Aug. 14, 1923.

1,465,174

J. M. PORTER

WINDMILL

Filed June 8, 1922

2 Sheets-Sheet 1

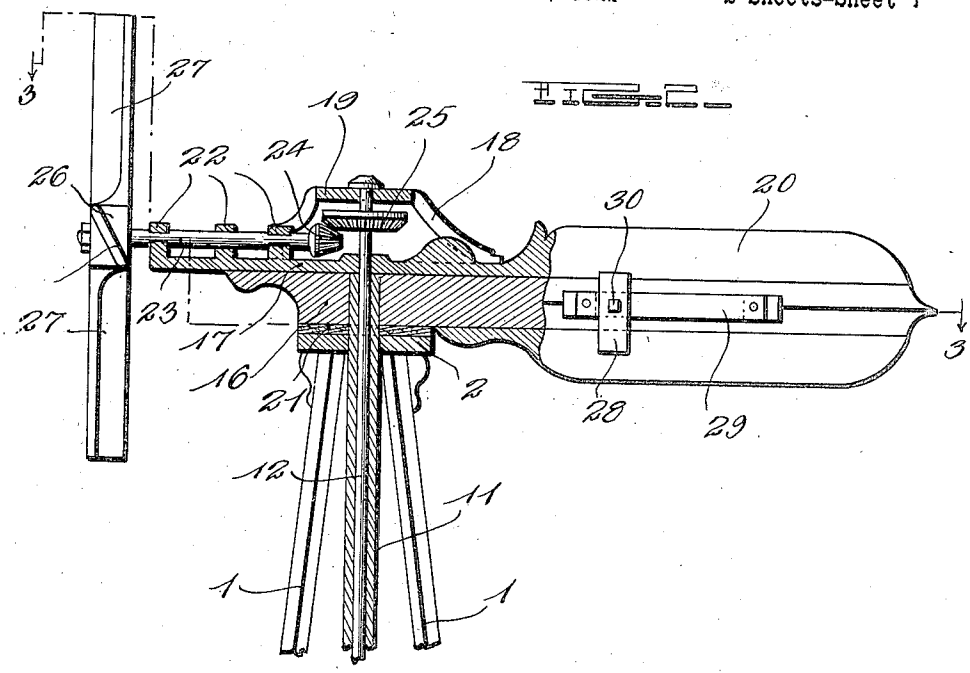
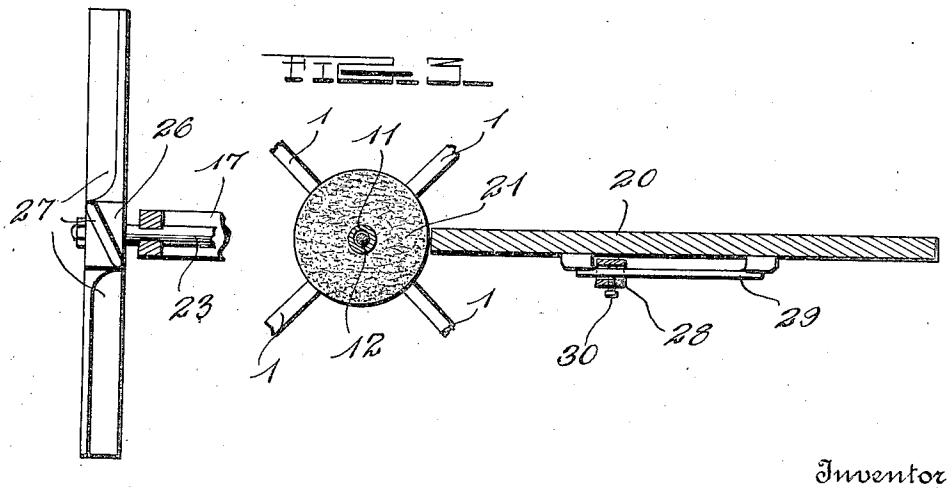


FIG. 3.



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Witness

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2 Sheets-Sheet 2

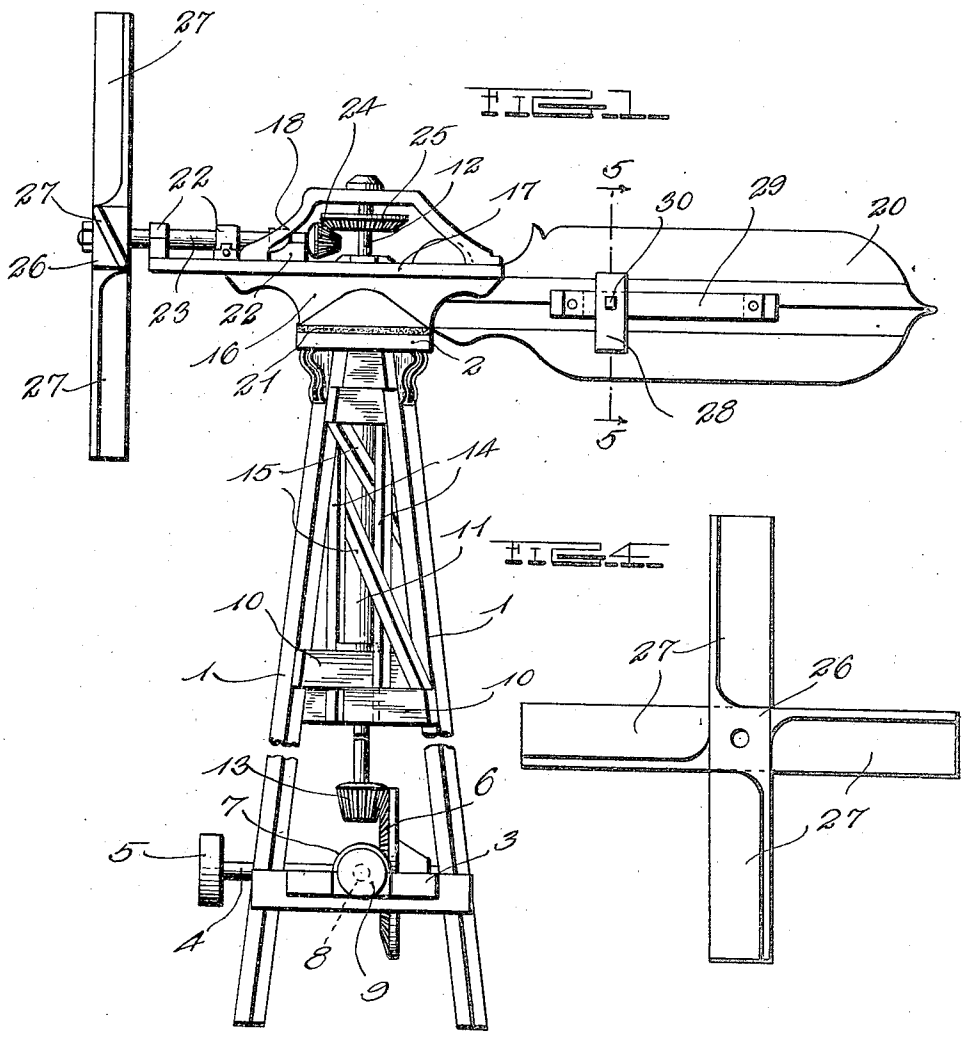


FIG. 1.

FIG. 4.

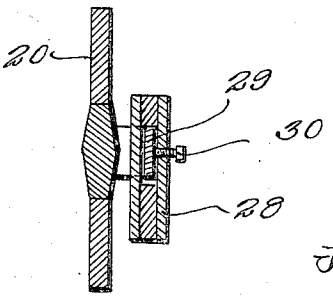


FIG. 5.

Witness

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Patented Aug. 14, 1923. 1,465,174

UNITED STATES PATENT OFFICE.

JOHN M. PORTER, OF WILMINGTON, NORTH CAROLINA.

WINDMILL.

Application filed June 8, 1922. Serial No. 566,809.

To all whom it may concern:

Be it known that I, JOHN M. PORTER, a citizen of the United States, residing at Wilmington, in the county of New Hanover and State of North Carolina, have invented certain new and useful Improvements in Windmills, of which the following is a specification, reference being had therein to the accompanying drawing.

This invention relates to an improved windmill and one object of the invention is to provide the windmill with an improved drive mechanism including rotatably mounted shafts having geared connection and one of them constituting a drive shaft and carrying an improved type of propeller wheel, the blades of which are relatively few in number and pitched at such an angle that it can be readily acted upon by wind to cause rotation of the drive shaft.

Another object of the invention is to provide the windmill with an improved type of head portion for the tower, this head portion being rotatably mounted in an improved manner and having improved means for rotatably mounting the propeller carrying drive shaft and shaft which will be rotated from this drive shaft and extend vertically of the tower through a bearing sleeve disposed in the tower.

Another object of the invention is to so construct and mount the head of the tower that it may have free rotary movement but at the same time prevented from having wobbling and also prevented from having vibration.

Another object of the invention is to provide the head with an improved type of vane for engagement by the wind to keep the propeller properly directed with respect to the wind and to provide this vane with a counterbalancing weight for the propeller movable longitudinally of the vane and lockable in the proper position to prevent the weight of the propeller from overbalancing the weight of the vane.

This invention is illustrated in the accompanying drawings, wherein:

Figure 1 is a view showing the improved windmill in side elevation.

Figure 2 is a view showing the upper portion of the windmill partially in vertical section and partially in elevation.

Figure 3 is a sectional view taken along the line 3—3 of Fig. 2.

Figure 4 is a view showing the propeller in front elevation.

Figure 5 is a sectional view taken along the line 5—5 of Fig. 1.

This windmill is provided with a tower which will be built the desired height and will be provided with the usual corner standards or bars 1. These corner posts will be suitably braced so that they will be held in the proper position with their upper ends converging and secured to a platform 2. Near the lower ends of the corner bars 1, there has been provided cross bars 3 which extend from one side bar to another. A main power shaft 4 is rotatably connected with certain of the bars 3 and is provided at its outer end with a pulley 5 so that rotary movement can be transmitted by means of a suitable belt passed about this pulley. Adjacent its other end and within the lower portion of the tower, the shaft 4 carries a gear disk 6 which meshes with a gear or pinion 7 and thus transmits rotary movement to the shaft 8 which carries a pulley 9 so that a belt may be passed about this pulley 9 and rotary movement transmitted from this shaft 8 as well as from the shaft 4. It will thus be seen that when the shaft 4 is rotated, power may be taken directly from the shaft 4 through the medium of the pulley 5 and may be indirectly taken from the shaft 4 by means of the pulley 9 carried by the shaft 8. At a suitable point intermediate the height of the tower, there has been provided diagonally disposed strips 10 which serve to support and brace the lower end portion of a sleeve 11 which extends upwardly above the platform 2 and serves as a bearing and guiding sleeve for a shaft 12. This shaft 12 carries at its lower end a bevel gear or pinion 13 which meshes with the gear disk or plate 6 and causes rotation of the disk 6 and shaft 4 when the shaft 12 is rotated. The sleeve 11 is further braced and supported by vertically disposed bracing bars 14 and diagonally disposed bracing bars 15 and it will thus be seen that the bearing sleeve will be very firmly held in place.

The head 16 of the windmill is provided with a vertically disposed opening to receive the sleeve 11 and this head is provided

with an upper longitudinally extending platform portion 17 provided with a smaller opening to receive the upper end portion of the shaft 12. Yokes 18 extend longitudinally of the platform at the sides thereof and these yokes 18 have their upper end portions connected by a connecting strip or web 19 which is provided with an opening to receive the upper end of the shaft 12. Since the head fits loosely upon the sleeve 11 and also fits loosely about the shaft 12, it will be readily seen that this head can turn freely when the wind strikes the vane 20. It should be noted however that since the upper end portion of the sleeve 11 fits into the socket or passage in the head 16, and the upper end portion of the shaft 12 rotatably engages the connecting strip 19 of the yokes 18, this head will be prevented from having side play. Between the head 16 and the head or platform 17 there has been provided a washer 21. This washer 21 is formed of leather and will prevent vibration and also serve to permit the head 16 to turn freely. The platform 17 is extended forwardly and carries bearings 22 in which the drive shaft 23 is rotatably mounted. This drive shaft 23 has its rear or inner end provided with a pinion 24 which meshes with a bevel gear 25 carried by the shaft 12 and it will be readily seen that when this drive shaft 23 is rotated, rotary movement will be imparted to the vertically disposed shaft 12 and through the medium of the gears 13 and 6 to the shafts 4 and 8. Upon its outer end portion the drive shaft 23 carries a propeller which is of the four-blade type. This propeller which is indicated in general by the numeral 26 has its blades 27 pitched at an angle as shown in Figs. 1, 2 and 3 so that when the wind is blowing, the wind will act upon the blades very effectively to rotate the propeller and thereby cause rotation of the shaft 23 upon which the propeller is rigidly mounted. This propeller is formed in two sections which are positioned in crossed relation and interlocked at the hub so that the sections brace each other and prevent any tendency toward independent rotation. The weight of the propeller upon the outer end portion of the shaft 23 might have a tendency to cause tilting of the head 16 in this direction and thereby prevent the head from turning freely. In order to overcome this, there has been provided a counter balancing weight 28 which is slidably mounted upon a track bar 29. This track bar 29 extends longitudinally of the vane and it will be readily seen that by moving this weight longitudinally of the track bar and then securing it in the desired position by means of the set-screw 30, the weight of the propeller may be counterbalanced and the head permitted to turn freely under action of the wind.

When this windmill is set up, the tower is erected with the sleeve 11 extended vertically thereof and projecting above the head or platform 2 at the upper end of the tower. The lever washer 21 is then put in place about the extended upper end portion of the sleeve and the head 16 can then be put in place to rest upon the washer and turn about the sleeve. The shaft 12 is extended upwardly through the sleeve 11 and when extended upwardly through the head, the gear 25 will be put in place so that it will mesh with the gear or pinion 24 carried by the drive shaft. The gear or pinion 13 will be put in place upon the lower end of the shaft 12 and will mesh with the gear disk or plate 6 carried by the shaft 4. When the propeller is put in place and secured upon the outer end portion of the shaft 23, the counter balancing weight 28 can then be adjusted to the proper position and the windmill will be ready for use. As the wind blows it will act upon the blades 27 of the propeller to rotate this propeller and the drive shaft and rotary will be imparted to the shaft 12 and from this shaft 12 to the shafts 4 and 8. There has thus been provided a windmill which will be very effective in operation and which is provided with a very efficient type of propeller and also provided with a washer to prevent vibration when the windmill is in operation.

I claim:

1. In a windmill, a tower having a bearing platform at its upper end, a sleeve disposed vertically in said tower and extending through and above said bearing platform, a head upon said platform rotatable about the extended upper end portion of said sleeve, a vertically disposed shaft rotatable in said sleeve and extended above the sleeve and through and above said head, yokes extending longitudinally of said head upon opposite sides of the extended upper end portion of said shaft, a bearing element for the upper end of said shaft carried by said yokes, a drive shaft rotatably mounted and extending longitudinally of said head, a wind operated propeller upon the outer end of said drive shaft, and means for transmitting rotary movement from said drive shaft to said vertically disposed shaft.

2. In a windmill, a tower having a bearing platform at its upper end, a sleeve disposed vertically in said tower and extending through and above said bearing platform, a head upon said platform rotatable about the extended upper end portion of said sleeve, a vertically disposed shaft rotatable in said sleeve and extended above the sleeve and through and above said head, a leather washer between said head and bearing platform to provide easy turning and eliminate vibration, a drive shaft rotatably carried by said head, a wind operated propeller carried

by said drive shaft, means for transmitting rotary movement from said drive shaft to said vertically disposed shaft, and wind operated means for keeping said propeller headed into the wind.

3. In a windmill, a tower having a bearing platform at its upper end, a sleeve disposed vertically in said tower and extending through and above said bearing platform, a head upon said platform rotatable about the extended upper end portion of said sleeve, a vertically disposed shaft rotatable in said sleeve and extended above the sleeve and through and above said head, a drive shaft for said driven shaft rotatably carried by said head and having one end portion extended beyond said head, a wind operated propeller carried by the extended end of said shaft, a vane extending from the opposite end of said head, a track bar extending longitudinally of said vane in spaced relation thereto and having its end portions extending to the vane and secured to the same, a weight for counterbalancing said propeller slidably carried by and movable longitudinally upon said hanger, and means for releasably holding said weight in an adjusted position.

4. In a windmill, a tower having a bearing platform at its upper end, a sleeve disposed vertically in said tower and extending through and above said bearing platform, a head upon said platform rotatable about the extended upper end portion of said sleeve, a vertically disposed shaft rotatable in said sleeve and extended above the sleeve and through and above said head, a drive shaft for said driven shaft rotatably carried by said head and having one end portion extended beyond said head, and a wind operated propeller carried by the extended end of said shaft and formed in sections positioned in crossed relation and having their hub portion recessed for interlocking relation when the edges with the end faces of one section flush with the end faces of the other section, said sections having their end portions extending in radiating relation from the hub portions and each end portion being shaped to form a blade having a steep pitch to cause rapid rotation of said drive shaft when the wind is blowing, with the forward and rear side edge faces of the blades extending in the same planes as the forward and rear ends of the hub.

In testimony whereof I hereunto affix my signature.

JOHN M. PORTER.