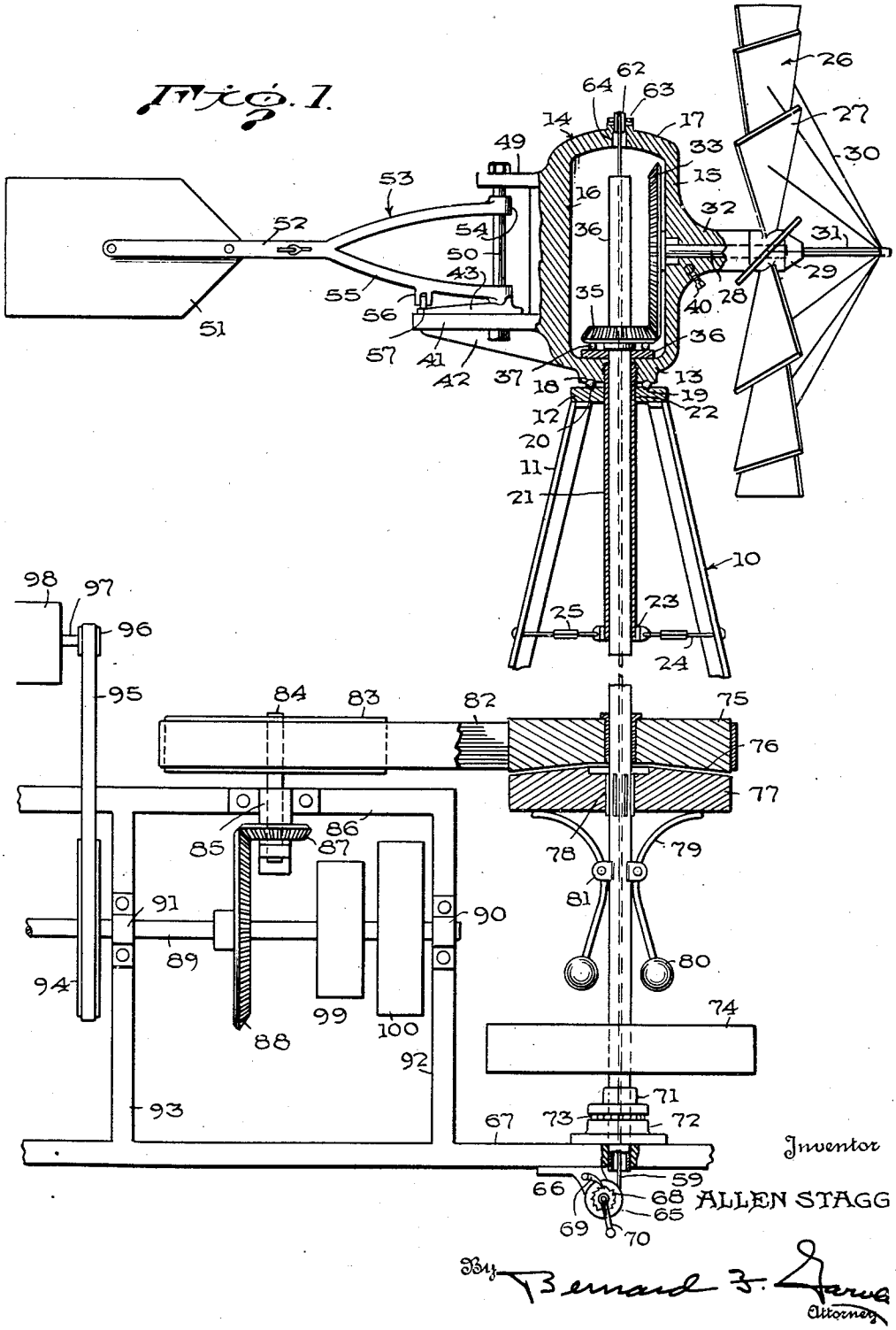
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WINDMILL

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Fig. 1.



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Fig. 2.

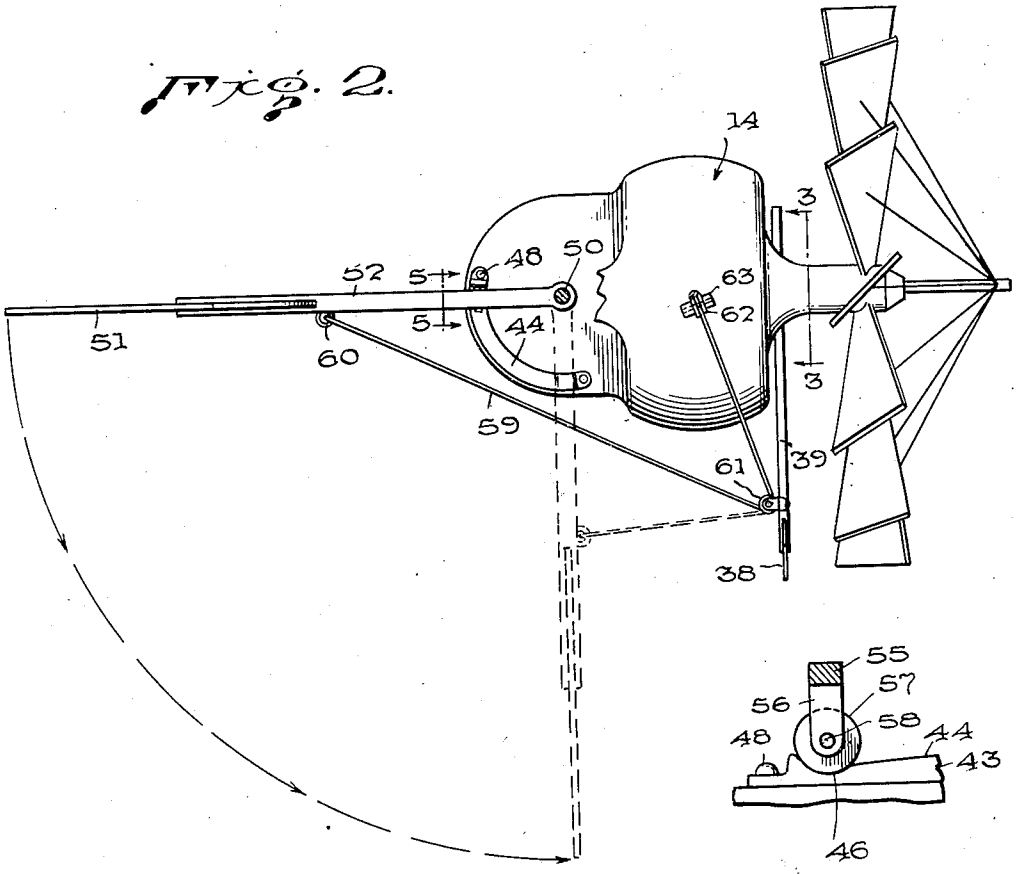


Fig. 5.

Fig. 3.

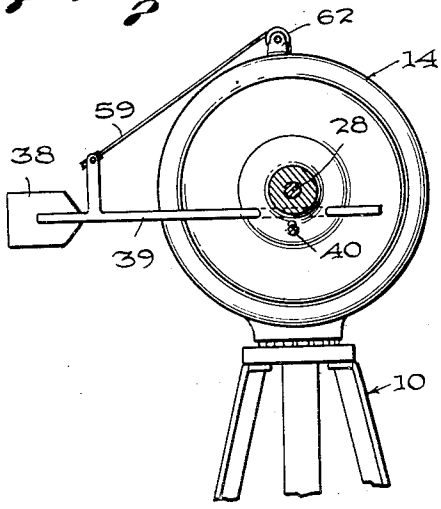
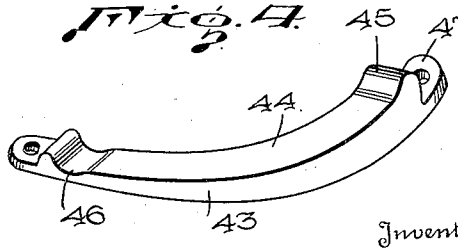


Fig. 4.



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2,417,022

UNITED STATES PATENT OFFICE

2,417,022

WINDMILL

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Application May 23, 1945, Serial No. 595,408

3 Claims. (Cl. 170—46)

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This invention relates to windmills and particularly to a windmill coupled to an electric generator or other power means.

An object of this invention is to provide a windmill having a pivoted vane for maintaining the wheel in the wind and an improved means for adjusting the position of the vane so that the latter may be moved to an inoperative position.

Another object of this invention is to provide in a windmill construction a centrifugally operated clutch for coupling the drive shaft connected with the wind wheel to a power means.

A further object of this invention is to provide a construction of this kind wherein the parts which are exposed to the weather are encased in tubular means so that they will not become injured by weather conditions.

A further object of this invention is to provide in an adjustable wheel guiding vane, an improved means for pivotally mounting the vane so that it can be maintained in an inoperative or operative position.

A further object of this invention is to provide in a windmill construction of this kind an improved means for maintaining the wind wheel in confronting position to the wind which will eliminate the use of weights or springs.

In the drawings:

Figure 1 is a detailed side elevation partly in vertical section and partly broken away, of a windmill construction according to an embodiment of this invention.

Figure 2 is a top plan view of the device.

Figure 3 is a fragmentary sectional view taken on the line 3—3 of Figure 2.

Figure 4 is a perspective view of the cam member associated with the tail vane.

Figure 5 is a fragmentary sectional view taken on the line 5—5 of Figure 2.

Referring to the drawings, the numeral 10 designates generally a tower which is formed of a plurality of upwardly convergent supporting bars 11, having secured to the upper ends thereof a plate or head 12. A housing, generally designated as 14, is mounted on the upper end of the tower or support 10 and comprises front and rear walls 15 and 16, respectively, and a substantially circular side wall 17. The side wall 17 is formed with a flat lower side 13 which is formed with a ball race 18 with which antifriction balls 19 are engaged. The head plate 12 is also formed with an annular ball race 20 with which the antifriction members 19 are engaged so that the housing 14 may freely rotate about a vertical axis.

A tubular member 21 is threaded into the

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lower wall 13 of the housing 14 and is loosely extended through an opening 22 which is formed in the head member 12. The tubular member 21 is also rotatably disposed through a ring 23 which is supported below the head member 12 by means of a plurality of radially arranged adjustable supporting rods 24. The rods 24 include turn-buckles 25 so that the lower end of the tubular member 21 will be rotatably supported in a vertical position and will be free to rotate about a vertical axis.

A wind wheel 26 which includes a plurality of blades 27 secured to a shaft 28 is disposed at the front side of the housing 14, the blades 27 being carried by a central hub 29 and braced with respect to the hub 29 by means of a plurality of forwardly extending bracing rods 30. The bracing rods 30 are secured to a centrally disposed rod or shaft 31 extending forwardly from the hub 29. The shaft 28 is rotatably mounted in a bushing 32 which is formed integral with or carried by the front wall 15 and the shaft 28 has secured to its inner end within the housing 14 a large beveled gear 33. A tubular shaft 34 which is disposed in a vertical position terminates at its upper end within the housing 14 and has secured thereto a beveled gear 35 which meshes with the bevel driving gear 33.

A bearing plate 36 is mounted on the inner side of the bottom wall 13 of the housing 14 and anti-friction balls 37 are interposed between the bearing plate 36 and the lower side of the gear 35.

A side vane 38 is disposed rearwardly of the wheel 26 extending at right angles to the length of the shaft 28 and supported outwardly from the housing 14 by means of an elongated supporting bar 39. The outward position of the vane or plate 38 may be regulated by means of a set screw 40. The housing 14 has extending from the rear wall 16 thereof a plate 41 which is braced in a horizontal position by means of a bracing web 42. The plate 41 is substantially semicircular in plane and has secured to the upper side thereof an arcuate cam member 43. The cam member 43 is formed with an inclined upper surface 44 which is formed with an abutment or stop 45 at its high point and is formed with an arcuate recess 46 at its low point. The cam member 43 is formed with a pair of ears 47 extending from the opposite ends thereof which are secured by fastening members 48 to the upper side of the supporting plate 41. A rearwardly extending arm 49 is carried by the rear wall 16 of the housing 14 and has extending vertically therethrough a shaft or bolt 50 which also extends through the plate 41. The shaft 50 constitutes a supporting shaft for a tail

vane. 51. The tail vane 51 is secured to a supporting bar 52 which is formed with a bifurcated inner end portion 53 having bosses 54 through which the shaft 50 loosely engages. The lower arm 55 of the fork 53 has secured to or formed integral therewith a pair of ears 56 between which a roller 57 is rotatably mounted. The roller 57 is carried by a roller shaft 58 engaging through the ears 56 and the roller 57 engages the upper surface of the cam member 43. The arcuate recess at the low end of the cam member 43 is provided in order that the roller 57 may engage therein for locking the vane 51 in axial alignment with the shaft 28 at which time the vane 51 is in its operative position.

In order to provide for adjustment of the tail vane 51 from an operative to an inoperative position, the latter being shown in dotted lines in Figure 2, I have provided a flexible tail vane regulating member 59. The flexible member 59 is secured at one end as at 60 to the supporting member 52 for the tail vane and is then trained through a sheave 61 which is secured to the outer portion of the side vane supporting rod 39. The tail vane adjusting cable 59 is then trained over a pulley 62 which is journaled in a bearing 63 formed in the top of the housing 14.

The housing 14 is provided with an opening 64 through which the cable 59 is extended and this cable is then extended downwardly and centrally through the hollow shaft 34. The cable 59 is then trained about a drum 65 carried by supporting member 66 which is secured to a platform 67. The drum 65 has correlated therewith a ratchet 68 with which a pall 69 carried by the supporting member 66 is engaged so that drum 65 will be selectively held against rotation. A crank 70 is secured to the drum shaft and provides a means whereby the drum may be rotated for either winding or unwinding the cable thereon.

The lower end of the shaft 34 has secured thereto one member 71 of an anti-friction bearing which is in the form of a collar, and a second bearing member 72 is fixed to the upper side of the platform 67 confronting the bearing member 71. Anti-friction balls 73 are interposed between the two bearing members 71 and 72 so that tubular shaft 34 may freely rotate with a minimum of friction.

A weighting fly wheel 74 is secured to the shaft 34 adjacent the lower end thereof and provides a means for equalizing the rotation of the shaft 34. A pulley 75 is loose on the tubular shaft 34 at a point above the platform 67, and is formed at its lower side with a clutch face 76. A complementary clutch member 77 is splined as at 78 on the shaft 34 and is adapted to be urged upwardly to clutching position by centrifugal means which includes a plurality of curved arms 79 having weights 80 at their lower ends. The arms 79 engage the lower side of the lower clutch member 77 and are rockably supported on the tubular shaft 34 between pairs of ears 81 which are fixed relative to the shaft 34. The pulley 75 has trained thereabout a belt 82 and this belt is also trained about a pulley 83 carried by a shaft 84 disposed laterally of the drive shaft 34. The shaft 84 is journaled through a bearing 85 which is carried by a base structure, generally designated as 86. The shaft 84 also has fixed thereon a beveled gear 87 which meshes with a larger beveled gear 88 secured to a counter-shaft 89. The counter-shaft 89 is journaled in a pair of bearings 90 and 91 which are carried by transverse supporting members 92 and 93, respectively, forming part of the base 86. A relatively large diameter pulley 94 is secured to the counter-shaft 89 and has trained thereabout a belt 95 which is also trained about a small pulley 96 secured to a generator shaft 97. The generator shaft 97 is correlated with an electric generator 98 which is adapted to be operated when shaft 34 is rotated, and clutch members 76 and 77 are in clutching position. A pair of power take-off pulleys 99 and 100 of different diameters are also secured to the counter-shaft 89 so that additional belts may be coupled to counter-shaft 89 for operating desired appliances.

In the use and operation of this windmill, when it is desired to provide for rotation of the drive shaft 34, drum 65 is rotated so as to unwind the cable 59 therefrom and permit the wind striking the tail vane 51 which, in its inoperative position, confronts the direction of the wind to swing the tail vane 51 rearwardly into alignment with the wind wheel shaft 28. When the cable 59 is released, the roller 57, which will be at the high point of the cam 43, will gravitatingly roll downwardly toward the low end of the cam 43 until the roller 57 engages in the locking recess 46.

As wind wheel 26 is rotated by the wind, shaft 34 will be rotated and when sufficient speed has been attained, centrifugal weights 80 will swing the lower ends of the arms 79 outwardly and cause the upper outwardly curved ends thereof to raise the clutch member 77 to clutching position with the clutch face 76. At this time, pulley 75 will be rotated and the elements coupled to the pulley 75 will thereupon be operated through the pulley 83 and the shaft 84. By having the fly wheel 74 secured to the lower end of the tubular shaft 34, the speed of rotation of this shaft will be equalized and will be prevented from sudden pick-up or drop in rotation so that a steady flow of power will be provided.

The side vane 38 also provides a governor construction which will balance the pressure of wind on the wind wheel. As the wind pressure on the side vane increases, the housing 14 will be rotated with the side vane and as the wind will maintain the tail vane in substantially a stationary position, the roller 57 will ride up on the cam. As the side vane 38 causes the wind wheel to assume an angular position with respect to the direction of the wind, this wheel will be rotated at a slower speed than is normal for the wind pressure. When the wind pressure on the side vane 38 decreases, the tail vane 51 will swing on the pivot member 59 to push the wheel or roller 57 adjacent the lower end of the cam member 43. When the roller 57 engages in the recess 46 the wind wheel 26 will be operating at normal or predetermined speed for a predetermined wind pressure, but if this pressure should increase, the speed of wind wheel 26 will be reduced by wind pressure on side vane 38 causing the housing 14 and wind wheel 26 to swing at an angle to the direction of the wind. In this manner there will be maintained a relatively normal speed for the wind wheel and the shaft 34. The side vane 38, therefore, constitutes a governor which is correlated with the pivoted tail vane 51 and the cam member 43 in maintaining the wind wheel 26 either facing the direction of the wind or disposed at an angle with respect to the wind.

What is claimed is:

1. A windmill comprising a supporting standard, a housing pivotally mounted on said stand-

ard for rotary movement about a vertical axis, a windwheel shaft journalled in said housing, a windwheel on said shaft, a vertical power shaft rotatably carried by said standard, motion transmitting means connecting the windwheel shaft with said power shaft and enclosed by said housing, a tail vane, means pivotally supporting said tail vane from said housing, an arcuate cam member, means supporting said cam member from said housing, said cam member having the upper surface thereof inclined to the horizontal and formed with a depression at the low end of said inclined surface, and a roller carried by said supporting means engaging said cam member and adapted when disposed in said depression to releasably lock said tail vane in alignment with said windwheel shaft.

2. A windmill comprising a supporting standard, a housing pivotally mounted on said standard for rotary movement about a vertical axis, a windwheel shaft journalled in said housing, a windwheel on said shaft, a vertical power shaft rotatably carried by said standard, motion transmitting means connecting the windwheel shaft with said power shaft and enclosed by said housing, a tail vane, means pivotally supporting said tail vane from said housing, an arcuate cam member, means supporting said cam member from said housing, said cam member having the upper surface thereof inclined to the horizontal and formed with a depression at the low end of said inclined surface, a roller carried by said supporting means engaging said cam member and adapted when disposed in said depression to releasably lock said tail vane in alignment with said windwheel shaft, a stabilizing vane, means supporting said stabilizing vane at right angles to said windwheel shaft, a flexible regulating member extending downwardly from said housing, a pulley carried by said supporting means for said stabilizing vane, said regulating member being trained over said pulley and fixed to said tail vane supporting means whereby downward pull on said regulating member will draw said tail vane toward said

stabilizing vane to thereby hold said windwheel in inoperative position.

3. A windmill comprising a housing mounted for rotary movement about a vertical axis, a shaft rotatably supported by a wall of said housing, a wind wheel supported on said shaft exteriorly of the housing, a power shaft having an end thereof within said housing, motion transmitting means connecting the wind wheel shaft with said power shaft and enclosed by said housing, a tail vane pivotally supported on a wall of the housing opposite to the first mentioned wall, an arcuate cam member supported exteriorly of the housing and provided at one end with a stop and at a relatively opposite end with a recess, a roller carried by the tail vane and movable over said cam for coaction with the stop and recess of the latter, a stabilizing vane supported on said housing and extending at right angles to the wind wheel shaft, a flexible member trained through said housing and connected at one end with said tail vane and a pulley mounted on said stabilizing vane over which said flexible member is trained.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
217,147	Reed	July 1, 1879
223,379	Page	Jan. 6, 1880
361,894	Reibe	Apr. 26, 1887
556,803	Bramwell	Mar. 3, 1896
689,635	Carney	Dec. 24, 1901
781,449	McPhail	Jan. 31, 1905
1,722,845	Gonzalez et al.	July 30, 1929
2,247,929	Terhune	July 1, 1941

FOREIGN PATENTS

Number	Country	Date
715,089	French	Sept. 21, 1931