

No. 628,497.

Patented July 11, 1899.

R. W. SMITH.
WINDMILL.

Application filed May 14, 1898.

(No Model.)

2 Sheets—Sheet 1.

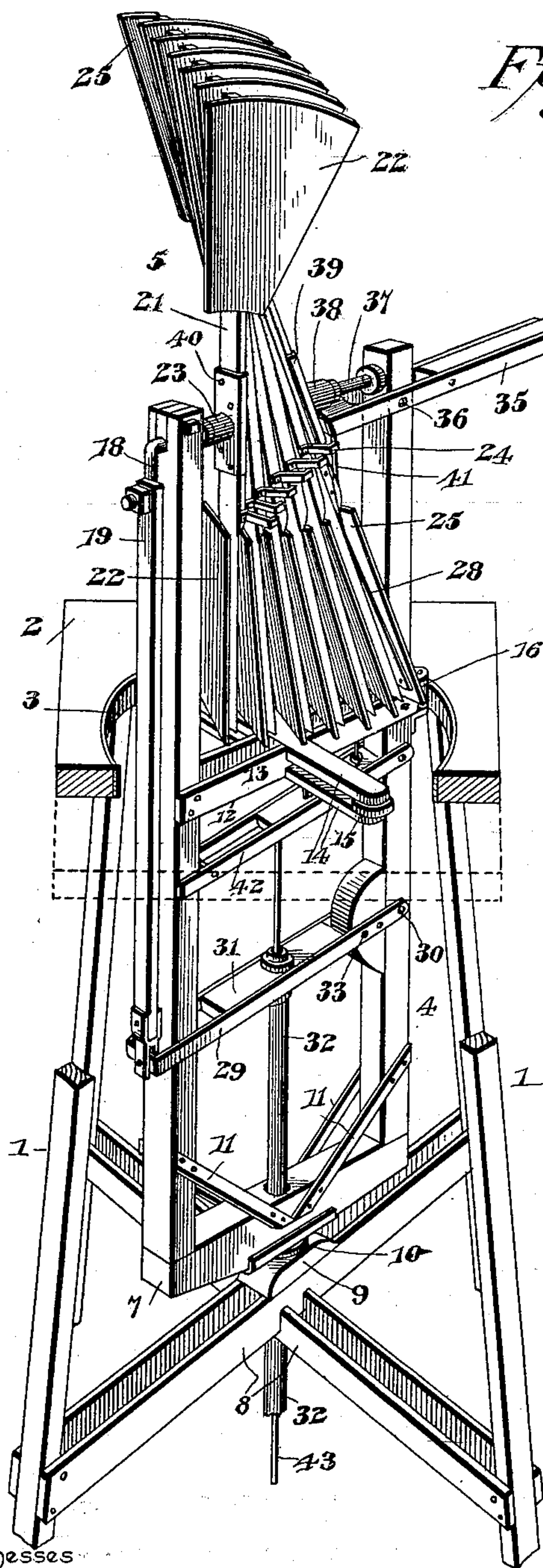


Fig. 1.

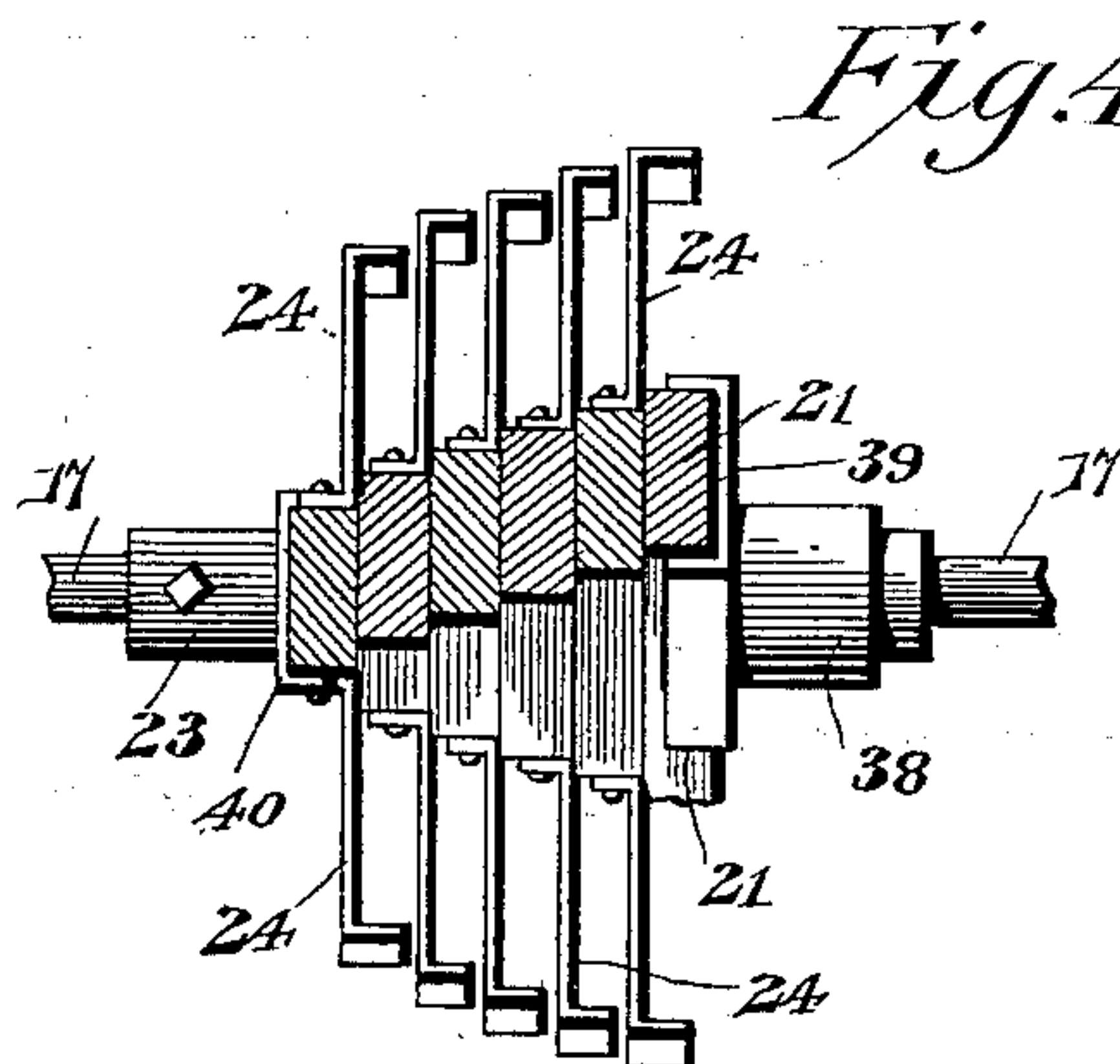
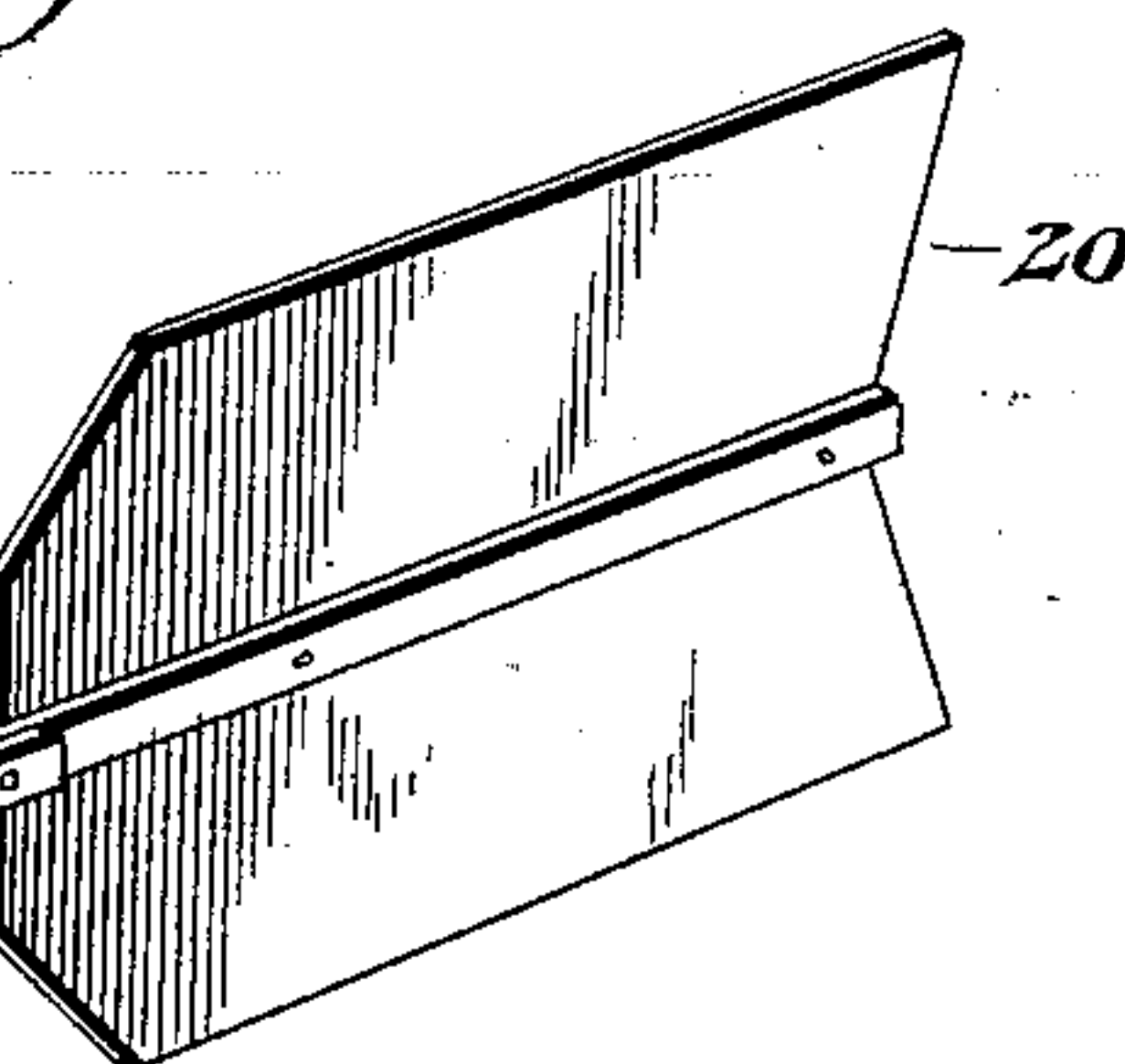
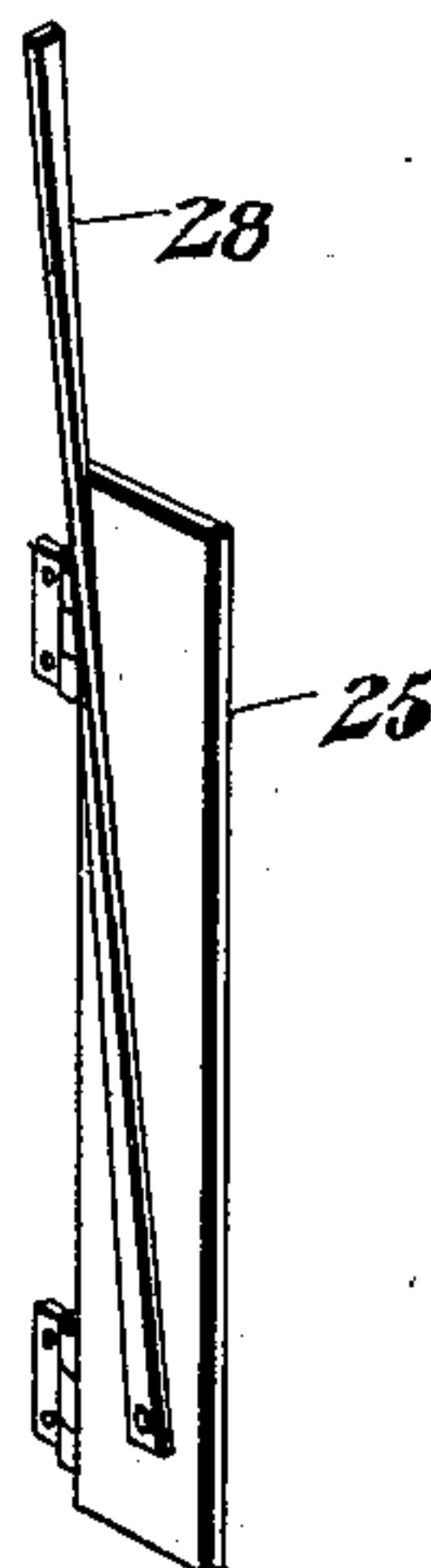


Fig. 4.

Fig. 5.



Witnesses

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2 Sheets—Sheet 2.

Fig. 2.

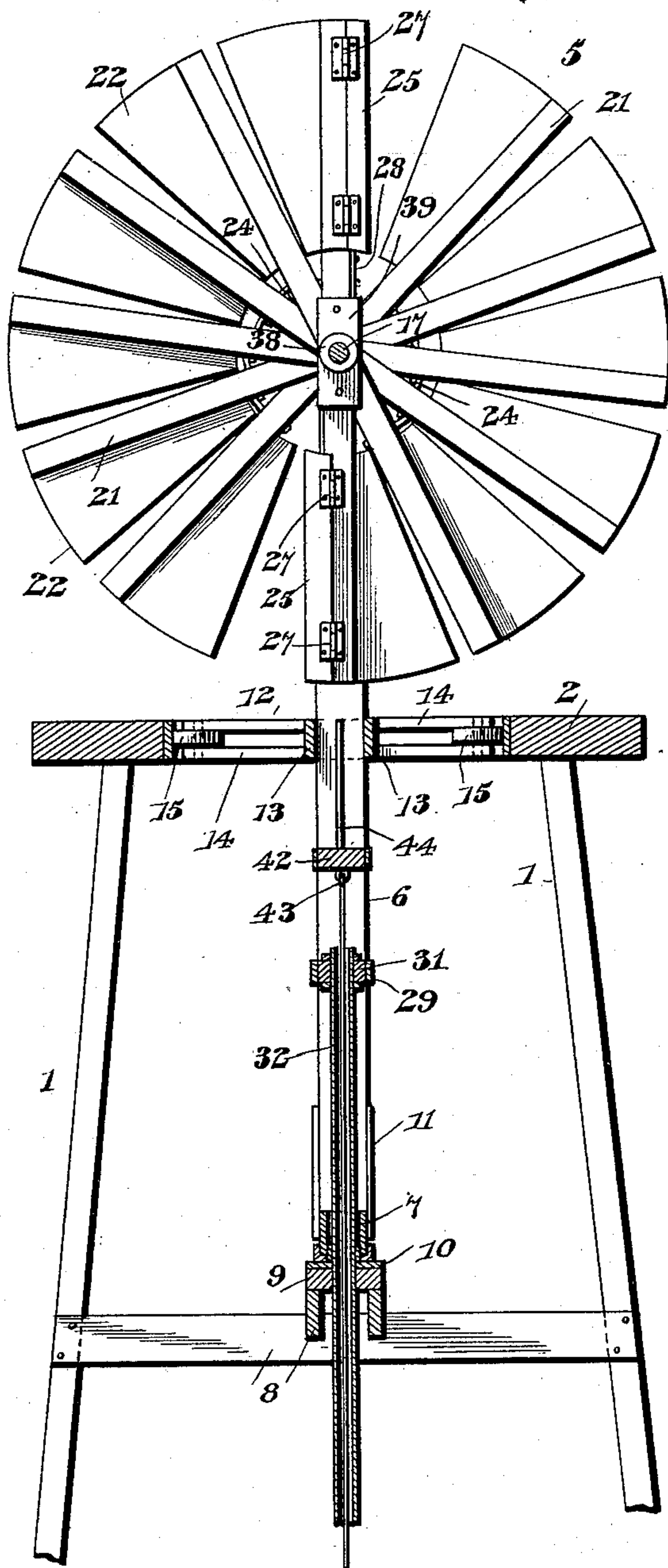
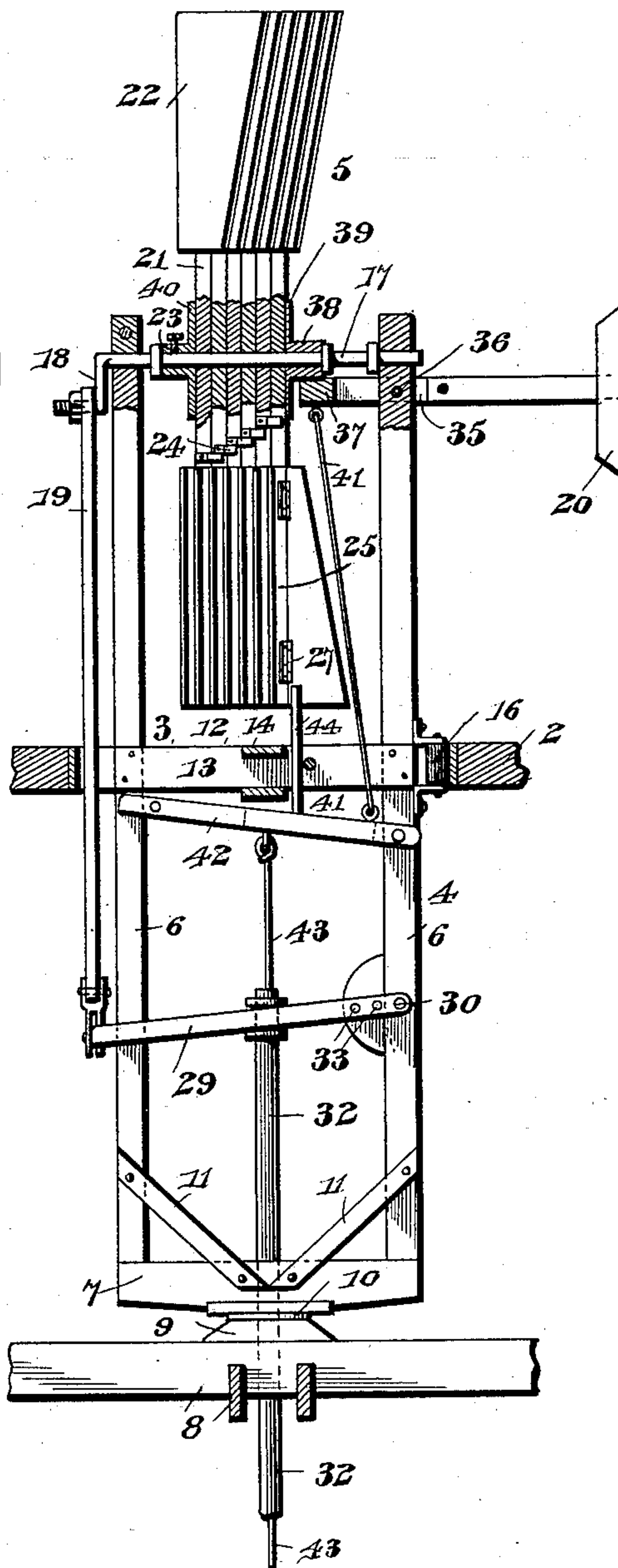


Fig. 3.



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UNITED STATES PATENT OFFICE.

RUFUS W. SMITH, OF OKLAHOMA, OKLAHOMA TERRITORY.

WINDMILL.

SPECIFICATION forming part of Letters Patent No. 628,497, dated July 11, 1899.

Application filed May 14, 1898. Serial No. 680,729. (No model.)

To all whom it may concern:

Be it known that I, RUFUS W. SMITH, a citizen of the United States, residing at Oklahoma, in the county of Oklahoma and Territory of Oklahoma, have invented a new and useful Windmill, of which the following is a specification.

The invention relates to improvements in windmills.

The object of the present invention is to improve the construction of windmills and to provide a simple and comparatively inexpensive one which will be automatic in its operation and adapted to run at a uniform speed.

A further object of the invention is to balance the parts on the rotary frame or turntable and enable the wind-wheel to hang true at all times, and thereby prevent any wobbling.

The invention consists in the construction and novel combination and arrangement of parts hereinafter fully described, illustrated in the accompanying drawings, and pointed out in the claims hereto appended.

In the drawings, Figure 1 is a perspective view of a windmill constructed in accordance with this invention, the blades being folded and a portion of the tower being broken away to show the lower portion of the rotary frame.

Fig. 2 is a vertical sectional view taken transversely of the wind-wheel shaft and showing the wind-wheel open. Fig. 3 is a vertical sectional view taken longitudinally of the wind-wheel shaft, the wind-wheel being closed and locked against rotation. Fig. 4 is a detail sectional view taken transversely of the wind-wheel, the parts being folded and illustrating the arrangement of the hooks. Fig. 5 is a detail view of one of the auxiliary blades.

Like numerals of reference designate corresponding parts in all the figures of the drawings.

1 designates a tower constructed of suitable material and provided at its top 2 with a central circular opening 3, in which operates a vertically-disposed oblong rotary frame 4, which forms a turn-table and which carries a wind-wheel 5. The oblong frame is composed of vertical sides or uprights 6, a horizontal connecting bottom piece 7, and suitable connections and braces for preserving the parallelism of the sides or uprights 6. The bottom of the rotary frame is supported by diagonally-disposed bars 8, arranged in pairs, as shown, and crossing each other at the center of the tower, being suitably secured at that point and forming a central space for the passage of the pump-rod and other connections. A block 9 is secured to the upper edges of the upper pair of the bars 8, and the rotary frame rests directly upon this block, suitable bearing-surfaces being provided between the parts, which may have any desired form of bearing. The bearing 10 consists of a circular bottom plate and an annular flange or bushing extending from the upper face of the plate and projecting into a central opening at the bottom of the rotary frame.

The sides 6 and the bottom 7 are connected by inclined braces 11, arranged in pairs and diverging upwardly, and the rotary frame is provided at the top of the tower with a horizontal bearing-frame 12, composed of bars 13 and 14, arranged in pairs at right angles to each other and centrally secured together. The bars 13 are secured at their ends to opposite sides of the uprights or sides 6 of the rotary frame and form a vertical space between them, and the bars 14, which are arranged one above the other, are secured to the upper and lower edges of the bars 13. The outer ends of the bars 14 support anti-friction-wheels 15, which are journaled in the space between the bars and arranged to run on the curved walls of the opening 3 of the top of the tower, and a vertically-disposed anti-friction wheel or roller 16 is arranged at the outer face of one of the sides 6, being journaled in suitable bearing-brackets. The enlarged opening 3 at the top of the turntable has its walls provided with a suitable metal lining to receive the anti-friction-wheels of the rotary frame, and by this construction the rotary frame moves freely with a minimum amount of friction.

The upper portion of the rotary frame is open to receive the wind-wheel, which is centrally arranged on a horizontal wind-wheel shaft 17, journaled in suitable bearings at the upper ends of the sides 6, and by centrally mounting the wind-wheel in this manner the rotary frame is evenly balanced and the wear

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on the bearings is evenly distributed, so that the wind-wheel hangs true at all times and rotates without wobbling. One end of the horizontal wind-wheel shaft is provided beyond the rotary frame with a crank 18, and a substantially vertical pitman 19 is connected with the crank; but an eccentric or similar connection may be substituted for the crank, as will be readily understood. A vane 20 is mounted at the upper side of the rotary frame and operates to counterbalance the pitman and its connections in order to preserve an even balance of the rotary frame.

The wind-wheel 5 is composed of a series of arms or spokes 21, provided at their ends with curved blades 22 and having central registering perforations, through which passes the horizontal wind-wheel shaft. One of the spokes or arms 21 is fixed to the wind-wheel shaft at 23, and the other spokes or arms are loose on the shaft, whereby the wind-wheel is adapted to open and close by partially rotating the arms or spokes on the wind-wheel shaft to arrange the blades of the wheel in the positions illustrated in Figs. 1 and 2 of the accompanying drawings. The independent rotary movement of the spokes or arms on the shaft is limited by a series of hooks 24, constructed of suitable metal and arranged as shown in the accompanying drawings. As shown in Fig. 4, each hook is provided at its inner end with an arm which is secured to one edge of a spoke, and it has at its outer end an engaging arm, which extends across the path or plane of rotation of the adjacent spoke to form a stop for the same.

The blades are slightly curved and are adapted to be automatically opened by the action of the wind, and in order to prevent the wind-wheel from rotating at too great a speed and preserve a uniform operation of the windmill one of the spokes or arms is provided with a pair of auxiliary blades 25, arranged the reverse of the said blades and connected with the spoke upon which they are mounted by hinges 27. The auxiliary blades, which are adapted to open to a plane substantially at right angles to that of the blades 22, are controlled by springs 28, disposed longitudinally of the arm or spoke and secured at their inner ends to the same. The outer ends of the longitudinal torsion-springs are attached to the auxiliary blades, and when the force of the wind exceeds the power of the springs the auxiliary blades are opened and operate to close the wind-wheel to a greater or less extent. As soon as the force of the wind abates the torsion-springs close the auxiliary blades and permit the windmill to open.

The lower end of the pitman, which is located on the exterior of the rotary frame, is connected with a horizontally-disposed oscillating lever 29, extending across the rotary frame and located at a point beneath the top of the tower and adjustably fulcrumed at 30. The horizontal lever 29 is composed of two sides, preferably constructed of a single piece

of metal doubled between its ends, as shown, and the said lever is provided with a central block or piece 31, secured between the sides of it and provided with a central opening, in which is swiveled a vertically-reciprocating tubular pump-rod or lift-rod 32. The terminals of the metal of which the sides of the horizontal lever are constructed are provided with perforations 33, and the pivot or fulcrum may be arranged in any of the perforations, whereby the length of the stroke of the windmill may be regulated to accommodate it to the character of pump, depth of well, and similar conditions.

The vane is provided with parallel side bars 35, pivoted at 36 to one of the sides or uprights of the rotary frame and extending inward beyond the same and carrying a brake-shoe 37, which engages a brake-sleeve 38, mounted on the wind-wheel shaft and connected with the adjacent spoke. The hub or sleeve 38 is formed integral with a plate 39, provided at its edges with longitudinal flanges and secured to the adjacent end spoke, as shown. The other end spoke is provided with a similar plate 40, which carries the portion 23, that is fixed to the wind-wheel shaft. The weight of the vane operates to hold the brake-shoe in engagement with the brake-sleeve when it is free to do so, and it assists in preventing the wheel from rotating.

The inner end of the vane is connected by a wire 41 or other suitable connection with a transverse lever 42, fulcrumed on the rotary frame beneath the vane and located beneath the top of the tower. The lever 42 is composed of a pair of side bars and a connecting piece or block interposed between the side bars and secured to the same, and an operating-wire 43, which extends through the tubular pump-rod, is connected with the lever 42, and controls the brake. The lever 42 also carries a vertically-movable catch or stop 44, guided by the bearing-frame and arranged to project above the same and lie in the path of the wind-wheel, whereby the movable blades are furled. The catch, which extends upward from the lever 42, operates simultaneously with the brake and is controlled by the operating-wire 43. The blades by being arranged at an angle overlap sufficiently to prevent one from passing the other when the wheel is engaged by the stop 44 to furl the blade.

The invention has the following advantages: The windmill, which is simple and comparatively inexpensive in construction, is positive and reliable and automatic in operation, and the parts carried by the rotary frame are balanced, and the wind-wheel, which is centrally arranged, always hangs true and cannot wobble. The stroke of the windmill is readily regulated and may be varied to suit the character of pump, the depth of well, and various other conditions which render an adjustable or variable stroke necessary. The brake and the catch are simultaneously applied, and the weight of the vane holds the

brake-shoe in engagement with the brake-sleeve and maintains the catch in engagement with the wind-wheel.

Changes in the form, proportion, and minor details of construction may be resorted to without departing from the spirit or sacrificing any of the advantages of this invention.

What I claim is—

1. In a windmill, the combination of a frame, a wind-wheel having movable blades, and a vertically-movable stop mounted on the frame and arranged in the path of the blades and adapted to furl the same, substantially as described.

2. In a windmill, the combination of a vertical rotary frame, a wind-wheel mounted on the same, and having movable blades, a lever fulcrumed on the frame, and a stop or catch mounted on the lever and arranged to project in the path of the blades of the wind-wheel to prevent the latter from rotating and to furl the blades, substantially as described.

3. In a windmill, the combination of a vertical rotary frame, a wind-wheel mounted thereon and provided with movable blades, a substantially horizontal lever fulcrumed on

the frame and extending across the same and located below the wind-wheel, a catch mounted on the lever and extending upward therefrom, said catch being guided by the frame and being adapted to project into the path of the blades to furl the latter, and means for operating the lever, substantially as described.

4. In a windmill, the combination of a rotary frame, a wind-wheel, a vane fulcrumed on the frame and carrying a brake-shoe for retarding the rotation of the wind-wheel, said brake-shoe being arranged at the inner end of the vane and being applied by the weight of the latter, a lever fulcrumed on the frame and connected with the inner end of the vane, a catch carried by the lever and arranged to project in the path of the blades, and operating mechanism connected with the lever, substantially as described.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

RUFUS W. SMITH.

Witnesses:

J. S. LINDSEY,

CHARLES C. DITTMER.