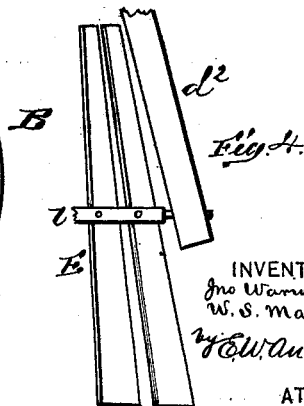
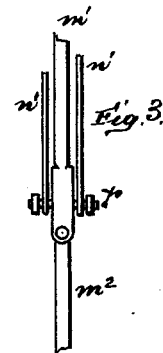


Patented April 1, 1879.



WITNESSES
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JOHN WARWICK, OF MEDO, MINNESOTA, AND WILLIAM S. MARSHALL, OF
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IMPROVEMENT IN WINDMILLS.

Specification forming part of Letters Patent No. **213,960**, dated April 1, 1879; application filed
October 14, 1878.

To all whom it may concern:

Be it known that we, JOHN WARWICK, of Medo, Blue Earth county, Minnesota, and WILLIAM S. MARSHALL, of Batavia, in the county of Kane and State of Illinois, have invented a new and valuable Improvement in Windmills; and we do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the annexed drawings, making a part of this specification, and to the letters and figures of reference marked thereon.

Figure 1 of the drawings is a representation of a longitudinal vertical section of our improved windmill; and Figs. 2, 3, and 4 are details.

This invention has relation to improvements in wind-wheels for actuating grinding, sawing, pumping, and other mechanisms.

The nature of the invention consists in the construction and novel arrangement of parts, as hereinafter shown and described.

In the annexed drawings, the letter A designates the tower of my improved wind-wheel, the same being an elevated structure of suitable form and construction, having at its upper extremity a platform, *a*, and at a suitable distance below said platform a secondary stage, *b*.

The platform *a* and stage *b* are each provided with a central aperture, *c*, and the former has an annular marginal flange, *d*, from which the bottom of the said platform rises in conical form, as shown at *d'*.

B indicates a carriage composed of a body, *e*, formed of two concentric rings, *e'*, in which are journaled the conical rollers *i*, corresponding to the contour of the surface *d'*, and the horizontal rollers *i'*, bearing against the flange *d* aforesaid. This carriage fits snugly inside of the flange *d* of the platform *a*, and has a central opening, the center of which corresponds to that of the said platform and that of the stage *b*.

C indicates the table of my improved wheel, having a tubular, preferably open, spindle, *C'*, of tapering form, and fitting after the manner of a journal in the platforms *a* *b*.

The under side of the turn-table C rests

upon the rollers *i*, and the rollers *i'* bear against the inner vertical face of the flange *d*, lessening the friction thereon.

As shown in Fig. 1, the lower extremity of the spindle *C'* has removably secured thereto a collar, *e'*, which has its bearing in the platform *b*, and is provided with a flange, *f*, that, abutting against the under side of the said platform, effectually prevents the said table from being carried away from the tower by a gust.

The table C is provided with a horizontal arm, *g*, in which is journaled the wheel-shaft D, and also with a vertical arm, *g'*, in line with the arm *g*, and having fulcrumed therein a vertically-vibrating angular lever, E, the object of which will be hereinafter set forth.

The shaft D is provided near its outer end with a hub, *h*, to which are rigidly secured the spokes *d'* of the wheel. These spokes radiate, preferably, from a common center, and afford bearings to the wind-sail sections E'. These vibrate readily between the spokes *d'*, so as to expose the faces *j* of their blades to the wind, or when the breeze becomes dangerous to swing upon their bearings, so that the air-current may pass through the wheel without actuating it.

The sail-sections are composed each of a chord-like beam, *l*, the ends of which are journaled in the spokes *d'*, and of a sufficient number of blades, *d''*, secured to said beam *l* in an oblique position, and radiating from the hub.

The inner end of the shaft D has a crank-arm, *m*, connected by means of a pitman, *m'*, to the plunger-rod *m''* of a pump mechanism. This pitman has on its lower extremity a cross-head, *r*, the ends of which are connected by means of rods *n'* to sufficiently-strong metallic springs S, projecting from arm *g'* of the table.

The rotation of the wheel imparts a vertically-reciprocating motion to the plunger-rod *m''* of the pump, and at each downward stroke of the same the springs S are distended, and at the ascending stroke, when the strain in pumping is greatest, they react and materially aid in raising water.

G G' represent disks arranged on the shaft

D, the one inside of and the other outside of the hub, and sliding freely thereon. These disks are connected together by metallic rods *o*, of suitable rigidity, that extend through the hub *h* and cause the said disks to be keyed to the shaft D. The disk G' is connected to the hub of the wheel by a rod, *p*, secured at one end to the said disk, and pivoted at the other to an angular lever, *p*¹, having its fulcrum on the hub, and connected by means of a rod, *p*², to an arm, *q*, of the wind-sail sections E'.

Intermediate the disk G and the hub is a lever, I, having its fulcrum on the horizontal arm of the table, and provided with a central opening, through which the shaft D and rods *o* extend. This opening is sufficiently large to allow the lever I to vibrate without binding on the said rods. The lever I is connected by a rod, *q'*, to the long arm of the lever E aforesaid, and its bearing-face *r'*, adjacent to the disk G, is in contact therewith only when the lever E is vibrated by drawing down upon the pull-rod J, the upper end of which is secured to the said lever. This rod extends down through the spindle of the table within convenient distance of the platform. By drawing down forcibly upon said rod the wind-sail sections are thrown out of the wind, through the medium of the lever E, connecting-rod *q'*, the lever I, the connected disks G G', and the devices hereinbefore mentioned connecting the disk G' to the wind-sail sections E; or, should a gust of wind come up, the said sections will swing into positions at right angles to their working positions, and the disk G caused to slide upon the shaft D, thus compressing a spring, L, between said disk and the wheel. The gale having subsided, the reaction of the said spring, of which there is one to each sail-section, forces the disk G back to its normal position, and, through the rod *p*, angular lever *p*¹, and rod *p*², brings the sail-section back into the wind. By this means all danger of the wheel being carried away is effectually obviated.

Each of the springs L is secured at one end to a wheel-spoke, and bears at its free end against the disk G'.

It will be clear that the wind-sail sections

will be wholly or partially thrown out of the wind, according to its force, and that only so much of the said sections will be exposed to the wind as is necessary to do good work at all times.

Upon the rod *q'* is an adjustable collar, *y*, that regulates the movements of the wind-sails E, and by abutting against the vertical arm of the turn-table prevents them from swinging entirely out of the wind.

What we claim as new, and desire to secure by Letters Patent, is—

1. The combination, with a tower, A, having platforms *a b*, and a carriage, B, having rollers *i i'* at right angles to each other, of a turn-table, C, having spindle C' journaled in said platforms, and a collar, *e*², applied upon the said spindle below platform *b*, as and for the purpose set forth.

2. The combination, with the tower A, a turn-table, C, rotating thereon, a shaft, D, journaled on said table, and a wind-wheel having independent vibrating wind-sails E', of the disks G G', sliding on said shaft at each side of the wheel-hub *h*, the connecting-rods *o*, uniting said disks, the vertically-vibrating levers I E, the rod *q'*, connecting said levers, the angular lever *p*¹ upon the wheel-hub, rod *p*, connecting disk G' and the said lever, the rod *p*², connecting lever *p*¹ and the wind-sail sections E', and a spring, L, between the outer disk and hub, substantially as set forth.

3. The combination, with the pitman *m*¹, having cross-head *r*, and the plunger-rod *m*² of a pump mechanism, of the springs S and rods *n'*, connecting said springs and head, substantially as specified.

In testimony that we claim the above we have hereunto subscribed our names in the presence of two witnesses.

JOHN WARWICK.

W. S. MARSHALL.

Witnesses as to signature of John Warwick:

H. G. WILLMARTH,
JOHN CAMM.

Witnesses as to signature of W. S. Marshall:

JOHN W. WILLIS,
W. P. CLOUGH.