July 26, 1938. A. J. EVANS 2,125,222

WINDMILL GOVERNOR

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Fig. 1.

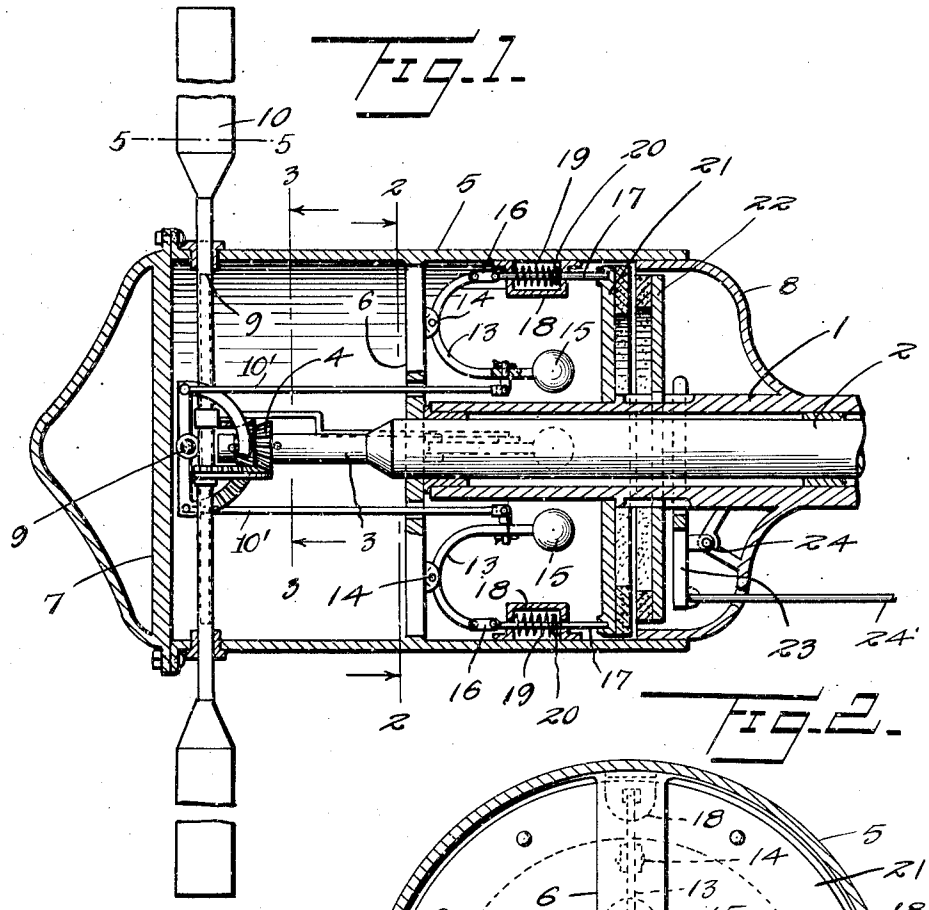


Fig. 2.

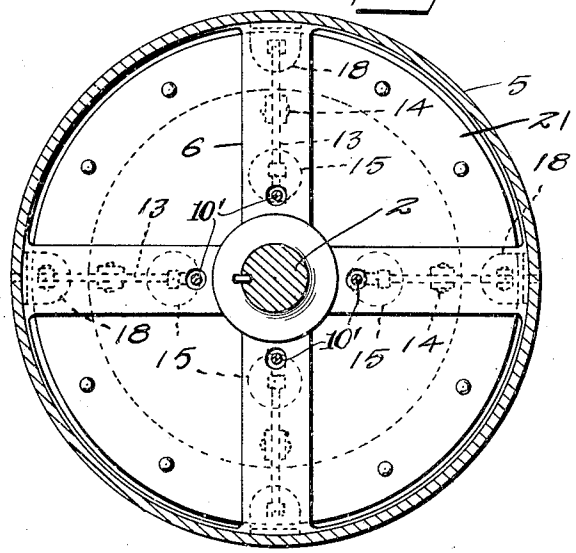


Fig. 5.

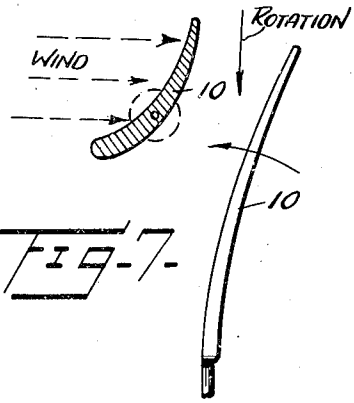


Fig. 7.

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Fig. 3.

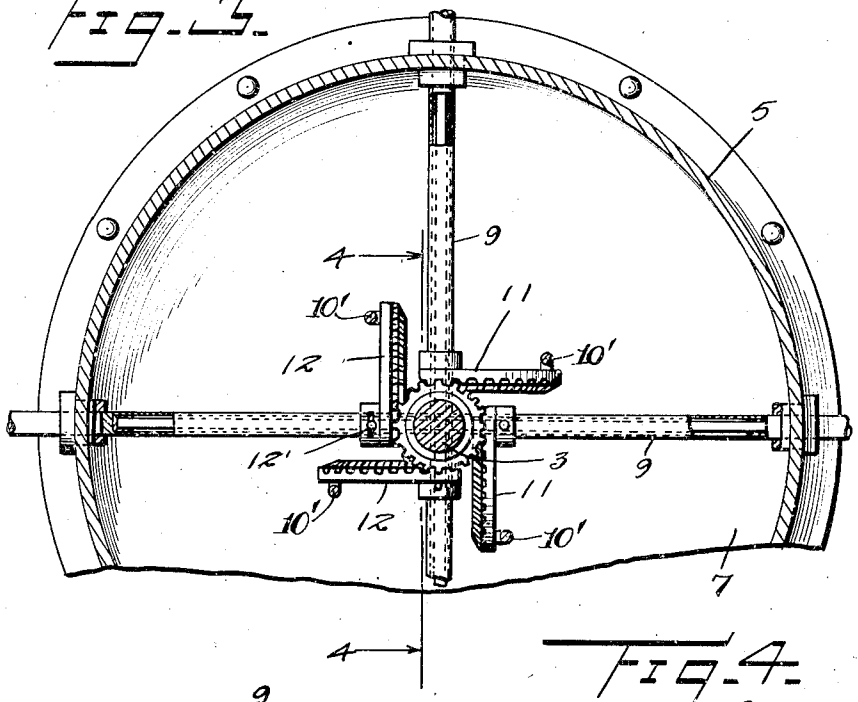


Fig. 4.

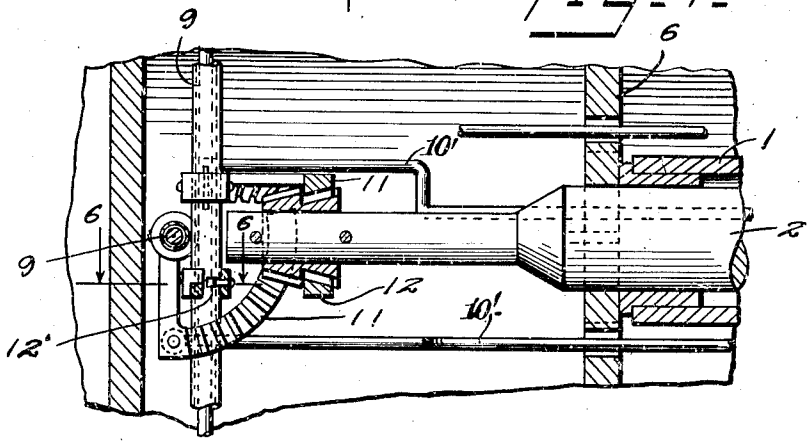
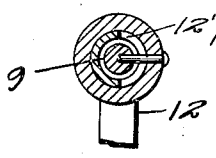


Fig. 6.



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Patented July 26, 1938 2,125,222

UNITED STATES PATENT OFFICE

2,125,222

WINDMILL GOVERNOR

Arthur J. Evans, Columbus, N. Mex.

Application August 15, 1936, Serial No. 96,280

1 Claim. (Cl. 170—68)

This invention relates to governor controlled windmills and has for the primary object the provision of a simple and efficient device of this character which will automatically vary the pitch of the blades in accordance with the velocity of the wind to maintain the operation of the windmill at a substantially predetermined speed and also through the manual actuation of a suitable means cooperating with the governor mechanism the windmill may be easily stopped.

With these and other objects in view, this invention consists in certain novel features of construction, combination and arrangement of parts to be hereinafter more fully described and claimed.

For a complete understanding of my invention, reference is to be had to the following description and accompanying drawings, in which

Figure 1 is a fragmentary horizontal sectional view illustrating a windmill constructed in accordance with my invention.

Figure 2 is a transverse sectional view taken on the line 2—2 of Figure 1.

Figure 3 is a transverse sectional view taken on the line 3—3 of Figure 1.

Figure 4 is a fragmentary sectional view taken on the line 4—4 of Figure 3.

Figure 5 is a detail sectional view illustrating the curvature of one of the blades and taken on the line 5—5 of Figure 1.

Figure 6 is a sectional view taken on the line 6—6 of Figure 4.

Figure 7 is an edge elevation illustrating one of the blades and the curvature thereof extending from one end to the opposite end of said blade and showing by an arrow the direction of rotation of the blade when acted on by wind currents as suggested by arrows in Figure 5, and also showing the endwise curvature of said blade with respect to its direction of rotation when the blade is in full operative position for rotating the shaft of the windmill by the wind currents.

Referring in detail to the drawings, the numeral 1 indicates a supporting sleeve mounted in any suitable way and forms a journal for a power shaft 2, one end of which is reduced to form an extension 3 on which is journaled a gear 4. The sleeve and shaft 2 extend into a casing 5 and the latter has secured thereto a spider 6 which is in turn secured to the power shaft 2. One end of the casing is closed by a removable cap 7 and received within the other end of the casing is a closure 8 forming an inegral part of the supporting sleeve 1.

Pairs of shafts 9 extend through the casing and are suitably journaled thereto. The pairs of shafts cross each other at a point in alignment with the longitudinal axis of the power shaft. The shafts of each pair fit one within the other and the outer shaft has a slot 12' extending transversely thereof. Secured to the outer shaft of each pair of segmental gears 11 and journaled on the outer shaft are segmental gears 12, which are secured to the inner shafts. The segmental gears 11 and 12 mesh with the gear 4. Integral with the shafts 9 are blades 10 and each is transversely curved and tapers from one edge towards its opposite edge and also is arcuately curved from one end to its opposite end; in accordance with the laws of aero-dynamics, the arcuate transverse curvature of the blade increases the efficiency of the blades since in facing the wind the concave side of the blade receives pressure while on the convex side there will be a suction pull, and I have found that the longitudinal curve of the blade from end to end maintains a more direct right angle push and pull on the blade probably due to the fact that the outer end of the blade travels faster through a greater area. Governor rods 10' are pivoted to the segmental-shaped gears 11 and 12 and are slidable through openings formed in the spider 6 and have pivotal connection with governor arms 13. Each arm 13 is of substantially U-shape pivoted to the spider, as shown at 14. A weight 15 is secured on one end of the arm 13 while the opposite end is pivoted to a link 16. The link 16 is pivoted to a rod 17 slidably mounted in a housing 18 secured to the casing. Coil springs 19 are mounted on the rods 17 and bear against the housings 18 and seats 20 secured to said rods. The weights when influenced by centrifugal action work against the action of the springs. A brake plate 21 is journaled on the sleeve 1 and secured to the rods 17 and cooperating therewith is a brake plate 22 splined to the sleeve 1 and is actuated by the pivotal movement of a lever 23, the latter being pivotally supported, as shown at 24, on the closure 8 and sleeve 1. An operating element 24' is secured to the lever 23, and this element can be operated to move brake plate 22 forwardly toward brake plate 21 to effect a retardation of the rotation and by sufficient forward movement thereof stopping of the windmill will be effected by a direct braking action between the plates.

It is to be understood that the sleeve 1 is to be equipped with a tail vane for the purpose of holding or maintaining the windmill in the wind.

In operation, with the brake plates disengaged, the governor will act to maintain the operation of the windmill at a substantially predetermined

speed during the variance of the velocity of the wind. The governor arms act on the segmental gears which are caused to move in unison through the gear 4 for the purpose of varying the pitch of the blade in accordance with the varying in velocity of the wind.

Having described the invention, I claim:

A windmill comprising a supporting sleeve, a power shaft journaled in said sleeve, a casing receiving said sleeve and shaft, a spider formed on said casing and secured to the shaft, blade shafts extending through said casing and crossing each other with their point of crossing in alignment with the power shaft, blades secured to said blade shafts, a gear journaled on the power shaft, segmental gears meshing with said gear and secured to said blade shafts, governor arms pivoted to said spider, rods connecting the governor arms to the segmental-shaped gears, housings secured to said casing, rods slidable in said housings and pivotally connected to the governor arms, springs acting on said rods, brake plates located in the casing and one journaled in the sleeve and the other splined to said sleeve, one of said brake plates being secured to the rods, and an operating mechanism for effecting sliding movement of the other brake plate.

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