Feb. 22, 1927. 1,618,549

J. O'TOOLE

WINDMILL

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FIG. 1.

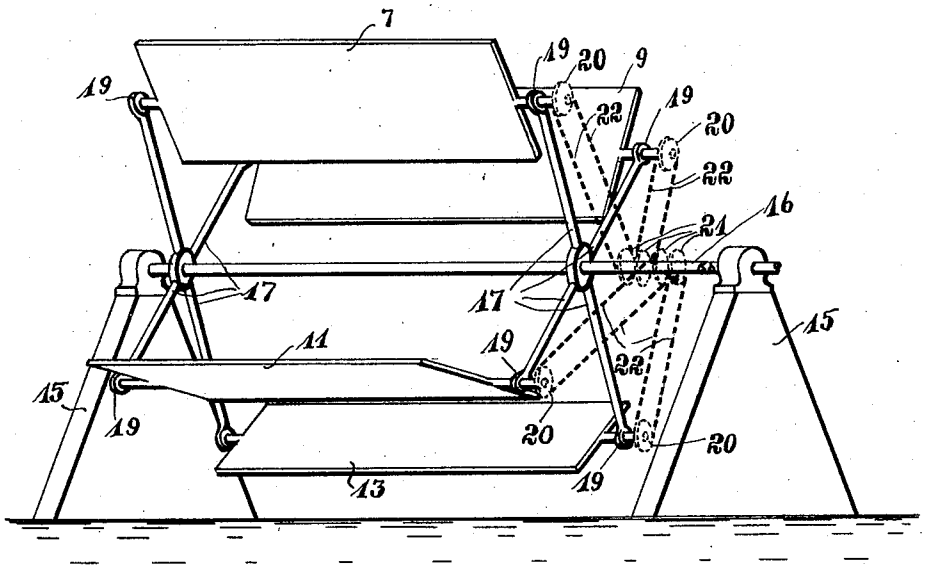


FIG. 3.

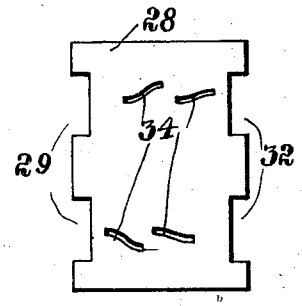
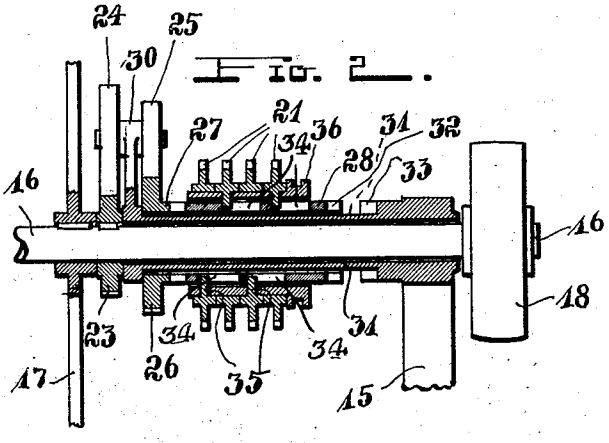


FIG. 2.



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Fig. 4.

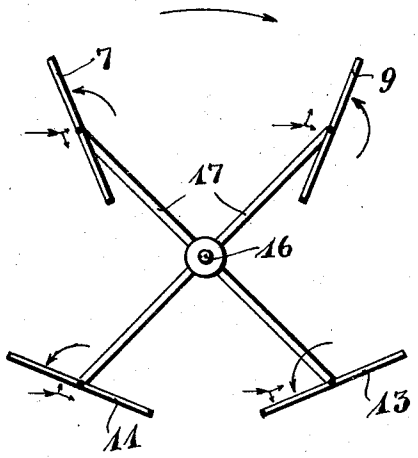


Fig. 5.

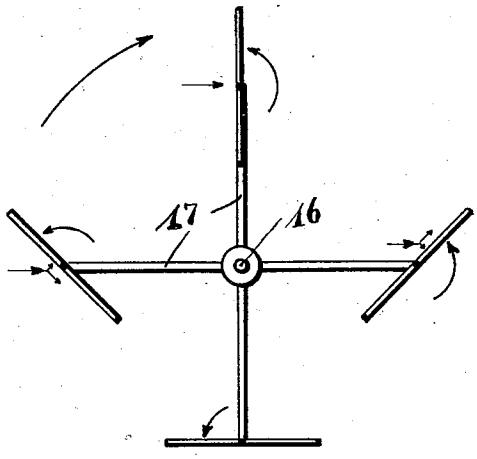
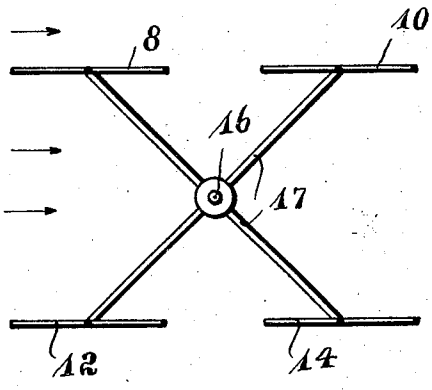


Fig. 6.



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UNITED STATES PATENT OFFICE.

JOHN O'TOOLE, OF LOS ANGELES, CALIFORNIA.

WINDMILL.

Application filed February 20, 1926. Serial No. 89,722.

This invention relates to devices used in controlling windmills.

One of the objects of this invention is to provide controlling means for shifting and turning the vanes of the mill in certain relation to the wind wheel, by which the vanes may also be set and held against rotating movements so as to cut the wind with a minimum wind-surface.

Another object is to provide sleeve controls mounted on the main shaft of the windwheel, including one sleeve to be held stationary by which the vane-actuating and rotating mechanism may also be held stationary when so set.

Another object is to provide means by which the vanes may be moved to advanced or retarded positions for stopping or reversing actions.

Other objects will appear from the following description and appended claims as well as from the accompanying drawings, in which—

Fig. 1 is a perspective somewhat diagrammatical illustration of a wind-wheel embodying the invention, the vane-controlling sprockets being merely roughly outlined, and the connecting gears and pulleys being left off to make the interconnection between the vanes and the several sprockets distinct.

Fig. 2 is a detail longitudinal sectional view of the shafts, sprockets, and gears.

Fig. 3 is a flat plan view of the cams in form of slots in the tubular control member for setting and holding the sprockets in certain positions.

Fig. 4 is a diagrammatic side elevation of the wind-wheel illustrating the vanes in certain operative positions.

Fig. 5 is a diagrammatic side elevation illustrating the vanes in another operative relation to one another.

Fig. 6 is a diagrammatic side elevation similar to the illustration in Fig. 4, in which the vanes have been illustrated in inoperative and ineffective positions.

From the illustrations in Figs. 4 and 6, it is readily understood how a forward or rearward turning of the vanes may tend and serve to bring and hold the vanes so as to make the pressure of wind ineffective upon the wind-wheel. By providing means by which the vane 7 in Fig. 4 may be moved to the position indicated at 8 in Fig. 6, and the vane 9 of Fig. 4 to the position indicated at 10 in Fig. 6, and the vane 11 of Fig. 4 to the position indicated at 12 in Fig. 6, and the vane 13 of Fig. 4 to the position indicated at 14 in Fig. 6; wind, whether coming from the front or from the rear, has little or no effect upon the vanes in such changed positions; while, in the positions in which the vanes are illustrated in Figs. 4 and 5, wind has a distinct effect in one and the same direction in relation to the rotating of the wind-wheel upon each and all of the vanes.

The wind-wheel is illustrated in a horizontal position though a vertical arrangement may be just as practical and effective.

In this horizontal arrangement, bases or uprights 15 are provided to turnably support the main shaft 16. The main arms 17 are firmly mounted on the main shaft, to transmit the motion from the arms to the main shaft, to be further transmitted by pulleys or other customary transmitting means, a pulley 18 being indicated on the end of the shaft 16 in Fig. 2.

The arms 17 are provided with bearings 19 in which the vanes 7, 9, 11, and 13 are turnably mounted. The sprockets 20 serve to control the rotating movements of the vanes. Other sprockets 21 are mounted in operative relation to the main shaft 16, and are operatively connected with the sprockets on the vanes by suitable flexible means 22.

The sprockets and connecting means are merely roughly outlined and indicated in Fig. 1, to illustrate their operative relation, since their constructive details are of little or no importance and well known type may be used.

The direct connection between the main arms 17 with the pulley 18 through the main shaft 16 is illustrated in Fig. 2. A gear 23 is also firmly mounted on the main shaft, to transmit the motion of the shaft to other gears 24, 25, and 26, and further to a coupling member 27. A sleeve 28 is provided with corresponding coupling or engaging means 29, by which the motion of the main shaft 16 may be transmitted to this sleeve 28. The gears 24 and 25 are pivotally mounted in the arm 30, which in turn is a part of a stationary sleeve 31. The stationary sleeve 31 extends to the standard or base 15. The gear 26 with the coupling member 27 is turnably mounted on the stationary sleeve 31.

In operation, the rotating sleeve 28 is coupled with the gears and thereby with the

wind-wheel through the main shaft 16 and the arms 17.

To effect a neutralizing of the wind-wheel, the rotating sleeve 28 is disengaged from the gears and thereby from the main shaft, and other engaging or coupling means 32 on the opposite end of the sleeve 28 serve to hold the wind-wheel in neutral position by being brought into engagement with the corresponding engaging means 33 on the stationary sleeve and base.

The neutralizing of the wind-wheel is further effected by a shifting of the sprockets 21 in a rotating direction, so as to turn the vanes to positions in which they offer a minimum and equalized wind surface. The rotating sleeve 28 is for this reason and purpose provided with curved slots of cam-like design, as indicated at 34 in Fig. 3, into which inwardly extending lugs 35 on the sprockets extend so as to be controlled by these cams. The sprockets are mounted on a sleeve 36, which is shiftably and at the same time rotatably mounted on the rotating sleeve 28. By a shifting of the sprocket-carrying sleeve 36 the lugs 35 are caused to move along the cams in the slots 34 so as to rotate the sprockets to a limited extent. This limited rotating of the sprockets is designed in agreement with the illustrations of Figs. 4 and 6, as explained above, so that the vanes may be moved forward or rearward to such an extent that wind has no effect upon the vanes. The design and form of the cams depends therefore entirely upon the extent to which the sprockets have to be turned or moved to assure a neutralizing. Any number of vanes can be controlled in this manner, though four have been indicated in the drawings as described above.

Though two coupling members each on the opposite ends of the sleeve 28 as indicated at 29 and 32, it must be understood that this too is merely a matter of detailing, and it may actually be found more practical and convenient to provide only one coupling member each on the opposite ends, so as and in order to avoid mistakes in setting the vanes in their relation to the main arms 17 and the main wind-wheel, since, with two coupling members it might be possible that the vanes be set unintentionally to reverse the movement of the wind-wheel.

Having thus described my invention, I claim:

1. In a windmill, in combination with rotatory vanes and their controlling means including sprockets, gears to transmit rotating motion to the sprockets, and cam-like engaging members between the gears and the sprockets whereby the sprockets may be set to and held in inoperative position so as to control said vanes in a similar manner.

2. In a windmill, a wind-wheel mounted on a main shaft and carrying rotatory vanes, a sprocket drive between the main shaft and the vanes, and cam-like engaging means between the main shaft and the sprockets whereby the sprockets and therewith the said vanes may be moved to and held in inoperative position.

3. In a windmill, a wind-wheel mounted on a main shaft and carrying rotatory vanes, a stationary sleeve mounted on the main shaft, gears pivotally mounted on the stationary sleeve, another gear firmly mounted on the main shaft to transmit the motion from the shaft to the first-named gears, another gear turnably mounted on the stationary sleeve operatively engaged with the first-named gears, a second sleeve turnably and shiftably mounted on the stationary sleeve, and a sprocket-wheel-carrying sleeve turnably and shiftably mounted on the last-named sleeve, the second and third-named sleeves having cam-like interengagements whereby the sprocket and thereby said vanes can be moved to and held in inoperative position.

In testimony that I claim the foregoing as my invention I have signed my name.

JOHN O'TOOLE.