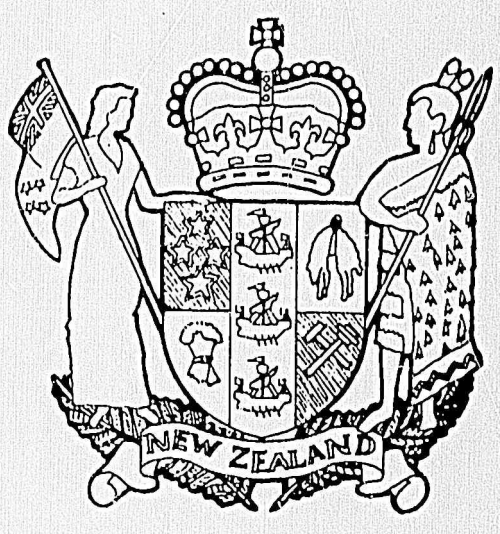



NEW ZEALAND

PATENT SPECIFICATION

34551

PATENT OFFICE
12 MAR 1914
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HENRY HUGHES LIMITED

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COMPLETE SPECIFICATION.

"WINDMOTORS"

We, Flint & Walling Manufacturing Co., a corporation organized under the laws of the State of Indiana, of Kendallville, Noble County, Indiana, United States of America, carrying on the business of Manufacturer at Kendallville, Indiana, U.S.A., do hereby declare the nature of this invention and in what manner the same is to be performed to be particularly described and ascertained in and by the following statement.-

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Flint & Walling Manufacturing Co., a corporation organized under the laws of the State of Indiana, of Kendallville, Noble County, Indiana, United States of America, carrying on the business of Manufacturer, at Kendallville, Ind., U. S. A., hereby declares the nature of this invention for

W I N D M O T O R S,

and in what manner the same is to be performed to be particularly described and ascertained in and by the following statement.

This invention relates to windmotors or windmills.

This invention has utility when embodied in features of construction and control of windmills, especially of the vertical or solid wheel type.

Referring to the drawings:

Fig. 1 is a fragmentary side elevation of an embodiment of the invention in a solid wheel type of windmill;

Fig. 2 is a section of the governor spring on the line II- -II, Fig. 1, looking in the direction of the arrow;

Fig. 3 is a perspective view of the one-piece frame;

Fig. 4 is a fragmentary section of the stem mounting in the one-piece frame;

Fig. 5 is a fragmentary elevation from the opposite side to the showing in Fig. 1, in each instance the vane being in position to hold the wheel into the wind or in running position;

Fig. 6 is a fragmentary plan view of the mill of Fig. 1;

Fig. 7 is an elevation of the mill from the back, or side opposite the windwheel, and with the vane in position to hold the windwheel out of the wind;

Fig. 8 is a vertical section of the yoke on the line VIII- -VIII, Fig. 5;

Fig. 9 is a bottom plan ofthe yoke on the line IX- -IX, Fig. 8, looking in the direction of the arrow, and

Fig. 10 is a section on the line X- -X, Fig. 7, looking in the direction of the arrow.

The windmill tower or mounting 1 has the swivel bearing or turntable 2 through which may extend the stem 3 (Figs.1,4) carrying the main integral or one-piece frame having on its lower side the swivel bearing 4 coacting with the bearing 2. The upper end of the stem 3 is tapered upwardly to snugly coact with the frame seats 6, 7, and is rigidly locked in such assembled position by swaging 8 of the upper extremity of the stem 3 into securing relation, thereby maintaining the frame 9 and its stem 3 together as a unit.

The windwheel comprises the central bearing or overhanging mounting cone 10 having the concentric blade mountings 11, 12. Clips 13 on the inner circular mounting 11 engage the blades 14 to positively hold their inner ends, while the embracing members 15 slipped outwardly into snugly-fitting locking relation as to the curved or dished blades 14 fix the angle of pitch of the blades as to the outer circular mounting 12 passing through the blades. The circular mountings 11, 12, are held in position by the radiating arms 16, 17, carried by the cone hub 10. The wheel as described, when built up of metal, may have its resistance to weather deterioration by a coating, as galvanizing. The outer portions of the blades, where the strains are greatest, are securely held by the plate members 15, resisting in their strongest direction, thereby producing maximum of strength in a light structure and by a device having no connection liable to weather weakening.

The windwheel is fast to the windwheel shaft 18 having secured thereto the pinions 19, 20, intermediate the bearings 21, 22, for the shaft 18 in the frame 9. While the windwheel is overhung, this transmission means from the windwheel shaft is a balancing thereof and a stiff construction in itself. Furthermore, it is to be noted the bearing 21 is long and within the load plane of the blades.

The pinion 19 is in mesh with the crank or gear wheel 33 held by the set screw 24 entering the groove 25 for rotative mounting on the crank wheel shaft 26, overhung from each end of

the bearing 27 in the main frame 9. In mesh with the pinion 20 is the second crank or gear wheel 28 held by key 29 to rotate with the crank shaft 26. With the crank 23 loose and the crank 28 fast, differences in alignment or wear, or from any other cause, may be taken up in the transmission and each crank carry its portion of the work (Figs. 5, 6), distributing such work along the windwheel shaft 18 in such a manner as to effectively neutralize the windstrain tugs and pulls transmitted from the windwheel in the wind shiftings and irregular workings due to atmosphere conditions. While the spaced bearings 21, 22, and their relatively long extent are material features in contributing to the life of the structure, the two gears with connecting rods, walking beam and yoke driven thereby, for taking the drive from the shaft 18 are great factors in the efficiency of the mill in giving the mill steadiness of operation under the most trying conditions.

Each crank wheel 23, 28, carries a wristpin 30 which may be radially adjusted as desired in the corresponding openings 31, (Fig. 7) so that each of the pitmen 32 in their straight upward extension may engage the common pivot pin 33, locked by the set screw 34 medially of the length of the pin 33. This screw 34 is carried by the walking beam 35 mounted by the pivot pin 36 in the walking beam bracket 37 forming an upwardly extending portion of the main frame 9.

On the pin 33 and disposed outside the walking beam 35 and between the pitmen 32 is the Y-yoke 38 forming a reciprocable member driven by the pitmen and guided by the walking beam. The upper arms of the Y are pivotally connected to the pin 33, while the lower stem has a seat 39 with lugs 40 rising therefrom just above the openings 41 therethrough so that the U-bolt fastening means may firmly lock the angle pump rod 43 over the lugs 40 and against the seat 39. Accordingly in the lift movements of the Y-yoke 38, the load is taken by the

lugs 40, thereby removing shearing action from the U-bolt 42, As the pair of openings in the pump rod 43 are properly spaced to receive the lugs 40 and afford registry with the two openings in the yoke stem, the insertion of the U-bolt and locking it in position provides a tight connection firm against any working loose (Figs. 5, 8, 9).

In the main frame 9 adjacent the bearing 27 is the opening 44 (Fig. 3) with which engages the pin 45 for the upper hinge bracket 46 of the vane 47. In the main frame 9 and in line with the opening 44 and therebelow is the bracket 48 rigid with the main frame 9 (Figs. 1, 3). This bracket 48 affords a seat for the lower end of the pivot pin 45 through the opening 44. On this pin 45 adjacent the bracket 48 is the lower hinge bracket 49 for the vane 47.

With the windwheel in gear, or for running, the vane is disposed at right angles thereto and slightly to one side of the wheel center (Fig. 6). The vane is yieldably held in this running position by the governor. Mounted on the pin 45 just above the lower hinge bracket 48 is the outwardly extending arm 50 to the end of which is hooked the adjustable link 51 connected to the U-rod 52 having at its end remote from the frame 9 the hooks 53 extending over to engage a coil of the compression governor spring 54. The opposite end of the spring 54 is engaged by the hooks 55 of U-rod 56 similar to the rod 52 but oppositely extending to be anchored by the link 57 to the vane 47 (Figs. 1, 2).

To limit the swing of the vane away from the windwheel in throwing the windwheel into gear, there is the hook 58 on the frame 59 of the vane. The hook 60 engages this frame 59 as guided to position by the rod 61 sliding through the hook 58. The opposi end of the rod 61 is mounted by the pin 62 on the arm 63 having the pivot pin 64 attaching it to the boss 65 on the main fram

This arm 63 is yieldably held in position at right angles to the line of the windwheel shaft 18 (Fig. 6). The arm 63 has lateral extensions 66, 67, each carrying a bolt 68 surrounded by a compression spring 69, so that the heads of the bolts are yieldably thrust against the stops 70 on the frame 9 to form cushions in sudden lunges to which the arm may be subjected. Accordingly when the vane 47 swings the windwheel into gear, the cushion pocket 66 takes up the concussion thereby eliminating excessive strains from the vane, frame and entire windmill structure, a feature materially contributing to the elimination of breakage in the mill and lengthening the life of an easy running machine.

For pulling the vane 47 out of gear, the flexible line or connection 71 is connected to the frame member 59 of the vane and extends about the pulley 72 (Figs. 1, 6) on the arm 63, and thence over the pulley 73 to guide the line through the pump rod opening 74 in the main frame 9. A swinging of the vane violently by pulling the line 71, or by the wind automatically acting upon the spring governor to throw the windwheel out of the wind, is taken care of to avoid concussion by the vane striking the stop 74 on the arm 63, and the arm yielding at its compression cushion 67.

In pulling the line 71 to bring the windwheel out of gear, the line 71 becomes taut under the trigger 75 (Figs. 1, 7) to lift this trigger so that in the swinging out of gear of the vane 47, this trigger 75 strikes the end of the arm 76 pivoted on the rod 45. This arm 76 medially of its length has the lug 77 connected to which is the rod 78 having the compression spring 79 holding this rod into yieldable connection with the bracket 80 of the brake shoe 81. This curved brake face 81 is mounted by the arms 82 to swing from the bearings 83 in the long bearing 21 of the main frame 9 (Figs. 3, 6).

Accordingly when the governor controls the swinging of the windwheel out of the wind for slacking speed, this automatic action

does not stop the wheel necessarily, thereby checking the effective wind action upon the wheel and still permitting the desired service to be performed. This swinging out from governor action does not set the brake. The brake as shown is set only by the pulling of the line 71 which through the trigger 75 causes the arm 76 to yieldably force the brake shoe 81 to engage the inner face 84 of the wheel cone 10.

To preclude a locking of the wheel by this brake, the arm 76 has at its mounting end a lug 85 in the path of the lug 86 on the vane hinge bracket 46. When the vane 47 swings out of gear, the lug 86 moves away from the lug 85 and thus in the automatic action or even in the manual throw off there is no driving connection between these lugs to effect the brake 81. However the setting of the brake 81 in the manual throw out of the mill, moves the arm 76 and likewise the lug 85, so with the brake 81 thus set, any moving of the vane hinge bracket 46 causes its lug 86 to act upon the lug 85 to swing the arm 76 back in following the trigger 75 away from the wheel and thus positively withdraw the brake 81 through the rod 78.

In the structure as shown, oil cups are disposed above the various bearings to provide proper lubrication.

Having now particularly described and ascertained the nature of ~~this~~ our said invention, and in what manner the same is to be performed, ~~it is~~ we declare that what ~~I~~ we claim ~~is~~:

1 In a windmill, the combination with a blade provided with an opening therethrough, a first member extending through said opening, and a blade-embracing member having an opening therethrough for the blade, said embracing-member being anchored to the first member to fix the pitch of the blade.

2 A windmill comprising concentric blade-mountings, a series of blades through which the outer mounting extends, and means anchored to the outer mounting and embracing the blades to fix the pitch of the blades as to the mounting.

3 A windmill comprising a frame, a windwheel shaft mounted in said frame, a windwheel on said shaft, and wind-strain distributing means for steadying said shaft in said frame embodying a pair of cranks driven by said shaft, and a shaft for said cranks, said frame providing a bearing for said crank-shaft intermediate the cranks.

4 A windmill comprising a frame, a wind wheel shaft mounted in said frame, a windwheel on said shaft, and wind strain distributing means for steadying said shaft in said frame embodying a pair of pinions fast thereon, a pair of relatively independent crank wheels in mesh with said pinions, and a shaft for supporting said crank wheels, said frame providing a bearing for said shaft.

5 A windmill comprising a frame, a windwheel shaft mounted in said frame, a windwheel on said shaft, and windstrain distributing means for steadying said shaft in said frame embodying a pair of cranks actuated from said shaft at spaced points, a pitman for each crank, a walking beam, a reciprocable member, and a common pin connecting said pitman, walking beam and member, said frame providing supporting means for the cranks a walking beam.

6 A windmill comprising a frame, a windwheel shaft mounted in said frame, a windwheel on said shaft, and windstrain distributing means for steadying said shaft in said frame embodying a pair of cranks actuated from said shaft at spaced points, a straight pitman for each crank, a reciprocable member, and a common pin connecting said pitmen and member, said frame providing supporting means for said cranks.

7 A windmill comprising a frame, a windwheel shaft mounted in said frame, a windwheel on said shaft, and wind strain distributing means for steadying said shaft in said frame embodying a pitman actuated by said shaft, a Y-yoke to which said pitman is connected, and a reciprocable rod connected to said yoke, said frame providing a guide fo said reciprocable rod.

8 A windmill comprising a frame, a windwheel shaft mounted in said frame, a windwheel on said shaft, a walking beam mounted in said frame and actuated by said windwheel, a Y-yoke to which said walking beam is connected, and a reciprocable rod connected to said yoke, said frame providing a guide for said reciprocable rod.

9 A windmill comprising a frame, a windwheel shaft mounted in said frame, a windwheel on said shaft, a Y-yoke, driving means from the shaft for the yoke, and a reciprocable rod connected to said yoke, said frame providing a guide for said reciprocable rod.

10 A windmill comprising a frame, a windwheel shaft mounted in said frame, a windwheel on said shaft, a yoke, driving means from the shaft for the yoke, said yoke having a seat and a lug, a rod to engage said seat and provided with a recess to coact with said lug, and means to hold the rod in seat engaging position as to the yoke, said frame providing a guide for the rod, whereby the yoke may maintain the rod in position as to th guide.

11 A windmill comprising a frame, a windwheel shaft mounted in said frame, a windwheel on said shaft, a yoke, driving means from the shaft for the yoke, said yoke having a pair of openings and a pair of lugs just above said openings, a rod provided with openings to receive the lugs and register with the yoke openings, and U-bolt fastening means to hold the yoke and rod together, said frame providing a guide for the rod, whereby the yoke and bolt may clear the guide and maintain the rod in position as to the guide.

12 A windmill frame provided with a swivel bearing, said frame having an annular tapered seat extending upwardly from the bearing, and a stem engaging said seat and having swaged connection against relative movement as to the frame to form a guide.

13 A windmill integral frame comprising a bracket for directly carrying the walking beam bearing pin, a crank shaft bearing, and a pair of spaced windwheel shaft bearings, said pin bracket and crank shaft bearing being disposed intermediate the two windwheel shaft bearings and laterally thereof.

14 A windmill comprising a windwheel, a brake therefor, a vane, means connected to the vane for moving the vane, and a device movable relatively to the vane and actuated by the means from the vane for setting the brake.

15 A windmill comprising a windwheel, a pivoted brake therefor, a vane, a governor against the resistance of which said vane may move, and means actuated by said vane to control automatically the wheel independently of setting the brake.

16 A windmill comprising a windwheel, a pivoted brake therefor, a vane for the windwheel, a governor connected to the vane for controlling the wheel, and connections between the brake and governor for releasing the brake as the governor moves the vane to throw the wheel into the wind.

17 A windmill comprising a windwheel, a brake therefor, a vane, a trigger on the vane, a connection for pulling the vane against the wheel, and means actuated by the trigger for setting the brake.

18 A windmill comprising a windwheel, a brake therefor, a vane, a trigger on the vane, a connection for pulling the vane against the wheel, means actuated by the trigger for setting the brake, and additional means for releasing the brake upon reverse movement of the vane.

19 A windmill comprising a windwheel, a brake therefor, an actuating arm yieldably connected to the brake, brake setting connections for moving the arm in one direction, and brake releasing connections for moving the arm in the opposite direction.

20 A windmill comprising a windwheel, a vane therefor, a frame on which the vane and wheel are mounted, and a yieldable arm movable independently of the frame and extending from the frame and in the path of the vane to take the concussion of the vane as the vane moves theretoward in throwing the wheel out of the wind.

21 A windmill comprising a windwheel, a vane therefor, a frame on which the vane and wheel are mounted, a pull out line for the vane, a buffer arm pivotally mounted on and movable independently of the frame, and a pulley for the line carried by the arm.

22 A windmill comprising a windwheel, a vane therefor, a frame on which the vane and wheel are mounted, and a yieldable buffer arm movable independently of the frame and connected to cushion the limiting movements of the vane.

Dated at Heckington this 12th day of March 1914.

True copy
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W. Alexander

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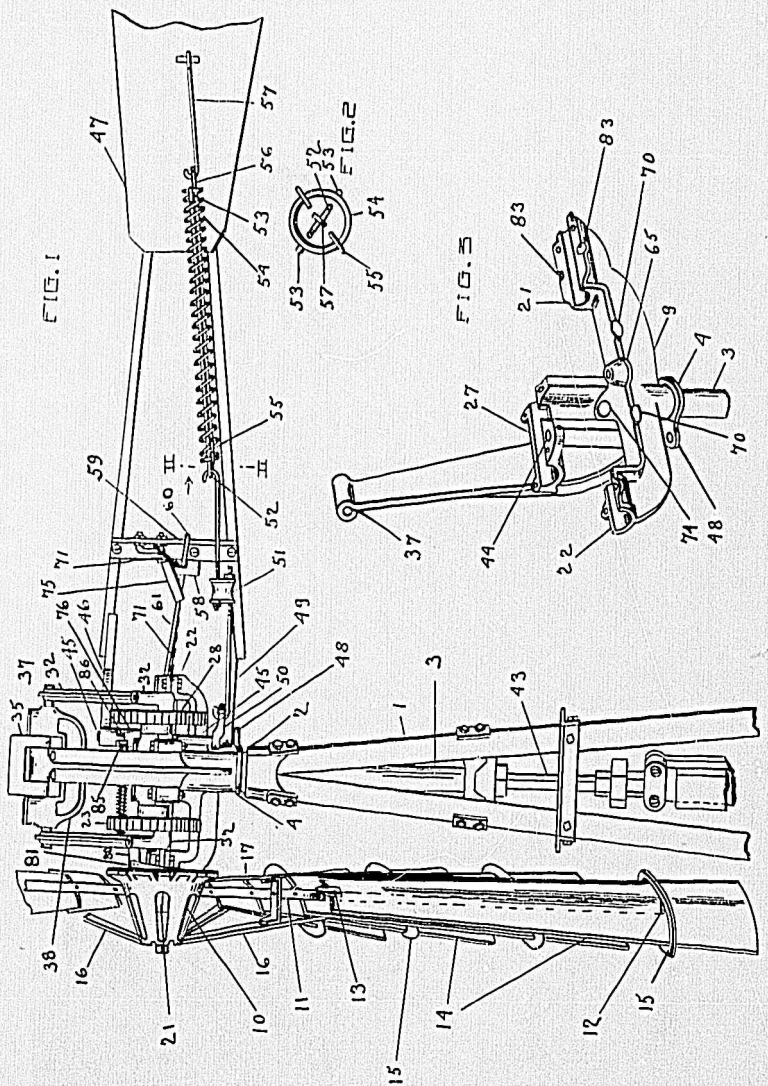


FIG. 1



FIG. 2



FIG. 3

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FIG. 5

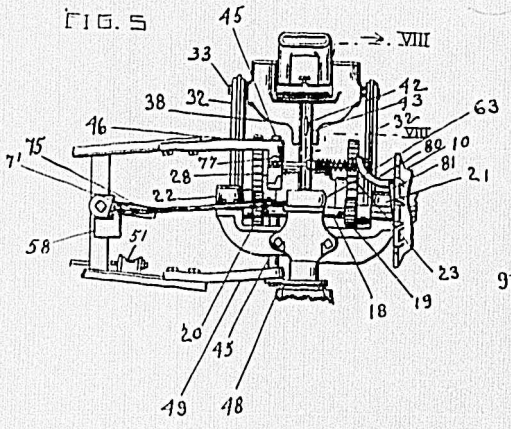



FIG. 4

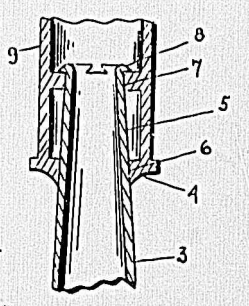
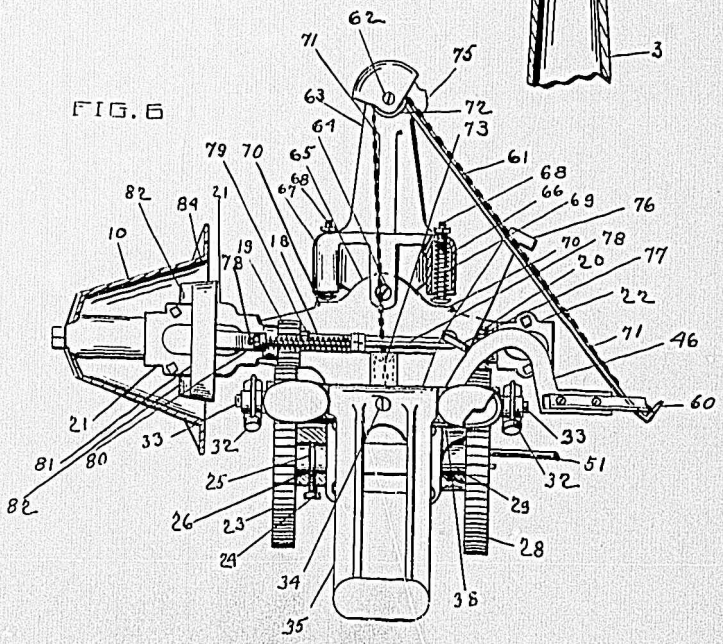



FIG. 6




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FIG. 7

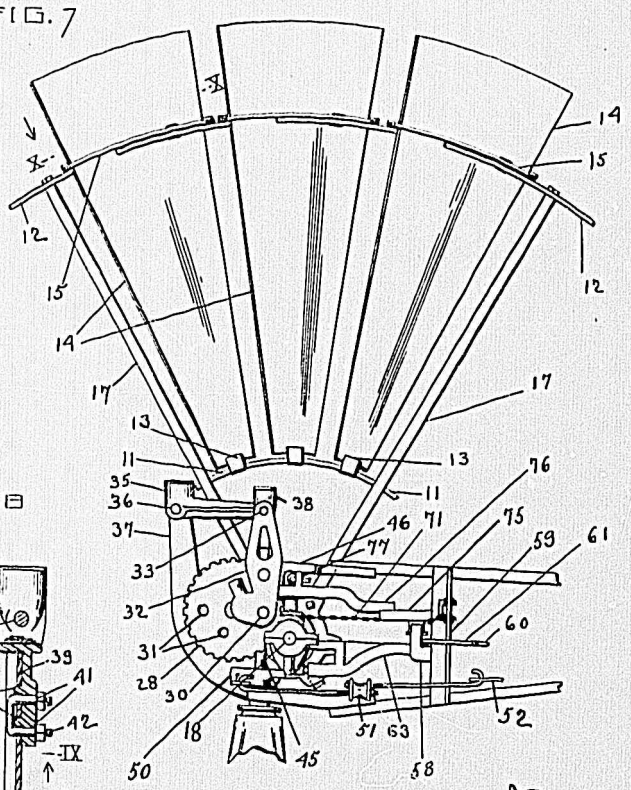



FIG. 8



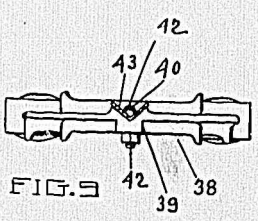
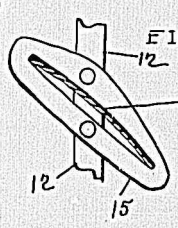




FIG. 9

FIG. 10




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