(No Model.)

J. F. DUCKER.

WINDMILL.

No. 590,970. Patented Oct. 5, 1897.

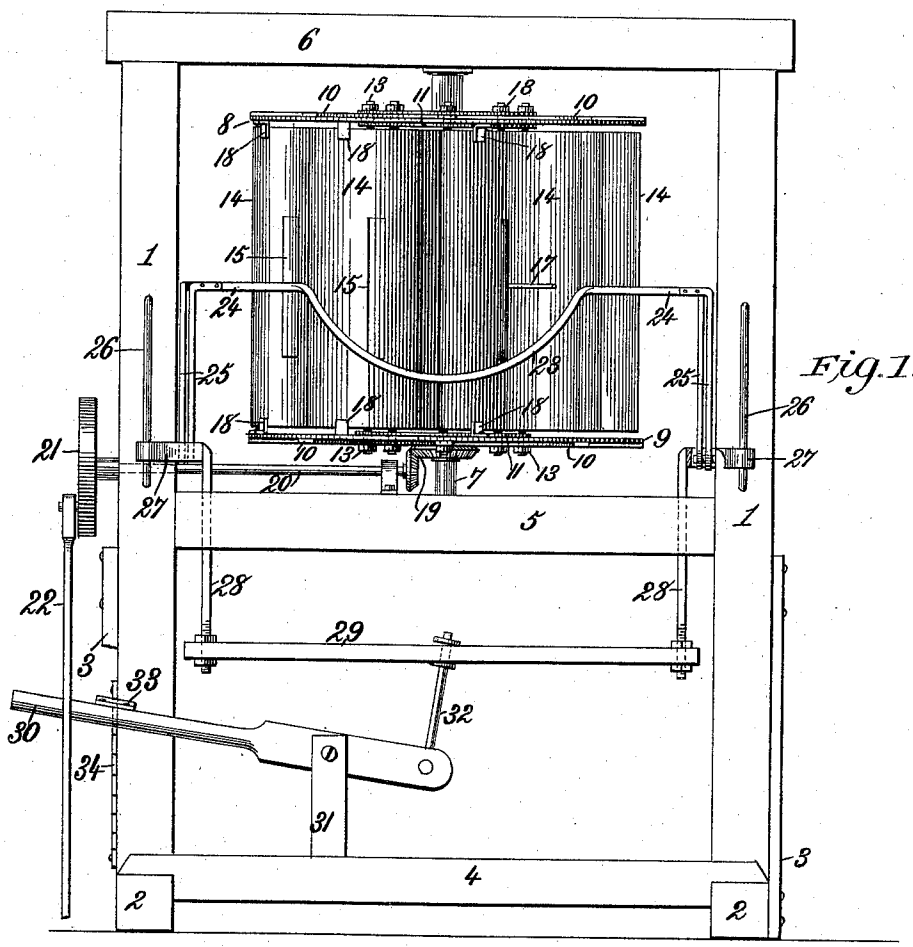


Fig. 1.

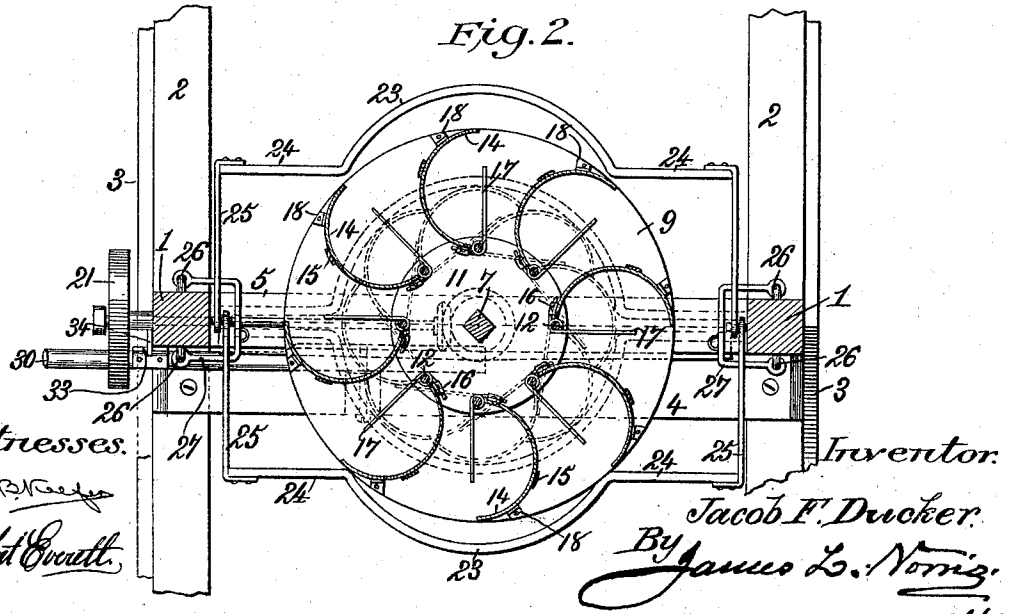


Fig. 2.

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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

JACOB F. DUCKER, OF ARGONIA, KANSAS.

WINDMILL.

SPECIFICATION forming part of Letters Patent No. 590,970, dated October 5, 1897.

Application filed May 20, 1897. Serial No. 637,422. (No model.)

To all whom it may concern:

Be it known that I, JACOB F. DUCKER, a citizen of the United States, residing at Argonia, in the county of Sumner and State of Kansas, have invented new and useful Improvements in Windmills, of which the following is a specification.

This invention relates to windmills of that class in which the wheel is mounted to revolve in a horizontal plane about a vertical axis.

The object of the invention is to improve the construction and arrangement of the pivotal vanes or wheel-blades and the mechanism for closing in and securing said vanes when it is desired that the wind-wheel shall be inoperative.

My improvements consist in features of construction and novel combination of parts in a windmill, as hereinafter particularly described and claimed.

In the annexed drawings, illustrating the invention, Figure 1 is an elevation of my improved windmill. Fig. 2 is a horizontal section of the same through the wind-wheel.

The reference-numeral 1 designates uprights of the frame or tower, which may be of any suitable construction. As shown, the uprights 1 are supported on sills 2 and stayed by braces 3. The sills may be connected by cross-bar 4, as shown. Between the uprights 1 there is a cross-bar 5, and a cap-piece or upper cross-bar 6 connects the uprights at the top. These cross-bars 5 and 6 are provided with bearings for a vertical shaft 7, on which the wind-wheel is securely mounted.

In the construction of the wind-wheel there are secured to the vertical shaft 7 an upper disk or head 8 and a lower disk or head 9 at a suitable distance apart, according to the required dimensions of the wheel. Each of these heads or disks is preferably braced on its outer side by strips 10, firmly secured to the respective heads. At its central portion on the inner side each head 8 and 9 is preferably reinforced by a smaller disk 11, that may be riveted to the head. Between the upper and lower heads 8 and 9 are extended a number of vertical pivots 12, arranged in annular series, at about the margin of the reinforcing disks or plates 11, and preferably extended through the same and beyond the outer sides of the heads. The projecting ends of these pivots 12 are screw-threaded for attachment of nuts 13 to make the said pivots fast to the heads.

To the pivots 12 are hinged the wheel-blades or vanes 14, each of which is curved in the arc of a circle. A reinforcing-strip 15 may be secured longitudinally to the outer side of each vane to brace or stiffen the same. On the outer side of each vane 14, near its hinged edge, is secured a clip 16 to fasten one end of a spring 17, which is partly coiled around the adjacent vane-pivot 12 and then extended a suitable distance across the inner concaved face of the vane toward its outer edge. The purpose of these springs or spring-arms 17 is to give the vanes a tendency to open in an operative direction and prevent them from swinging so far inward or so close together as to cut off the access of air-currents against the concaved working faces of said vanes.

The several vanes or wheel-blades 14 are extended between and near to the inner faces of the heads 8 and 9, on which are secured stop-lugs 18 to limit the outward swing of each vane. It will be seen that by reason of the tendency of the vanes 14 to remain opened or partly opened (the spring-arms 17 preventing a complete closing of one vane upon another) the wind-wheel will be always normally in condition for operation by an air-current from any direction. The wind exerts its pressure on the concaved faces of the several vanes in succession, thereby causing the vanes 14 to rotate the heads 8 and 9 and the vertical shaft 7 to which the said heads are secured.

By means of bevel-gearing 19 the rotation of the vertical wheel-shaft 7 may be communicated to a horizontally-mounted shaft 20, carrying a crank or crank-wheel 21, for operating the pitman or connecting rod 22 of a pump or other machinery.

As a means for closing in the vanes 14 against the action of their spring-arms 17 to make the wind-wheel inoperative there are provided clamping-yokes 23, placed on opposite sides of the wheel and having a contour corresponding with the smaller circumference of said wheel when its pivotal vanes are closed inward, as shown by dotted lines in Fig. 2. These yokes 23 have their ends formed into horizontally-extended arms 24,

that are secured to the upper ends of levers 25, which have their lower ends pivotally attached to the inner sides of the uprights 1, between which the wind-wheel is mounted. The uprights 1 are provided on opposite sides with guides 26 for vertically-movable slide-brackets 27, that form a loop around the levers 25 and are adapted to fold each pair of levers together when the slides 27 are moved upward thereon. Each slide-bracket 27 is provided with a depending rod or stem 28, that connects at its lower end with a bar 29 below the cross-bar 5 of the windmill-frame, said cross-bar 5 being perforated for passage of the said stems or rods. A hand-lever 30 is fulcrumed to a standard 31 on the cross-bar 4 and connects through a rod 32 with the bar 29, to which the stems 28 are attached. Thus by pressing down on the outer end of the hand-lever 30 the bar 29 and connected slide-brackets 27 will be elevated, thereby folding together the levers 25 and causing the clamping-yokes 23 to closely embrace and close together the pivotal vanes 14, so that the wind-wheel will be held inoperative until its further action is required. A catch 33 may be provided on the hand-lever 30 to engage a toothed rack 34 on the frame and thereby hold the yokes 23 more or less closely to the vanes of the wind-wheel. The strips 15 on the outer sides of the vanes may be so located as to serve as wear-plates for contact of the yokes 23 when clamped onto the wheel.

What I claim as my invention is—

1. In a windmill, the combination of a vertical shaft having secured thereto an upper head and a lower head, a series of concaved vanes extended between said heads and hinged to vertical pivot-rods secured to the heads, stop-lugs on the said heads to limit the outward swing of the vanes, and spring-arms carried by the several vanes and extended across their inner concaved faces toward the outer edges of the vanes to prevent normal closing of the vanes one upon another, substantially as described.

2. In a windmill, the combination with the vertical shaft having secured thereto an upper head and a lower head, and a series of curved vanes hinged between said heads, of yokes adapted and arranged to clamp the said vanes in a closed and inoperative position, and lever mechanism for operating said yokes, substantially as described.

3. In a windmill, the combination with a vertical shaft having secured thereto an upper head and a lower head and vertical pivot-rods extended between said heads, of concaved vanes hinged to said pivots and provided with spring-arms to prevent the vanes from closing one upon another, stop-lugs on the said heads to limit the outward swing of the vanes, clamping-yokes adapted to close the vanes against the action of their springs, and lever mechanism for operating said yokes, substantially as described.

4. In a windmill, the combination of a frame, a vertical shaft provided with an upper head and a lower head, concaved vanes pivotally connected with and between said heads, stops to limit the outward swing of said vanes, clamping-yokes arranged on opposite sides of the wheel to bear on and hold the vanes in a closed position, folding levers pivoted to the frame and supporting said yokes, vertically-movable slide-brackets engaged with said levers and adapted to fold them and clamp the said yokes upon the vanes, lever mechanism for operating the said sliding brackets, and a catch for locking the said lever mechanism, substantially as described.

5. In a windmill, the combination, with a frame, and a wind-wheel comprising pivotal concaved vanes, of clamping-yokes supported on opposite sides of the wheel and adapted to close the vanes upon one another, levers arranged in pairs at opposite sides of the frame and supporting said yokes, slide-brackets embracing the said pairs of levers to fold the levers of each pair and clamp the yokes upon the vanes, a bar to which the said slide-brackets are connected, and lever mechanism for imparting a vertical movement to said bar, substantially as described.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

JACOB F. DUCKER.

Witnesses:
GEO. LINN,
R. S. HAMMOND.