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United States Patent Office.

JOHN FRAZEE, OF ST. LOUIS, MISSOURI. #

Letters Patent No. 83,620, dated November 3, 1868.

IMPROVEMENT IN WINDMILLS.

The Schedule referred to in these Letters Patent and making part of the same.

To all whom it may concern:

Be it known that I, JOHN FRAZEE, of the city of St. Louis, in the county of St. Louis, and State of Missouri, have made certain new and useful Improvements in Windmills; and I do hereby declare that the following is a full and clear description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

The nature of this invention is in the arrangement for feathering the fans of the windmill, and, secondly, in an arrangement of a governor-device, regulating the speed of the rotating wings or fans, all of which will be more fully hereinafter mentioned and described.

To enable those skilled herein to make and use my said invention, I will describe the same fully, referring to the accompanying

Figure 1 as a general plan; to

Figure 2 as a vertical sectional elevation.

I construct a frame, usually of wood, to sustain the operating-devices. On the upper end hereof is a base, A, having rollers, *a*, to sustain the rotating upper frame B. Said frame B is arranged to support the governor-devices, hereinafter described, on its lower base-plate B¹. On its upper plate, B², are arranged the concentric cam-guides B³; and centrally on said plate B² is the support for the main power-shaft C, resting, by its journal-hub *c*, on said plate B².

To said hub *c* is connected the spider D, in which the fan or wing-shafts E are held and guided.

Secured to said shafts E, and outside of said spider, are the wings or fans *e*, upon which the force of the wind is exerted.

On said shafts E are furthermore fixed the cams *f* and *f'*. Said cams are guided by the cam-plates B², thus determining the position of the fans *e*. When the fans in their rotation pass without the proper range for a direct propulsive action of the wind, the inner cam, *f*, is no longer guided by its cam-plate B², but the outer cam, *f'*, by the action of its cam-plate, turns the fan, so that it turns a feather-edge to the direction of the motion, thus reducing the air resistance of the fan when the propulsive action thereon becomes too small.

It will be seen that the point at which the fans are thus turned or feathered must be determined by the direction of the wind. In order to cause the wind to determine said point of "feathering," I arrange the wind-vanes G and G'. Of these, G usually stands vertically, and G' horizontally, or nearly so.

By the action of the wind, the vane G will then stand in the direction thereof; but the vanes G and G' are both connected with the frame B in such wise that the wind, in turning the vane G about the vertical axis of the entire mill, will also turn the frame B. Then, as the cam-plates B² are secured to said frame, and are properly placed thereon, the vane G and frame B, in turning to the wind, the cam-plates will be thus

turned, and their initial points (where the cams *f* and *f'* are turned to feather the fans) will thus always be in the direction of the wind, hence the fans *e* will be feathered at such positions, relative to the points of the compass, as will accord with the direction of the wind.

On the said shaft C, I secure the pulley *g*. This has a belt or other connection with the pulley *h* on the shaft H of the governor. When, now, the action of the wind is too great, and causes an undue velocity of the shaft C, the velocity being transmitted to the shaft H, causes the governor-globes, *h*¹, to rise by centrifugal force, thereby raising the collar *h*², and acting to turn the crank *h*³, of the shaft *g*¹, of the vane G', and this, by the mitre-gearing *h*⁴, turns the shaft *g*² of the vane G; thus both of said vanes are turned by the action of the governor, in case the velocity of the fans *e* is excessive. But as the vane G' stands horizontally (with feather-edge to wind) ordinarily, and as it is placed about at right angles to the vane G, which marks the direction of the wind, it will be seen that as soon as the governor turns the shaft *g*¹, the vane G' turns its broad face to the wind-action, whereby the wind will cause the same and the frame B to turn; but as also the vane G is turned from its vertical position, it opposes a smaller resistance to the turning of the frame than it did before. All said parts, therefore, act effectively to turn the frame, so that the wind-direction vane G no longer points in the exact direction of the wind. But as the fans *e* are feathered when they reach the line of the vane G, they now feather before they reach this direction; the fans *e*, therefore, no longer feather at proper point, and hence they are gradually impeded by the resistance of the wind, thus decreasing their velocity, which was excessive.

It will thus appear that by the action of the governor any undue velocity of the windmill is corrected.

The general detail of the parts in action, as aforesaid, appears from the accompanying drawings.

By any of the usual methods the revolving shaft C is made to transmit the power received thereon by the action of the revolving fans *e*.

Having thus fully described my invention,

What I claim, is—

1. The vanes G and G', respectively combined with the frame B, cam-plate B², cams *f* and *f'*, and fan-shafts E, substantially as and for the purposes set forth.

2. The governor-device *h* H *h*¹, acting upon the vanes G and G', to cause them to turn the frame B, substantially as and for the purpose set forth.

JOHN FRAZEE.

Witnesses:

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