

E. WOODRUM.

## WINDMILL.

APPLICATION FILED SEPT. 22, 1909.

999,423.

Patented Aug. 1, 1911.

2 SHEETS—SHEET 1.

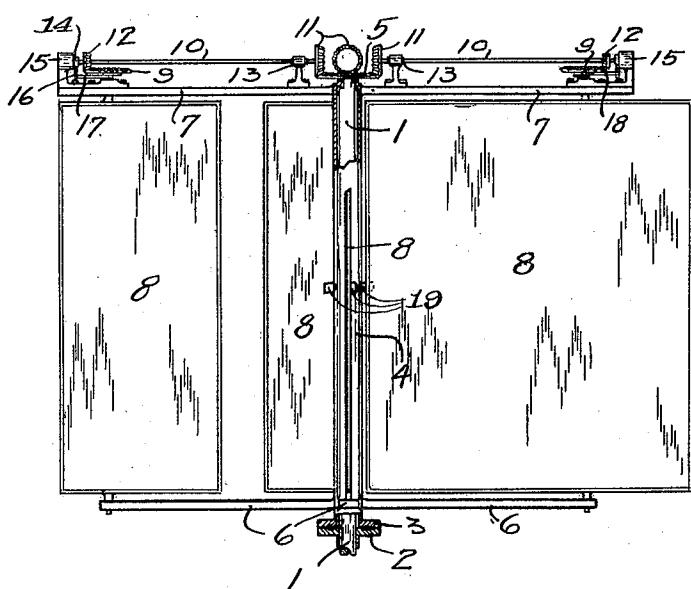


Fig. 1

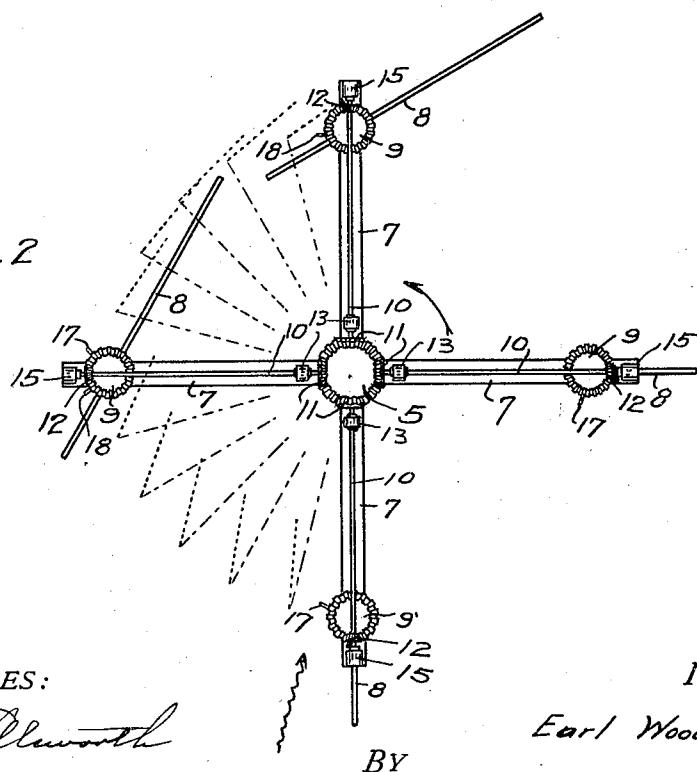


Fig. 2

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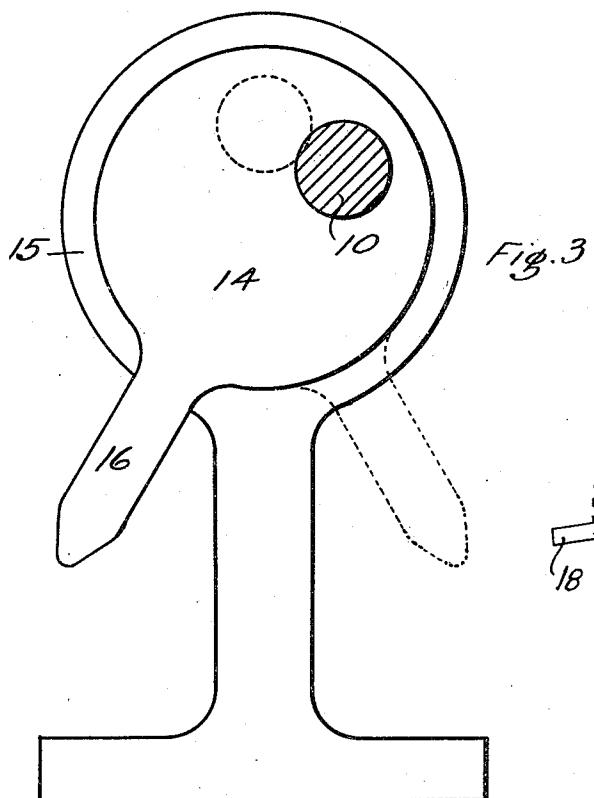


Fig. 3

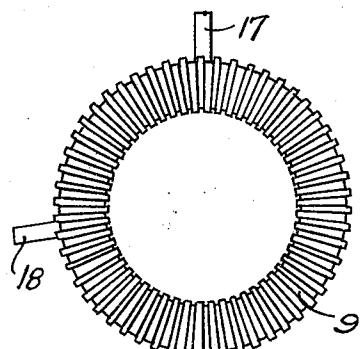


Fig. 5

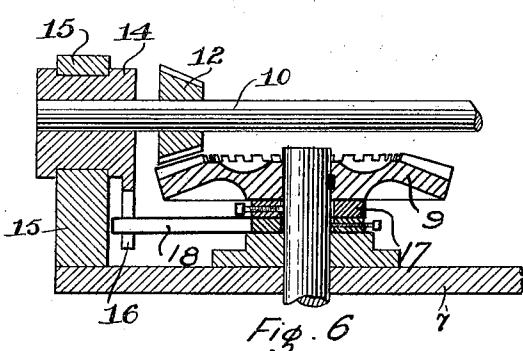
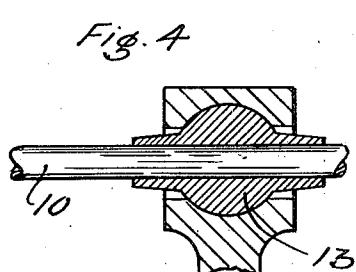


Fig. 6

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# UNITED STATES PATENT OFFICE.

EARL WOODRUM, OF GLENCOVE, WASHINGTON.

## WINDMILL.

999,423.

Specification of Letters Patent. Patented Aug. 1, 1911.

Application filed September 22, 1909. Serial No. 519,015.

To all whom it may concern:

Be it known that I, EARL WOODRUM, a citizen of the United States of America, residing at Glencove, in the county of Pierce and State of Washington, have invented certain new and useful Improvements in Windmills, of which the following is a specification, reference being had therein to the accompanying drawing.

10 This invention relates to windmills and similar motors and has for its object to provide means whereby the wind, or other fluid pressure, will exert a rotatory action on both sides of the axis of the machine. I 15 attain this and other objects by the devices and mechanisms illustrated in the accompanying drawings in which—

Figure 1 is an elevation of my improved windmill; Fig. 2 is a plan thereof; Fig. 3 20 is an elevation of the eccentric bearing; Fig. 4 is a section of the ball-and-socket bearing; Fig. 5 is a plan of the wing operating bevel gear; and Fig. 6 is a longitudinal vertical section of the wing operating mechanism.

25 Similar numerals of reference refer to similar parts throughout the several views.

The stationary cylindrical post 1 supports the windmill by means of a collar 2 which engages a collar 3 secured to the lower edge 30 of the tube 4 of the mill. Suitable ball or other antifriction bearings may be placed between the collars 2 and 3 and between the post 1 and the tube 4 in such places as may be necessary to support and hold the tube 4 35 without interfering with its rotation on the post 1. The post 1 extends through the tube 4 and has a fixed bevel gear 5 mounted on its upper end.

The tube 4 has four lower arms 6 secured 40 thereto above the collar 3 and at right-angles to each other, and four similar upper arms 7 secured vertically above the arms 6 and near the upper end of the tube. The wings 8 are formed of any suitable material and 45 are preferably rectangular in shape and are pivoted between the arms 6 and 7. The axis of said pivoted connection is vertical and is outside of the center of the wing. Each wing is provided with a wing gear 9 fixedly 50 secured to the pivot thereof and preferably mounted above the arm 7 of the mill. On each arm 7 is mounted a transmitting shaft 10, each of which has suitable gears 11 and 12 at its two ends adapted to engage respectively the fixed gear 5 and the wing gear 9. 55

The bearing 13 for the shaft 10, near the

gear 11, is preferably constructed as shown in Fig. 4 so as to allow a certain amount of motion of the shaft 10, the gears 11 and 5 being purposely mounted slightly loosely 60 relatively to each other. The bearing 14 for the shaft 10, near the gear 12, is mounted in an eccentric sleeve 15 secured to the arm 7, and is free to turn therein through a slight angle and has an operating arm 16 extending downward therefrom. The eccentricity of the bearing and sleeve is sufficient to disengage the gears 12 and 9. The two actuating lugs 17 and 18 are separately adjustably mounted on the shank of the pivot of the 70 wing, below the wing gear 9 and are each adapted to engage the operating arm 16 of the eccentric bearing 14 to actuate it. The position of the lug 17 is such that it forces the arm 16 into the position shown in Fig. 75 3, in which the shaft 10 is lowered and the gears 12 and 9 are in engagement, when the wing 8 flies open under the action of the wind (as in the upper wing of Fig. 2). The position of the lug 18 is such that it forces 80 the arm 16 into the dotted position shown in Fig. 3, in which the shaft 10 is raised and the gears 12 and 9 are disengaged, when the wing 8 has been closed against suitable stops 19 mounted on tube 4 by the action of said 85 gears 12 and 9 as well as by the pressure of the wind.

The operation of my improved windmill is as follows: If the wind is blowing steadily from one direction, then the wings 8 always close and open at about the same position. Taking one such wing and following it around its course it is noted that as it passes the windward position its larger side is adjacent the tube 4 and is engaging 95 the stops 19 thereon and that in this position the gears 12 and 9 are separated and the wing gets the direct action of the wind on it. But, when it passes the lee position, the wind turns it on its pivots so that the 100 larger side flies outward; this causes the lug 17 to strike the arm 16 to lower the gear 12 into engagement with the gear 9 and this is preferably accomplished when the wing has turned through about 120 degrees though 105 the exact position may be changed by adjusting the position of the lug 17 on the pivot. In this position the wind acts slantly on the wing and tends to aid the rotation of the mill. As the arms 6 and 7 rotate about the post 1 the gears 5, 11, 12 and 110 9 gradually draw the larger side of the wing

8 back to the closed position against the stops 19 on the tube 4 and in practically all intermediate positions thereof the wind aids the rotation of the mill. As the wind shifts, 5 the point of rotation at which the wings 8 will open will shift with it and therefore the mill will work whatever direction the wind may come from.

Having described my invention what I 10 claim is:

1. In a windmill, the combination of a fixed post; a set of arms rotatably mounted thereon; wings pivoted to said arms; a fixed gear mounted on said post; gears secured to 15 said wings; means connecting the fixed gear to the wing gears whereby said wing gears are operated by the rotation of the mill; means for releasing said connecting means; and means mounted on said wings and con- 20 trolling said releasing means.

2. In a wind mill, the combination of a fixed post; a set of arms rotatably mounted thereon; wings pivoted to said arms; a fixed gear mounted on said post; gears secured to said wings; means connecting the fixed gear 25 to the wing gears whereby said wing gears are operated by the rotation of the mill; an eccentric bearing for said connecting means whereby said means may be brought into or out of action; and lugs mounted on said 30 wings and adapted to engage and turn said eccentric bearing whereby the action of said connecting means is controlled.

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

EARL WOODRUM.

Witnesses:

M. F. McNEIL,  
CALEB BENNETT.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents,  
Washington, D. C."