No. 789,497. PATENTED MAY 9, 1905.

A. C. JOHNSON.

WINDMILL.

APPLICATION FILED JAN. 30, 1905.

2 SHEETS—SHEET 1.

Fig. 1.

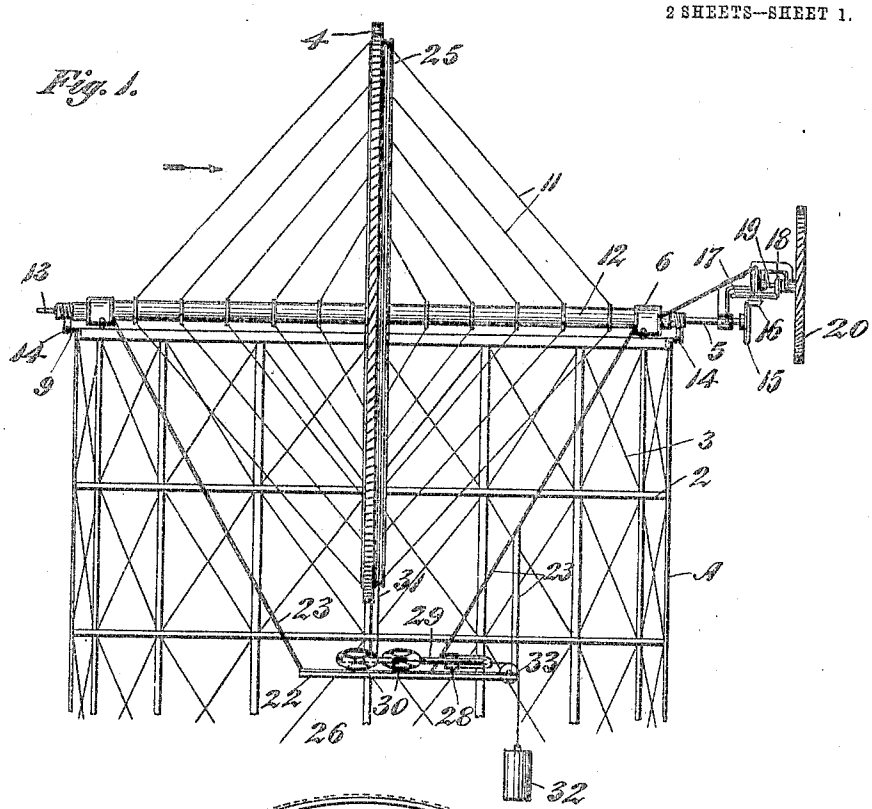
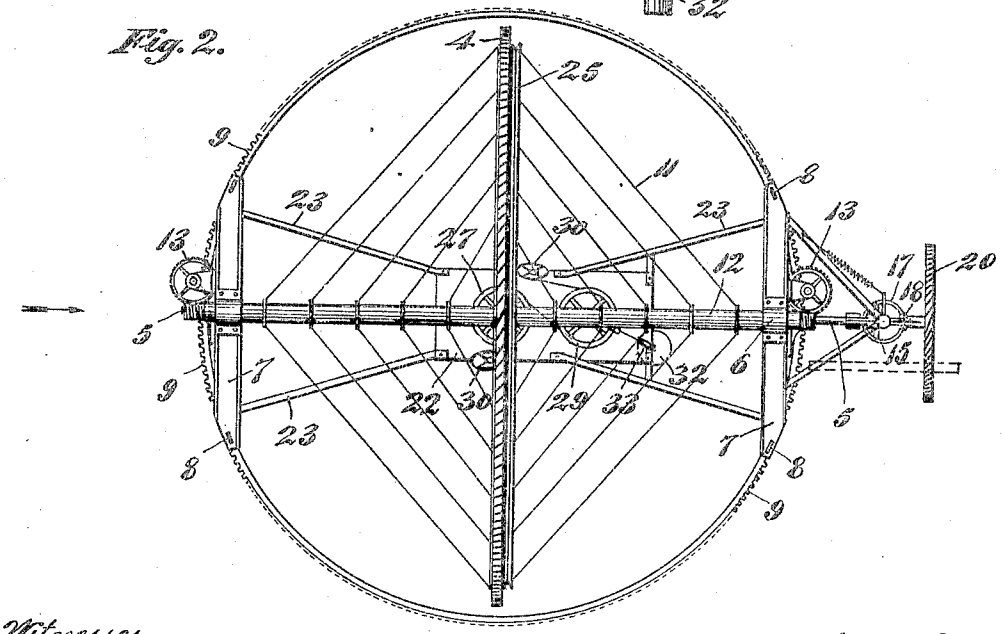


Fig. 2.



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2 SHEETS—SHEET 2.

Fig. 3.

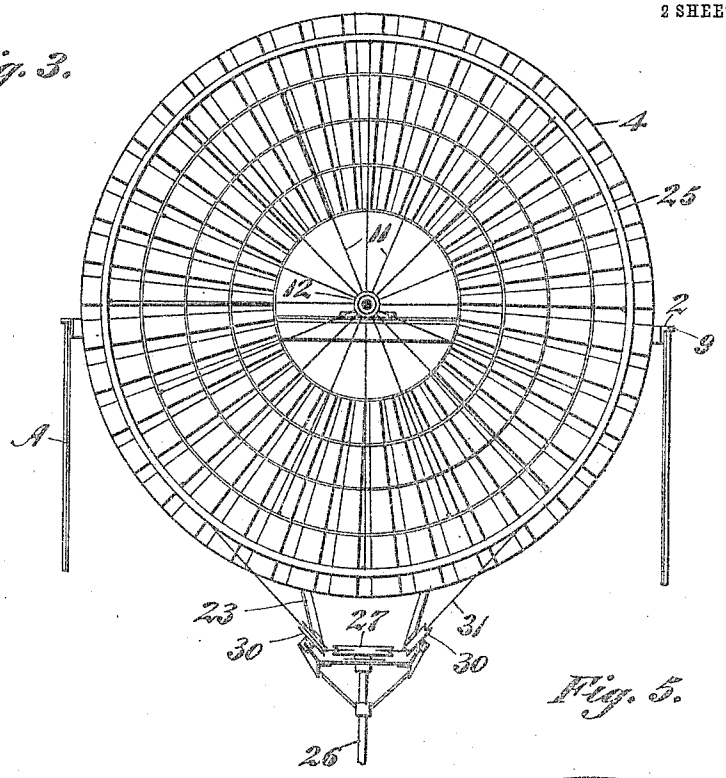


Fig. 5.

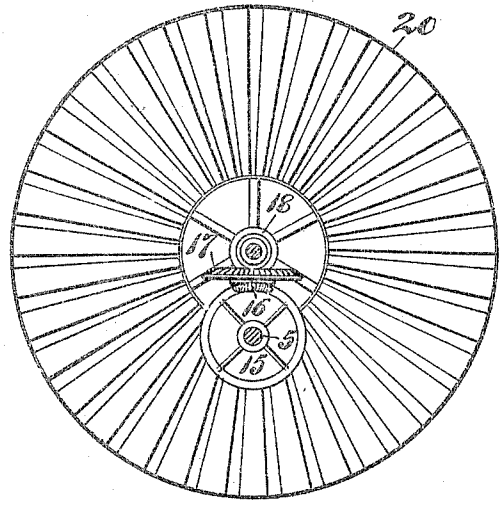


Fig. 4.

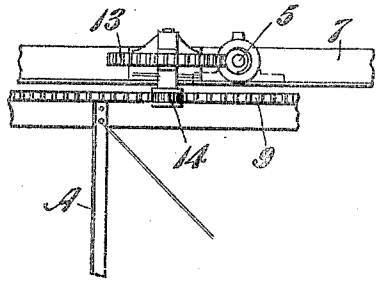
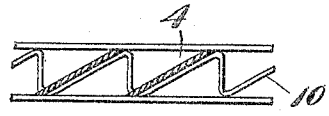


Fig. 6.



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UNITED STATES PATENT OFFICE.

ALFRED C. JOHNSON, OF WINTERS, CALIFORNIA.

WINDMILL.

SPECIFICATION forming part of Letters Patent No. 789,497, dated May 9, 1905.

Application filed January 30, 1905. Serial No. 243,246.

To all whom it may concern:

Be it known that I, ALFRED C. JOHNSON, a citizen of the United States, residing at Winters, in the county of Yolo and State of California, have invented new and useful Improvements in Windmills, of which the following is a specification.

My invention relates to improvements in windmills; and it consists in means for positioning the mill with relation to the wind, means for transmission of power from the wind-wheel, and the construction of the wheel, the tower, and intermediate supporting devices.

The invention comprises combinations of parts and details of construction, which will be more fully explained by reference to the accompanying drawings, in which—

Figure 1 is a transverse section of my invention. Fig. 2 is a plan view of same. Fig. 3 is a view of wind-wheel. Fig. 4 is a view of worm-wheel and rack. Fig. 5 is a view of regulating-wheel. Fig. 6 is a view showing method of supporting vanes.

It is the object of my invention to provide a wind-propelled wheel so constructed that the most effective exterior portions of the vanes of the wheel are available without the weight of a comparative valueless center. A skeleton tower is also so constructed as to allow of a free passage of the air through it, so that the wheel being journaled upon the top of the tower the lower half is exposed to the action of the wind.

Means are provided for revolving the wheel and its bearings within the tower and means for transmitting the motion of the wheel to a centrally-journaled universally-adjustable mechanism through which power may be transmitted to fixed apparatus.

As shown in the drawings, the tower is composed of angle-iron bars A, which are made of the smallest possible area for strength. These bars are united by similar and horizontally-disposed angle-irons 2, fixed to the vertical posts at intervals and forming a substantially cylindrical structure, and the whole is again strengthened by transversely-disposed slender rods or wires 3, drawn to the required tension for rigidity. This forms a structure which allows the wind to pass through it almost entirely unimpeded, and I am thus enabled to journal a wind-wheel 4 of large diameter upon the top circular ring of the tower, so that one half only of the wheel appears above the tower, the other half turning within it, but being fully exposed to the action of the wind.

The shaft 5 of the wheel extends entirely across from side to side, and its journal-boxes 6 are supported upon frames or yokes 7, having rollers 8, which are adapted to travel upon the top rim of the tower. This rim is preferably made of angle-iron, and its outer periphery may be toothed, as shown at 9.

The wind-wheel consists of suitably-formed radially-disposed vanes having light concentric rings upon each side of the vanes at intervals between the outer and inner ends, and these rings are braced from one to the other with diagonally-disposed bracing-bars, the angle of which bars is such as to coincide with and support the vanes in their angular position. This structure is well shown at 10. As the inner portion of the vanes would have little or no propelling power on account of their narrowness and on account of their proximity to the axis, I have shown the inner supporting-ring of large diameter and the whole wheel supported at a considerable distance outside of its axis by tension-wires 11, stretched from either side of the wheel to the sleeve 12, which forms the axis, and is turnable upon the shaft 5, which extends across the tower. The wheel is thus practically suspended around the shaft with its periphery turning in close proximity to the upper rim of the tower.

The ends of the shaft 5, exterior to the journal-boxes, have worms upon them, and these engage with gear-wheels 13, which are journaled upon the yoke or frame which carries the journal-boxes of the shaft. Upon the lower ends of the shafts of these gear-wheels are pinions 14, which engage the teeth around the rim of the tower. As the gear-wheels and pinions are so disposed that one may turn in one direction and the other in the opposite direction, it will be seen that by thus turning the pinions the shaft will be gradually turned

around upon the top of the tower, one end moving in one direction and the other in the opposite direction, so that the wheel may always be placed in the desired position to receive the full power of the wind or to be turned out of the wind, as required, and this travel of the shaft around the common center will maintain the wheel in its proper position within the tower. In order to thus operate this turning-gear, I have shown the shaft extended beyond the worm or screw at one end and having upon the outer end a bevel or crown gear 15. This is engaged by a pinion 16 upon the vertically-supported shaft, and upon the same shaft is a gear-wheel 17, which engages with a pinion 18, mounted upon the shaft 19 of a small wind-wheel 20. This wind-wheel and its shaft is turnable about the vertical axis of the gear-wheel 17 and may thus be thrown into or out of the wind. If thrown into the wind, its action will turn the main-wheel shaft 5 and thus acting through the sleeve carrying the main wind-wheel will simultaneously turn the worm-gears at opposite ends and will thus turn the main wheel with relation to the direction of the wind, as previously described. When the proper or desired position has been reached, it is only necessary to throw the small wheel out of the wind and the main wheel will remain in the position to which it has been set, either so as to receive the wind or be thrown out of the wind.

In order to transmit the motion and power of the main wheel and to make it possible to do so whatever may be the position of the wheel, I have shown a platform 22, and this is suspended by light rods 23 from the yokes or frames which carry the wind-wheel shaft journals, so that whatever change of position of the wheel may take place will be transmitted to the platform, which will move in unison therewith. Upon the rim of the wind-wheel is fixed a light pulley 25. Upon the platform is journaled a vertical shaft 26, carrying a pulley 27 upon the upper end, and parallel with this shaft is another shaft 28, having a pulley 29 lying in the same plane with the pulley 27.

30 represents angularly-supported direction-pulleys, and the driving-cord 31, passing around the main-wheel pulley, passes thence around one of the angularly-journaled direction-pulleys, thence successively around the two horizontal pulleys, as shown, thence from the other angular pulley to the main pulley, so that power will be transmitted to the vertical shaft 26, which is located centrally of the tower and in a line passing through the plane of the wind-wheel and its axis. From the shaft 26 power may be transmitted by any suitable or desired connections, depending upon the work to be done.

The shaft of the pulley 29 is journaled in a fork or yoke, so as to be movable to or from the pulley 27, and by means of a weight 32 and a cord passing over a pulley 33 and connecting said weight with the yoke in which the wheel 29 is journaled the latter may always be moved outwardly, so as to insure a proper tension upon the driving-belt.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. The combination in a windmill of an open tower having a rim or track at the top, wheeled carriages located at opposite sides, journal-boxes thereon, a shaft extending diametrically between said journal-boxes, a sleeve turnable upon said shaft, and a wind-wheel mounted upon said sleeve midway between its ends.

2. The combination in a windmill of an open-sided tower having a horizontal rim or track at the top, wheeled carriages located at opposite sides, journal-boxes upon the carriages, a shaft turnable in said boxes, a sleeve turnable upon the shaft between the boxes, a wind-wheel mounted upon the sleeve midway between its ends and worm-gears at opposite ends of the shaft, pinions driven thereby and teeth upon the tower-rim engaged by said pinions.

3. The combination in a windmill of an open-sided tower having a horizontal rim at the top, journal-box carriages upon the opposite side adapted to move on said rim, a wheel mounted centrally upon a sleeve turnable on the shaft between the journal-boxes, worm-gears having one member fixed upon the shaft and the other journaled upon the carriages, pinions driven by the worm-gears and teeth upon the tower-rim engaged by said pinions, and means for turning the shaft and gears whereby the journal-boxes of the wind-wheel are moved in opposite directions around the rim of the tower.

4. The combination in a windmill of an open-sided tower having a horizontal rim at the top, journal-boxes movable upon said rim and located at opposite sides, a shaft journaled in said boxes, a sleeve turnable upon the shaft, a wind-wheel mounted upon the sleeve midway between its ends, teeth formed upon the periphery of the rim of the tower, worm-gears carried by the wheel-shaft and pinions actuated thereby and engaging the gear-teeth of the tower-rim, and means whereby said gears are revolved to carry the journal-boxes of the wheel-shaft around the rim in opposite directions.

5. The combination in a windmill of an open-sided tower having a toothed rim at the top, journal-boxes movably mounted upon said rim, a shaft having a sleeve turnable thereon, said shaft being turnable in the boxes, a wind-wheel mounted centrally upon the shaft, worm-gears fixed upon the shaft, pinions engaging the teeth of the rim, said pinions turnable by the movements of the worm-gear, a small wind-wheel turnable about a vertical axis in line which intersects the main-wheel shaft,

gearing driven by said small wheel by which the main-wheel shaft and the worm-gear is revolved and the main-wheel shaft moved in either direction upon the tower.

6. The combination in a windmill of a tower composed of horizontal and vertical posts and circumferential rings with braces forming an open-sided structure, a rim or track at the top of the tower, carriages at opposite sides of the rim and traversable thereon, a horizontal shaft extending across the rim and upon which the carriages are mounted, a vertically-disposed wind-wheel having a sleeve mounted on the shaft and means whereby the carriages are moved around the rim in opposite directions.

7. The combination in a windmill of an open-work tower, a shaft journaled diametrically across the top of the tower, a sleeve turnable upon said shaft, a wind-wheel composed of radial vanes, concentric rings connecting and supporting said vanes, the inner of said rings being concentric with the sleeve and at a distance therefrom and tension-wires by which the wheel is suspended from the sleeve.

8. The combination in a windmill of an open-sided tower, a wheel suspended and turnable across the top of the tower, a platform suspended beneath the wheel, a pulley-rim carried by the wheel, direction-pulleys and a transmission-pulley journaled upon the platform, the shaft of said transmission-pulley lying in a plane of the wind-wheel and intersecting the axis thereof.

9. In a windmill, an open-sided tower, a vertically-disposed wind-wheel, a horizontal shaft therefor said wheel having radial vanes, concentric rings upon each side thereof, a sleeve fixed to the wheel and journaled upon the shaft and inclined supports extending from the rings to different points on the sleeve.

10. In a windmill, a wheel consisting of radial vanes with concentric rings in pairs upon opposite edges of the vanes and angularly-fixed supports extending between the rings behind the vanes, a shaft with which the rings are concentric and out of contact, a sleeve fixed to the wheel and journaled upon the shaft, and tension-wires extending from the rings to different points on the sleeve upon opposite sides of the wheel.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

ALFRED C. JOHNSON.

Witnesses:
HENRY P. TRICOU,
S. H. NOURSE.