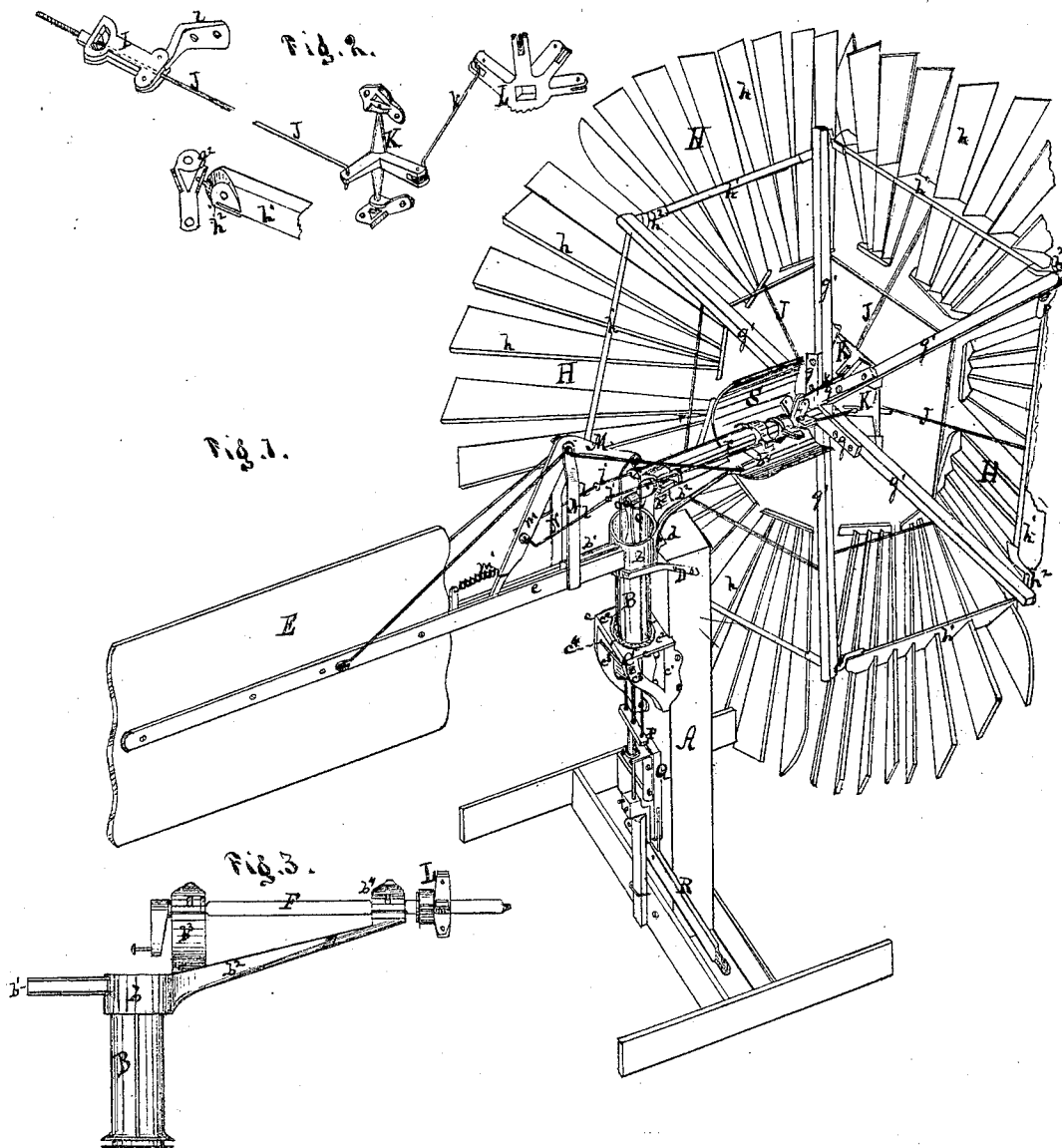


GILES MABIE & THOMAS C. LITTLE.

Improvement in Windmills.

No. 114,309.

Patented May 2, 1871.



Witnesses:

S. J. Hayes.

B. H. Person

Inventors:

Mabie & Little by

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UNITED STATES PATENT OFFICE.

GILES MABIE AND THOMAS C. LITTLE, OF DIXON, ILLINOIS; SAID MABIE ASSIGNS HIS RIGHT TO SAID LITTLE.

IMPROVEMENT IN WINDMILLS.

Specification forming part of Letters Patent No. **114,309**, dated May 2, 1871.

To all whom it may concern:

Be it known that we, GILES MABIE and THOMAS C. LITTLE, of Dixon, in the county of Lee and State of Illinois, have invented a new and useful Improvement in Windmills; and we do hereby declare that the following is a full and exact description of the same, reference being had to the accompanying drawing, and to the letters of reference marked thereon.

This invention relates to that class of windmills which is provided with a vertical wheel upon a horizontal shaft, the wheel having rosette fans or sails, provided with the usual weights for regulating their position relatively to the wind; and consists in certain details of construction, which will be fully described hereinafter.

In the drawing, Figure 1 represents a perspective view of mill, with the shield in section. Fig. 2 represents views in perspective of the projecting arm of the cross-bar, bell-crank, slide-head, bearing-plate, and clasp; Fig. 3, a side elevation of the cylinder, with its arms, standards, &c.

To enable others skilled in the art to make and use our invention, we will now proceed to describe fully its construction and method of operation.

A represents the tower or standard, which may be of any proper form and suitable construction. B represents a cylinder, which forms a support or base for the remaining parts of the mill. It is itself secured to the standard by means of the step C at its lower end and the strap D at its upper end. The step C is formed of two equal parts, *c c*, of corresponding form, each of which is provided with an angle-iron, *c'*, top plates *c''*, and brace-bar *c'''*. The top plate *c''* extends inwardly a little beyond the vertical line of the inner face of the inner half of the angle-iron, and consequently rests, when in place, in a recess in the standard. The angle-iron is secured by proper fastening to the corners of the standards, as shown.

Each top plate *c''* of the step is provided with a semicircular recess upon its inner side, which forms, when the parts are united, a central opening for the reception of the lower

end of the cylinder B. The latter is provided at this point with a groove formed by projecting flanges, in which groove the edges of the top plate of the step rest, as clearly shown in the drawing.

c' represents a bolt, by means of which the parts of the steps are securely bound together after the cylinder is placed in position.

The strap D may be of any proper construction. In connection with it is used a bearing-plate, *d*, attached to the standard, which rests against the cylinder and assists in holding it properly in place. The cylinder B, in addition to the flanges at its lower end, is provided also with an enlargement, *b*, at its upper end, and with arms *b'* *b''*, extending at right angles, or nearly so, to its vertical center line, and in opposite directions from each other. The arm *b'* is provided with projecting edges above and below upon each side, by means of which a recess is made to secure the arms or beams *e* of the vane or guiding-fan E. The arm *b''* is inclined upward slightly as it extends outward from the enlarged end of the cylinder, and is provided with standards *b'''* *b''''*, to which are secured the boxes for the bearings of the main shaft F. It may be further provided also, if desired, with ears for holding the ends of suitable base-rods to stay the machine.

The main shaft F has attached to one end, in any suitable manner, the wind-wheel, and to the other the crank, to which is connected the pitman for operating the pump-rod. The pitman is held at proper intervals by suitable guides, and is connected to the pump-rod by a loose joint, which will permit the former to revolve without affecting the latter. The wind-wheel is connected to the shaft F in this case by means of a circular plate, G, provided with radial arms *g*, corresponding in number with the divisions of the wheel. To the arms *g* the fan-supporting arms *g'* are secured in any proper manner.

H represents a set of sails or fans, such as is common to rosette fan-wheels, which consists of a series of blades, *h*, of similar form, which is attached in an inclined position to a common central cross-bar, *h'*.

The cross-bar itself is pivoted at its ends to the ends of the arms *g'*, the connection be-

tween the parts being established by means of a clasp, h^2 , upon the end of the cross-bar h^1 , which is provided with a tapering stud or spindle, which rests in bearings in the plate g^2 upon the arm g^1 . This plate is peculiarly constructed. It is provided with ears upon each side and with a central triangularly-shaped projection, which latter acts as a stop and prevents excessive lateral motion on the part of the cross-bar h^1 in its bearing in the plate.

The foregoing description relates especially to the construction of the mill proper, without regard to the means for regulating or controlling it.

We will now proceed to describe the devices by means of which its speed is always automatically regulated.

i represents an arm projecting from the cross-bar h^1 of each set of fans, to which is securely fastened the peculiarly-formed iron I . This latter is constructed in two equal and similar parts, each of which is provided with a semicircular longitudinal recess, which forms, when the parts are united, an orifice for the reception of the end of the connecting-rod J . The free end of the iron also is enlarged and provided with an opening, as clearly shown in the drawing, which is designed for the purpose of holding a nut upon the rod and permitting the same to be easily manipulated. The outer end of the rod beyond the iron is also provided with a nut, by which arrangement the length of the rod relatively to the iron can be easily adjusted when desired.

The inner ends of the rods J are attached to one of the arms of the bell-cranks K , to the other arm of which latter are attached rods k , by means of which connection is made with the sliding head L .

The bearing-arms of the bell-cranks rest in bearings in a plate constructed similarly to the plate g^2 , hereinbefore described.

The sliding head L consists of a collar provided with slotted radial arms and a flanged sleeve, the whole surrounding the main shaft F , and so attached to it as to revolve with it and slide upon it.

In the groove of the sleeve rest curved bars, united at their ends to each other and to the connecting-rods l , which latter, passing through suitable guides, are jointed at l' , and united at their rear ends to the long arm of the elbow-lever M , as shown. This latter is pivoted to the upper ends of the standards N , which rise from the vane-beams c below, and is united by means of its short arms to the connecting-rods o , as shown.

To the extreme end of the long arm of the lever M is attached one end of a spring, m , the other end of which latter is suitably attached to the vane-beams, as shown.

The connecting-rods o pass downward upon the inside of cylinder B , through its enlargement b , and upon its outside through grooves,

as shown, the remaining part of the way to the lower flanges, and through them to the cross-head p . This latter is provided with a central cylindrical downwardly-projecting stud, through which passes the pitman, and which has also a groove, in which rest the fingers of the bar Q , attached to the adjusting-lever R .

S represents a shield, which is, preferably, cylindrical in form, and is secured to the arms of plate g , and is designed to protect the slide-head from being affected by snow or ice.

The operation is as follows: The wheel is actuated by the wind in the usual well-known manner. When the pressure upon the fans becomes excessive they are caused to revolve with sufficient rapidity to throw outward, by centrifugal force, the irons I , which act as weights, and thus, by their movement, turn the sails more or less parallel with the direction of the wind's movement, and remove them, to a greater or lesser extent, from the influence of its action.

The movement of the sails causes, by means of the connections described, a corresponding movement of the slide-head, and with it also the elbow-lever M , which draws out the spring m . It therefore follows that when the pressure of the wind has subsided sufficiently to permit the spring m to act, it will retract and draw the sail again into the wind. It consequently follows that the devices for regulating the fans are automatic in their operation.

When the pressure of the wind is excessive the sails are thrown out of the wind by the centrifugal action of the weighted irons; but as soon as the force subsides the sails are drawn again into the wind by the action of the spring m .

By means of the adjusting-lever R the position of the sails can be regulated at any time at will.

Some of the specific details of the construction shown are possessed of marked advantages. The peculiar construction of the cylinder and its step permits the parts to be easily and quickly attached to each other and the standard.

The peculiar construction of the connecting-rods and irons attached to the sails permits an adjustment to be easily made, so that the relative position of the sails to the slide-head may be changed when desired—that is to say, if it should be found in practice that the extreme movement of the slide-head did not permit the sails to be sufficiently exposed to the wind, or the opposite, the connecting-rods could be easily changed, so as to throw the sails farther out or draw them farther in.

The manner of forming the bearing-surfaces with tapering ends, which are limited in their lateral movement by steps, is believed to possess advantages over the usual shoulder placed upon the bearing-shaft.

The windmill as a whole is simple in its construction, and not liable to get out of order.

Having thus fully described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. The arrangement of the elbow-lever M, with its standards N and connecting-rods *l l'* *o o'*, by means of which the adjusting-lever is connected to the slide-head, as described.

2. The irons I, constructed as described, in combination with the connecting-rods J, as set forth.

This specification signed and witnessed this 19th day of December, 1870.

GILES MABIE.

THOMAS C. LITTLE.

Witnesses:

HARVEY MORGAN,
G. W. FORD.