W. W. MARSH & O. E. MILES.

Wind-Mills.

No. 140,931. Patented July 15, 1873.

Fig. 1.

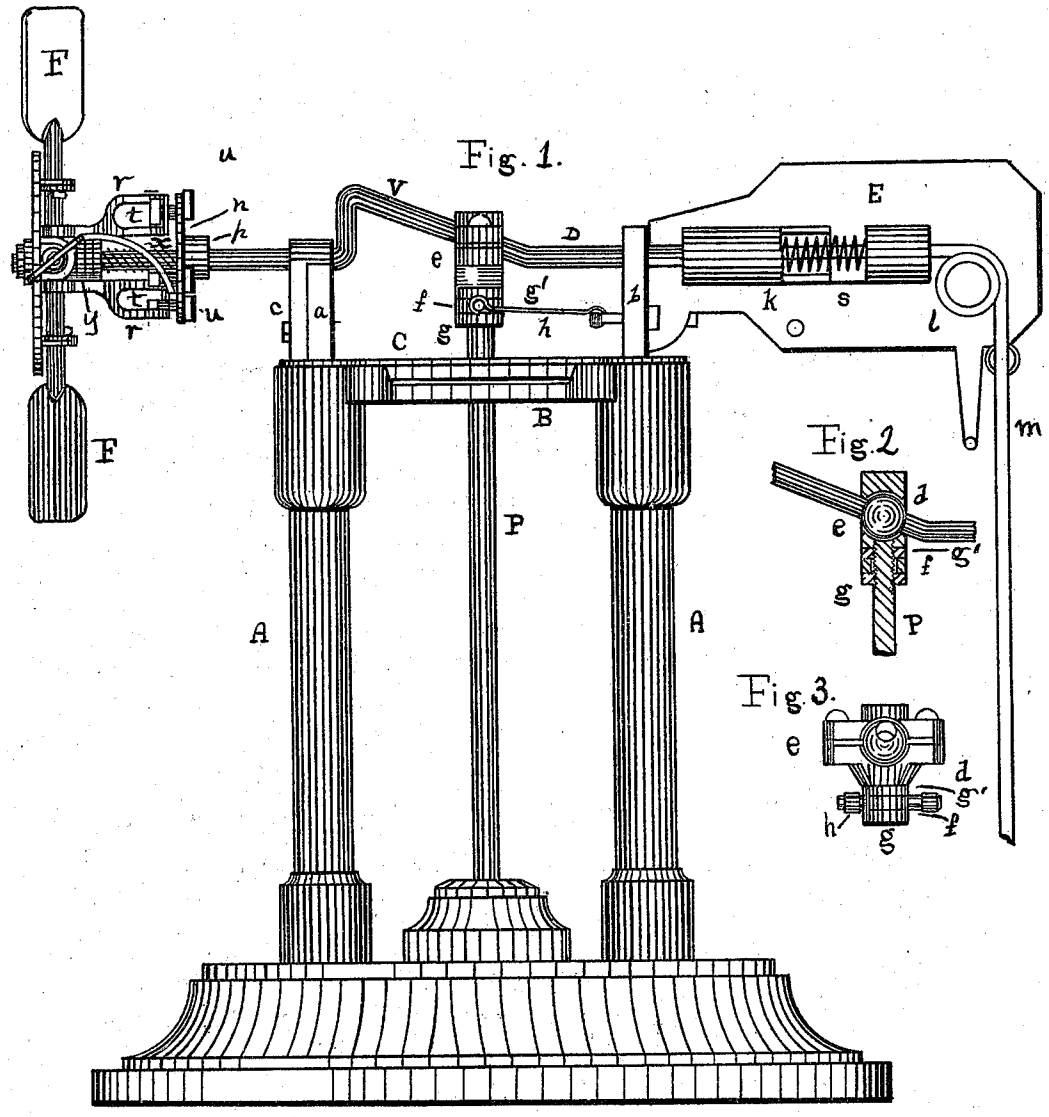

Fig. 2

Fig. 3.

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UNITED STATES PATENT OFFICE.

WILLIAM W. MARSH AND OREN E. MILES, OF SYCAMORE, ILLINOIS.

IMPROVEMENT IN WINDMILLS.

Specification forming part of Letters Patent No. 140,931, dated July 15, 1873; application filed April 21, 1873.

To all whom it may concern:

Be it known that we, WILLIAM W. MARSH and OREN E. MILES, of Sycamore, in the county of De Kalb and State of Illinois, have invented certain new and useful Improvements in Windmills, of which the following is a full description, reference being had to the accompanying drawings making a part of this specification, in which—

Figure 1 is an elevation, and Figs. 2 and 3 details.

The objects of our invention are, first, to construct a windmill so that the length of the stroke of the piston of the pump will vary with the varying force of the wind; and this we accomplish by the use of a movable graduated crank, constructed as hereinafter described; second, to so construct the mill that the end pressure of a strong wind will cause the edges of the sails to be turned to the wind, stopping the action of the pump; and, third, in the devices and combinations hereinafter claimed.

In the drawings, A represents supports upon which the mill is placed; B, a fixed plate having a large opening through the center, forming a bearing for the movable plate C having an opening through its center. *a b* are supports or bearings attached permanently to C; D, a shaft which operates the pump revolving in the bearings *a b*, one of which should be left open at the top to allow the shaft D to be inserted in its place, which opening may be closed by the part *c*, which is bolted or secured to *a*. The shaft D is bent, as shown in Fig. 1, the bent portion V forming a graduated crank, which passes through the ball *d*, through which it can freely move. This ball is located in the head *e*, which head forms a bearing for the ball, the head and ball forming a universal joint. P is the pitman-rod of the pump. Near the top of this rod are two pieces, *g g'*, screwed or otherwise secured upon the rod, between which is the movable piece *f*; and the head *e* is secured in any suitable manner to the top of the pitman P. *h* is a jointed stay, one end of which is pivoted to the support *b*, and the other end is pivoted upon each side of the part *f*; its object is to prevent the ball and head *e* from sliding upon the crank, and keep the pitman in its proper position relative to the boxes of the crank-shaft D. E is the vane of the mill; *k*, a receptacle attached to the vane, within which is placed the spring *s*, which spring is so arranged as to press upon that end of the crank-shaft D which passes into *k*; *l*, a pulley, over which the chain or cord *m* passes, one end of which chain is secured to the end of the crank-shaft in *k*. *n* is a circular plate having a hub, *p*, placed loosely upon the crank-shaft D. *r* are curved arms, one end of each of which is attached to each of the sails; the other end is provided with a long slot, *t*, in which are located pins *u*, which pins are secured to the plate *n*. The sails F are so connected with the mill as to be movable, as usual. Between the plate *n* and the hub *y* is a spring, *x*, which keeps the head *n*, arms *r*, and the sails F in the position represented in Fig. 1, except when changed by the force of the wind. When there is a light wind the several parts will be in the position represented in Fig. 1, and the stroke of the piston will be short, pumping a small quantity of water. As the wind increases in force, its pressure upon the sails and the end of the mill will force the crank-shaft D through the ball *d*, the distance which this shaft moves depending upon the force of the wind; and, as the shaft D passes through this ball, the length of the stroke of the piston will be increased, and a larger quantity of water will be pumped. As the wind decreases in force, the pressure of the spring *s* upon the end of D will return the parts to the position shown. The parts are so adjusted that, before the right-angled portion of the crank comes in contact with the head *e*, the hub *n* will come in contact with the post *a c*, compressing the spring *x*, bringing *n y* nearer together, and, by the action of the curved arms *r*, turning the edges of the sails to the wind. The sails can also be turned in this position by means of the chain or cord *m*. The strength of the spring *s* must be adjusted according to the size of the mill and the required resistance to the action of the wind. By this construction, serious objections to mills now in use are overcome. A pump having a piston of long stroke can be used; but the distance through which the piston passes with each revolution of the sails is not uniform

but varies with the force of the wind, so that the work which the pump is to do is automatically graduated to correspond with the power applied. Heretofore a light wind has not had sufficient force to carry the piston through the entire length of its stroke, and with such wind no water can be raised; but with this device, though the wind be very light, a small quantity of water can still be constantly elevated. The work which the pump has to do increases with the force of the wind, and this has a tendency to check the velocity with which the mill itself moves, and keep up a steady motion.

This windmill may be used for other purposes than raising water. The position of the sails may be changed by means of end pressure of the wind, without the use of the graduated crank.

What we claim as new is as follows:

1. In a windmill, a movable shaft, D, substantially as and for the purposes specified.

2. The spring *s*, in combination with a movable shaft, D, substantially as and for the purposes specified.

3. The sails F, slotted curved arms *r*, plate *n*, and pins *u*, in combination with a movable shaft, D, and spring *s*, substantially as specified.

4. The movable shaft D, when provided with a graduated crank, *v*, substantially as and for the purpose specified.

5. The movable shaft D, spring *s*, and chain *m*, substantially as described.

6. The movable shaft D having a graduated crank, *v*, in combination with the ball-and-socket joint *d e*, substantially as described.

7. The jointed stay *h*, in combination with the pitman-rod and head P *e*, substantially as specified.

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