(No Model.)

M. W. PALMER.

WINDMILL.

No. 303,882. Patented Aug. 19, 1884.

Fig. 1.

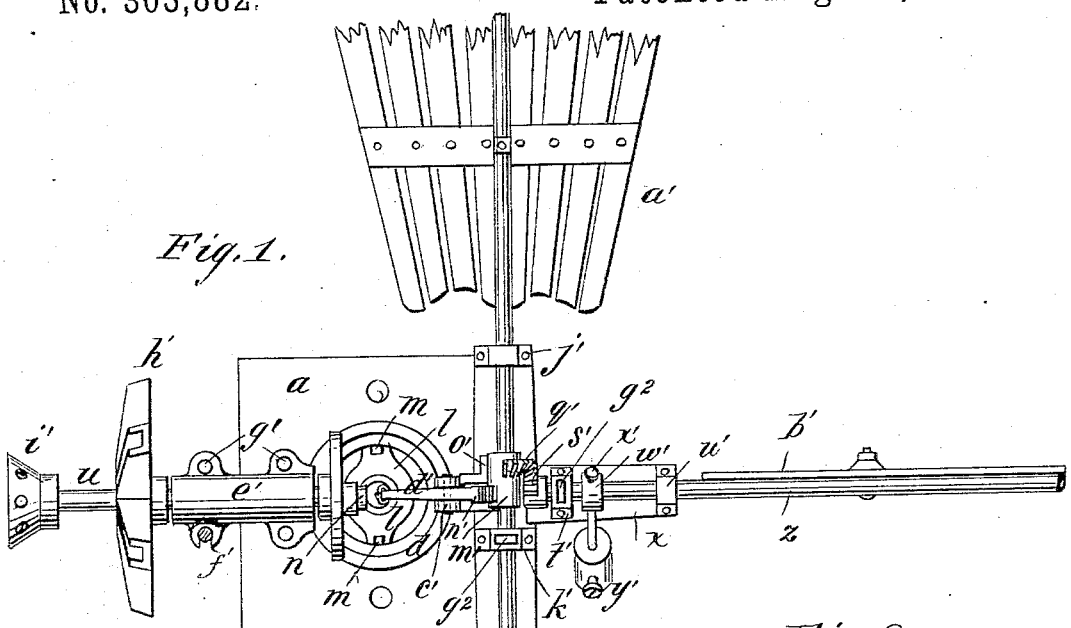


Fig. 2.

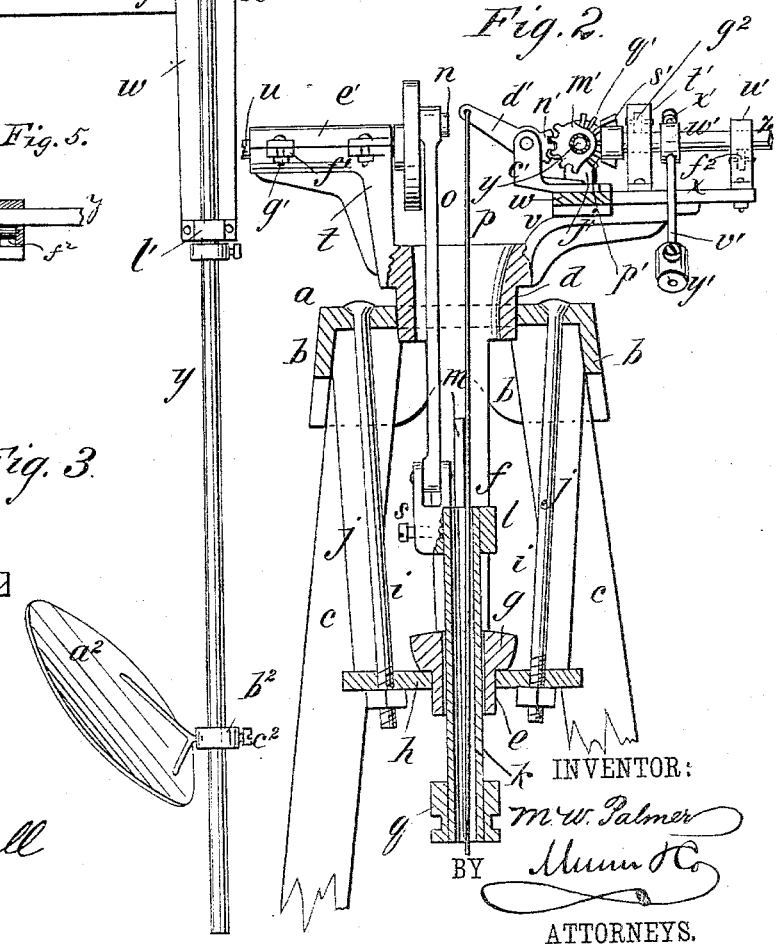


Fig. 4.

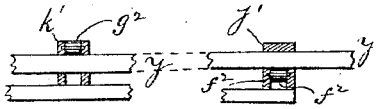
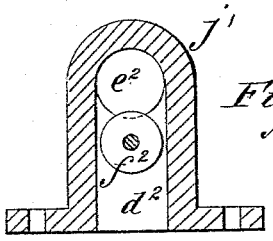


Fig. 5.

Fig. 3.



WITNESSES:

Donn Twitchell

L. Sedgwick

INVENTOR:

M. W. Palmer

BY Munn & Co

ATTORNEYS.

UNITED STATES PATENT OFFICE.

MERRITT W. PALMER, OF HOLLAND, MICHIGAN.

WINDMILL.

SPECIFICATION forming part of Letters Patent No. 303,882, dated August 19, 1884.

Application filed April 30, 1883. (No model.)

To all whom it may concern:

Be it known that I, MERRITT W. PALMER, of Holland, in the county of Ottawa and State of Michigan, have invented a new and Improved Windmill, of which the following is a full, clear, and exact description.

My invention relates to that class of self-regulating windmills in which two rock-shafts bearing steering-vanes are mounted upon a wheel-frame, and are geared together at right angles, and are made to throw the wheel more or less edgewise to the wind about a vertical axis in proportion to the strength of the wind.

My improvements consist in the peculiar construction and arrangement of parts, as hereinafter fully described, and pointed out in the claims.

Reference is to be had to the accompanying drawings, forming part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 is a plan view of my improved windmill with some of the parts omitted and the regulating-vanes broken off. Fig. 2 is partly a side elevation and partly a sectional elevation of the parts, showing my improvements. Fig. 3 is a detail of the improved bearing device for the regulating-vanes in section, and Figs. 4 and 5 are similar views taken sidewise the shaft *y*, Fig. 4 showing the anti-friction roller above, and Fig. 5 showing it below, the shaft.

I make a square cast-iron cap, *a*, with side flanges, *b*, for the top of the tower-posts *c*, which are fitted in the angles of the cap and secured by bolts through the side flanges, said cap having a central hole in the top for the upper journal, *d*, of a skeleton device, which I employ for a turn-table, which has a lower journal, *e*, connected to the upper one, *d*, by the two bars *f* and collar *g*, said journal being extended a considerable distance below the upper one, and having a bearing in a plate, *h*, suspended from the cap *a* by the bolts *i*, which clamp it firmly against struts *j*, which abut against the under side of the cap. Both of these journals are hollow for the pump-rod connection, which in this case consists of the gas or similar tube *k*, fitted in the collar *g* and lower journal, *e*, and connected to the cross-head *l*, which works on guides *m* of the bars *f*, and is connected to the crank-pin *n* by the rod *o*. The starting and stopping rod *p* also extends through these hollow journals and through the tube *k*, the lower end of which tube has a swivel-collar, *q*, for connecting with the lower section of the pump-rod, so as to turn with the wind-wheel as it shifts in the wind, while the upper end enters a socket of the cross-head and is secured by a set-screw, *s*.

From the top of journal *d* of the turn-table a bracket, *t*, extends to one side, for the support of the wheel-shaft *u*, and another bracket, *v*, extends from the opposite side, for the support of a bed-frame, consisting of the plates *w* and *x*, on which the bearings for the shafts *y* and *z* of the vanes *a'* and *b'*, and also the bracket *c'*, for the support of the starting and stopping lever *d'*, are mounted.

It is to be observed that by the extension of the lower journal, *e*, of the turn-table device so much below the upper bearing the said turn-table may be substantially supported by these bearings of small diameter, whereon the wind-wheel and its appendages may turn with the wind much easier than in those machines wherein the upright position of the turn-table is maintained by widely-extending bearings of great diameter. I make this improved turn-table by casting the bearings *d e*, collar *g*, connecting-bars *f*, guides *m*, and the bearing-brackets *t* and *v* all in one piece, which, besides providing the best form of turn-table, is the simplest and cheapest mode of making it.

To provide for adjusting the cap *e'* to the wind-wheel shaft when fitting it to the bracket *t*, I cast the ears *f'* for the cap-bolts *g'* with slots for said bolts, which enable them to adjust themselves to the proper position.

The vane *a'*, which is for the purpose of shifting the wind-wheel, (represented by spider *h'* and brace-hub *i'*,) is attached to the long shaft *y*, which ranges transversely to the crank-shaft *u*, and is mounted in bearings *j'*, *k'*, and *l'* on the long plate *w*. The shaft *y* has a plain faced segmental wheel *m'*, with which a toothed sector, *n'*, of the starting and stopping lever *d'* gears, for turning the vane *a'* sidewise to the wind when it is desirable to have the wind act on it, so as to shift the wheel out of the wind—that is, edgewise to it—so as not to be rotated thereby. A stop consisting of a flange, *o'*, cast together with the lever-supporting bracket *c'*, is arranged in such relation to shaft *y* that the

lower end, p', of a bevel sector-wheel, q', cast on the same hub with sector m', strikes said stop when the vane a' stands sidewise to the wind, and prevents said vane from being turned too far by the pull-rod p. The bevel-sector q' gears with another, s', on the end of the tail vane-shaft, z, by which the wind-wheel is held in the wind for being rotated thereby, the said tail vane-shaft being arranged in the axial line of the crank-shaft and mounted in bearings t' and u' on the short plate x. The gears connecting these two vane-shafts are so set in connection with each other that when one vane is in a horizontal plane the other is vertical, and, being geared together, they shift accordingly when the shaft of either vane is turned, as before stated. The lever d' and pull-rod p are employed for setting the vane a' sidewise to the wind, and the vane b' edgewise thereto for stopping the wheel, which is effected by pulling the rod p down and fastening it to any suitable holding device, whereon it remains as long as the wheel is not required to run; but when it is to be set in motion the said pull-rod is disconnected from the holding device and allowed to rise, for permitting the vanes to shift into the position for enabling the wheel to run, which is effected by the weighted arm v', fitted to shaft z, which overbalances the vanes, so that it swings down until it rests against the plate x, which serves for a stop to said arm when it has turned the vanes to the right positions. The arm is secured adjustably to the shaft by its collar w' and a set-screw, x', so as to be properly set thereon for holding the vanes, as required, when it rests against its stop, and the weight y' is adjustable along the arm to vary its leverage for power to hold the vanes.

In order that the wheel may shift automatically as the force of the wind varies, to relieve it from undue pressure when the wind is too strong, I have placed the fan a^2 on the extension of the shaft y, opposite to vane a', beyond the range of the wheel, where the wind will strike it freely, said fan being oblique to the course of the wind, so as not to offer too much resistance when the wind is light. Said fan is connected to the shaft so as to project above it, and to so apply its power to the shaft as to tend to raise the weighted arm v'; but its power is to be less than that of the weight in any wind that the wheel is capable of sustaining properly. When, however, the force of the wind is too great for the wheel, the power of such a wind on the fan is to be sufficient to overbalance the weighted arm and allow the wheel to shift. Said fan is connected to the shaft by a collar, b^2, and set-screw c^2, enabling it to be shifted around the shaft to adjust it properly as to the leverage it is to have against the weighted arm, also to shift it along the shaft for a counter-balance to the vane a'.

In order that these shafts y and z may be mounted in the best arrangement for turning with the least friction, I have constructed the bearings j' and u', where the greatest stress is downward, with a recess, d^2, (see Figs. 3 and 5,) below the bore e^2 for the shaft, and fitted the friction-rollers f^2 therein for the shafts to rest on, and in those bearings k' and t', where the greatest stress is upward, I have similarly arranged other friction-rollers, g^2, (see Fig. 4,) in recesses suitably provided over the shafts, thus mounting them so as to be very easy to shift, and thus be very sensitive to the changes of the wind, whereby the speed of the wheel will be regulated with great nicety, and the shifting of the vanes by the pull-rod may be easily done.

I prefer to make the shafts y and z hollow for lightness; but they may be solid, if desired.

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

1. The lower bearing-plate, h, for the turn-table step e, in combination with cap a and tower-posts c, said plate being attached to said cap by the bolts i and struts j, substantially as described.

2. In a turn-table consisting of hollow journals d e, the latter having collar g, connecting-bars f, and the wheel and vane supporting brackets t and v, cast together, the bars f, having the guides m for the cross-head cast together with them, and the cross-head l, tube k, and connecting-rod o, combined with said turn-table, and the crank-shaft u, said shaft being mounted on the bracket t, substantially as described.

3. The combination, with the turn-table and wind-wheel, of the vanes a' b', arranged with relation to each other and the said wind-wheel, and geared together and with the shifting-lever d', substantially as described.

4. The brackets c', for the support of lever d', having stop-flange o', in combination with shoulder p' of wheel q', attached to vane-shaft y, substantially as described.

5. The combination of toothed lever d', sector-wheels m' q', vane-shaft y, sector-wheel s', and vane-shaft z, substantially as described.

6. The combination, with the turn-table and wind-wheel, of the vanes a' b', shafts y and z, weighted arm v', and the fan a^2, with collar b^2, and set-screw c^2, for axial adjustment about its shaft, said vanes being arranged with relation to the wind-wheel and geared together substantially as described.

7. The combination, with the turn-table arms of a windmill and the oscillating vane-shafts, of bearings for the rocking vane-shafts, provided with anti-friction rollers, as shown and described.

MERRITT W. PALMER.

Witnesses:

CHARLES R. BROWNELL,

ISAAC FAIRBANKS.