W. A. FIFIELD.

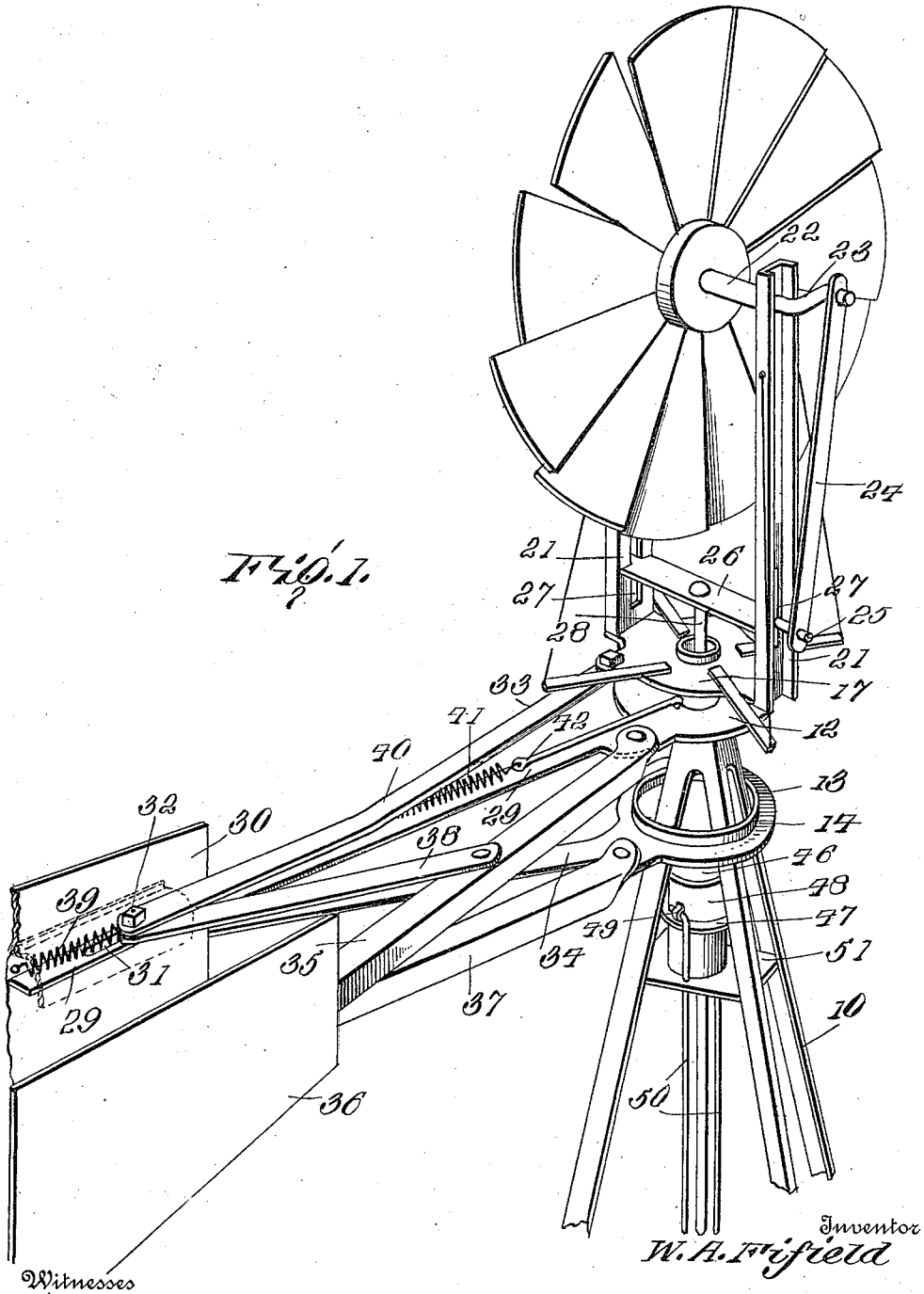
WINDMILL GOVERNOR.

APPLICATION FILED APR. 18, 1910.

984,755. **Patented Feb. 21, 1911.**

2 SHEETS—SHEET 1.

Fig. 1.



Witnesses

W. N. Woodson.

Juana M. Fallin.

Inventor

W. A. Fifield

By

H. A. B. Lacey. Attorneys

W. A. FIFIELD.

WINDMILL GOVERNOR.

APPLICATION FILED APR. 18, 1910.

984,755.

Patented Feb. 21, 1911.

2 SHEETS—SHEET 2.

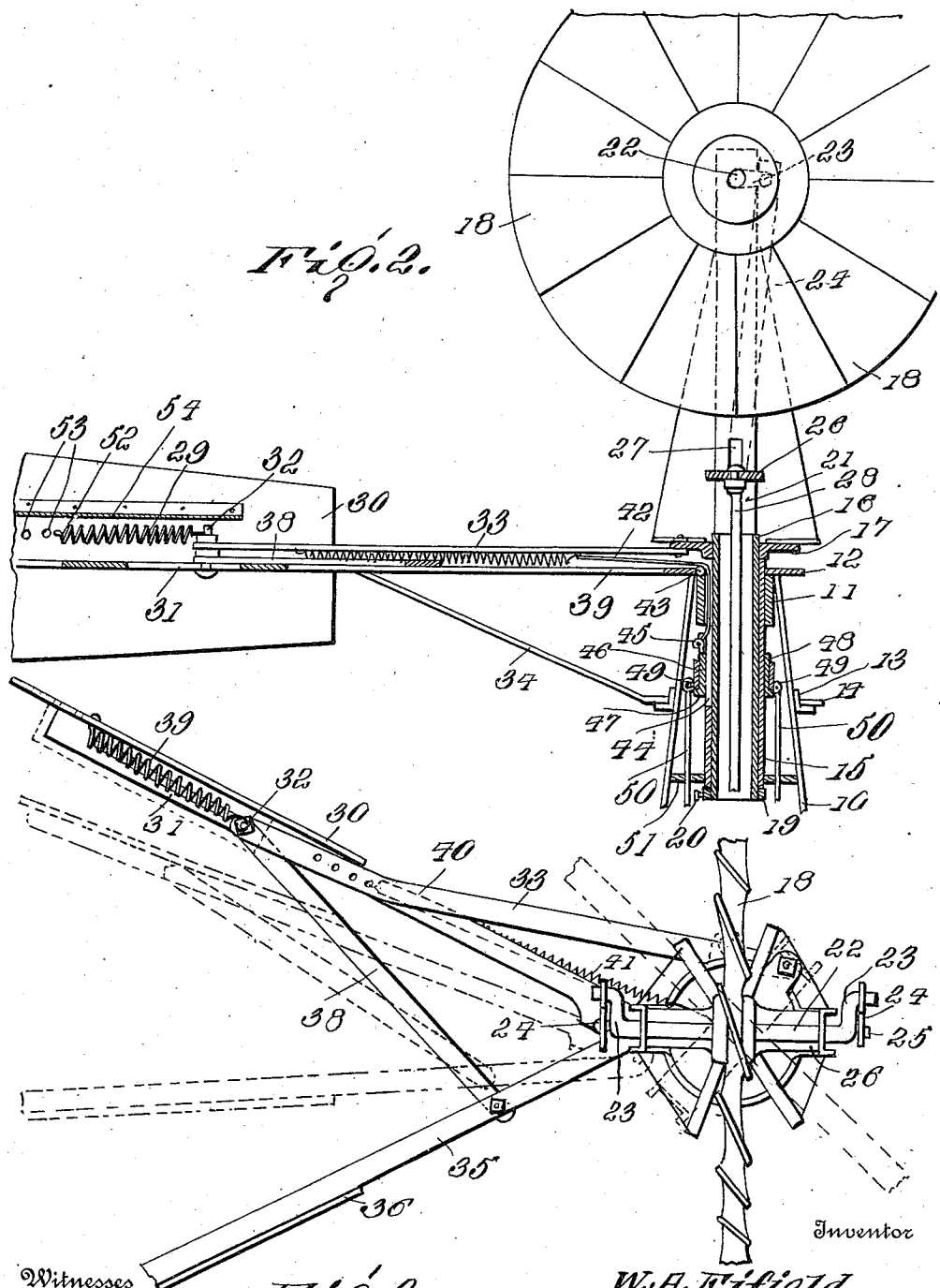


Fig. 2.

Fig. 3.

Witnesses

W. A. Woodson.

Juana M. Fallin.

Inventor

W. A. Fifield

By Thompson, Attorneys

UNITED STATES PATENT OFFICE.

WILLIAM A. FIFIELD, OF MINOT, NORTH DAKOTA.

WINDMILL-GOVERNOR.

984,755. Specification of Letters Patent. **Patented Feb. 21, 1911.**

Application filed April 18, 1910. Serial No. 556,054.

To all whom it may concern:

Be it known that I, WILLIAM A. FIFIELD, citizen of the United States, residing at Minot, in the county of Ward and State of North Dakota, have invented certain new and useful Improvements in Windmill-Governors, of which the following is a specification.

This invention relates to that type of mechanical motors which are known as windmills, and refers particularly to certain improvements upon a similar device, Patent No. 932,260 for which was granted August 24, 1909.

An object of this invention is to provide a substantial and efficient mounting for the operative parts of the mill, whereby a more durable and practical device is obtained.

Another object of the present invention is to provide means for automatically closing or contracting the vanes when the tension spring is released. This automatic means comprises a spring which also serves the purpose of overcoming or counter-balancing the friction of the sliding bolt in the guide, and to automatically turn the windmill out of the air current when it is not to be operated.

A still further object of this invention is to so mount the windwheel that it is disposed directly over, and in vertical alinement with the axis of the tower, and whereby the operative parts are more rigidly supported and at the same time the friction is lessened between the moving parts of the same.

For a full understanding of the invention reference is to be had to the following description and accompanying drawings, in which:—

Figure 1 is a perspective view of the improved windmill, the lower portion of the tower being broken away. Fig. 2 is a vertical central section through the same. Fig. 3 is a top plan view thereof.

Corresponding and like parts are referred to in the following description and indicated in all the views of the accompanying drawings by the same reference characters.

Referring to the drawings the numeral 10 designates a suitable tower or support which may be of any approved construction. The upper end of the tower 10 terminates in an annular frame 11 having a smooth upper edge for the reception of a plate 12. An annular rest 13 is secured about the outer face of the tower 10 and spaced downwardly from the upper end thereof. The rest 13 comprises a flanged ring for the reception of a lower plate 14. The plates 12 and 14 are rotatably disposed with respect to the tower 10 and are suitably connected as will hereinafter appear. A tube 15 is rotatably disposed through the frame 11 and carries upon its upper end and in rigid relation thereto the upper plate 12. A hollow spindle 16 is disposed for rotation through the tube 15 and carries upon its upper end a base-plate 17 upon which the windwheel 18 is supported. The hollow spindle 16 is provided upon its lower end with a collar 19 which is adjustably secured thereon through the medium of a set-screw 20. The collar 19 is adapted for loose engagement against the lower end of the tube 15 to retain the hollow spindle 16 against upward movement. The base-plate 17 is provided at its opposite sides with a pair of standards 21 in the upper ends of which are journaled the opposite extremities of a shaft 22 to which the windwheel 18 is rigidly secured. The ends of the shaft 22 are projected outwardly beyond the standards 21 and are formed into crank-arms 23. Pitmen 24 depend from the crank-arms 23 and are hingedly mounted at their lower extremities upon studs 25 which are outwardly projected from a cross-head 26. The cross head 26 is positioned between the standards 21 and carries upon the ends thereof the studs 25 which are projected through slots 27 formed longitudinally in the lower ends of the standards 21. The cross head 26 is provided centrally with a connecting rod 28 extending downwardly through the hollow spindle 16 and the tower 20. The upper plate 12 is provided at one side with a rigid arm 29 which projects outwardly in a horizontal plane upon the plate. The arm 29 is rigidly secured against the inner face of the vane 30. The arm 29 is provided adjacent its outer end with a longitudinal slot 31 forming a guide for the reception of a sliding bolt 32. The bolt 32 carries the outer end of a connecting bar 33 which is hingedly mounted at its inner end to the base-plate 17. The

lower plate 14 is provided with a rigid brace 34 extending diagonally upward from the plate to engage with the rigid arm 29 at a point adjacent the inner end of the vane 30. The upper plate 12 carries a hinged arm 35 which extends outwardly in the plane of the rigid arm 29 and carries upon its outer end a pivoted vane 36. The hinged arm 35 is reinforced by the provision of a hinged brace 37 which is secured thereto at a point adjacent the inner end of the vane 36 and extends diagonally downward to engage in pivotal relation upon the plate 14. By this construction it is observed that the vanes 30 and 36 swing toward and from one another in a horizontal plane. A link 38 is pivoted intermediate of the ends of the hinged arm 35 and extends inwardly to loosely engage about the bolt 32. The vane 30 carries a spring 39 which is secured at its outer end to the vane 30 and at its inner end to the bolt 32 to normally hold the bolt in the outer end of the slot 31. The bar 33 is given a slight outward curve as at 40 in order to accommodate the link to the rigid arm 29 when the vanes are diverged as is disclosed in Fig. 3. Adjacent the outer end of the bar 33 the outer extremity of a spring 41 is secured which extends inwardly and is secured at its opposite extremity to one end of a tension cable 42. The cable 42 is passed inwardly over the upper face of the plate 12 and engages over a roller 43 located at the inner edge of the plate. The cable is then passed downwardly through a longitudinal slot 44 which is formed on the inner side of the tube 15 to which the upper plate 12 is rigidly secured. The lower end of the cable 42 is secured to a lug 45 which is carried upon the upper edge and at one side of a sleeve 46 which is slidably disposed about the tube 15. The sleeve 46 is provided with an annular flange 47 upon its lower edge which holds a ring 48 rotatably about the sleeve 46. The ring carries at its opposite sides a pair of eyes 49 to which are attached the upper ends of a forked tension rod 50. The arms of the rod 50 extend downwardly through a web 51 which is positioned within the tower 10 and about the lower end of the tube 15.

In the operation of this windmill the rod 50 is drawn downwardly to draw the cable 42 taut and to thereby open the vanes 30 and 36. This position of the vanes is effected through the medium of the spring 41 which draws the connecting bar 33 inwardly to slide the bolt 32 toward the inner end of the slot 31. As the link 38 is carried upon the bolt, the same is forced outwardly to swing the arm 35 away from the rigid arm 29. The spring 39 during this movement is expanded. The connecting bar 33 is of such a length that when the vanes are opened to a position approximating that which is disclosed in Fig. 3 the mounting of the windwheel 19 is such as to dispose the plane of the windwheel at right angles to the vanes. As the air current strikes the windwheel 18 the same is revolved and is caused to reciprocate the cross-head 26 between the standards 21 through the medium of the pitmen 24. This action causes the reciprocation of the connecting rod 28. When the air current is of sufficient strength to close the vanes the link 38 moves the bolt 32 backwardly in the slot 31 and carries therewith the connecting bar 33. The connecting bar 33, which is hinged to the base 17 of the wheel mounting, swings the wheel mounting into an angle obliquely to the direction of the air current proportionately to the closing of the vanes, or to the strength of the air current. The spring 41 admits of this closing of the vanes as the spring yields under the increased force of the air current. It will be noted that when the vanes are moved in a horizontal plane about the tower the plates 12 and 14 are carried therewith, the plate 12 revolving with the tube 15 within the frame 11, while the plate 14 moves upon the rest or guide 13. The wheel mounting is carried upon the upper end of the hollow spindle 16, and as the base-plate 17 rests upon the upper end of the tube 15, the mounting is permitted to move freely upon the tube and within the frame 11. The tension rod 50 will be drawn downwardly to any desired and adaptable distance to increase the tension of the yielding spring 41. When the tension rod 50 is released, the spring 39 returns the bolt 32 to the outer end of the slot 31 and thereby closes the vanes automatically.

The spring 39 is employed chiefly for the purpose of overcoming the friction of the bearing surfaces between the movable parts connected to the vanes. The spring 39 is formed with a hook 52 for adjustable engagement in a plurality of openings 53 formed through the vane 30.

The vane 30 carries an overhanging shield 54 which is secured against the inner side of the vane 30 to cover the spring 39, the sliding bolt 32 and the supporting guide or outer end of the arm 29. The shield 54 is employed for the purpose of protecting the brace arranged therebeneath from rain, snow, ice and the like which would otherwise hinder the free operation of the windmill.

Having thus described the invention what is claimed as new is:—

1. A windmill including a tower, horizontal and spaced plates rotatably disposed about the upper end of said tower, co-acting vanes one of which is movable relative to the other carried by said plates, means for yieldingly and adjustably holding the vanes in an open position, a windwheel mounting located on said tower, and connecting means between said vanes and said mounting to

turn the windwheel upon the movement of said vanes relative to one another.

2. A windmill including a tower, plates rotatably mounted about the upper end of the tower, a vane carried rigidly upon the plates, a second vane pivoted upon the plates, a link arranged between the vanes and pivoted to one of them, retaining means connected between one of the vanes and the other end of the link to yieldably hold the vanes apart, a wheel mounting rotatably carried upon the tower, and a bar connecting the wheel mounting to the free end of the link.

3. A windmill including a tower, spaced and horizontal plates carried upon the upper end of the tower, rigid supporting means carried by the plates, hinged supporting means carried by the plates, vanes carried upon said supporting means and adapted to open and close, a link connecting the supporting means, a wheel mounting carried by the tower, a connecting bar disposed between the mounting and the link, and a tension cable connected to the bar for holding the vanes in an open position.

4. A windmill including a tower, spaced plates horizontally and rotatably arranged about the upper end of said tower, a vane rigidly connected to the plates, a second vane hingedly connected to the plates, a sliding bolt carried by one of said vanes, a link connected at one end to the bolt, the opposite end of said link being connected to the movable vane, a spring connected to the bolt to yieldingly hold the same in a position to operate the vanes.

5. A windmill including a tower, spaced plates carried by the tower, a rigid arm carried by the upper of said plates, a rigid brace carried by the lower of said plates and engaged with the outer end of said arm, a hinged arm carried by the upper of said plates, a hinged brace carried by the lower of said plates and connected to the outer end of said hinged arm, vanes carried upon the outer ends of said arms, a link connecting said arms, a slidable bolt carried by one end of said link and adjustably engaged with one of said arms, and a tension device connected to said slidable bolt to normally hold the vanes in an open position.

6. A windmill including a tower, a pair of spaced plates horizontally positioned about the upper end of said tower, a guide carried by the tower to support the lower of said plates, a tube rotatably disposed in the tower and rigidly connected to the upper of said plates, rigid members carried by said plates, a vane carried by said members, hinged members carried by said plates in the plane of said rigid members, a hinged vane carried by said hinged members, a link pivoted to one of said members, a bolt slidably disposed in the opposite of said members and carrying the opposite end of the link, a tension cable connected to said bolt and passed inwardly over the upper of said plates, said tube having a longitudinal slot formed upon the inner side thereof for the reception of the tension cable, a sleeve loosely arranged about the tube and connected to the lower end of the cable, a ring loosely arranged about the sleeve, a tension rod connected to the ring to reciprocate the same over said tube, and a windwheel mounting carried upon the upper end of said tube and connected to said slidable bolt to be actuated thereby.

7. A windmill including a tower, a circular frame mounted in the upper end of the tower, a tube rotatably disposed in the frame, a spindle positioned through the tube, a base-plate carried upon the upper end of said spindle, spaced standards upwardly extending from the base-plate, a shaft journaled in the upper ends of said standards and having crank portions upon its opposite ends, a windwheel carried centrally upon the shaft, a cross-head arranged for reciprocation between the standards, pitmen carried by the cross-head and connected to said crank portions, a connecting rod depending from the cross-head through the spindle, an upper plate carried upon the upper end of said tube, a guide carried by the tower and spaced downwardly from the upper plate, a lower plate slidably disposed upon the guide, movable vanes carried by said plates, a connecting bar disposed between the vanes and said base-plate, and tension means disposed between the vanes and the tower for yieldably holding the vanes in an open position.

8. A windmill including a tower, a circular frame mounted in the upper end of the tower, a vertical tube disposed for rotation in said frame, a hollow spindle carried by the tube for rotation therein, a wheel mounting carried upon the upper end of the spindle, a collar adjustably secured upon the lower end of the spindle to engage against the lower extremity of said tube to hold the spindle in position, a plate carried by the tube, a lower plate spaced downwardly from the upper end of the tower, vanes carried by said plates, a tension cable connected to the vanes and passed downwardly through the upper of said plates, a sleeve loosely arranged about said tube and connected to the lower end of said cable, a ring carried about said sleeve, and a tension rod connected to the ring to move said sleeve over the tube.

9. A windmill including a tower, horizontal plates rotatably disposed about the tower, co-acting vanes, one of which is movable relative to the other disposed upon the plates, a link pivotally connected at one end to one of the vanes and loosely carried at

its opposite end by the opposite vane, a spring disposed between the opposite vane and the loose end of the link to yieldably close the vanes, and an adjustable tension cable carried by the tower and connected to the loose end of the link to yieldably operate the vanes.

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

WILLIAM A. FIFIELD. [L. S.]

Witnesses:
ROBERT S. GILLESPIE,
NICHOLAS RUSTAD.