No. 633,879. Patented Sept. 26, 1899.

J. MILLER.

WINDMILL.

(Application filed Feb. 3, 1898.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1.

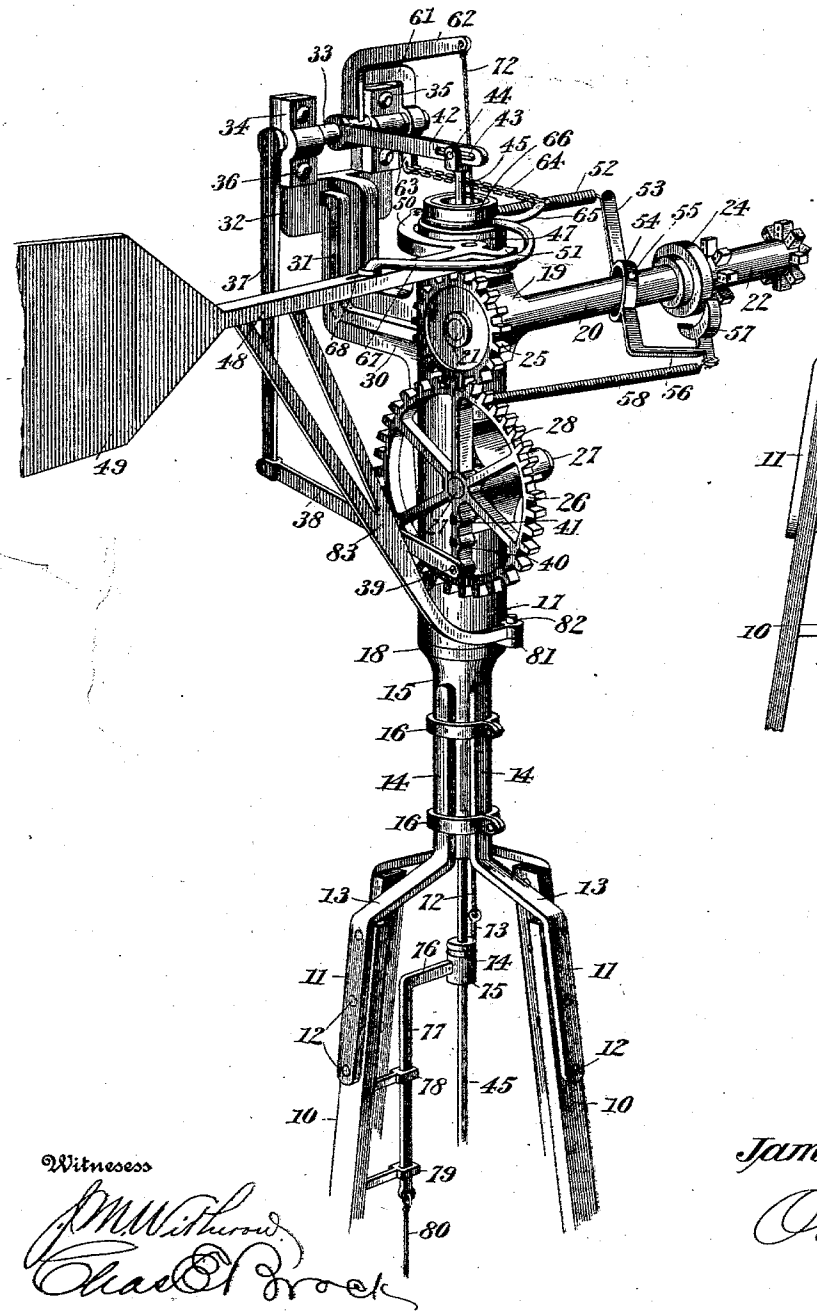
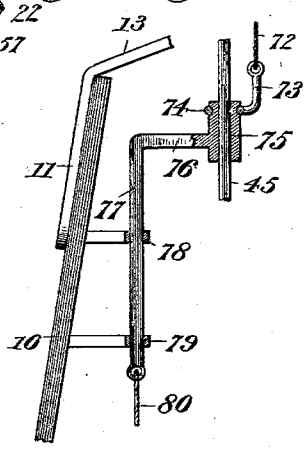


Fig. 8.



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Fig. 2.

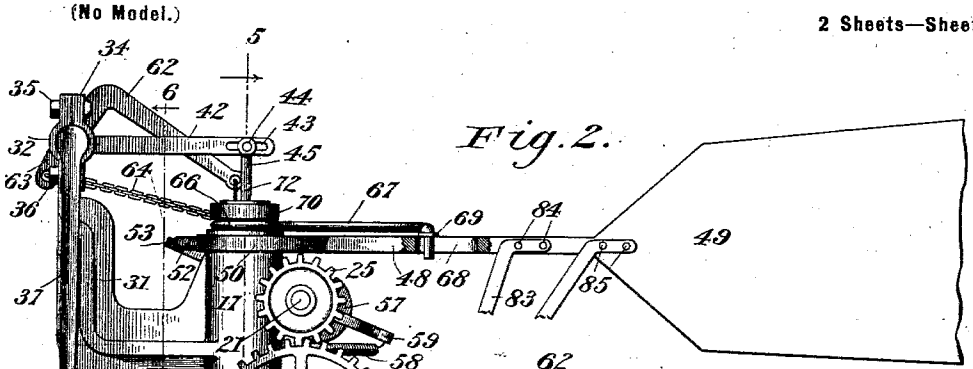


Fig. 3.

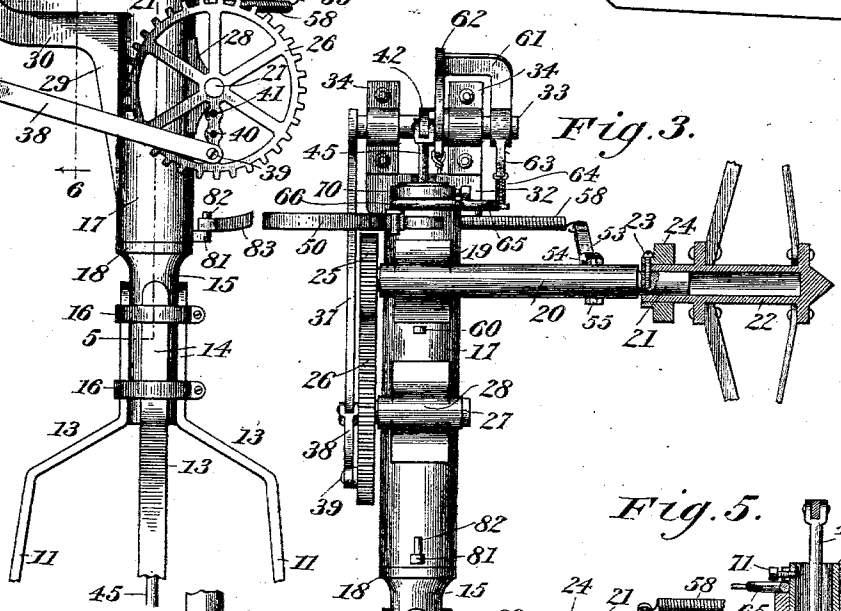


Fig. 4.

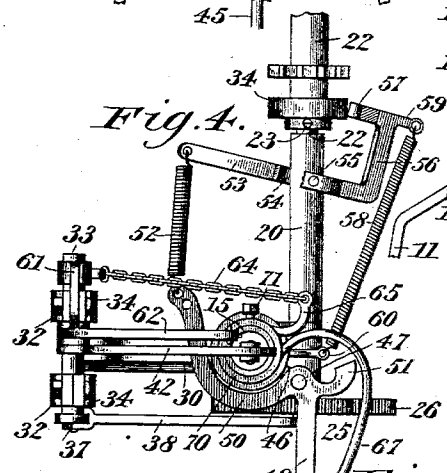


Fig. 5.

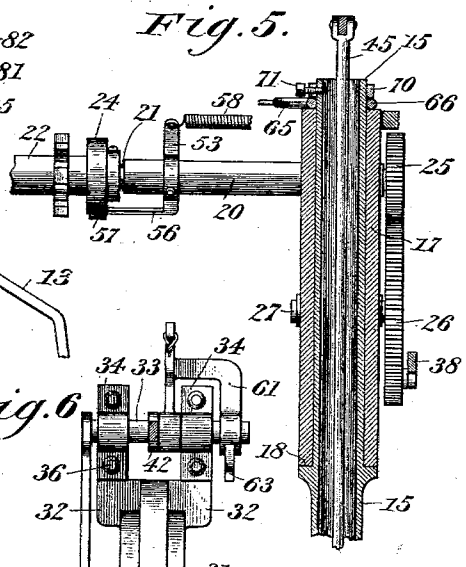
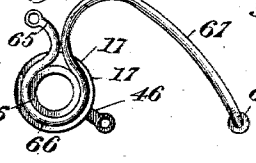


Fig. 6.

Fig. 7.



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UNITED STATES PATENT OFFICE.

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WINDMILL.

SPECIFICATION forming part of Letters Patent No. 633,879, dated September 26, 1899.

Application filed February 3, 1898. Serial No. 669,028. (No model.)

To all whom it may concern:

Be it known that I, JAMES MILLER, a citizen of the United States, residing at Surber, in the county of El Paso and State of Colorado, have invented a new and useful Windmill, of which the following is a specification.

My invention relates to windmills, and has for its object to generally improve their operation by simplifying and cheapening their construction and at the same time rendering them more powerful and reliable.

With this object in view my invention consists in the improved construction, arrangement, and combination of novel parts, as hereinafter fully described, whereby I provide improved means for communicating the rotary motion of the wind-wheel shaft to the pump-rod and improved means for bringing the wheel from a position of work to a position of rest the particular points of novelty in such parts and combinations being specifically pointed out in the appended claims.

In order to enable others skilled in the art to which my invention most nearly appertains to make and use the same, I will now proceed to describe its construction and operation, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a perspective view of a windmill constructed in accordance with my invention, the lower portion of the tower and the outer portion of the vane being broken away and the parts being in the positions they assume when the mill is at work. Fig. 2 is a view of the same parts in side elevation, the parts being in the positions they assume when the mill is at rest, the supporting-braces of the vane being partly broken away. Fig. 3 is a view in elevation, looking from the right-hand side, of the mill in the position illustrated in Fig. 2, the brake-collar and wind-wheel being shown in section. Fig. 4 is a top plan view of the mill as illustrated in Fig. 1, the vane and wind-wheel being broken away. Fig. 5 is a detail sectional view on the plane indicated by the broken line 5 5 of Fig. 2 looking in the direction of the arrow. Fig. 6 is a detail sectional view on the plane indicated by the broken line 6 6 of Fig. 2 looking in the direction of the arrow. Fig. 7 is a detail top plan view illustrating the bar for moving the vane-supporting stem or rod when the mill is put out of the wind. Fig. 8 is a detail view illustrating the manner of guiding and supporting the adjusting rope or cable.

Like numerals of reference mark the same parts wherever they occur in the various figures of the drawings.

Referring to the drawings by numerals, 10 indicates the upper ends of the uprights of the tower upon which the mill is supported, and 11 represents bars secured upon them by bolts or rivets 12, said bars being bent inward, as at 13, and again upward, as at 14, these upper ends 14 being clamped upon the outside of a cylinder 15 by means of clamping-rings 16, the cylinder 15 passing upward and serving as the support or spindle of the vertical hub or sleeve 17, to which all the operative parts of the mill are attached, said sleeve resting at its lower end upon a shoulder 18, formed on the cylinder a short distance above the upper ends of the bars clamped thereon. This construction permits of the free rotation of the sleeve 17 with all the operative parts of the mill upon the cylinder 15, whereby the wheel may be kept in the wind or in an operative position as long as may be desired, the action of the wind upon the vane keeping the wheel facing the wind in the usual well-known manner.

Upon one side of the sleeve 17, near the upper end thereof, is cast or otherwise formed or secured a bracket 19, provided with a laterally-extending horizontal bearing-sleeve 20, in which is journaled a horizontal shaft 21, which projects slightly beyond the outer end of the sleeve into the hub 22 of a wind-wheel of any approved construction, the hub being rigidly secured upon the shaft by a screw 23, passing through one side of a collar 24 and of the hub and into the shaft, as clearly shown in Fig. 3. The shaft 21 also projects slightly beyond the inner end of the horizontal sleeve 20 and carries a pinion 25, which engages with a gear-wheel 26, mounted on a short shaft 27, journaled in a bracket 28, secured to or cast with the sleeve 17 below the

bracket 19, the shaft 27 being parallel with the shaft 21.

On the opposite side of the sleeve 20 from the brackets 19 and 28 is formed or secured a bracket 29, having a horizontal arm 30, at the upper end of which is a vertical branch 31, upon which are mounted uprights 32, each of which serves as one half of a bearing for a cross-shaft 33, the plates 34 and 35, clamped to the uprights by bolts 36, forming the other halves. This cross-shaft has a radial arm 37, mounted upon its outer end, which is connected pivotally at its outer end to one end of a pitman 38, the opposite end of the pitman being connected to the gear-wheel 26 at either 39, 40, or 41, according as the stroke is to be long or short and the power correspondingly diminished or increased.

Secured upon the cross-shaft 33 is a horizontally-extending arm 42, having a slot 43 in its outer end, in which works a pin 44, by means of which the forked upper end of the pump-rod 45 is secured to the arm. The pump-rod passes downwardly through the cylinder 15 and the tower and is connected at its lower end to any approved construction of pump. (Not shown.)

Above the bracket 19 a small bracket 46 projects laterally from the sleeve 17 and carries an upright pintle 47, upon which is pivotally secured a rod 48, which at its outer end supports a vane 49 of any ordinary construction. This rod is provided with an arm 50 on one side, which is substantially semicircular in shape for the greater part of its length, and on its opposite side with a stop-arm 51. A spring 52 connects the outer end of the arm 50 with the outer end of an arm 53, which projects from a loop 54, which encircles the horizontal sleeve 20 and is pivotally connected to said sleeve at 55. An arm 56 projects from the loop on its opposite side and is bent backward and provided with a curved brake-shoe 57 at its opposite end, said shoe being adapted to engage the collar 24 on the wind-wheel hub. A spring 58 is secured at one end to a short arm 59, projecting backwardly from the arm 56, and at the other end to an arm 60, projecting laterally from the sleeve 17.

An inverted-U-shaped bracket 61 is pivotally mounted upon the shaft 33, straddling the upright 32 and carrying at its upper end an arm 62, which projects horizontally to a point above and in line with the cylinder 15. An arm 63 projects downwardly from the opposite end of the bracket 61, and at its lower end is connected a chain 64, which connects it with one branch 65 of a rod 66, which encircles the upper end of the cylinder 15 loosely enough to turn thereon, and is provided with another branch 67, which is bent around to a position immediately over the bar 48, which supports the vane. The outer end of the arm 67 is bent downwardly and engages in a slot 68 in the bar 48, a collar 69 being provided to insure easy movement in the slot. The rod 66 and the sleeve 17 are prevented from rising upon or slipping off the cylinder 15 by a ring 70, adapted to be clamped upon the upper end of the cylinder 15 above the rod 66 by means of a screw 71.

A rope, cable, or chain 72 is secured at the outer end of the arm 62 and passes downward through the cylinder 15 into the tower and carries at its lower end a rod 73, bent to form a ring or eye 74, which engages in an annular groove in the sleeve or collar 75, mounted upon the pump-rod 45.

Rigidly secured to or formed with the sleeve 75 is a horizontal arm 76, having a vertically-depending arm 77, which is rectangular in cross-section and is slidably arranged in similarly-shaped openings in the outer ends of the brackets 78 and 79, rigidly secured to one of the uprights 10 of the tower.

To the lower end of the arm 77 is secured a rope, chain, or cable 80, which extends down through the tower to within reach of a person upon the ground or platform of the tower.

At the lower end of the sleeve 17 a small bracket 81 projects laterally and is provided with an upright pintle 82, upon which is swiveled the lower end of a forked brace 83, the upper prongs of which are secured to the vane-supporting bar and to the vane by means of bolts 84 and 85, whereby the vane is strengthened and braced.

The construction of my improved windmill will be readily understood from the foregoing description, and its operation may be described as follows: Supposing the parts to be in the position shown in Fig. 1 of the drawings and the wind turning the wheel, the hub, through its attachment to the shaft 21 by means of the screw 23, will turn that shaft and the wheel 25 upon its inner end. The teeth of this wheel engaging the wheel 26 will cause the wheel 26 to be rotated, but at a much less speed and with much greater power than the wheel 25. The rotation of the wheel 26 through the medium of the pitman 38 and crank-arm 37 will cause the shaft 33 to be rocked or oscillated, and the arm 42, being rigidly secured to the shaft, will also be oscillated in the same manner. Through this action by means of the pin 44 the pump-rod will be moved up and down by the movement of this arm and the pump thus operated. It will be obvious that the stroke of the pump may be varied in length by changing the place of attachment of the pitman 38 upon the wheel 26. In the drawings the pitman is shown as attached to the wheel 26 at 39, which gives the pump-rod its longest stroke. When attached at 40, the stroke will be lessened in extent and when attached at 41 will be still more decreased, the power with which the stroke is made, however, increasing to the same degree that the extent of the stroke is decreased. It will be noticed that the wind-wheel shaft and the vane-supporting bar are arranged in

line with each other in Figs. 1 and 4. In this position the action of the wind upon the vane will cause the wheel to face the wind and be turned thereby. While the parts are retained in this position, the wheel will continue to turn, and when it is desired to stop the operation of the mill the operator will pull downward upon the rope or cable 80, which, through the medium of the bar 77, the sleeve 75, and the rope or cable 72, will draw the arm 62 downward, causing the arm 63 to be moved outward, pulling upon the chain 64 and exerting a pull upon the arm 65 of the rod 66. Before the rod 66 can be turned upon the cylinder 15 the resistance of the vane to the movement of the curved arm 67 of the rod 66 must be overcome. This resistance when the wind is blowing at a reasonable speed is greater than the resistance offered by all the rest of the machinery of the mill carried by the sleeve 17, and as a consequence the vane will remain pointed in the direction of the wind and the sleeve and its attached mechanism, including the wheel, will be turned about a quarter of a revolution, so that the side of the wheel will be presented to the wind instead of the face. As a consequence of this the wheel will cease turning and the operation of the mill be stopped. During this operation of stopping the mill by turning the wheel out of the wind the bar 77 will move vertically, but be prevented from turning on account of its angular shape and the corresponding shape of the openings in the brackets 78 and 79, which arrangement will prevent any tendency of the sleeve 75 catching on the pump-rod 45, and when the wheel is turned the arm 62, to which the rope or cable 72 is attached, will also be turned, any tendency of the rope or cable 72 to twist itself around the pump-rod being obviated by the eye 74 of the rod 73 turning upon the sleeve 75. When the wheel-shaft is turned out of the wind, the arm 53 will be carried with it, which will cause the spring 52 to be distended and to exert a pull upon said arm. This movement will cause the loop 54 to be oscillated on its pivot 55 and the shoe 57 on the arm 56 to be thrown into contact with the periphery of the brake-collar 24, thus securely holding the brake-sleeve, and consequently the wind-wheel, to the hub of which the brake-collar is attached, from turning. The movement of the sleeve in the operation of turning the wind-wheel out of the wind will be limited by the arm 51, which will be of a proper length to come in contact with the sleeve 17 when the proper turn has been made. When the turning of the wheel out of the wind has been accomplished, the cable 80 will be secured in any well-known manner, which will hold the parts of the mill in their inoperative position.

When it is desired to bring the mill into operation, it will only be necessary to release the cable, when the spring 52 will return the parts to their operative position, bringing the wind-wheel shaft and the vane-supporting arm into line with each other, as shown in Figs. 1 and 4.

From the foregoing description it will be obvious to all skilled in the art to which this invention most nearly appertains that by means of my improved construction of mill great power will be exerted upon the pump-rod, such power being increased, first, in proportion to the difference in size between the pinion on the wind-wheel shaft and the crank-gear wheel with which it meshes, and, second, in proportion to the difference in length between the arm 37 and the arm 42.

The construction and arrangement of the different parts of the mill are such that it will not be expensive to manufacture, and any of the parts may be readily replaced if broken or worn out, there being, however, but little liability of such breakage or wear with ordinary use.

While I have illustrated and described the best means now known to me for carrying out my invention, I do not wish to be understood as limiting myself to the exact details of construction and arrangement shown and described, but hold that any slight changes such as might suggest themselves to the ordinary mechanic would properly fall within the limit and scope of my invention.

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

1. The combination with the sleeve and its supporting-cylinder, of the wind-wheel shaft and pivoted vane-supporting arm carried by the sleeve, a rod mounted to turn on the sleeve, connected at one end to vane-arm, an elbow-lever, a chain connecting one arm thereof to the swiveled rod, and a cord or cable depending from the other arm of the elbow-lever, substantially as described.

2. The combination with the sleeve and the tower-supporting cylinder upon which the sleeve is swiveled, projecting slightly above it, of a bracket secured to the sleeve, a vane-supporting arm pivoted thereto, a second bracket on the side opposite the first bracket, a shaft journaled in the second bracket, an elbow-lever carried by said shaft, a rod mounted to turn upon the cylinder, resting upon the top of the sleeve and having two arms, the end of one of which engages in a slot in the vane-supporting arm, a chain connecting one end of the elbow-lever with the end of the other arm, and a rope or cable secured upon the outer end of the elbow-lever and depending through the cylinder, substantially as described.

3. The combination with the tower-supported cylinder, of the sleeve swiveled thereon, the cylinder projecting a short distance above the sleeve, the vane-supporting arm pivoted to the sleeve and provided with lateral arms extending in opposite directions

from the pivotal point, the wind-wheel shaft mounted in a bracket secured to the sleeve, a rod mounted to turn loosely on said shaft and having arms projecting in both directions, a spring connecting the outer end of one of these arms with one of the arms of the vane-supporting bar, a brake-collar secured upon the wind-wheel hub, and a brake-shoe mounted upon the opposite arm of the loop and adapted to engage said shoe, substantially as described.

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Witnesses:
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WM. J. PARK.