R. H. BOYD.
Windmill.

No. 218,855. Patented Aug. 26, 1879.

Fig. 1.

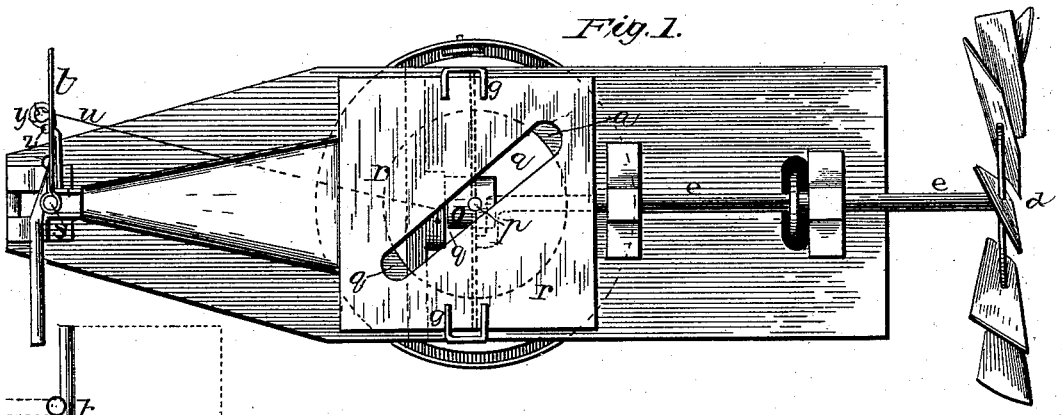

Fig. 2.

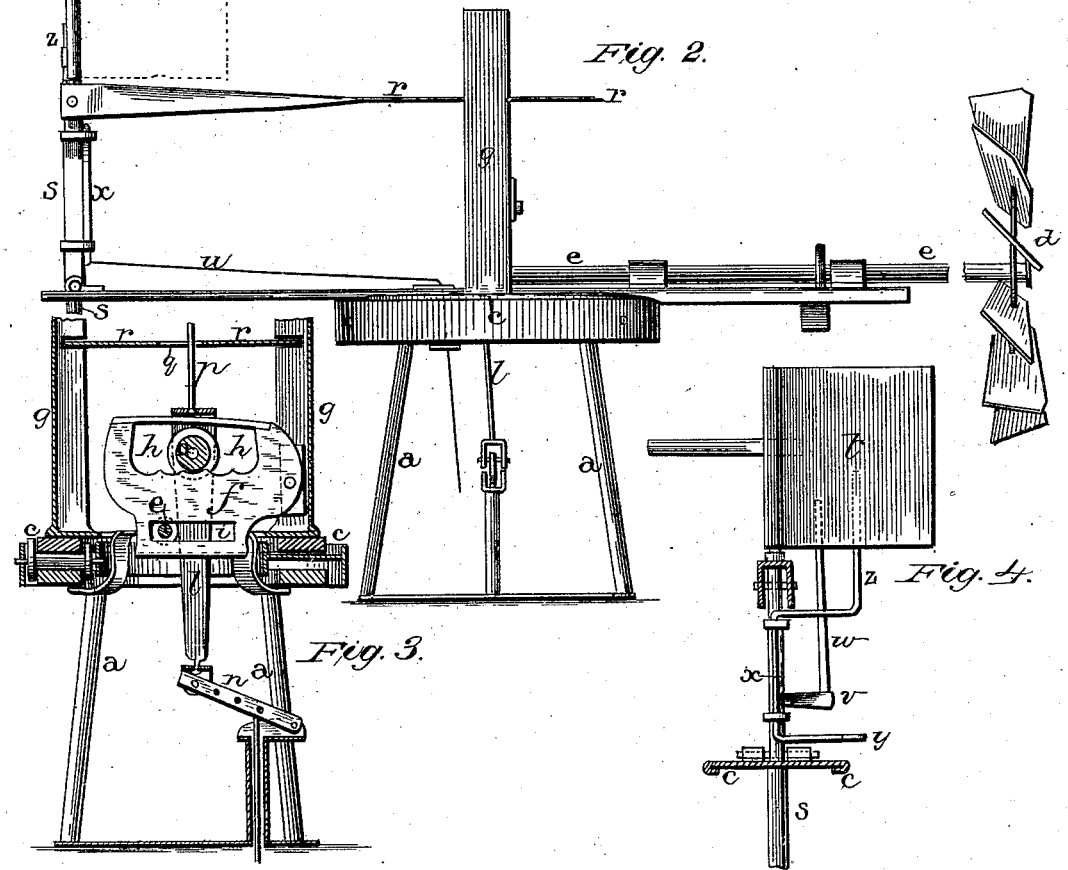

Fig. 3.

Fig. 4.

Witnesses.
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UNITED STATES PATENT OFFICE.

ROBERT H. BOYD, OF NEW SALEM, OHIO.

IMPROVEMENT IN WINDMILLS.

Specification forming part of Letters Patent No. **218,855**, dated August 26, 1879; application filed June 28, 1879.

To all whom it may concern:

Be it known that I, R. H. BOYD, of New Salem, in the county of Fairfield and State of Ohio, have invented certain new and useful Improvements in Windmills; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use it, reference being had to the accompanying drawings, which form part of this specification.

My invention relates to an improvement in windmills; and it consists in the arrangement and combination of devices whereby the length of the stroke of the pump-rod can be increased or decreased in direct proportion to the force of the wind, and the wheel thrown in and out of the wind, as will be more fully described hereinafter.

Figure 1 is a plan view of my invention. Fig. 2 is a side elevation of the same; Fig. 3, a vertical cross-section through the turn-table; Fig. 4, a front view of the vane.

a represents a suitable tower; *c*, the turn-table; *d*, the wind-wheel, and *e* the wheel-shaft properly journaled on the turn-table. The blades of the wheel are so curved and placed in relation to each other that the rear edge of one blade extends back a suitable distance behind the front edge of the one next to it, whereby the wind is turned at a right angle from its line of motion before it leaves the blade, and thus a greater percentage of the power of the wind is exerted upon the blades. The rear end of the shaft *e* is cranked and revolves in a slot, *i*, of the lever *f*, which is pivoted at its lower corner to one of the guides *g*. This lever has a second slot, *h*, which runs parallel with the one *i*, but is much wider and longer, and has the lower edge of the slot *h* notched or indented, so that the roller *o*, which rests thereon, will not move back and forth in the slot too easily. This roller is pivoted in the upper end of the pitman *l*, which is connected either to a lever, *n*, at its lower end for working the pump-rod, or directly to the pump-rod itself. Projecting from the top of the pitman is a guide-rod, *p*, which passes up through the slot *q* in the slide *r*. This slide is fastened at one end to the pivoted vane-rod *s*, and moves horizontally back and forth between the two guides *g* for the purpose of moving the roller and the pitman connected thereto out or in toward the pivoted end of the lever *f* in the slot *h* to lengthen or shorten the stroke of the pump-rod.

The rod *s*, pivoted in the end of the turn-table that is opposite to the wheel *d*, has the vane *t* pivoted upon its upper end in such a manner that it can be turned partially around by the force of the wind, or drawn around by the rope, chain, or wire *u* from below, for the purpose of forcing the wheel *d* around out of the wind.

Projecting out from the rod *s*, on the same side as the vane, is the arm *v*, from the outer end of which projects the spring *w*, which has its upper end fastened to the vane for the purpose of holding the vane at right angles to the wind and drawing it back again into the wind after it has been blown partially around, or drawn around by the wire, chain, or rope *u*.

Pivoted or otherwise loosely fastened to the rod *s* is a partially-revolving rod, *x*, which has an arm, *y*, at its lower end for the chain, rope, or wire to fasten to, and another arm, *z*, at its upper end to catch against the vane. When the chain, rope, or wire is pulled upon, the rod *x* is turned around, and the arm *z* turns the vane at such an angle to the wind that it turns the wheel around, so that only its edge is presented to the wind.

When the wind is blowing but gently the vane remains perpendicular and squarely before the wind, and the slide is drawn forward, so as to force the roller *o* in toward the inner end of the slot *h*, and thus give but a short stroke. When, however, the wind begins to blow with considerable force the vane inclines the rod *s* toward the wheel, and thus forces the slide backward, whereby the guide-rod moves the roller out toward the outer end of the slot, thus giving a longer stroke to the pump-rod. Thus it will be seen that the slide is automatically moved back and forth by the vane, and as it moves the guide-rod is made to move the roller in and out in the slot, so that the pump-rod gives a stroke in direct proportion to the force of the wind. As the vane-rod *s* is forced backward the vane turns more and more at an angle to the wind, so as to turn the wheel *d* also at an angle to the wind; and as the

wind decreases the weight of the lower end of the rod *s* raises the vane-rod to a perpendicular position again, and the spring again draws the vane around to the wind. This vane and its attachments can be used independently of the slotted guide, in which case the rod *s* will be rigid instead of pivoted. By thus regulating the stroke of the pump-rod to the force of the wind the amount of water pumped is much greater and the working capacity of the mill increased in every way.

Having thus described my invention, I claim—

1. In a wind-wheel, the combination of a vane that is forced backward by the wind, a slotted guide connected thereto, a guide-rod and pitman, and a slotted lever connected to the wheel-shaft, whereby the pump-rod is made to give a stroke in direct proportion to the wind, substantially as described.

2. The combination of the pivoted lever *f*, having the slot *h*, and operated by the wheel-shaft, with the pitman and an automatic mechanism for shifting the pitman back and forth, so as to give a variable stroke in proportion to the force of the wind, substantially as specified.

3. The combination of the rod *s*, vane *t*, spring *w*, slotted slide *r*, guides *g*, guide-rod *p*, lever *f*, operated by the wheel-shaft, and having the slot *h*, roller *o*, and pitman *l*, substantially as shown.

4. The combination of the rod *s*, vane *t*, spring *w*, and rod *x*, substantially as specified.

In testimony that I claim the foregoing I have hereunto set my hand this 23d day of June, 1879.

R. H. BOYD.

Witnesses:
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