P. BERGMAN.
Windmill.

No. 217,724. Patented July 22, 1879.

Fig. 2

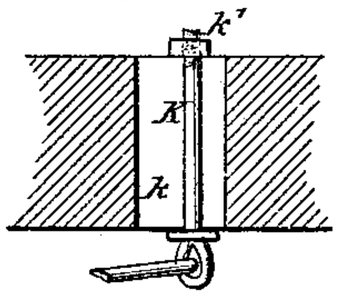

Fig. 1

Fig. 3

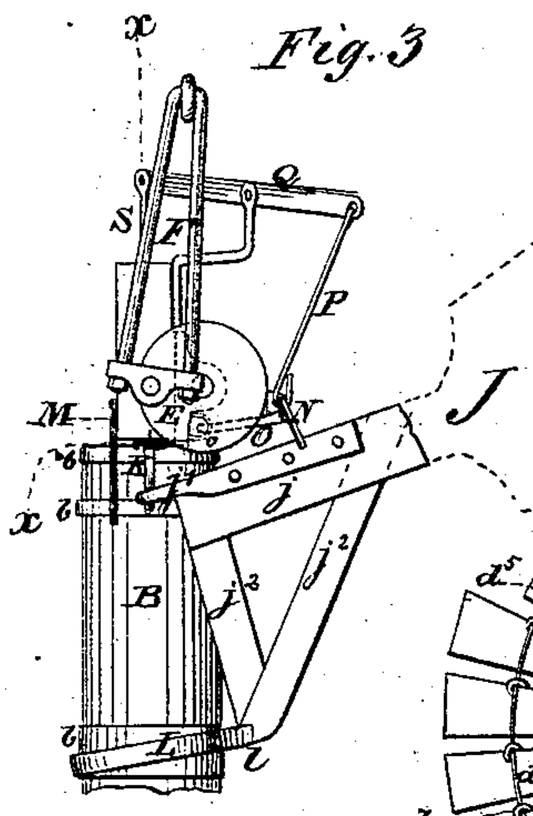

Fig. 4.

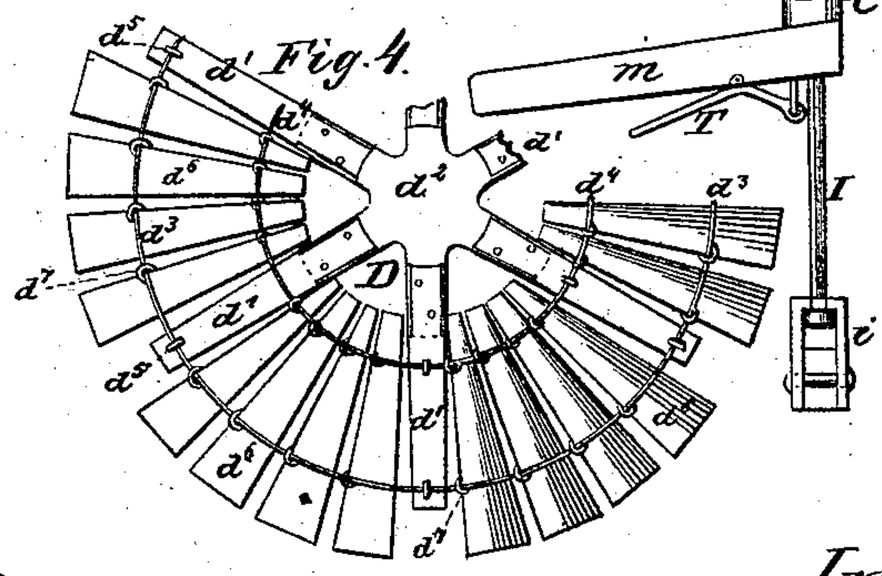

Fig. 1

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UNITED STATES PATENT OFFICE.

PETER BERGMAN, OF PLATTE PRECINCT, NEBRASKA.

IMPROVEMENT IN WINDMILLS.

Specification forming part of Letters Patent No. **217,724**, dated July 22, 1879; application filed May 27, 1879.

To all whom it may concern:

Be it known that I, PETER BERGMAN, of Platte Precinct, in the county of Polk and State of Nebraska, have invented a new and useful Improvement in Windmills, of which the following is a specification.

The object of my invention is to provide a strong, simple, and improved construction of windmills, (such as are used for working pumps, or for other purposes for which the rotary motion of the wind-wheel is converted to produce a reciprocating vertical motion of a rod,) and whereby they shall be conveniently managed and adjusted, and not liable to get out of order.

The invention consists in the construction and combination of the various parts, as will be hereinafter described and claimed.

In the accompanying drawings, Figure 1 represents a side elevation of my improved windmill. Fig. 2 is a detail longitudinal vertical section of the bearing-beam for the wind-wheel shaft, the section being taken on the line *x x* of Fig. 3. Fig. 3 is an elevational view of the upper part of the mill, seen in the direction of the arrow 1, and showing the tail swung around the vertical shaft one-fourth of a turn from its position in Fig. 1, and retained by a catch in the position it occupies when the wheel is "out of the wind" and the mill stopped. Fig. 4 is a partial face view of the wind-wheel.

The same letter or mark of reference in the different figures indicates the same or equivalent part.

The frame of the mill, made in the usual pyramidal shape, is composed of four corner-posts, A, secured together by braces *a*, and provided on top with a horizontal floor or platform, a^1, through which is secured, in the line of the axis, the vertical tubular wooden post B, banded by irons *b*. This central post B affords support for the whole movable superstructure of the mill, which is swiveled or pivoted in the bore of the post B by a hollow shaft, *c*, secured through an upper cross head or beam, C, which latter thus rests and turns upon the upper end surface of the post B. To one of the vertical sides of this beam or cross-head C, at each end thereof, is bolted a bearing, *c'*, for the horizontal shaft *d* of the vertically-rotating wind-wheel D.

The size of the cross-head C and distance between the bearings *c'* are adapted to allow of mounting a shaft, *d*, of sufficient length to insure rigidity and steadiness of motion.

The wheel D is strongly built of radial wooden arms d^1, bolted in sockets upon the face of a cast-iron center or hub, d^2, rigid upon one end of the shaft *d*.

Two or more concentric wires, d^4 d^3, are secured by staples d^5 to the arms d^1 on each side of the wheel D, and arranged in pairs, d^3 d^3, d^4 d^4, on opposite sides of the arms, equidistant from the center.

The working area of the wind-wheel is formed of sector-shaped vanes or wings d^6, inserted between the said two or more pairs of concentric wires, and inclined upon their own radial axes by securing their opposite edges to the corresponding opposite members of each pair of circular wires.

The fastening is effected simply by wire ties d^7, one for each vane d^6 at each pair of circular wires, said wire d^7 being inserted through a hole in the vane d^6, then bent down upon the surface of the vane, and its opposite ends bent around opposite members of one pair of concentric wires, thus clasping the corresponding edge of the vane to the said member. This makes the general form of the wire ties d^7, when secured, something like the letter **S**, as shown in Fig. 1.

The rotary motion of the wheel D is transmitted by the crank E, on the end of the shaft *d* opposite to that holding the wheel, and a connecting-rod, F, to one end of a walking-beam or lever of the first class, G, to give the latter a vertically-oscillating and the pump-piston a reciprocating motion, the said lever G being fulcrumed at *h* to uprights H, secured to the cross-head C, and connected at its other end to the pump-piston by a rod, I, running through the cross-head C and tube *c* the whole height of the mill.

In the center line of the lever G, on both sides of the fulcrum *h*, are holes *g*, through which and a movable pin the lever may be pivoted at *h*, to change and adjust the proportion of leverage or of the distances between the fulcrum and the rods F and I, and consequently varying the length of stroke of the pump as desired. The lower end of the rod I

is connected to the upper end of the pump piston-rod by a swivel-joint, *i*, to prevent any torsional strain on either rod when the wheel is swung around horizontally on the post B to face a shifting wind.

J is the so-called "tail" of the mill, or the large vane by which the wheel D is steered to face the wind. The tail J is pivoted or hinged with the inner end of its center-bar *j*, at j^1, to the eye or lower end of a bolt, K, going through a vertical slot, *k*, in the cross-head C, and securable in position in the said slot, at a greater or less distance from the post B, by a nut, *k'*. The bar *j* is provided with downward-projecting braces j^2, affording a point, *l*, a distance below the point j^1, for securing the ring L, which surrounds the post B on one of the iron bands *b*, thus allowing the point *l* of the tail-frame to be turned upon the post B as the pivot or hinge-pin of the tail J. As the ring L keeps the point *l* of the tail J always at the same distance from the post B, an adjustment of the bolt K (and the point j^1) to a trifle farther off from the post B will cause the axis of the tail J to incline to the horizontal, with the tail end lowest, when in the position shown in Fig. 1. When now the fulcrum-point, at j^1, is stationary, and the point *l* moving (on account of the band L) around the circumference of the post B, on a lateral deflection of the tail J the end of the latter will rise above the horizontal, as shown in Fig. 3, and, if retained in a position parallel with the wind-surface of the wheel D, will keep the edge of the said wheel against the direction of the wind, and thus stop the motion of the mill until released again, when it will, by the force of its own gravity, resume the position in which the point *l* is perpendicularly beneath the point j^1 and the tail again at right angles to the wind-surface of the wheel D, thus causing the latter to again face the wind and operate. A stop, M, attached to the cross-head C, checks the tail J in the last-named central position.

When the wheel D is turned out of the wind (which is done easily by turning the handle or lever *m*, secured to the lower end of the upright tube *c*) the bar *j* of the tail J, remaining in the direction of the wind, will raise a pawl, N, (laterally adjustable by slots and bolts *s* upon a plate or bar hinged by rods O to staples *o* upon the cross-head C,) and after passing an incline or two of the same be retained either in the notch *n*, where it will keep the wheel D running at an oblique angle with reduced force in a heavy wind, or in the notch *n'*, where it will be parallel with the wheel and keep the latter at a stand-still, as before mentioned.

The catch-pawl N is connected by a rod, P, to one end of a lever of the first class, Q, pivoted to an upright, R, secured to the cross-head C. The other end of the lever Q is connected to the upper end of a rod, S, which goes through the central tube *c* at the side of the rod I. The lower end of the rod S is jointed to a hand-lever, T, which is fulcrumed to the under side of the lever *m*, so that it may be operated simultaneously with the latter.

When the wheel D is turned in the wind by the lever *m* the lever T is pressed against the lever *m*, thereby raising the pawl N and releasing the tail J, thus causing the latter to turn in gear by its own weight simultaneously with the wheel D.

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

1. The wind-wheel D, having its crank-shaft *d* mounted in bearings *c'* upon the side of the cross-head C, pivoted by the tube *c* in the post B, in combination with the rod F, beam G, having its fulcrum adjustable in the uprights P upon the cross-head C, and the rod I, working in the tube *c* and swiveled at its lower end, substantially as specified.

2. The tail J, pivoted at *l* by the ring L upon the post B, and at j^1 to the adjustable eyebolt K, secured in the slot *k*, in combination with the wind-wheel D, journaled as described, the cross-head C, pivoted by the tube *c* in the post B, and the lever or handle *m*, secured to the said tube *c*, substantially as specified.

3. The combination of the cross-head C, having the stop M, staples *o*, and upright R with the notched catch-pawl N, hinged to the staples *o*, and connected by the rod P, lever Q, and the rod S in the tube *c* to the operating hand-lever T, pivoted to the lever *m*, and with the tail J, pivoted to the post B and cross-head C, in the manner set forth, substantially as specified.

4. The wind-wheel D, constructed of radial fans d^6, secured by wires d^7 obliquely between pairs, d^3 d^3, d^4 d^4, of concentric wires, which are attached on opposite faces of the wheel to radial arms d^1, fastened in sockets of the central hub a^2, substantially as specified.

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Witnesses:

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