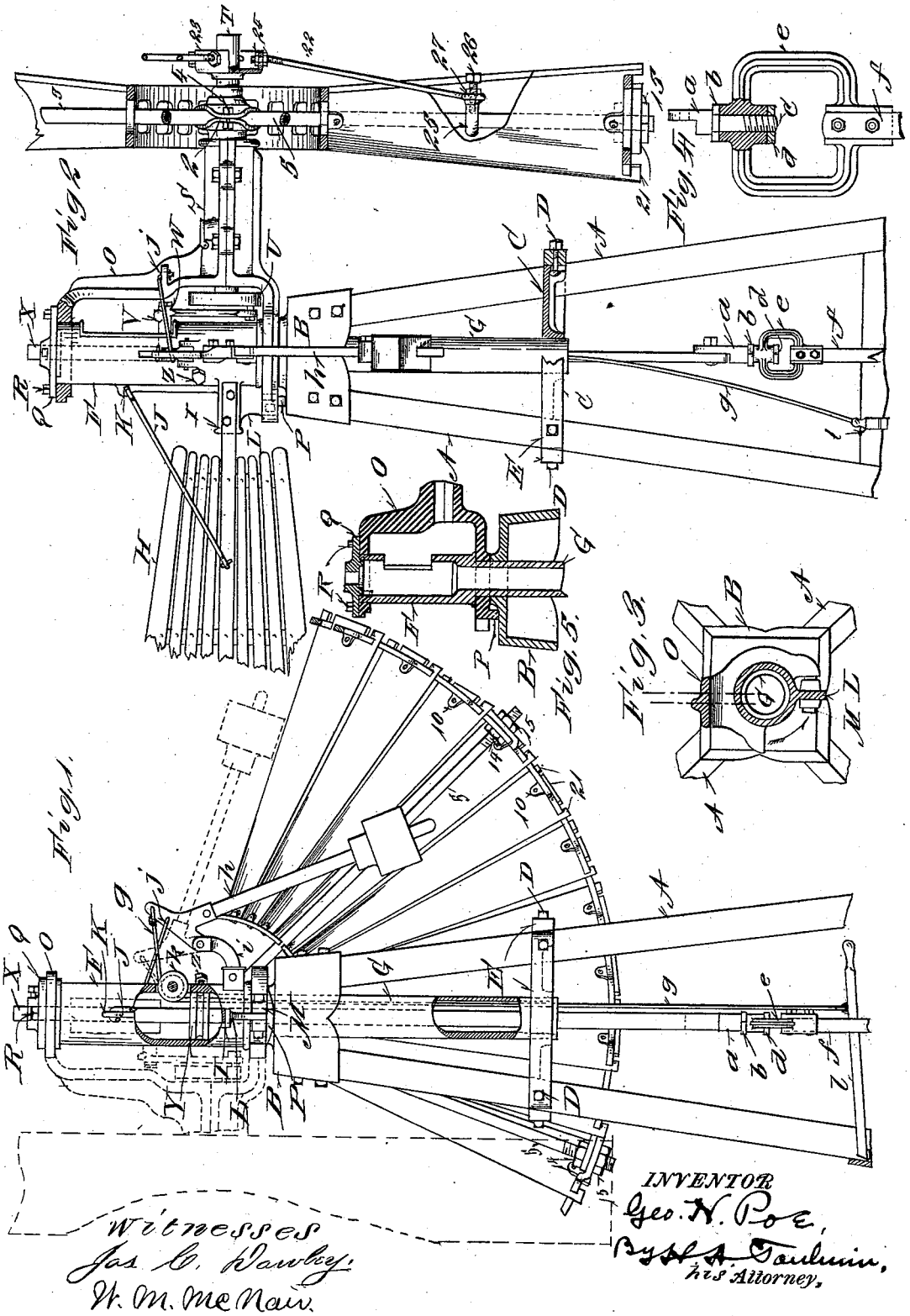
(No Model.) 2 Sheets—Sheet 1.

G. H. POE.

WINDMILL.

No. 523,484. Patented July 24, 1894.



Witnesses
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his Attorney.

(No Model.) 2 Sheets—Sheet 2.

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Fig. 6.

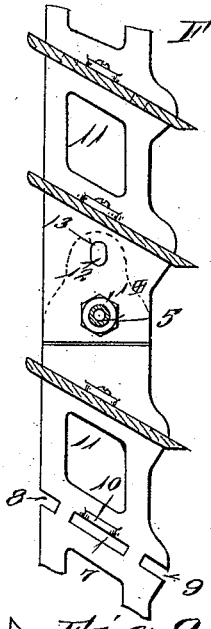


Fig. 7.

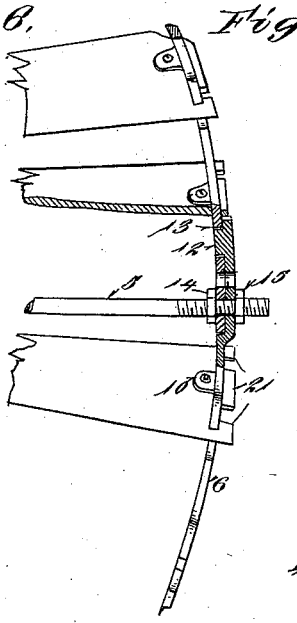


Fig. 10.

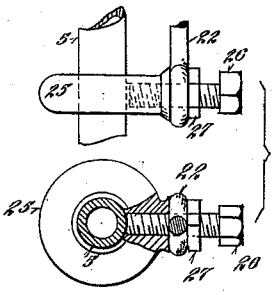


Fig. 11.

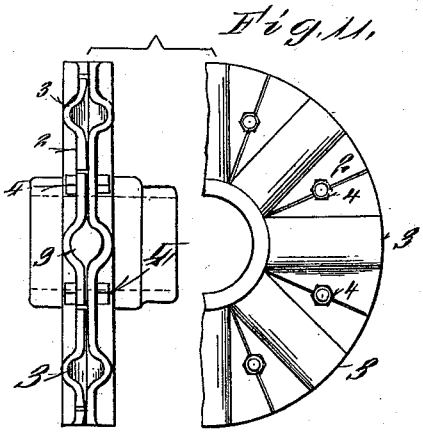


Fig. 8.

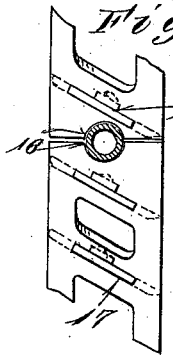


Fig. 9.

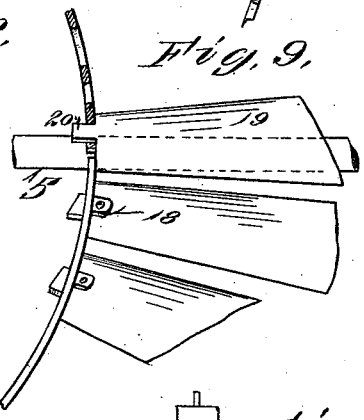
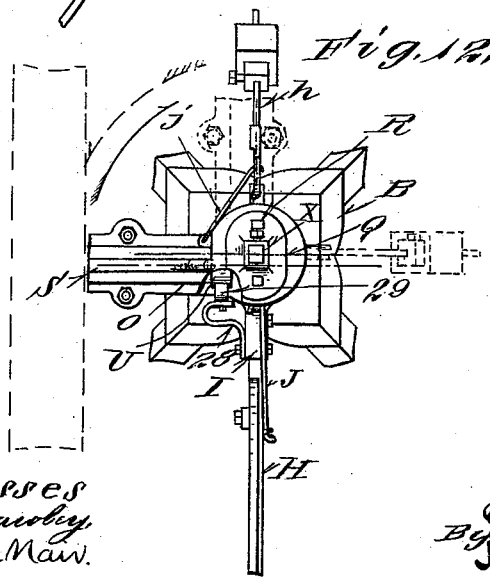


Fig. 12.



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UNITED STATES PATENT OFFICE.

GEORGE H. POE, OF KENTON, OHIO.

WINDMILL.

SPECIFICATION forming part of Letters Patent No. 523,484, dated July 24, 1894.

Application filed April 21, 1893. Serial No. 471,273. (No model.)

To all whom it may concern:

Be it known that I, GEORGE H. POE, a citizen of the United States, residing at Kenton, in the county of Hardin and State of Ohio, have invented certain new and useful Improvements in Windmills, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to certain new and useful improvements in wind mills, the various novel features of which will be hereinafter fully described and particularly pointed out and claimed.

In the accompanying drawings on which like reference letters indicate corresponding parts: Figure 1, represents a side elevation of the upper part of the tower, the mechanism mounted thereon and a portion of the wheel, some of the parts being broken away to facilitate illustration; Fig. 2, a similar view looking in another direction, namely, toward the edge of the wheel and the side of the vane, some of the parts being also broken away; Fig. 3, a detail partial plan and partial sectional view showing the bumper for limiting and resisting the side swing of the bearing yoke by which the wheel is carried; Fig. 4, a detail partial elevation and sectional view of the swivel coupling for the actuating rod; Fig. 5, a detail sectional view of the turn-table, the head and the bearing yoke; Fig. 6, a detailed view showing the blades in cross section and the outer rim; Fig. 7, a detailed view partly in section and partly in elevation showing the same parts; Fig. 8, a detail view showing the inner ends of the blades and a portion of the inner rim; Fig. 9, a detail view showing the same parts in elevation; Fig. 10, detail view of one of the spokes and the clamp for the brace rod; Fig. 11, side and elevational views of the hub in detail; and Fig. 12 a plan view of the turntable, the head, the vane, the return weight, &c.

The usual tower is constructed of the posts A carrying at the top a turntable B, and a suitable distance below a spider C, whose arms are secured by bolts D to cross pieces E fastened to the posts. In this guide and the turntable is mounted the head of the mill, consisting of a cylindrical shell F in which is fastened a hollow shaft or pipe G. This hollow shaft forms an extended journal for the head, and is that part of the head which is mounted directly in the turntable and the bearing. To this head F is rigidly attached the arm of the vane H, as seen at I; a brace rod J connects the vane arm with an eye formed in a rib of the head, as seen at K. The head also has this flange extending down, as seen at L in Figs. 2 and 3, where a rubber cushion or bumper M is attached to relieve the jar when the wheel is swung to the extremes of in-wind and out-of-wind.

The letter O designates the bearing yoke which is pivotally mounted at its upper end on the head F and at its lower end on the hollow shaft G. The lower end has a curved foot P, as seen in Figs. 1 and 2 which slightly rests upon the turntable B and incidentally enlarges the bearing of the yoke on the turntable.

A cap Q, secured by bolts R to the yoke O guides the actuating rod. The bearing S for the wheel-shaft T is formed as a part of this yoke O. The disk U, carrying a wrist pin, operates a pitman V, which connects by a bolt W with the actuating rod X which passes through the plate Q as a guide and extends down within the head and the hollow shaft G. A collar Y secured against up and down movement in the head F by screws Z forms the other guide for the actuating rod. When the yoke bearing swings to either side the actuating rod turns with it, and hence the groove seen in the collar Y, so that the collar may turn with the rod without being held against rotation by the screw Z. The rod is jointed by a swivel connection, as shown in Figs. 1 and 4. This connection consists of a rod section *a*, bolted to the main portion of the actuating rod and having a shoulder *b*, a threaded piece *c*, on which is held by a nut *d*, a swivel buckle *e*, which is free to turn on the pintle. The buckle at its lower end receives the lower section *f* of the actuating rod. Thus when the upper section of the rod is rotated the lower section is unaffected.

When it is desired to throw the wheel out of the wind more or less or entirely, as the case may be, a wire *g* is drawn upon by hand, and thus the short arm of the weighted lever *h*, pivoted in a bracket *i*, extending from the head F, is drawn upon and caused to throw the yoke O in the proper direction about its

center, a rod *j* connecting such arm of the lever with the yoke is seen in Figs. 1, 2 and 12. The wire *g* passes up inside of the hollow shaft G through an opening in the collar Y, over a pulley *k*, carried by the head F, and thence to the shorter arm of the lever *h*. At some suitable point on the tower, say to the cross bar *l*, the lower end of the wire *g* is attached. When released the weight of the lever *h* causes the longer arm to descend and thereby draw upon the rod *j* and thence upon the yoke O, bringing the latter back to the normal or desired position. At either extreme of movement the yoke O is yieldingly resisted by the cushion or bumper M, more clearly seen in Figs. 1 and 3.

Referring now to my improved wheel it will be seen that it consists of an outer rim and an inner rim, and hub, spokes, blades and brace rods, all peculiarly made and organized. The hub is fastened in any convenient manner to the shaft T. It consists of two disks 2, each having a socket 3. These sockets match in position, so as to receive the inner ends of the spokes, which are clamped by drawing the plates together with the bolts 4. The spokes are preferably made of iron tubes 5, whereby they are light and strong. These spokes are few in number, comparatively speaking. The wheel illustrated has eight spokes.

The outer rim is made of sections 6 of metal, preferably malleable iron, slotted as shown at 7, 8 and 9, in Fig. 6 and having a lug 10, as shown in Figs. 6 and 7. The sections also have openings 11 to make them lighter and more ornamental. The sections overlap each other where they meet and join together, one end of one section having a stud 12 and the adjoining end of the next section having a slot 13 to receive said stud. The spokes 5 pass through holes in the overlapped ends of the sections and are secured by nuts 14 and 15. Thus the outer rim is strongly made and held. The inner rim is also constructed of sections made preferably of malleable iron. Each of these inner sections is recessed at the ends, as shown at 16 in Fig. 8, each two recesses constituting a hole to receive a spoke. Thus the spoke prevents the sections from sidewise displacement. Each section is further provided with slots 17 and lugs 18, see Figs. 8 and 9. The blades 19 have tenons 20 at their inner ends which fit into these slots 17 of the sections of the inner rim, these slots being at the proper angle to give the blades the desired deflection. The blades at their outer ends have each three tenons 21 which respectively fit in the slots 7, 8 and 9 of the sections of the outer rim. The blades are further secured to the rims by bolts or rivets fastened through the blade and the lugs 18 of the inner rim and through the lugs 10 of the outer rim.

Thus it will be understood that my wheel is made up of rims formed in sections, blades secured to both rims, and of spokes which secure the rims and carry them, the spokes themselves being carried in the hub. Now to prevent any possible giving or buckling of the wheel I brace it by means of brace rods 22, secured to the spokes at their outer ends and to a disk 23 carried by the main wheel shaft T outside of the hub. The rods 22 are fastened to the disk flange by nuts 24. The position of the brace rods 22 with respect to the spokes is angling and hence the wheel by this means is rigidly braced and made very strong, yet but little weight is added. A peculiar clamp connects the brace rods with the spokes. This clamp is best shown in Fig. 10 and it consists of a body 25 with an eye in which the spoke fits, and carrying a screw 26 which binds against the spoke. The outer ends of the brace rods 22 are turned to form eyes through which the screw 26 passes, and then by means of a nut 27 the rods are firmly held against the body 25 of the clamp. It will be understood that these clamps are therefore adjustable in and out on the spokes, so as to put the rods 22 under the desired tensile strain; also, so as to hold them that they may be put under this strain by means of the inner of the nuts 24.

I will now refer to a means of constituting a brake of the vane, which will be applied when the wheel is thrown around to out-of-wind position. Referring to Fig. 12 it will be seen that a bracket 28 is secured to the vane arm or its support, and that rubber or brake-block 29 is carried by the bracket. When the wheel is thrown out of wind, the position shown in full lines, this disk U comes around and bears against the brake and thus stops the wheel.

It should be noted that the weight of the outer rim, being rather more than is usual in wind mills at a point so remote from the center, results in giving the wheel a steady and regular speed.

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

1. In a windmill, the combination with a hollow head F having a hollow shaft G, a guide Q at the upper end and a guide Y in the body of the head, said guides being rotatable, and an actuating rod mounted in said guides.

2. In a windmill, the combination with a tower, a turn-table and a guide secured to the tower, a head extending above the table and a hollow shaft forming a part of the head and extending through the turn-table and into the guide, a rotatable guide at the upper end of the head and another rotatable guide lower down in the head, an actuating rod mounted in said guides, a bearing yoke whose upper arm is mounted on the upper end of the head and whose lower arm is mounted on the hollow shaft, a wheel proper having its shaft carried in said bearing yoke, a pitman operated by said shaft and connecting with said actuating rod.

3. In a windmill, the combination with a tower, a turn-table and a guide, a slotted head above the turn-table, a rotatable guide carried within said head, and a hollow shaft forming a part of the head and extending through the turn-table and into a fixed guide carried by the tower, a bearing yoke whose upper arm is mounted on the slotted head and whose lower arm is mounted on said hollow shaft, a wheel proper having its shaft carried by the bearing yoke, a pitman operated by said shaft, an actuating rod within said slotted head and hollow shaft, and a stud on the actuating rod extending through the slot and connecting with the pitman.

4. In a windmill, a wheel proper consisting of a two-part hub, spokes clamped between the parts, the inner rim composed of abutting sections fitting against said spokes, said sections having slots and lugs, an outer rim composed of connected overlapped sections having slots and lugs, and connected to said spokes, and blades bolted to the rim and tenoned into the slots thereof, said lugs and slots being at an angle to the rims to give the blades the proper deflection.

5. In a windmill, the combination with a wheel shaft, a wind-wheel mounted thereon having a two-part hub, spokes clamped between the parts, an inner rim composed of disjointed sections, an outer rim composed of overlapped sections through which the spokes pass, and nuts screwed on the spokes to clamp the inside and outside of said overlapped rim, of braces connected to the spokes at one end and adapted at their other end to screw into a flanged disk also carried by the shaft remote from the inner ends of the spokes, and screw-threaded and nut connections between said braces and said flanged disk capable of applying a tensile strain upon said braces.

6. In a windmill, the combination with a hub, spokes carried thereby, an outer rim made in overlapped sections, the spokes passing through the overlapped parts, and nuts screwed on the spokes to clamp the inside and outside of the rim, an inner rim made in connected sections, slats carried by the outer rim and secured to and supporting the inner rim.

7. In a windmill, the combination with a wheel spoke, of a clamp having a body fitted upon the spoke, a screw to bind it, a brace fitting about the screw and a nut on the screw to bind the brace.

In testimony whereof I affix my signature in presence of two witnesses.

GEORGE H. POE.

Witnesses:
JNO. M. PEARCE,
JOHN C. BALES.