W. P. BRETT.

WINDMILL.

APPLICATION FILED JUNE 23, 1906.

1,067,970. **Patented July 22, 1913.**

2 SHEETS—SHEET 1.

Fig. 1.

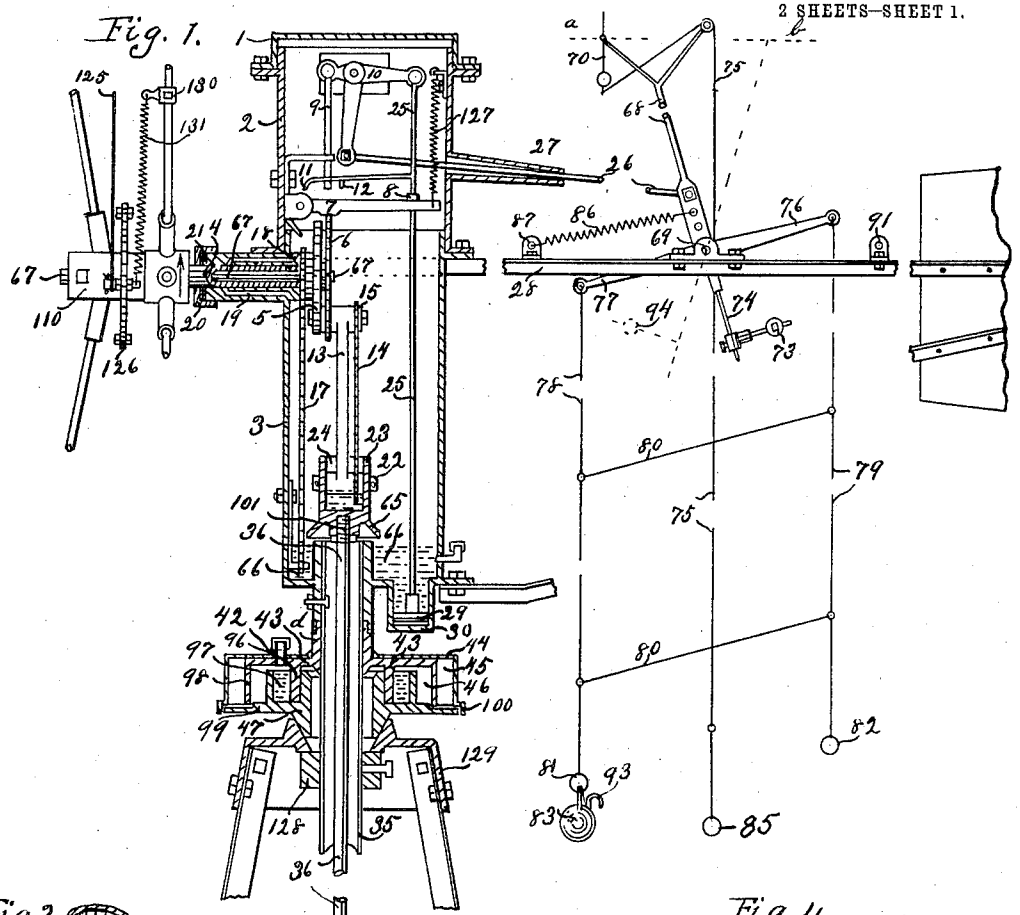


Fig. 3.

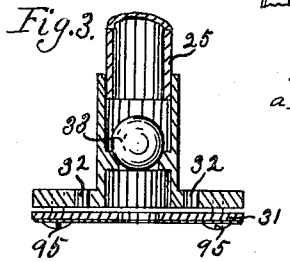


Fig. 4.

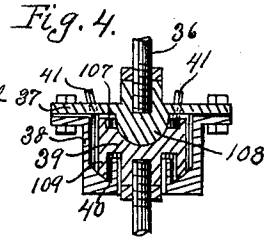


Fig. 2.

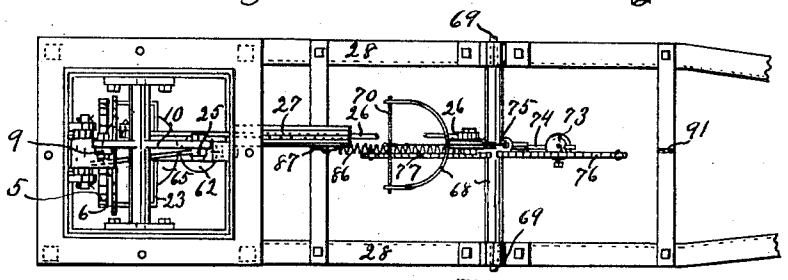
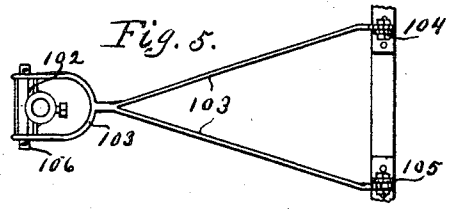


Fig. 5.



Witnesses:

Rufus Peabody.

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2 SHEETS—SHEET 2.

Fig. 6.

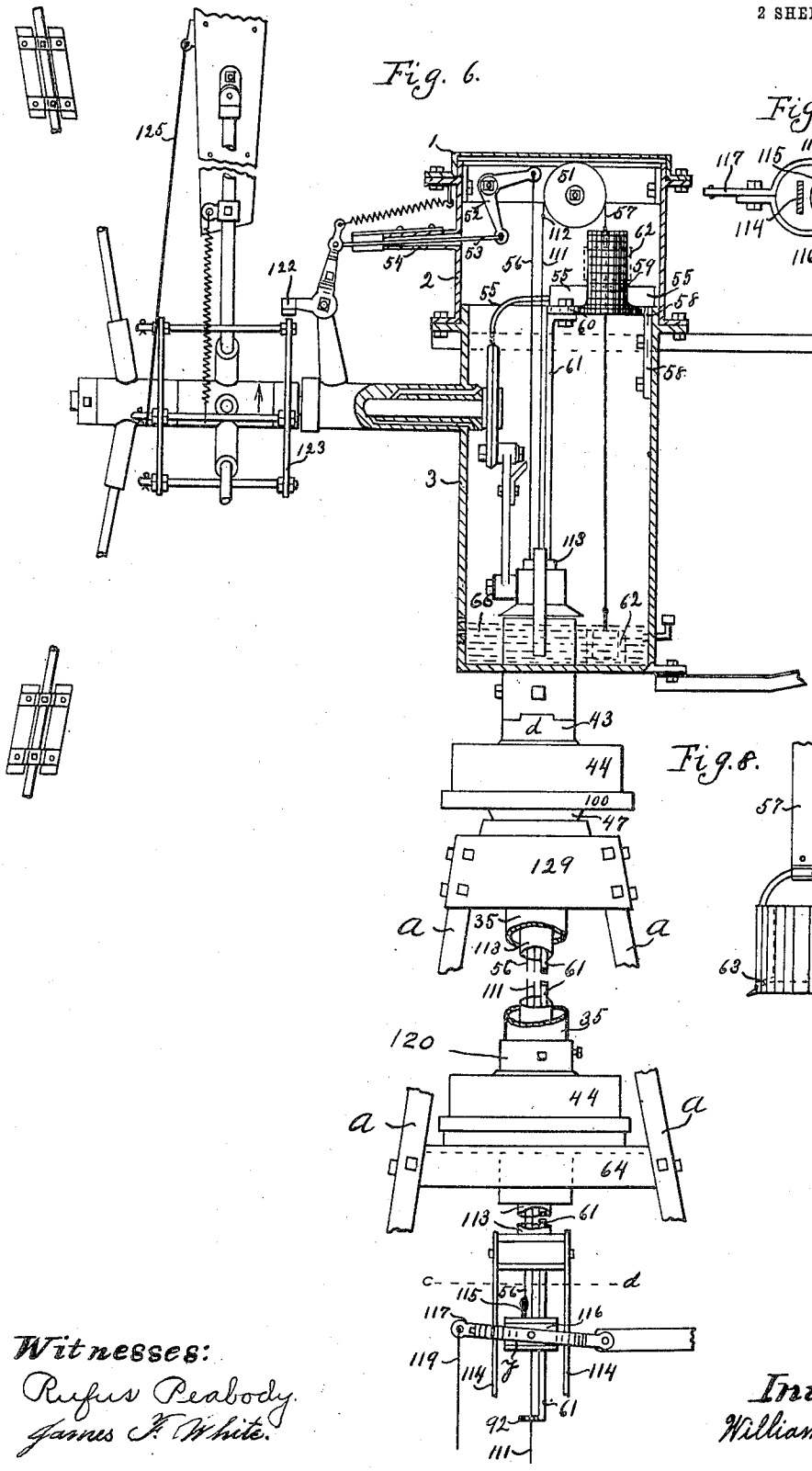


Fig. 7.

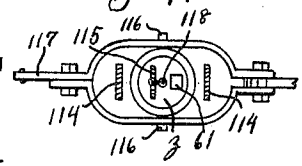


Fig. 8.

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UNITED STATES PATENT OFFICE.

WILLIAM P. BRETT, OF DECATUR, ILLINOIS.

WINDMILL.

1,067,970. Specification of Letters Patent. Patented July 22, 1913.

Application filed June 23, 1906. Serial No. 323,056.

To all whom it may concern:

Be it known that I, WILLIAM P. BRETT, a citizen of the United States, residing at Decatur, in the county of Macon and State of Illinois, have invented a new and useful Windmill, of which the following is a specification.

This invention relates to windmills of the vertical or upright type and has for its objects; first, the production of a power transmitting mechanism that operates substantially in a direct vertical line with the vertical plane in which the pitman operates; second, the production of a storm proof incasement for the main bearings of the windmill head; third, the production of a controller mechanism that is operative through storm proof apertures leading into the said incasement; fourth, the production of a lubricating system comprising a main oil storage reservoir which is carried by the turntable of the windmill head so that the oil from the principal bearings thereof will drain back into the reservoir for indefinitely repeated use; fifth, the production of a manually operative means whereby a person at the foot of the tower may apply lubricant from said reservoir to said bearings at option without the necessity of climbing the tower; and sixth, the production of a windmill turntable bearing that will have oil submerged frictional parts and thorough protection of the same from all of the destructive elements of the weather. I attain these objects by means of the novel designs, construction and arrangement of the several parts of the mechanism which will be apparent from the detailed description hereinafter set forth when read in connection with the accompanying drawings forming a part thereof, and wherein preferable embodiments of the essential parts of the invention are disclosed and various disconnected parts shown for the purpose of illustration.

In the drawings Figure 1, is a vertical sectional view of one of the preferable forms of windmill heads and the upper part of the tower, and is also a side view of the controlling mechanism and steering vane bracket, parts being broken away; Fig. 2, a top view of the incasement and controller mechanism shown in Fig. 1, with the part 1 of the incasement removed; Fig. 3, a vertical sectional view of the lower end of the oil pipe 25 and the piston and valves connected therewith; Fig. 4, a vertical sectional view through the swivel W of Fig. 1; Fig. 5, a sectional view on line *a*—*b* of Fig. 1 looking downwardly on the swinging link 103; Fig. 6, a vertical sectional view through parts of a modified form of windmill head, and a side view of the upper portion of the tower, parts being irregularly broken away; Fig. 7, a sectional view on line *c*—*d* of Fig. 6 looking downwardly at the swivel —*y*— and the lever 117; and Fig. 8 is an enlarged side view of the oil elevating vessel 62 of Fig. 6, and a portion of the strap 57 by means of which it is elevated.

Similar letters and figures refer to similar and corresponding parts throughout the several views.

The main frame or turntable of the windmill head comprises the three incasement parts 1, 2 and 3, the vertical tubular turntable mast 35 and the bearing casting 43 and is supported by the tower posts *a*, and is adapted to carry the tubular wheel shaft 4 in a horizontally projecting part of the portion 3 of the main incasement. The crank disk 5 is rigidly secured to the inner end of the tubular wheel shaft 4 and is adapted by means of the pitman 13 to impart a reciprocating motion to the crosshead 23 which is provided with the oil reservoir 24 and the oil deflecting flange 65. The lower end of the pitman is operatively connected to the wristpin 22 within the reservoir 24 and with the small sprocket wheel 15 in connection with the crank wristpin, is encompassed by the endless chain 14 which is adapted to carry oil from the reservoir 24 to the crank wristpin during the operation of the windmill. The sprocket 15 being rigidly secured to the crank wristpin causes it to impart a belt like motion to the chain 14 as it reciprocates with the pitman and crosshead. 17 is another endless chain that encompasses the hub of the crank-disk and is adapted to carry oil from the reservoir 66 to the top of the wheel shaft bearing whence part of it will flow into the oil channel 18 which leads to the portion of the shaft 4 near the packing 21, which is held tightly against the shaft and the outer end of the bearing by means of the screw cap 20, and from this point the oil will flow back through the bearing and duct 19 into the reservoir 66 again for repeated use.

67 is the shaft of the governor of the windwheel and is adapted to extend through the tubular shaft 4 and carry the brake wheel 6 adjacent to the face of the wristpin side of the crank disk and is adapted to os-

cillate independent of the crank disk to the extent that, in connection with suitable connecting parts comprising the hub portion 110, the flange 126 which is preferably an integral part of the hub 110, and the connecting bar 125 which is adapted to be connected to the sails of the wheel substantially as shown in Fig. 6, it and the spring 131 will cause the wheel sails to turn to or from either active or inactive positions.

The brake 7 is pivoted at one end within the incasement above the brake wheel 6 and is normally held clear of the wheel by the spring 127. Within the incasement above the brake 7 the double-ended bell-crank lever 10 is so pivoted as to carry the pivotally connected parts 9 and 25 in substantially vertical positions; the part 9 is of such length that it will set the brake 7 by its lower end pressing on the upper side of the brake, and the shaft 25 extends through an aperture in the brake lever and is provided with the collar 8 which is rigidly fixed a suitable distance above the brake lever to give lever 10 a good range of action without affecting the normal position of the brake 7, but at either limit of its range of action the lever 10 will by means of the collar 8 and shaft 9, set the brake so as to hold wheel 6 against rotation to the extent that it will cause the windwheel sails to be turned to their inactive positions.

To the double brace bracket 28, which extends outwardly from the main frame incasement, the controller mast 68 is pivoted at the points 69 (see Fig. 2) and is provided with the downwardly extending bar 74 on which the weight 73 is adjustably fixed.

26 is a connecting bar which extends with an easy sliding fit through the sleeve part 27 of the incasement and is pivotally connected at its inner end to the lower end of the vertical arm of lever 10 and at its outer end to the controller mast 68 a short distance from its fulcrum so that when the mast stands in the position shown in solid lines in Fig. 1 it will cause the collar 8 on the part 25 to depress the brake 7 and hold wheel 6 against rotation as above described. Part 25 is a tube of light but strong construction and is provided at its lower end with the piston 29 which is adapted to a practical sliding fit in the cylindrical part 30 in the bottom of the reservoir 66, and at its upper portion with a lateral branch which has the discharge nozzles 11 and 12 which are adapted to discharge onto the crank, and wheel shaft and pitman bearings, from which the surplus oil is caused to drain back into reservoirs 24 and 66 where it is continuously available for indefinite and substantially nonwasting use.

65 is an oil deflecting flange portion of the crosshead 23 and is larger than the upper portion of the tubular mast 35 and causes all of the oil that escapes from above to fall into the reservoir 66, and the packing 21 prevents substantially all oil from escaping by way of the wheel shaft, thus it is seen that the bearings within the incasement may be liberally flushed with oil as often as may be desired by a repeated use of the same oil and substantially without wastage. The controller mast 68 is provided with the oppositely extending arms 76 and 77 to which are attached the operating wires 78 and 79 which are provided at their lower ends with the hand loops 81 and 82 which are a convenient distance above the ground.

80 are space bars conveniently pivoted as shown to prevent the entanglement of the wires 75, 78 and 79.

86 is a strong spring and is adapted to cause the mast 68 to swing forward and set the brake 7 when the wind is too light for economical work and the sail 70, spring 86 and weight 73 are so proportioned and adjusted that during practical operating winds the mast 68 will be caused by the pressure or force of the wind against the sail 70 to swing back so as to relieve the pressure of the collar 8 on the brake 7 so that it will be held clear of the wheel 6 by means of the spring 127 so that the windwheel and governor mechanism will cause the sails of the windwheel to assume their active positions thus causing the windmill to automatically utilize the force of all practical winds.

83 is a weight that is intended to be hung on to wire 78 and is provided with the extra hook 93 with which the loop 85 of wire 75 is adapted to be engaged when it is desired to hold the sail 70 in a horizontal position as shown in broken lines at either *a* or *b* so that the windwheel may be held permanently out of action when desired regardless of wind forces. This controller device is adapted to stand either to the windward or leeward of the windwheel and be practical and effective in either position. As shown in Fig. 1 in solid lines it is arranged for standing to the leeward of the wheel, and the only changes necessary for operating to the windward of the wheel will be to swing the weight 73 to the position shown in broken lines at 94 and to unhook the spring 86 from its anchorage at 87 and hook it to the clip 91 and then the mast will normally stand as shown in broken lines.

The piston 29 (see Fig. 3) is provided with the centrally apertured disk valve 31 which is held in place just below the piston by the stops 95, this valve is adapted to a short vertical movement so that on the upward movement of the piston the valve rests on the stops 95 as shown thus permitting oil to flow through the intakes 32, but on the down stroke of the piston the oil in the cylinder below causes the valve 31 to seat clos-

ing the intakes 32 so that the oil in the cylinder has no way of escape but through the pipe 25 from which it is discharged as above described; and in the lower part of the tube 25 is the upwardly opening check valve 33 which prevents any back flow of oil during the upward movement of the piston, thus is constructed a complete single acting pump which by means of the two wires 78 and 79 can be operated by a person stationed at the foot of the windmill tower whereby, without the necessity of climbing the tower, all of the bearings of the windmill within the incasement can be thoroughly flushed and washed out without the waste of any oil, and by the operation of the pump it can be detected as to whether the oil supply in the reservoir needs replenishing or not. When it is desired to manipulate the oil pump by hand during a heavy wind the weight 83 is suspended exclusively by the wire 75 thus holding the sail 70 edgewise to the wind so that it does not impede the motion of the mast 68. It is also apparent that when the wind force decreases to the extent that the mast 68 is swung forward the downward movement of the tube 25 will cause one discharge of oil from the nozzles 11 and 12 and mainly from 12 which discharges into the reservoir 24 thus automatically maintaining the proper oil level in the crosshead reservoir.

The bearing casting 43 of the turntable is made to interlock and rotate with the main frame casting 3 as shown in Fig. 6 and is adapted to support the weight of the windmill head on the annular flange 96 which is adapted to bear on the bottom of the annular oil reservoir 97 (see Fig. 1) in the stationary casting 47. This reservoir is protected by the overhanging annular flange 98 of casting 43 which encompasses and overlaps the reservoir so as to extend down to near the horizontal annular flange 99 of casting 47, and 44 is a dishshaped centrally apertured casting which is adapted to encompass the part *d* of casting 43. The horizontal flange 99 of casting 47 is much larger in diameter than the rim 98 of casting 43 and the depending rim portion of casting 44 is made large enough to encompass and clear the outer edge-portion of the flange 99 as close as possible without contacting therewith during its rotation, and thus there are formed two large annular air chambers 45 and 46 of which 46 communicates with 45 through the crevice below the annular flange 98 and 45 communicates with the outside through the narrow crevice between the annular flange 100 and the outer edge portion of the flange 99 of casting 47, and thus the force of the wind is so broken from all sides that any dust, mist or snow carried thereby will be prevented from entering the oil reservoir 97, which may at any time be filled with oil through the vertical nipple 42 which is screw-threaded into casting 43 and extends upwardly through an aperture in casting 44 and is closed by a removable screw cap. Experience has taught that one air chamber will not protect such an oil reservoir from dust and fine snow during severe storms and in order to make such an oil reservoir most serviceable it is necessary to provide a plurality of annular air chambers with as small an opening between them as possible so that during the most severe storms no drafts of dust or mist laden air can enter the reservoir.

The bearing casting 120 at the lower end of the turntable mast 35 (see Fig. 6) is substantially a duplicate of the bearing casting 43 just described and the upper portion of the casting 64 has substantially the same configuration as the upper side of casting 47; thus the turntable mast has oil submerged bearings that have double and complete protection from the destructive elements of the weather.

With the controller mechanism shown in Fig. 1 the usual pull-out cord operating through the turntable pivot with its objectionable features is dispensed with, as the windwheel may be put into and out of action by means of the wires 75, 78 and 79 as above described; these wires being anchored far enough out from the vertical center line of the tower to swing clear of it at a suitable distance from the ground.

With this construction of a windmill head the reciprocating shaft 36 and its swivel have a common vertical center line which lies within the plane of the vertical center line of the pitman bearings, thus avoiding a great part of the side strains and friction that is common to windmills as ordinarily constructed. The shaft 36 is rigidly fixed to the center of the under side of the crosshead 23 as shown at the point 101 and is adapted to extend substantially vertically through the tubular turntable mast 35 and operate therethrough without any abrasive contact therewith, as the opening through the mast is large enough to permit of considerable vibration of the shaft without contacting therewith.

The swivel W is located a convenient distance below the lower end of the mast 35 and to the nonrotatable part of the shaft 36 below the swivel the casting 102 is rigidly fixed to and adapted to reciprocate with the shaft.

103 is a bifurcated swinging link that is designed to be pivoted to some stationary part of the tower somewhat as shown at the points 104 and 105 (see Fig. 5), and at the swinging end to the casting 102 by means of the pivot pin 106 thus permitting the shaft 36 to reciprocate vertically with a negligible amount of friction and with a very slight

and negligible amount of side movement from a direct vertical line.

Fig. 4 is a vertical sectional view through the swivel W which is composed of the three circular and concentric parts 37, 38 and 39 of which the two inclosing members 37 and 38 are rigidly secured together and are rigidly fixed to and adapted to rotate with the upper part of the shaft 36, and the inclosed member 39 is rigidly fixed to the lower nonrotatable section of the shaft and is provided on its upper side with the oil reservoir 107, in which the downwardly projecting spherical part 108 of casting 37 is adapted to bear, and with the downwardly projecting annular flange 109 on its under side which is adapted to bear in the oil reservoir 40 of casting 38; and 41 are filling plugs that are adapted to be removed so that the oil in the reservoirs 107 and 40 may be replenished. The circle of the bearing surfaces of the reservoirs 107 and 40 and the bearing surfaces in contact therewith have a common center from which substantially all of the bearing points of each of said surfaces are substantially equidistant so that as well as being a swivel it is a continuously lubricated universal joint that permits a slight lateral movement of the shaft 36 without causing any noticeable increase of friction. It is designed that there shall be a number of swinging links similar to the link 103 in connection with the shaft 36 and the tower in the taller towers so that the shaft 36 is adapted to actuate heavy as well as light loads.

Fig. 6 shows a modified form of windmill head and main incasement for inclosing the principal bearings of the power transmitting mechanism of the windmill head in connection with the usual pull-out cord that operates through the vertical aperture of the turntable pivot and is adapted to operate the controller mechanism of the windwheel by means of the bell crank lever 52 and the connecting bar 53 which is adapted to operate through the downwardly inclined sleeve portion 54 of the incasement. Reservoir 66 in Fig. 6 corresponds to 66 in Fig. 1 in its position in the main incasement and is so arranged relative to the lubricated bearings of the windmill head and the configuration of the oil deflecting parts in connection therewith that substantially no oil can escape from any of said bearings without being caused to return into this main storage reservoir which is located below the level of all of the bearings that are to be lubricated therefrom.

In the upper part of the incasement is a sheave 51 carrying a cord or strap 57 which is attached at one end to the heavy cast receptacle 62 and at the other end to the fine wire 111 at the point 112, this wire is made to extend downwardly through the tubular reciprocating shaft 113, the pull-out cord swivel *y*, eye 92 of shaft 61 and off to one side of the upper part of the nonrotatable part 114 of the reciprocating shaft from which it may be extended to and secured at any desired position at the foot of the tower. The oil elevating receptacle 62 is made heavy so as to overbalance the weight of the wire 111 and sink to the bottom of the reservoir 66 upon the release of the lower end of the wire 111 from its anchorage at the foot of the tower and thus it will be filled with oil immediately when the oil is deep enough to flow over the top of the receptacle and when there is not sufficient oil in the reservoir 66 to completely submerge the receptacle it will slowly fill to the level of the oil in the reservoir through the discharge aperture 63 (see Fig. 8) which is made small so that only a negligible portion of the oil will escape during the elevation of the receptacle to the position near sheave 51 as indicated by broken lines.

The bracket 58 is secured to the interior of the incasement as shown and is provided with the laterally projecting part 60 and the wide upwardly inclined part 59 and adjacent to the inclined part 59 with a vertical aperture through which the receptacle 62 is adapted to pass in its up and down movements; the cord 57 is preferably made flat in cross section so as to at all times hold the discharge orifice 63 in the right position to discharge into the oil conducting receptacle 55 which is so positioned and supported by the bracket 58 that as the receptacle 62 is raised against the under inclined surface of the part 59 the discharge orifice 63 will be caused to stand vertically above a portion of the conductor 55 so as to discharge the oil therein. When the receptacle 62 is drawn to this elevated position it is held there by the securement of the lower end of the wire 111 at the foot of the tower and the oil that is elevated thereby is allowed to slowly drip or flow into the conductor 55 which is adapted to discharge the same onto the crank disk from which it will flow onto and through the wheel shaft and pitman bearings and down into the reservoir 66 as stated above.

61 is a vertical shaft preferably square in cross section and is attached at its upper end to the part 60 of the bracket 58 and extends through the tubular reciprocating shaft 113 and has the swivel *y* mounted on it in such manner as to slide vertically thereon with the center portion *z* of the swivel adapted to rotate with the shaft 61 while encompassed by and adapted to be vertically moved by the nonrotatable trunnioned collar 116 and the lever 117 (see Fig. 7).

115 is an apertured vertical flange on the

upper side of the part *z* to which the lower end of the pull-out-wire 56 is attached and 118 is a vertical aperture through the center of the part *z* through which the oil elevating wire 111 is made to extend.

119 is the lower portion of the pull-out-cord which is attached to the free end of the lever 117 and is adapted by a downward pull by a person at the foot of the tower to put the windwheel out of action by means of the lever 52, rod 53 and brake 122 which are so connected that when the cord 119 is drawn downwardly with sufficient force the brake wheel 123 will be held against rotation to the extent that as the windwheel is moved forward by the force of the wind against the sails the rods 125 will cause the sails of the windwheel to be turned to their inactive position.

As the wind shifts and blows from different directions the windmill head will be caused to turn or oscillate on the turntable bearings described above and will carry the upper portions of the pull-out-cord and oil elevating wire with it in these movements which would result in the entanglement of the lower portions of this cord and wire were it not for the swivel *y* and parts connected therewith as above described.

With the pull-out-cord and oil elevating wire and devices shown and described in connection therewith it is readily seen that a person at the foot of a tower of any height may at option both control and lubricate a windmill at the top of the tower by simply manipulating the cord or wire, and it is also apparent that the cord and wire will not become entangled during the operation of the windmill.

Having thus described my invention what I claim as new and desire to secure by Letters Patent is—

1. In a windmill in combination a tower, a main frame or turntable rotatably mounted on said tower and comprising an incasement for the main frictional parts of the windmill that are in connection with and carried by said turntable, the said frictional parts, an oil receptacle within said incasement below the said frictional parts, and manual means whereby a person stationed at the base of said tower may at option cause all of said main frictional parts to be flushed with oil from said receptacle.

2. In a windmill in combination a tower, a main frame or turntable rotatably mounted at the upper portion of said tower, a rotatable motor part carried by said turntable, devices adapted to transmit motion from said motor part to mechanism stationed below said turntable, an oil receptacle carried by said turntable below the main bearings of said motor part and devices, the said main bearings, manual means whereby a person stationed at a distance therefrom may cause all of said main bearings to be flushed with oil from said receptacle at option, and means whereby the surplus lubricant that escapes from said bearings will be caused to return into the said receptacle for repeated use on said bearings.

3. The combination in a windmill of a tower, a turntable rotatably mounted at the upper portion of said tower, a rotatable motor part, a power transmitting member adapted to be actuated by said motor part and to actuate mechanism stationed below the said turntable, an incasement for the main frictional parts of said motor part and power transmitting member and the lubricating elements of the windmill, the said lubricating elements, windmill controller devices within said incasement, a weather proof aperture leading from without to the interior of said incasement, and means whereby a person stationed at the base of said tower may effect the optional manipulation of the said controller devices and lubricating elements through the said weather proof aperture.

4. In windmills in combination, a tower, a main frame or turntable, a windwheel carried by said turntable, bearing portions for the said wheel, a weather proof oil receptacle, wind actuated controller mechanism adapted to operate independent of the movement of the said windwheel, and means whereby the said controller mechanism may cause oil from said receptacle to be applied to the said bearing portions independent of the operation of the said windwheel.

5. In combination a tower, a main frame or turntable adapted to operate about a vertical axis at the top of said tower, a rotatable motor part carried by said turntable, a power transmitting device adapted to be actuated by said motor part and to actuate devices at a distance from said turntable, an inclosed oil reservoir, oil elevating devices within said reservoir adapted to cause bearing portions of said motor part and power transmitting device to be lubricated with oil taken from the said reservoir, means whereby the oil that escapes from said bearing portions is caused to return into the said reservoir, and manual means operative through a storm proof aperture which leads to the interior of said reservoir inclosure whereby a person stationed at the foot of the said tower may optionally manipulate said oil elevating devices.

6. In windmills in combination, a tower, a turntable, a windwheel and power transmitting mechanism carried by the said turntable, bearings for the said wheel and mechanism, a lubricant receptacle, a combined wind and spring actuated windwheel controller, and means connected with the said controller whereby lubricant from the said receptacle may be applied to the said

bearings automatically and independent of the operation of said wheel.

7. The combination in a windmill of a tower, a main frame or turntable mounted to operate about a vertical axis at the upper portion of said tower, power transmitting mechanism carried by said turntable, bearing portions for said mechanism carried by said turntable, an oil reservoir below the level of said bearing portions and mounted to move with the said turntable, controller and oil elevating mechanism carried by the said turntable, and a plurality of cords or wires whereby a person stationed at the base of said tower may optionally manipulate the said controller and oil elevating mechanism substantially as and for the purpose set forth.

8. The combination in a windmill of a tower, a main frame or turntable so mounted as to operate about a vertical axis at the upper portion of said tower, power transmitting mechanism carried by said turntable, a rigid bracket mounted to move with the turntable, an upwardly extending pivoted controller mast carried by said bracket, oppositely extending arms secured to said mast near its pivot portion, and a cord or wire secured to the outer end of each of said arms substantially as and for the purpose set forth.

9. The combination in a windmill of a tower, a turntable, a bracket carried by said turntable, a pivoted controller device carried by said bracket and comprising oppositely extending arms, and an operating cord or wire secured to each of said arms for the purpose set forth.

10. The combination in a windmill of a tower, a turntable, a bracket, a pivoted controller device comprising an upwardly extending arm or mast and two laterally and oppositely extending arms, a controller cord or wire suspended from each of said arms, and a weight adapted to be carried by either of said cords for the purpose set forth.

11. The combination in a windmill of a tower, a turntable, a bracket, power transmitting mechanism, a controller device for said power transmitting mechanism, a sail carried by said controller device, two laterally and oppositely extending arms forming a part of said device, and a plurality of suspended operating cords or wires whereby a person stationed at the base of said tower may optionally manipulate said sail and controller device.

12. The combination in a windmill of a tower, a turntable mounted at the top of said tower, a rotatable motor part and other power transmitting mechanism carried by said turntable, a controller device for said motor part and mechanism, a sail carried by said device, a pivot bearing for said device, two oppositely extending arms forming a part of said device, and a plurality of cords or wires and a weight whereby a person stationed near the base of said tower may optionally manipulate said sail and controller device.

13. In windmills in combination a tower, a turntable adapted to operate about a vertical axis at the upper portion of said tower, a rotatable motor part, a vertically apertured pivot portion for said turntable, a crosshead adapted to vertical movement in line with and above the vertical aperture of said pivot portion, a reciprocating shaft secured centrally to the under side of said crosshead and adapted to operate vertically through said aperture, and a pitman eccentrically pivoted at its upper end to said motor part and connected at its lower end to said crosshead above and in direct vertical alinement with the said reciprocating shaft.

14. In windmills in combination a main frame or turntable, the tubular shaft 35, and castings 43, 44 and 47 substantially as and for the purpose set forth.

15. In windmills in combination a main frame or turntable, a tower cap having a central aperture and a socket bearing for carrying the weight of said turntable, a bearing casting provided with a central vertical aperture and an oil reservoir surrounding said aperture and adapted to coact with said socket bearing, the tubular shaft 35, and casting 43 substantially as and for the purpose set forth.

16. The combination in a windmill of a tower, a windmill head comprising a main frame or turntable and so mounted as to operate about a vertical axis at the upper portion of said tower, power transmitting mechanism carried by said turntable, bearing portions for said mechanism carried by said turntable, an oil reservoir carried by said turntable below the level of said bearing portions, an oil pump mounted to move with said turntable, means whereby a person stationed at the base of said tower may cause said pump to discharge oil from said reservoir above said bearing portions, and means whereby the greater portion of the oil that is discharged by said pump will be returned into said reservoir for repeated use.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

WILLIAM P. BRETT.

Witnesses:

RUFUS PEABODY,

JAMES F. WHITE.