No. 650,041. Patented May 22, 1900.

E. EVERSON.

WINDMILL.

(Application filed Mar. 13, 1900.)

(No Model.) 3 Sheets—Sheet 1.

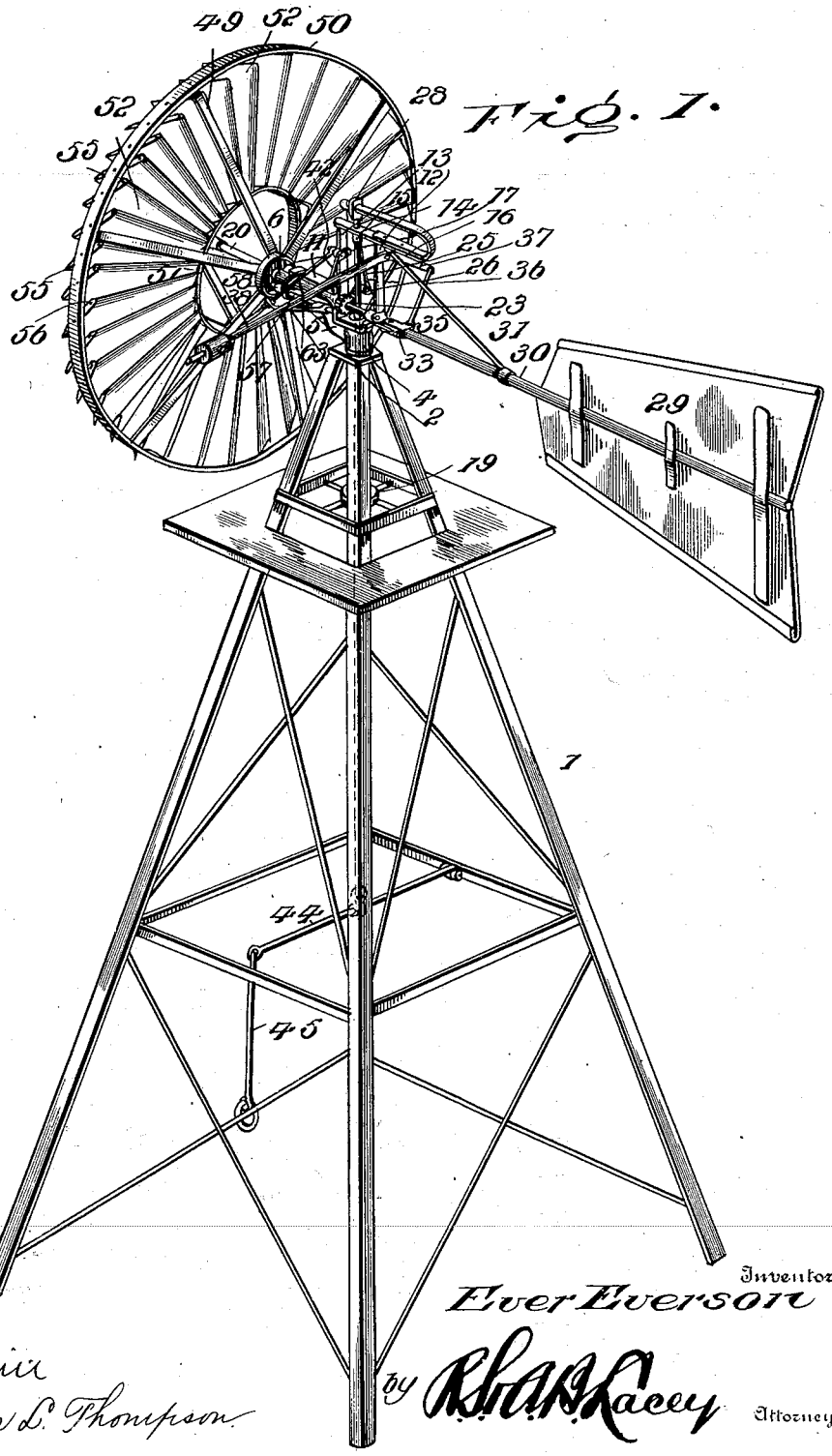

Fig. 1.

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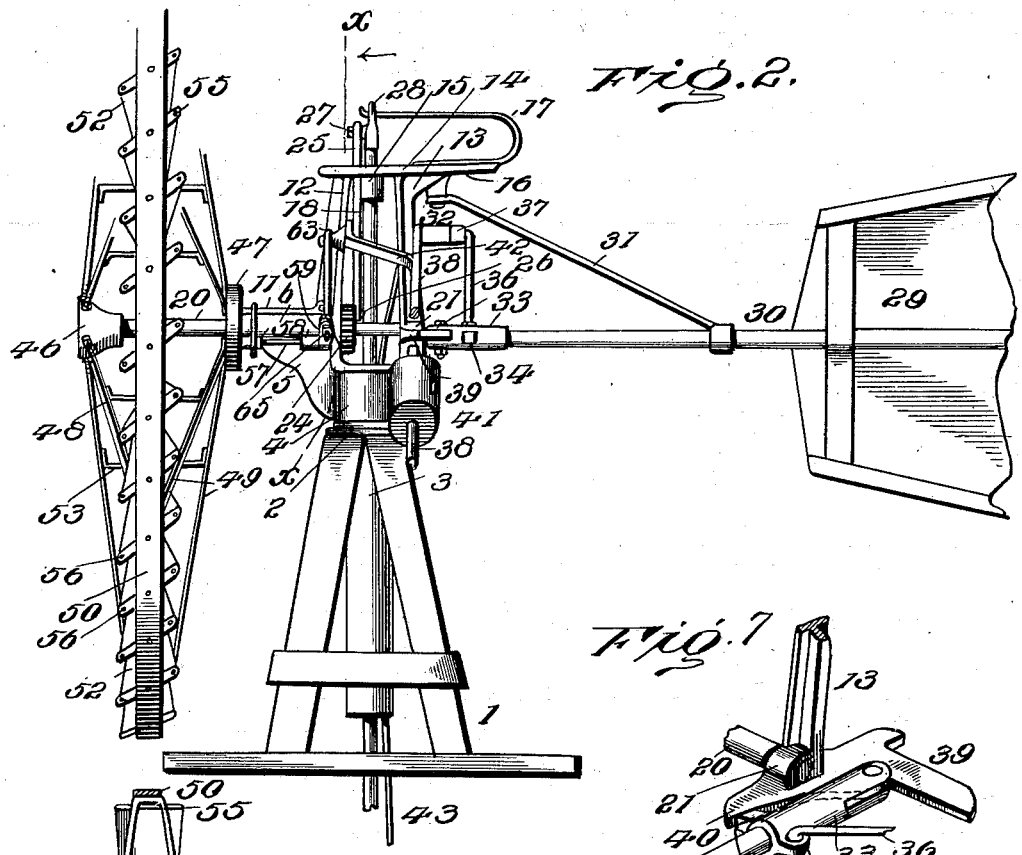

Fig. 2.

Fig. 7.

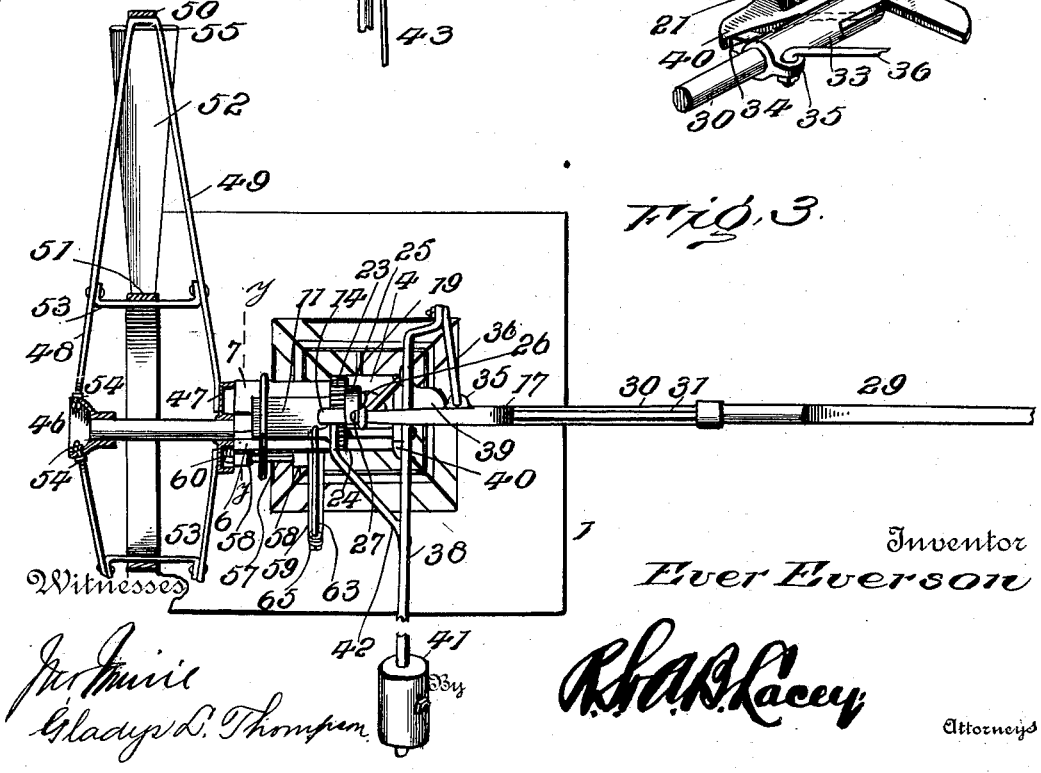

Fig. 3.

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(No Model.) 3 Sheets—Sheet 3.

Fig. 4.

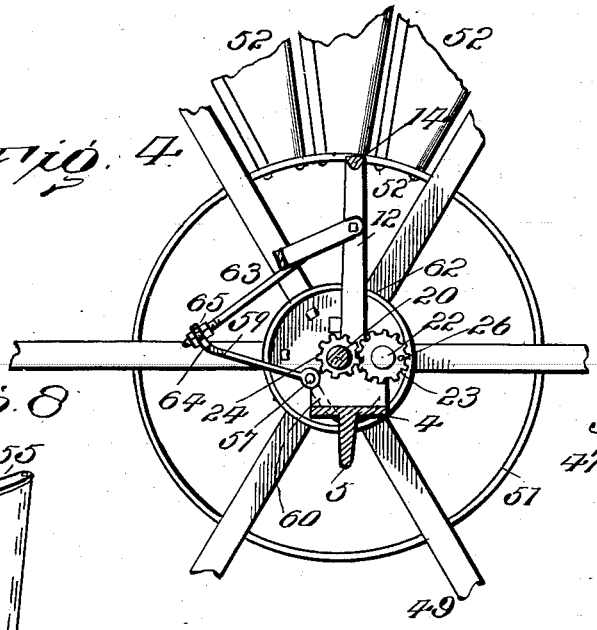


Fig. 9.

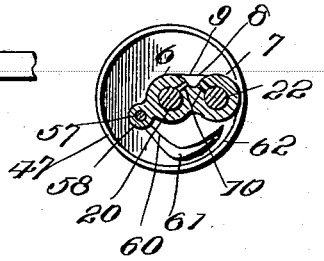


Fig. 8.

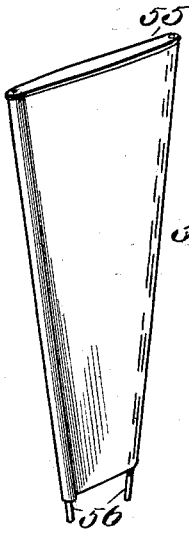


Fig. 5.

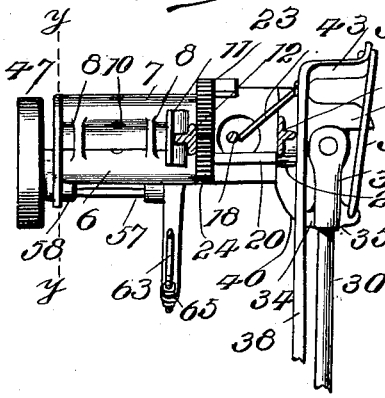


Fig. 6.

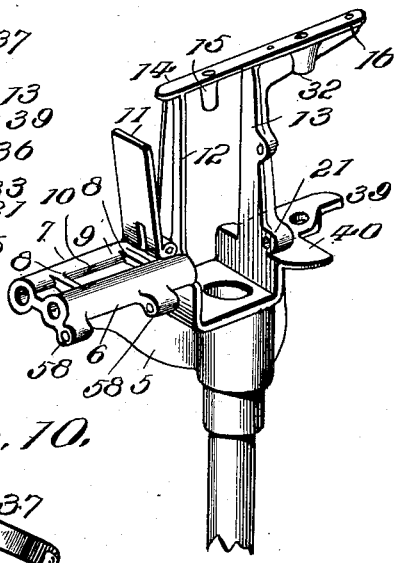
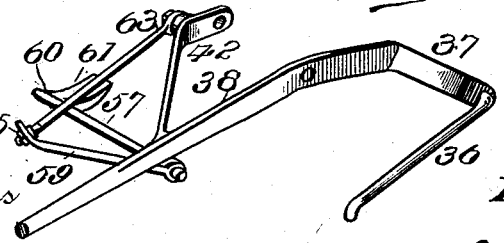


Fig. 10.



Witnesses

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UNITED STATES PATENT OFFICE.

EVER EVERSON, OF MANKATO, KANSAS.

WINDMILL.

SPECIFICATION forming part of Letters Patent No. 650,041, dated May 22, 1900.

Application filed March 13, 1900. Serial No. 8,505. (No model.)

To all whom it may concern:

Be it known that I, EVER EVERSON, a citizen of the United States, residing at Mankato, in the county of Jewell 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 the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to windmills, and has for its objects to lighten, stiffen, and brace the structure, particularly the wheel and head, to combine therewith a novel brake and governor mechanism arranged for simultaneous action, to dispose the parts whereby access can be readily had thereto for repairs, lubrication, cleaning, and any other desired purpose, and to provide an engine which will operate in a light wind, automatically throw itself more or less out of a high wind to avoid dangerous pressure, and which will be lasting, durable, and efficient.

For a full description of the invention and the merits thereof and also to acquire a knowledge of the details of construction of the means for effecting the result reference is to be had to the following description and the drawings hereto attached.

While the essential and characteristic features of the invention are necessarily susceptible of modification, still the preferred embodiment of the invention is illustrated in the accompanying drawings, in which—

Figure 1 is a perspective view of a windmill specially designed for attaining the objects of this invention. Fig. 2 is a side elevation, the lower portion of the derrick being omitted. Fig. 3 is a top plan view, the wheel being in section. Fig. 4 is a detail section on the line X X of Fig. 2 looking toward the wheel, as indicated by the arrow, the outer portion of the wheel being broken away. Fig. 5 is a detail view showing the relation of the parts when the wheel is thrown out of the wind. Fig. 6 is a detail view in perspective of the windmill-head stripped of its operating parts and the cover of the oil-box being thrown upward. Fig. 7 is a detail view in perspective of the inner or pivotal end of the arm bearing the tail-vane. Fig. 8 is a detail view in perspective of a paddle. Fig. 9 is a detail section on the line Y Y of Figs. 3 and 5. Fig. 10 is a detail view in perspective of the brake, the weighted lever, and the intermediate connections.

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

The tower or derrick 1 may be of any construction, according to the design and make of engine, and the corner posts or bars are connected at their upper ends by a cap 2, which is centrally apertured to receive the pendent tubular portion 3 of the windmill-head 4, said cap likewise constituting a table for the head 4 to turn upon in the various movements of the wheel to adapt itself to the direction of the current of air. A bracket-arm 5 projects outwardly from the head 4 and is provided at its upper end with bearing-sleeves 6 and 7, extending in parallel relation and connected near their ends by transverse ribs 8, which form, with the bearings, a box or receptacle 9 to receive lubricant, by means of which the shafts journaled in the bearings 6 and 7 are caused to run easy. Oil-ducts 10 connect the box or receptacle 9 with the respective bearings 6 and 7 to convey the lubricant to the working parts. The cover 11 is hinged at one end and is adapted to close the box or receptacle 9 and prevent dust and foreign matter from finding their way into the lubricant after the receptacle has been supplied. A standard or upright 12 rises vertically from the head 4 and is disposed at one side of the tubular extension 3 and at the inner end of the bearing-sleeves 6 and 7, and the cover 11 is hinged or pivoted thereto. A second standard or upright 13 rises vertically from the head 4 at the opposite side of the part 3 and alines transversely with the standard 12, the two standards being connected at their upper ends by a cross-bar 14, having a tubular bearing 15 in vertical alinement with the axis of the engine. An arm 16 projects outwardly from the upper end of the standard 13, and an approximately-U-shaped spring 17 has one member rigidly attached thereto, the opposite member projecting over the cross-bar 14 and having the upper end of the pump-rod 18 loosely connected therewith. A spider 19 is

located a short distance from the upper end of the tower, and its central portion constitutes a bearing for the lower end of the tube 3 and prevents wabbling thereof when the engine is in operation.

The shaft 20 of the wind-wheel is journaled in the bearing-sleeve 6, and its inner end extends across the space formed between the standards 12 and 13 and is mounted in a bearing 21 at the foot of the standard 13. The wind-wheel is secured to the outer end of the shaft 20 and operates in a vertical plane. A second shaft 22 is mounted in the bearing-sleeve 7 and is provided at its inner end with a gear-wheel 23, intermeshing with a pinion 24, secured upon the shaft 20. A pitman 25 connects the wrist 26 of the gear-wheel 23 with a corresponding wrist 27 at the upper end of the pump-rod 18 and imparts a reciprocating movement thereto in the operation of the engine. A casting or lug 28 is fitted to the upper end of the pump-rod 18 and carries the wrist-pin 27 and is apertured to receive the free end of the spring 17. The pump-rod 18 passes through the tubular extension 3 of the head 4 and through the bearing 15 and is caused to travel up and down in a vertical direction. The purpose of the spring 17 is to relieve the engine of the weight of the pump-rod and parts connected therewith, thereby enabling the wheel to operate in a comparatively-light wind and perform effective service.

The tail-vane 29 is secured to the outer end of an arm 30, which is pivoted at its inner end to an extension of the head 4, said arm being strengthened by a brace 31, having its inner end loosely connected with a journal 22, pendent from the arm 16 in vertical alinement with the pivot of the arm 30. A casting 33 is applied to the inner end of the arm 30 and is cleft or bifurcated to receive the part of the head 4 to which it is pivoted and is formed with a lug 34, constituting a stop, and an ear 35, which is apertured to receive the bent end of a link 36, connecting the arm 30 with the bent end 37 of the weighted lever 38, pivoted to the upper portion of the standard 13. A lug 39 projects rearwardly from the head 4 and forms a stop to limit the outward movement of the arm 30. A second lug 40 projects laterally from the head 4 and at a right angle to the lug 39 and is adapted to engage with the lug 34 and limit the relative movement of the tail-vane when folded so as to occupy a position parallel with the plane of the wheel.

The lever 38 is fulcrumed a short distance from its bent end 37 to the upper portion of the standard 13, and its outer end receives a weight 41, having adjustable connection therewith, and which can be moved so as to cause the wheel to offer a greater or less resistance to the wind, as may be required. A brace 42 is rigidly connected at one end to the lever 38 at a distance from its fulcrum, and its opposite end has pivotal connection with the standard 12 in transverse alinement with the pivot of the said lever 38. A wire 43 or analogous device has connection with the short arm of the lever 38 and passes through the tube 3 and is attached to a lever 44 of the second order fulcrumed at one end to a cross-bar of the tower, a pull wire or connection 45 being attached to the opposite end thereof and extended within convenient reach to be drawn upon when it is required to throw the engine out of action. The lower end of the pull device 45 may be secured in any convenient way, so as to hold the wheel out of the wind when it is not required to perform any work.

The wheel comprises a cup 46, secured to the outer end of the shaft 20, a rimmed disk 47, made fast to the said shaft adjacent to the outer ends of the bearings 6 and 7, truss-braces 48 and 49, having their inner ends secured, respectively, to the cup 46 and disk 47, concentric rings or bands 50 and 51, and paddles 52, secured between the rings 50 and 51 and inclined to the plane of the wheel at the required pitch, so as to receive the force of the wind and impel the engine. The outer ring or band 50 is attached to the extremities of the truss-braces, and the inner ring 51 is secured medially to cross-braces 53, connecting the truss-braces about midway of their ends. It will thus be observed that the rings 50 and 51, with the paddles 52, occupy a central position with reference to the truss-braces. The inner ends of the braces 48 have adjustable connection with the cup 46, and for this purpose their terminal portions are made rounding and threaded, each receiving a pair of nuts 54, receiving between them the flanged portion or sides of said cup. By a proper manipulation of the nuts 54 the braces 48 can be strained more or less, so as to true the wheel and compensate for strain, so as to equalize the action of the braces upon all parts of the wheel. Short bars 55 are attached midway of their ends to the outer ring 50 and are obliquely disposed with reference to the plane of motion of the wheel, the inclination corresponding with the required pitch of the paddles. The paddles are of tapering form and increase in width toward their outer ends, and their longitudinal edge portions are formed into rolls and receive wires 56, whose end portions project and enter openings formed in the extremities of the bars 55 and in the ring 51, the projecting ends of the wires being either upset or bent, so as to retain them in place. These wires 56 reinforce and stiffen the paddles in addition to the roller edges thereof and enable comparatively-thin sheet metal being used in the construction of the paddles.

When the engine is thrown out of action, it is essential to prevent any rotation of the wheel, and provision is had for this purpose by combining with the wheel a brake mech-

anism which is adapted to coöperate with the governor mechanism. A shaft 57 is journaled in bearings 58, projecting from the sleeve 6, and is provided at one end with a spring-arm 59 and at its opposite end with an arm 60, bearing a brake-shoe 61, adapted to bear against the inner periphery of the rim 62 of the disk 47. A link 63 connects the outer end of the spring-arm 59 with the inner end of the brace 42. Hence when the weighted end of the lever 38 rises to throw the engine out of the wind the spring-arm 59 is correspondingly elevated at its outer end and causes the brake-shoe 61 to engage with the rim 62 and hold the wheel against possible rotation when the engine is unshipped. The outer end of the spring-arm 59 is bent upwardly and is formed with an elongated opening, as shown at 64, to receive the end of the link 63, which is threaded and receives a pair of nuts 65, located upon opposite sides of the bent terminal of the said link 63. Hence the effective length of the link can be lengthened or shortened to cause the brake-shoe to bear with a greater or less degree of pressure against the rim 62. By having the arm 59 resilient or constructed so as to spring it can yield to permit the wheel to be thrown entirely out of the wind should the brake-shoe come in contact with the rim 62 prior to the complete movement essential to throw the engine entirely out of the wind.

It is to be observed that the wind-wheel shaft is set to one side of the arm 30, carrying the tail-vane, and this is necessary in order to make provision for the wheel being automatically thrown out of the wind in the event of a gale or strong current, so as to obviate injury to the engine. By shifting the weight 41 upon the lever 38 the wheel can be caused to offer a greater or less resistance to the wind before being moved thereby to automatically throw the same out of action.

When the engine is arranged for performing work, the tail-vane extends at a right angle to the plane of the wheel and is held in the wind by the action of the weighted lever 38, the wheel turning to face the wind about the tube 3 as a vertical axis. As the wheel revolves a reciprocating movement is imparted to the pump-rod 18 by the connection hereinbefore described, the spring 17 relieving the wheel of the weight of the pump-rod and parts attached thereto, whereby a comparatively-light current of air will cause the engine to perform the required work. When from any cause it is desired to throw the engine out of action, the part 45 is pulled upon and through the connections herein described relatively folds the tail-vane or brings it to a position parallel with the plane of the wheel, and the action of the wind thereon throws the wheel out of action, as will be readily comprehended. Simultaneously with throwing the engine out of action the brake mechanism is set to prevent any movement of the wheel from counter-currents or any cause whatsoever.

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

1. In a windmill, a head provided with parallel bearing-sleeves spaced apart and connected at their ends by transverse ribs forming an oil-receptacle having ducts leading therefrom into the said bearings, and shafts journaled in the bearing-sleeves and lubricated from the aforesaid oil-receptacle, one of the shafts bearing the wind-wheel and the other receiving motion from the wind-wheel shaft and having connection with the pump-rod, substantially as set forth.

2. In a windmill, a head provided with an offstanding bracket-arm provided with spaced bearing-sleeves connected near their ends by transverse ribs forming an oil-receptacle from which ducts lead into the bearing-sleeves, shafts journaled in the bearing-sleeves and effected for simultaneous actuation, one of the shafts bearing the wind-wheel and the other shaft being operatively connected with the pump-rod, and a cover hinged at one end to the bracket-arm and adapted to close the oil-receptacle, substantially as set forth.

3. In a windmill, the combination with the wind-wheel having an offstanding rim concentric with its axis, the tail-vane, and a lever for throwing the engine out of gear, of a shaft provided with an arm bearing a brake-shoe to coöperate with the aforesaid rim of the wheel, and a spring-arm projecting from the said shaft and operatively connected with the aforementioned lever, substantially as set forth.

4. The combination with a wind-wheel having an offstanding rim concentric with its axis, a tail-vane, and a lever for throwing the engine out of gear, of a shaft provided with an arm bearing a brake-shoe to coöperate with the aforementioned rim, a spring-arm applied to the said shaft and an adjustable connection between the spring-arm and the aforesaid lever to vary the effective force of the brake-shoe and admit of the engine being thrown entirely out of the wind should the brake be set prior to the completion of the movement of the tail-vane, substantially as set forth.

5. In combination, a wind-wheel, a tail-vane, spaced uprights located upon opposite sides of the vertical axis of the engine, a weight-lever fulcrumed to one of the said uprights and operatively connected with the tail-vane, a brace extending from said weighted lever and having pivotal connection with the other upright, a brake mechanism coöperating with the wheel and comprising an offstanding arm, and a connection between said arm and the brace of the weighted lever, substantially as set forth.

6. The herein-described wind-wheel com-

prising a shaft, a cup and disk secured to the shaft and spaced apart, braces formed of bent bars having one end secured to the disk and the opposite end adjustably connected with the cup, cross-braces connecting the aforesaid braces intermediate of their ends, inner and outer rings supported by the said braces, obliquely-disposed bars applied to the outer ring, and paddles secured between the said rings, substantially as set forth.

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

EVER EVERSON. [L. S.]

Witnesses:
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E. ELLINGSON.