(No Model.) 3 Sheets—Sheet 1.

E. P. MILES.

WINDMILL.

No. 383,477. Patented May 29, 1888.

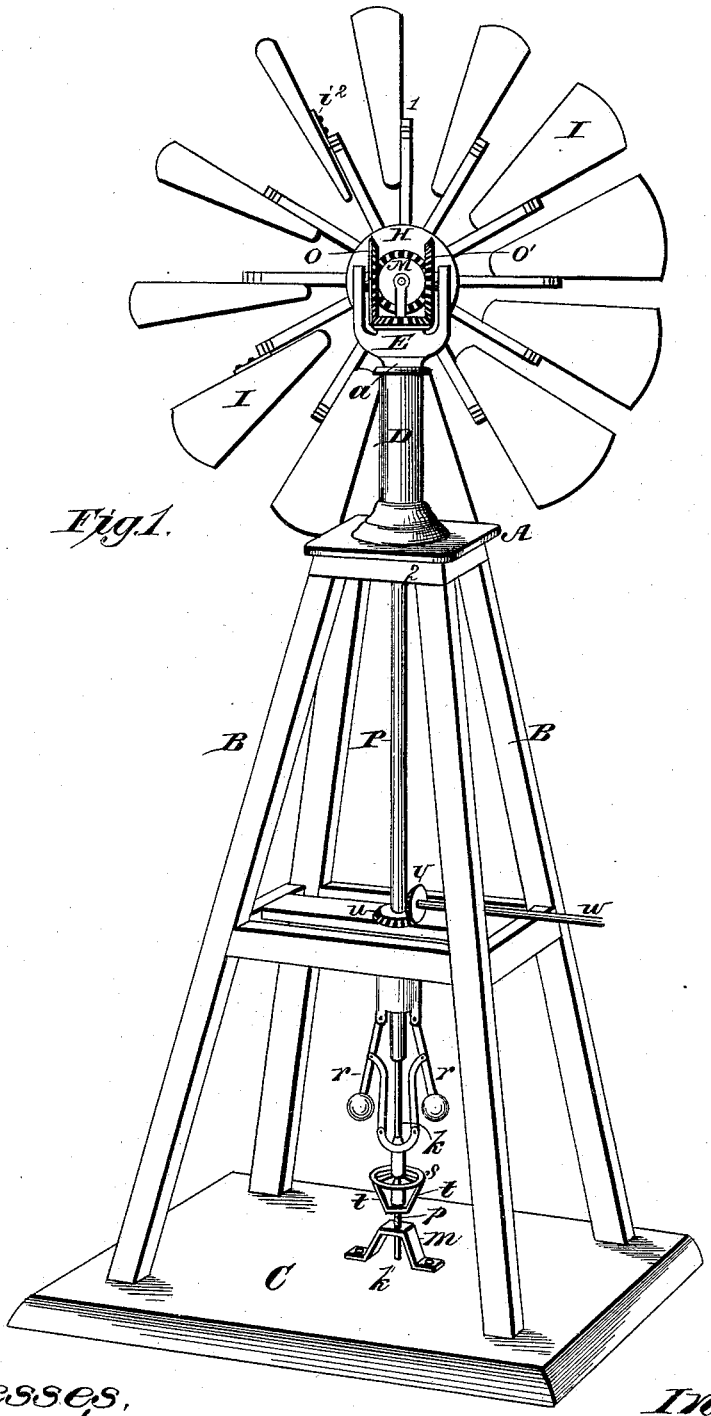


Fig. 1.

Witnesses,
S. E. Williams.
C. F. Little.

Inventor:
Enos P. Miles.
By
Hy W. Stackpole.
Atty.

(No Model.) 3 Sheets—Sheet 2.

E. P. MILES.

WINDMILL.

No. 383,477. Patented May 29, 1888.

Fig. 2.

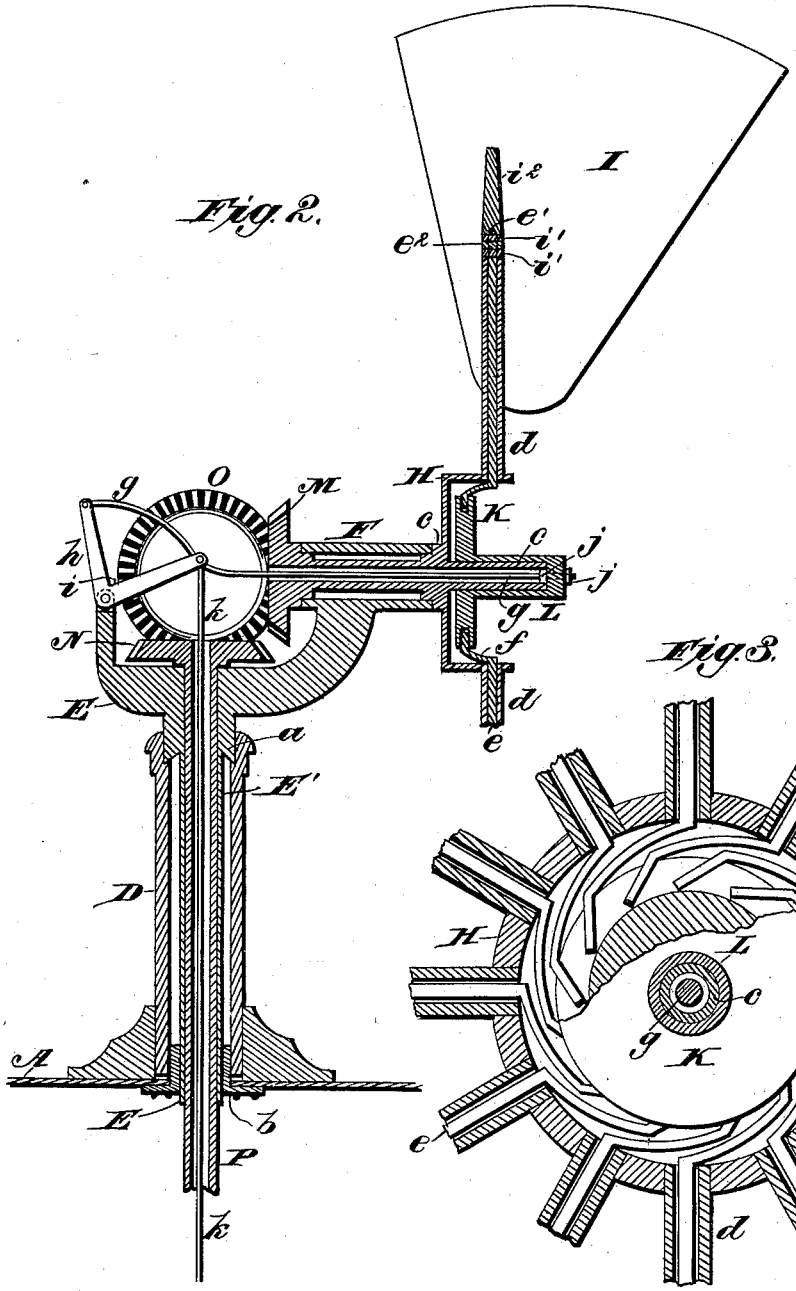
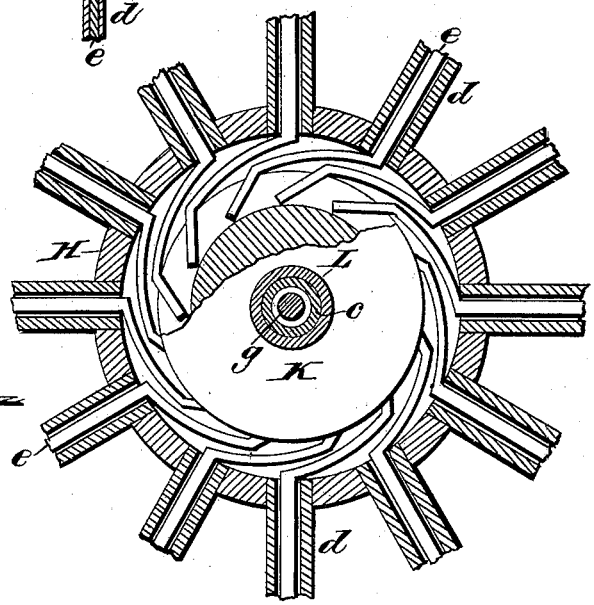


Fig. 3.



Witnesses,
S. E. Williams,
C. P. Kittle.

Inventor:
Enos P. Miles.
By
Hy. W. Stackpole,
Atty.

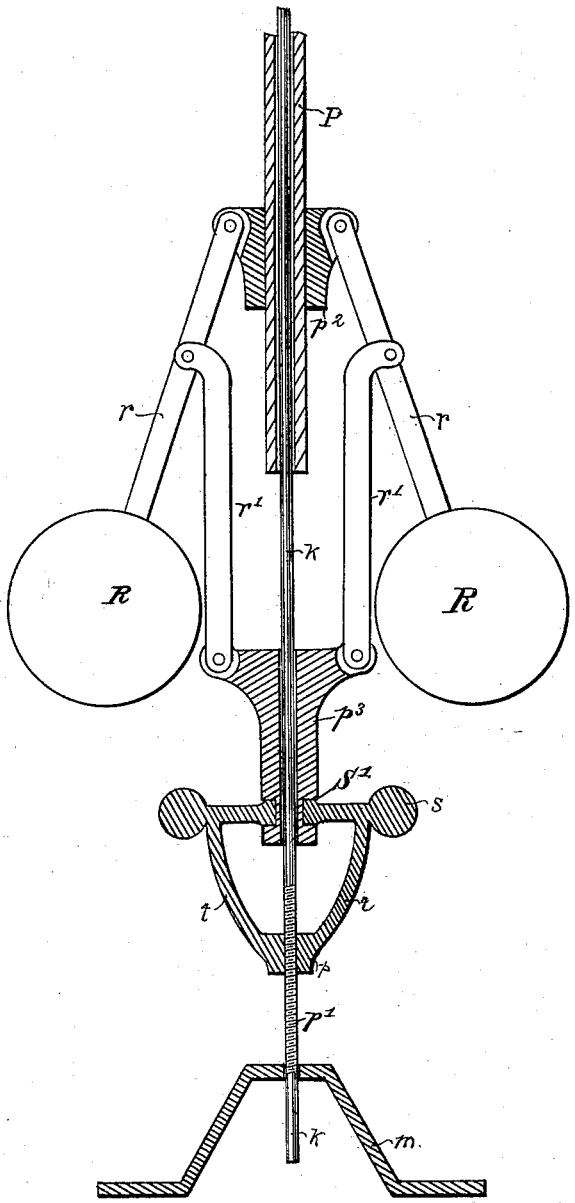
(No Model.) 3 Sheets—Sheet 3.

E. P. MILES.

WINDMILL.

No. 383,477. Patented May 29, 1888.

Fig. 4.



Witnesses.
Walter Taylor.

Inventor.
Enos P. Miles.
By his Attorney Hy. W. Stackpole.

UNITED STATES PATENT OFFICE.

ENOS P. MILES, OF CLAY CENTRE, KANSAS.

WINDMILL.

SPECIFICATION forming part of Letters Patent No. 383,477, dated May 29, 1888.

Application filed January 25, 1887. Serial No. 225,493. (No model.)

To all whom it may concern:

Be it known that I, ENOS P. MILES, a citizen of the United States, residing at Clay Centre, in the county of Clay and State of Kansas, 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 my invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

My invention consists in so constructing a windmill and attaching thereto a governor cut-off as that the windmill shall attain its utmost power and its speed be automatically and effectually regulated, controlled, and steadied at whatever velocity desired. I attain these objects by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a view in perspective of the entire machine; Fig. 2, a vertical section of a part of the machine on the line 1 2, Fig. 1; Fig. 3, a detailed sectional view of the reverse side of the wind-wheel as shown in Fig. 1. Fig. 4 is a central vertical section, enlarged, of the lower portion of Fig. 1, showing the governor mechanism and its adjusting devices.

Similar letters refer to similar parts throughout the several views.

The table or plate A, its legs or standards B B and platform C, and the standard D, secured to the upper side of the table, constitute the frame-work of the machine. In the standard D turns the hub E′, having a collar or bearing, *a*, which fits in an angular groove in the upper end of the journal or standard D. At the lower end the journal D has a lateral bearing on a bushing, *b*, having a flange which is bolted to the platform A. The form of the groove in which the collar *a* turns serves to hold the oil and avoid the necessity of frequent oiling.

The arm or brace G, firmly secured to the hubs E and F, serves to hold the wind-wheel in position. Through the hub F runs the axle *c*, which is firmly secured to the hub H of the wind-wheel. Through the spokes *d d* run the rods *e e*, to the outer ends of which are rigidly secured the fans I I, allowing the fans to turn into or out of the wind, as desired. The inner ends of the rods *e e* have attached thereto the cranks *f f*. The hub H is made hollow, and on the inside, so as to slide on the axle *c*, is placed a thick plate, K, which is grooved around its edge to receive the shanks or wrists of the cranks *f f*. To this plate is rigidly affixed the projection L, extending through the rear of the hub H far enough to admit of the construction and movements hereinafter described. The projection L is hollowed to within a short distance of its outer end and serves as a bearing for the end of the axle *c*. Through the axle *c* runs the rod *g*, which is pivoted to the outer arm of the bent lever *h*, fulcrumed on a pivot at its angle *i*, and to its inner arm is pivoted the governing-rod *k*. The rod *g* extends through the projection L, and by means of the shoulder *j* and nut *l* is firmly secured to said projection. I think now it will readily be seen that when the governing-rod *k* is drawn downward the plate K is shoved backward or outward, which, by means of the cranks *f f* and rods *e e*, turns the fans I I to any desired angle to engage the wind, and the velocity and power of the machine are regulated by the angle at which said fans are placed.

The power of the machine when in motion is transmitted in the following manner: The miter-gear M, firmly secured to the axle *c*, may be made to directly engage the miter-gear N; but when greater power is required it will be found advisable to insert an idler, *o*, as shown in Fig. 1, to prevent lateral walking of the wind-wheel when laboring hard. A second idler, similarly placed on the opposite side of the miter-gears, would assist in steadying the wind-wheel when laboring under a very heavy pressure. I, however, do not deem the second idler necessary, except, possibly, in extreme cases. The miter-gear N is secured to the shaft P, which revolves in the hub E. Said shaft is hollow, and through it runs the governing-rod *k* into the standard *m*, which is secured to the platform C to prevent lateral motion of said governing-rod. The governor cut-off *r r* is firmly secured to the shaft P, and is connected by a swivel-joint, *s′*, Fig. 4, with the regulating-wheel *s*, and thence with the governing-rod *k* by means of the braces *t t* and nut *p*. A thread, *p′*, Figs. 1 and 4, on said governing-rod *k* is engaged by said nut *p*. It

will readily be seen that when said wheel *s* is turned the rod *k* can be raised or lowered at will, thereby feathering the fans I I and stopping the machine, or bringing them into the wind at any desired angle, thus regulating the velocity of the wind-wheel. It will also be readily seen that when the wind-wheel revolves it causes the governor cut-off *r r* to also revolve, the centrifugal force having a tendency to raise the balls of said governor cut-off and thereby to raise the governing-rod *k* and feather the fans I I, thus controlling the velocity of the wind-wheel. To transmit power from the windmill to other machinery, a bevel-gear, *u*, may be secured to the shaft P and engage the bevel-gear V on the end of the horizontal shaft W.

By means of Figs. 2 and 4 it will be seen that the hollow shaft P is rigidly secured to the head p^2 of the governor, while the lower head, p^3, is movable vertically upon the rod *k*, said head p^3 being connected to the cut-off arms *r r* by means of arms *r' r'*, whereby the outward movement of the balls R upon the ends of the cut-off arms *r* will raise the head p^3, lift the governor-rod *k*, rock the lever *h*, draw the disk K toward the hub H, and turn the rods *d*, thereby giving the vanes or sails I a less angle with the direction of the wind and decreasing the speed of the mill. On the other hand, should the speed slacken so far as to permit the weights or balls R to drop or approach the axis of rotation, the governor-rod *k* is lowered, the disk K is pushed outward, and the sails are so turned that the wind acts with increased power upon them.

The sails may be attached to the arms or tubes *d* and rods *e* in various ways; but I have shown in the present case rings *i* on the end of the tubes *d*, with the arm *e* passing through said ring. A similar ring, *i'*, is placed above and held by the headed end *e'* of the rod *e*. Between the said rings is an annulus, e^2, turning with the rod *e* and carrying the plate i^2, to which the sail is riveted.

In the foregoing description I have referred by letter to only two each of said fans, spokes, the rods therein, and cranks; but it will readily be seen by reference to the drawings that all are constructed on the same principle. A second idler, O', may be introduced opposite the idler O, as shown in Fig. 1, to steady the action of the parts and throw the torsional resistance on both sides of the shaft.

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

1. In a windmill, a series of sails mounted upon radial arms having cranks at their inner ends, a disk having a grooved periphery, in which the ends of said cranks lie, a rod giving horizontal adjustment to said disk, a vertical governor-rod, connected to said adjusting-rod through an elbow or bell-crank lever, and a governor mounted upon a sleeve surrounding said governor-rod, and connected to a head which is adjustable on the latter, by the rotation of which the governor-rod is raised and lowered to give angular adjustment to the sails, substantially as described.

2. In a windmill, the combination, with a series of sails mounted on radial arms having cranks at their inner ends, of a grooved disk, with which the ends of said cranks engage, a rod giving horizontal adjustment to said disk, a governor-rod connected to the adjusting-rod by a bell-crank or elbow lever, a pair of weighted governor-arms pivoted upon a rigid revolving support and linked to the governor-rod, and an adjusting-wheel swiveled upon the head to which said links are connected, and having a nut engaging with a threaded portion of the governor-rod, substantially as described.

3. The combination, with the sails I, having tubes *d*, of the rods *e*, having cranks *f*, the head or hub H, having hub *c*, the disk K, having a peripheral groove and an extension, L, the rod *g*, bell-crank *h*, governor-rod *k*, the governor R *r r'*, connected to a head, p^3, adjustable on said rod, the gear M, carried by a sleeve connected to hub *c*, the gear N, having sleeve P, to which the governor is attached, and the intermediate O, substantially as described.

4. The combination, with the sails and with devices, substantially as described, for feathering the same, of a governor-rod, a bell-crank operated by the same and actuating the feathering devices, a governor mounted upon a rotating sleeve surrounding the governor-rod and connected to a head upon the governor-rod, and a nut swiveled in said head and having a female thread meshing with a male thread on the rod, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

ENOS P. MILES.

Witnesses:
P. M. WICKSTRUM,
GEORGE H. STROM.