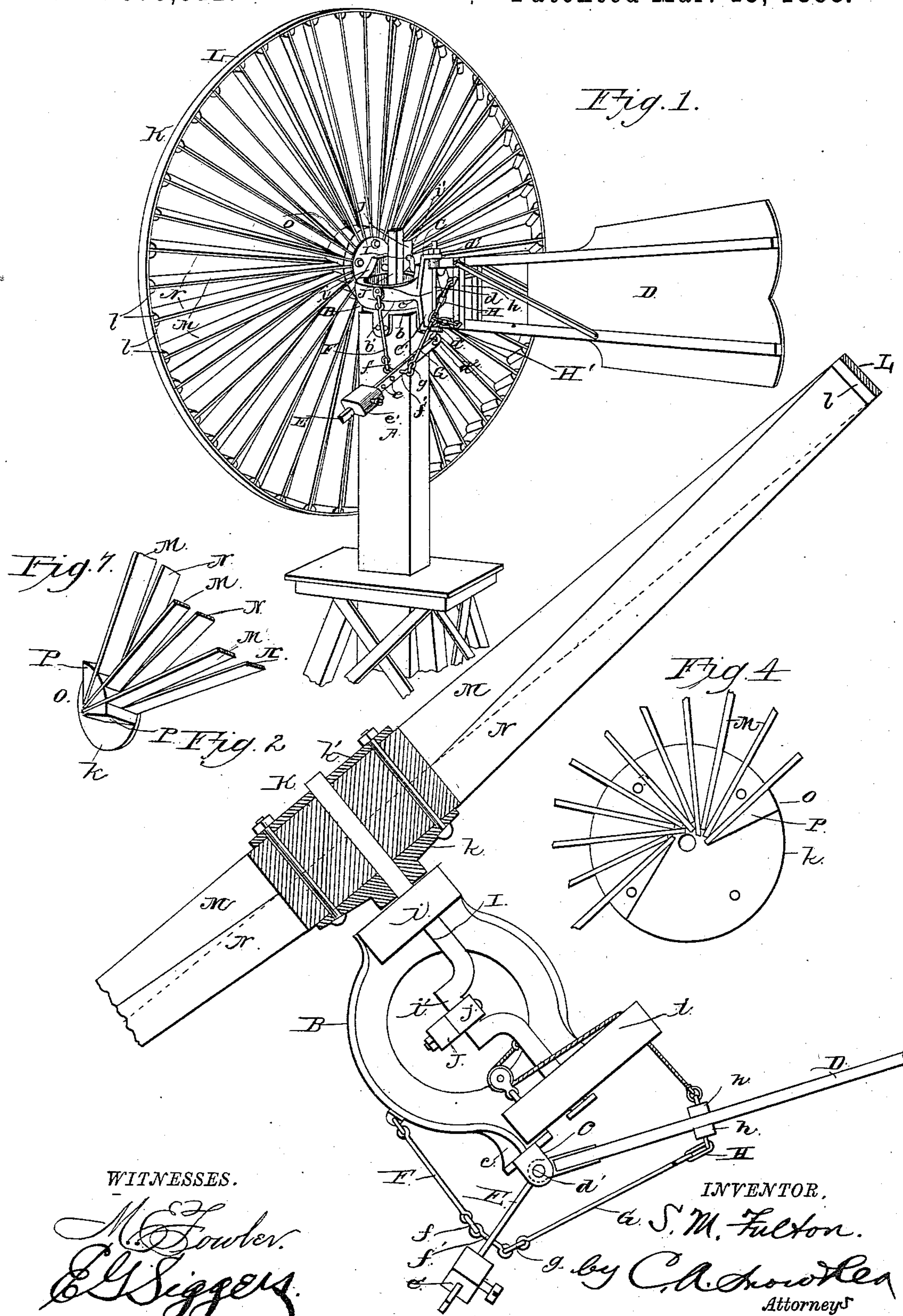
2 Sheets—Sheet 1.

S. M. FULTON.

WINDMILL.

No. 379,512.

Patented Mar. 13, 1888.



WITNESSES.

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C. A. Fowler.

INVENTOR.

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2 Sheets—Sheet 2.

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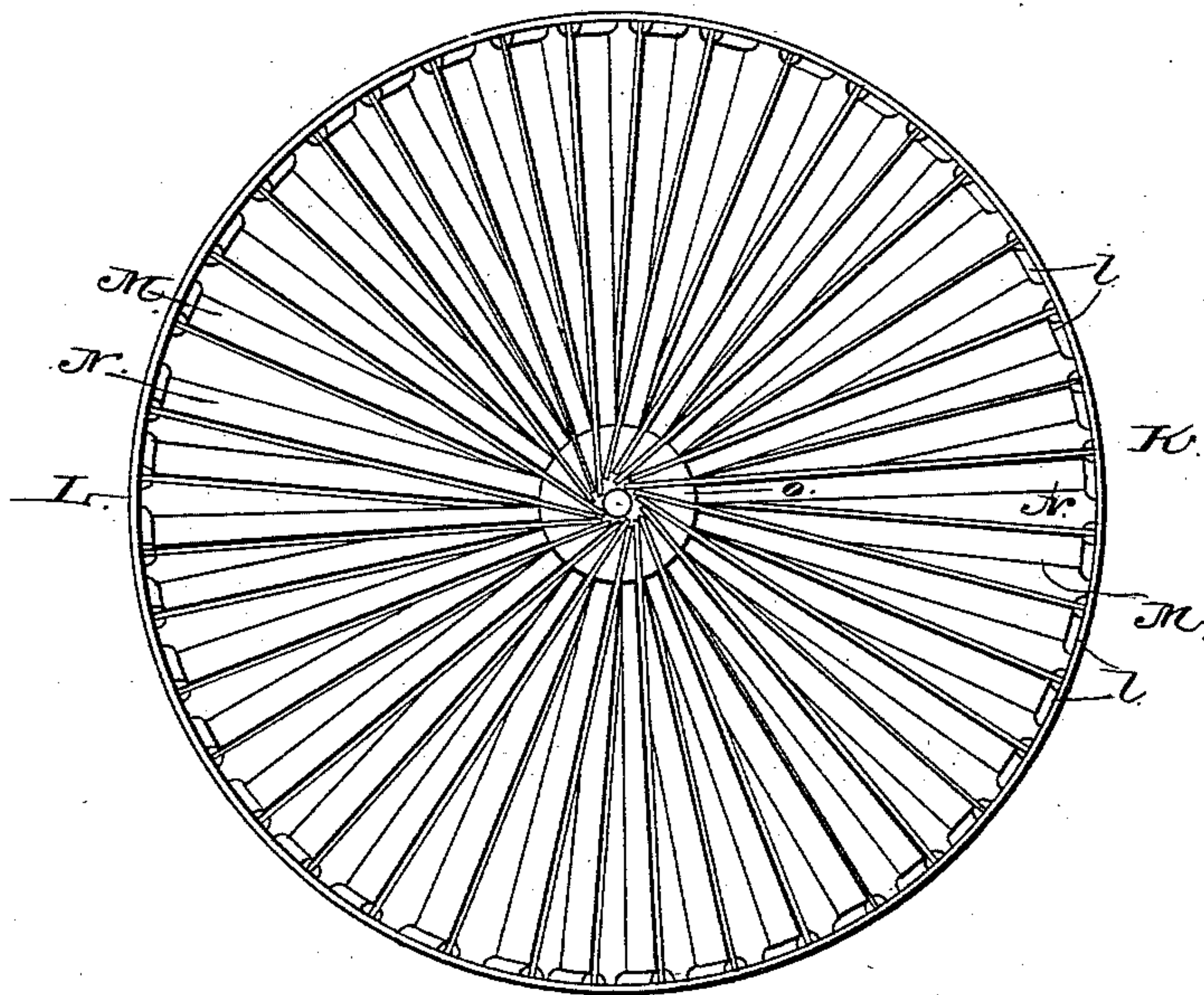
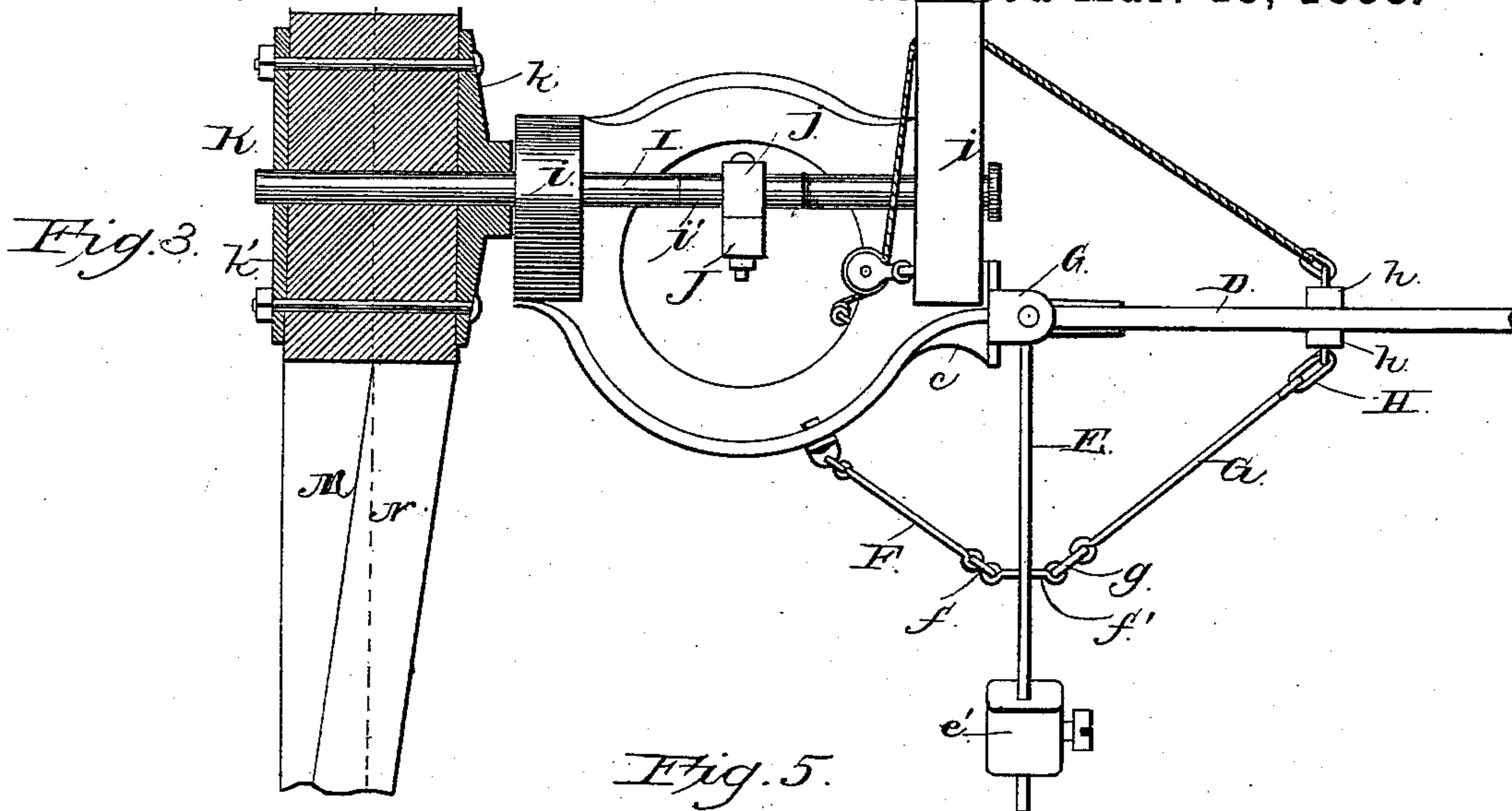
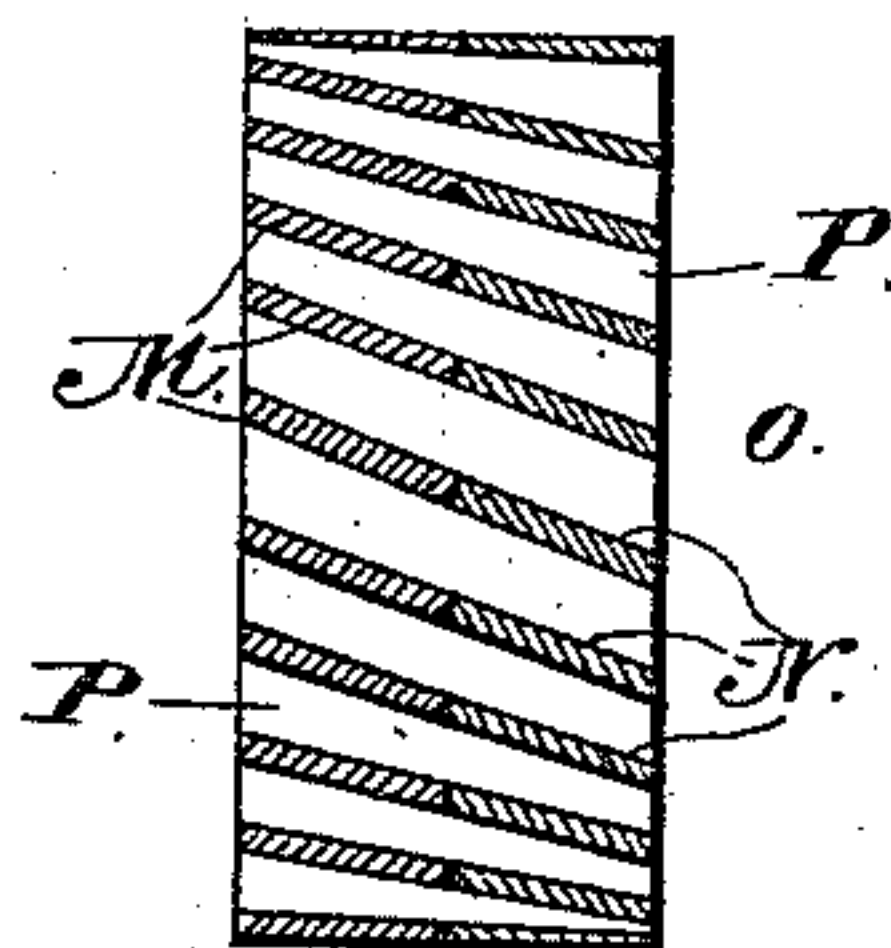


Fig. 6.



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UNITED STATES PATENT OFFICE.

SAMUEL MATHIESEN FULTON, OF GALT, CALIFORNIA.

WINDMILL.

SPECIFICATION forming part of Letters Patent No. 379,512, dated March 13, 1888.

Application filed May 11, 1887. Serial No. 237,869. (No model.)

To all whom it may concern:

Be it known that I, SAMUEL MATHIESEN FULTON, a citizen of the United States, residing at Galt, in the county of Sacramento and State of California, have invented a new and useful Improvement in Windmills, of which the following is a specification.

My invention relates to improvements in windmills, the objects being to cause the wheel to turn out of the wind a proper distance to avoid the full impact of the same when very strong upon the wings of the wheel; to prevent the wheel from turning too far out of the wind, so as to stop the operation of the mill, and to construct the wheel in such manner that the alternate wings shall brace each other and bind the parts of the hub together. These objects I attain by means of the construction and novel arrangement of parts hereinafter described, illustrated in the drawings, and pointed out in the claims hereto appended.

In the drawings, Figure 1 is a perspective view of a windmill embodying the invention and with the wheel in the wind. Fig. 2 is a top plan view of the same with the wheel turned some distance out of the wind. Fig. 3 is a plan or top view of the mill in the position shown in Fig. 1. Fig. 4 is an enlarged detail view of one side of the hub of the wheel with some of the wings in place. Fig. 5 is a similar view of the other side of the hub and wheel. Fig. 6 is an edge view of the hub with the wings cut off flush therewith. Fig. 7 is a detail perspective view of a portion of the hub, showing the manner of securing the hub-sections and wings together.

Referring to the drawings by letter, A designates the upper part of the tower of the windmill, having the turn-table B attached to its top. The lower section, *b*, of the turn-table is bolted to the top of the tower, and the upper section is attached to the lower section and made to turn easily thereon by any suitable mechanism, but preferably by that shown in the patent granted to me on the 11th day of January, 1887, and numbered 355,869.

C C' are ears, the former of which stands upward from the edge of the upper section, *b'*, of the turn-table, and the latter stands downward from a suitable point of the projection *c*, which extends from the upper sections, *b'*. The ears C C' are in line with each other, and have their

ends turned horizontally outward and provided with bearings for the rod or shaft *d*, upon which the frame of the vane D is pivoted at *d' d'*. The end of the rod *d* extended below its bearing is looped or made into a ring, *d*², for the purpose of engaging an opening on the inner end of the rod E, provided with a series of openings, *e e*, for the adjustment inward and outward on the rod of the notched weight *e'* by means of a suitable pin, as shown.

F is a link-rod attached by its outer hooked or looped end to a link, *f*, attached to the loop on the adjacent end of a pin, *f'*, passing through an opening at a proper point in the rod E. The other end of the link-rod F is connected by a hook to a link attached to and hanging from the projection *c*.

G is a link-rod similar to the rod F, and similarly attached to a link, *g*, connected to the loop on the opposite end of the pin *f'*. The inner end of the rod G is connected, by a hook or otherwise, to the outer ends of the chains H and H', the inner ends of which are respectively secured to the upper portion and to the lower end of the transverse rail *h* of the vane-frame on the corresponding side thereof.

I represents the crank-shaft of the wheel, which is arranged at one side of the center of the turn-table, and is journaled in bearings *i* on the upper side of the turn-table, as shown at Fig. 3. The crank *i'* passes through an opening in a block, *j*, secured on the adjacent edge of the pitman J, the lower end of which is pivoted to the upper end of the pump-rod or other device to be actuated.

The wheel K is composed of a hub, rim, and the connecting-wings, and is secured to the crank-shaft I by the iron plates *k k'*, which are placed on each side of the hub and secured by bolts passing therethrough and proper nuts engaging said bolts. The plate *k* has a boss on its face adjacent to the bearing *i*, and both plates have proper openings for the crank-shaft.

The construction of the wheel is as follows:

L is the rim, and M and N are two series of wings, the members of which alternate with each other. The outer ends of all the wings are secured to the inner surface of the rim by the cleats *l l*, which are arranged obliquely on the inner side of the rim. The inner ends of

both sets of wings converge, and the hub O is formed by securing wedge-shaped pieces P between the inner ends of the wings. The outer edges of the wings M are in a vertical plane in line with each other and the outer end of the hub, (see Fig. 3;) but the wings N incline rearward from the rim toward the inner end of the hub, as shown. The wheel is consequently flat on its front side; but the rear side of the wheel is convex by reason of the inclination of the wings N, so that the wheel as a whole is braced or stiffened, the wings N acting as brace-bars to the wings M, as will be readily understood. In consequence of the oblique position of the wings, the sides of the wedges P must be similarly angled in order to have the ends of the wings fit snugly between them. The wings do not extend radially from the hub, but are tangent to the central opening thereof, and in consequence of the inclination of the sides of the wedges and the different points of attachment to the rim of the wheel of adjacent wings M and N, the inner ends thereof, that enter the spaces between the wedges, are arranged obliquely with relation to the axis of the opening of the hub. The hub is thus made stronger and less apt to crack, as the fibers of the wedges and of the two series of wings run in different directions. A light wheel can be thus made that will be well braced, and none of the parts of which will be liable to breakage.

In consequence of the crank-shaft I not running diametrically across the turn-table, should the wind blow very strongly, its leverage will be such upon the wheel as to cause the outer part of the upper section of the turn-table to rotate toward the side nearest to the crank-axle, and thus the wheel will be turned somewhat out of the wind and the direct impact of the latter thereon lessened; but in order that the wings may not have their edges brought into the wind, and the mill thereby stopped, the rotation of the upper section of the turn-table tends to lift the rod E by means of the link-rod F, the force of the wind keeping the vane nearly in position against the pull of the rod G and chain H', upon which the strain comes when the weight on the rod

E is lifted. The increased leverage of the weight and rod caused by the lifting thereof acts against the wind and prevents the wheel from being turned in such a position as to stop the mill.

Having described my invention, I claim—

1. A wind-wheel consisting of a hub, a rim, and two series of wings, the outer ends of the wings of one series alternating with those of the other, the members of one series extending straight from the rim to the hub, so that the side of the wheel formed by their outer edges is flat, while the members of the other series incline rearward from rim to hub, so that the rear side of the wheel formed by the outer edges thereof is convex, thus causing all parts of the wheel to brace and stiffen each other, substantially as specified.

2. A windmill-wheel composed of a hub, a rim, and two series of wings, the hub being double as long as the width of any one of the wings, and having wedge-shaped blocks, with their sides properly inclined to their ends, and the inner ends of the wings inserted between said blocks, a wing of each series entering between each two blocks, and the wings of each series running to and into the hub tangentially to the axis of the hub, substantially as and for the purpose specified.

3. In a windmill, the combination of the hub-segments P, the wings M and N, having their inner ends secured between the hub-segments, said wings N having their inner ends secured to the hub in rear of and in line with the inner ends of wings M, and then inclined forward and having their outer ends arranged midway between the outer ends of wings M and in line therewith, and the rim connecting the outer ends of the wings M and N, substantially as described.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in presence of two witnesses.

SAMUEL MATHIESEN FULTON.

Witnesses:

C. G. COGSWELL,
C. C. CLEMENT.