A. H. COOK.

AIR DRIVEN MOTOR.

APPLICATION FILED APR. 7, 1919. RENEWED SEPT. 17, 1920.

1,361,019. **Patented Dec. 7, 1920.**

2 SHEETS—SHEET 1.

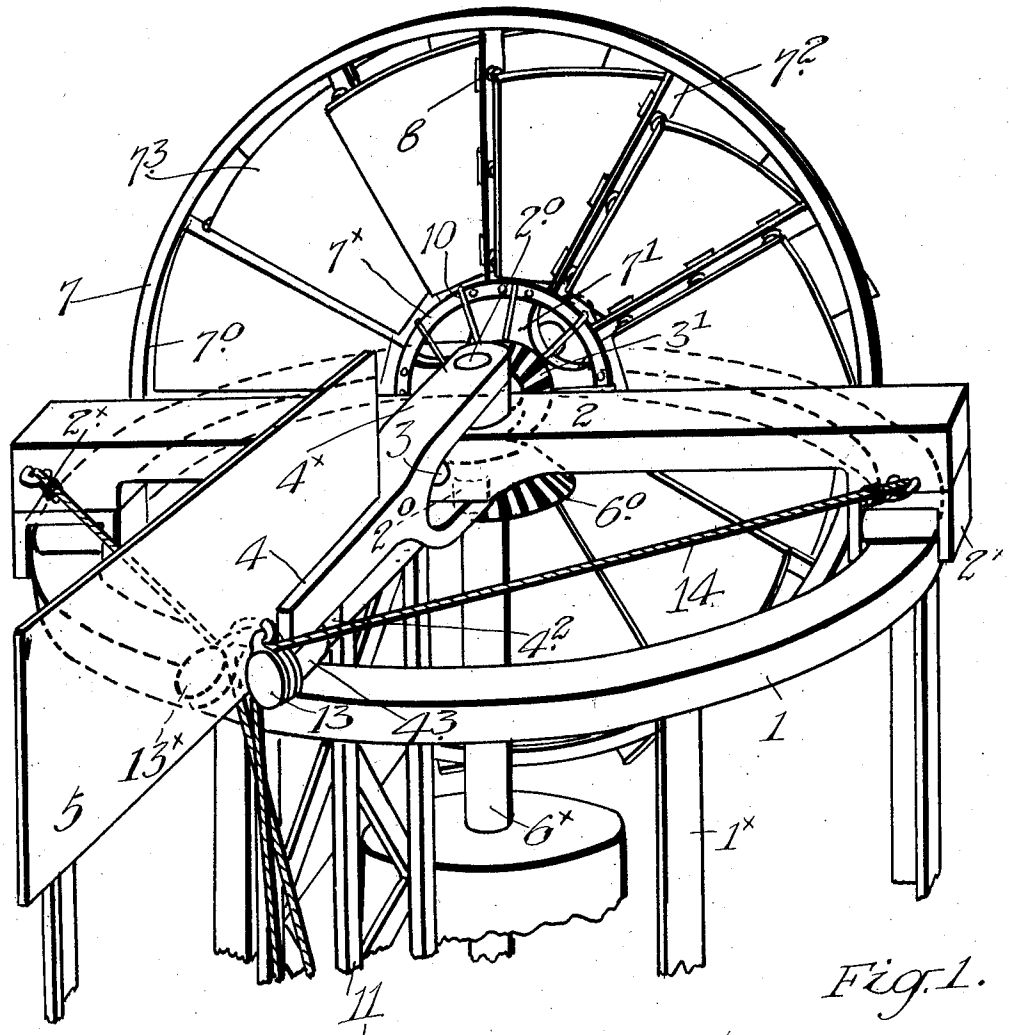
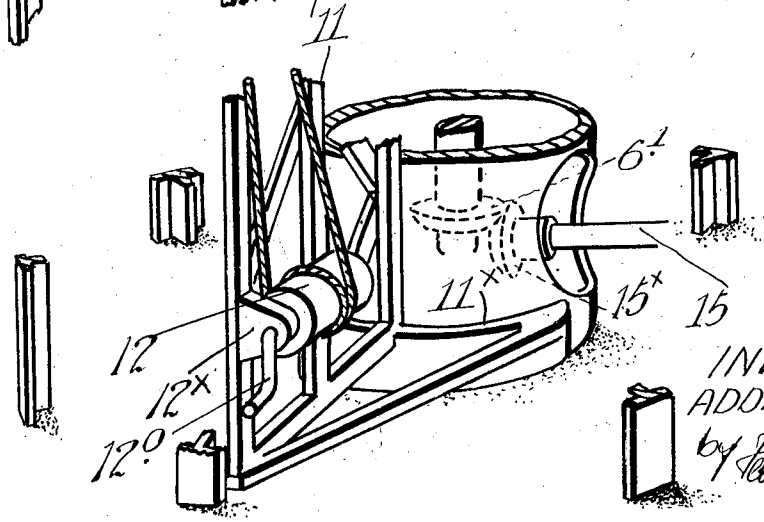


Fig. 1.



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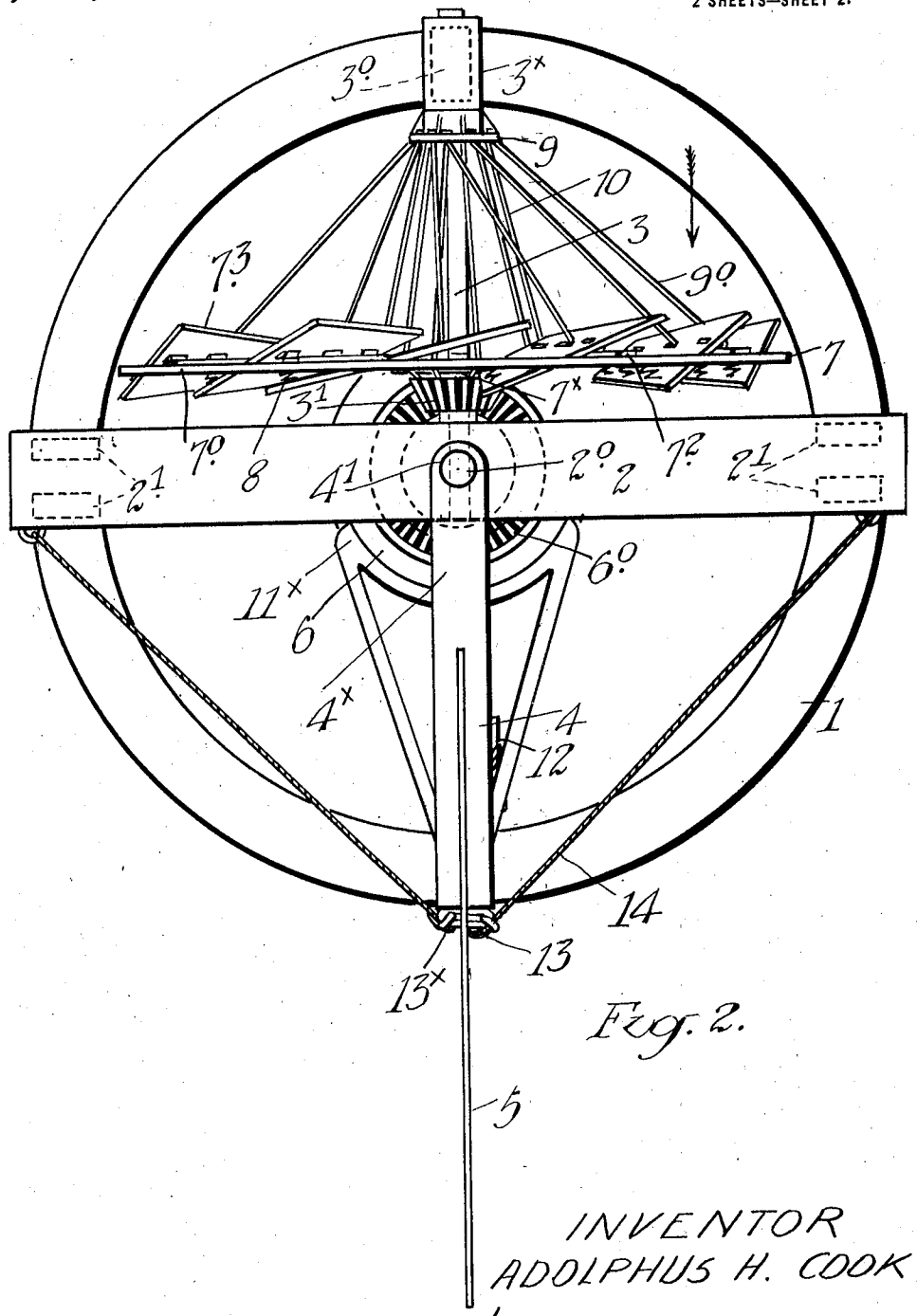


Fig. 2.

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UNITED STATES PATENT OFFICE.

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AIR-DRIVEN MOTOR.

1,361,019. Specification of Letters Patent. Patented Dec. 7, 1920.

Application filed April 7, 1919, Serial No. 288,003. Renewed September 17, 1920. Serial No. 410,964.

To all whom it may concern:

Be it known that I, ADOLPHUS HENRY COOK, of the city of Toronto, in the county of York, in the Province of Ontario, Canada, have invented certain new and useful Improvements in Air-Driven Motors, of which the following is the specification.

My invention relates to improvements in air driven motors and the object of the invention is to devise an efficient form of motor which will have a maximum capacity and which will have an even drive independent of the varying wind pressures brought thereagainst and it consists essentially of the following arrangement and construction of parts as hereinafter more particularly explained.

Figure 1 is a perspective view of my motor intermediately broken away of its height.

Fig. 2, is a plan view.

In the drawings like characters of reference indicate corresponding parts in the various figures.

1 indicates an annular track supported on standard bars 1^x which extend upwardly from the ground to a considerable height. 2 indicates a cross beam which extends diametrically across the annular track 1 above the same and is provided at each end with bearing brackets 2^x in which are journaled rollers $2'$ bearing upon the track. The beam 2 centrally thereof is provided with upwardly and downwardly extending gudgeons 2^0. 3 indicates a shaft which extends horizontally at right angles to the cross beam 2 and is journaled at one end in the center thereof. 3^x indicates a journal bracket into which the opposite end of the shaft 3 extends, such bracket being provided with a roller 3^0 bearing upon the track 1. 4 indicates an arm provided with a forked inner end 4^x, the arms of the fork 4^x having orifices $4'$ into which the gudgeons 2^0 extend. The outer end of the arm is provided with a bearing bracket 4^2 in which is journaled a roller 4^3 bearing upon the track 1 diametrically opposite to the roller 3^x when in the normal position.

5 indicates a tail vane which is secured to the arm 4 extending outwardly over the top of the track 1 and downwardly inside of the track 1 so as to provide a maximum surface. 6 indicates a tubular pillar, which extends upwardly from the ground to form a bearing support for the main vertical shaft 6^x, the lower end of the shaft 6^x being journaled in a suitable step bearing located within the pillar and the upper end in the head of the pillar. Intermediate bearings within the pillar may be provided if found necessary to support the shaft. 6^0 indicates a bevel gear secured to the upper end of the shaft 6^x. $6'$ indicates a bevel gear secured to the lower end of the shaft 6^x. $3'$ indicates a bevel gear secured to the shaft 3, the bevel gear $3'$ meshing with the bevel gear 6^0.

7 indicates a fan frame comprising an outer annular member 7^0 and an inner annular member 7^x which is suitably connected to the shaft 3 by a central casting $7'$. The annular members 7 and 7^x are connected together by radial bars 7^2. 7^3 indicate wind vanes which are hinged intermediately of their width to the bars 7^2, the point of the hinge preferably extending longitudinally of the vane so as to leave one-third of the vane in front of the fan and two-thirds to the rear. The major portion of the fan, that is, the portion formed by two-thirds of the fan vane extends to the back of the next adjacent bar 7^2 and is connected thereto by a series of tension springs 8.

9 indicates an annular member secured to the shaft 3 in proximity to the bearing 3, the casting 9 being connected to the hinge pins of the vanes 7^3 by bracing rods 9^0. Bracing rods 10 are also provided which extend from the casting 9 over the annular member 7^x, the opposite end being secured to the hub of the bevel gear $3'$. 11 indicates a frame which extends downwardly from the arm 4, such frame being free to swing with the arm 4 and is supported at its lower end to swing concentrically by an arc-shape shoe 11^x bearing against the exterior of the pillar 6. 12 indicates a winch which is supported upon the frame 11 by suitable bearing brackets 12. 12^0 indicates a crank by which the winch is operated. 13 and 13^x indicate pulley blocks connected to each side of the vane 5. 14 indicates a cable extending from one end of the beam 2 to which it is secured over the pulley block 13 down to the winch roller 12 around which it is wound and then back from the winch roller 12 over the pulley 13^x to the opposite end of the beam to which it is secured.

By operating the crank 12^0 the vane 5

may be swung to assume any desired position, the vane 5 being swung inwardly parallel with the face of the fan 11 when it is desired to render the motor inoperative.

15 indicates a horizontal shaft provided with a bevel gear $15^{\times}$ meshing with the bevel gear 6′ and from which the power derived from the fan 7 is transmitted, the shaft 15 being connected so as to utilize the power for the desired purpose.

In operation the vane 5 is swung outwardly so as to carry the fan into the wind, the wind bearing against the vanes of the fan in the direction indicated by arrow in Fig. 2, tending to swing them into a position at right angles to the annular member 7 drawing the springs 8 into tension, the degree of tension to which the springs 8 are drawn being proportionate to the strength of the wind, the greater the wind pressure the greater extent to which the vanes 7^{3} are swung, therefore producing an even drive.

It will be readily understood that when the wind is low and the vanes are in a position more or less parallel with the face of the fan 7 the whole pressure of the wind is utilized whereas when the wind pressure is high the fan vanes are swung so as to make a more or less open fan allowing part of the wind pressure to pass freely through and only utilize sufficient of the wind pressure to drive the fan at the normal rate.

From this description it will be seen that I have devised a very simple form of air motor which may be built to have any desired capacity and which will always be driven at an even rate of speed no matter what the wind pressure is above a predetermined minimum pressure.

What I claim as my invention is:

1. A wind driven motor comprising an annular track supported upon a suitable structure above the ground, a cross beam, rollers supporting the cross beam upon the annular track, a fan shaft journaled in the center of the cross beam and extending at right angles thereto, a bearing member carried by the outer end of the fan shaft, a roller journaled therein also bearing upon the annular track, a wind driven fan carried by the shaft, means for transmitting power derived from the fan from the fan shaft to a point in proximity to the ground, an arm swung upon the cross beam concentrically with the center of the annular track, a tail vane carried by the cross beam, and means for adjusting the angular position of the tail vane in relation to the fan.

2. In a device of the class described, a wind driven fan comprising inner and outer annular members connected together by radial bars, a plurality of vanes having their intermediate portions hinged to said bars and so arranged that each vane will have its rear edge overlapping an adjacent bar and its front edge overlapping the rear edge of an adjacent vane so that the spaces between the bars will be normally closed and a spring connection between each bar and the overlapping rear edge of the adjacent vane adapted to permit the angles of the vanes to vary with excessive wind pressure.

3. An air motor comprising an annular horizontal track supported above the ground, a cross beam having its ends supported on the track, a fan carrying shaft having one end journaled in said cross beam and the other end supported on the track, means for transmitting power from said fan shaft, a movable vane carrying arm connected at its inner end to the cross beam and having its outer end supported in the track, a frame depending from the arm and means on the frame connected with the cross beam and vane to vary the angular position of the vane in relation to the fan.

4. An air motor comprising an annular horizontal track supported above the ground, a tubular pillar element supported on the ground centrally of the track, a vertically extending shaft journaled in said pillar element and equipped at its upper end with a gear, a cross beam having its ends supported upon the track, a horizontal fan carrying shaft having one end thereof journaled on the central portion of the cross beam and the other end resting upon the track, a gear on said fan shaft meshing with said first gear, an angularly adjustable vane carrying arm connected to the cross beam and supported on the track, a frame depending from the arm having a guide shoe engaging the tubular pillar, and means supported on the frame and connected to the vane and cross beam to vary the angular position of the vane in relation to the fan.

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Witnesses:
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H. HEBDEN.