No. 607,151. Patented July 12, 1898.

H. WICHMANN.

WINDMILL.

(Application filed May 29, 1897.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1.

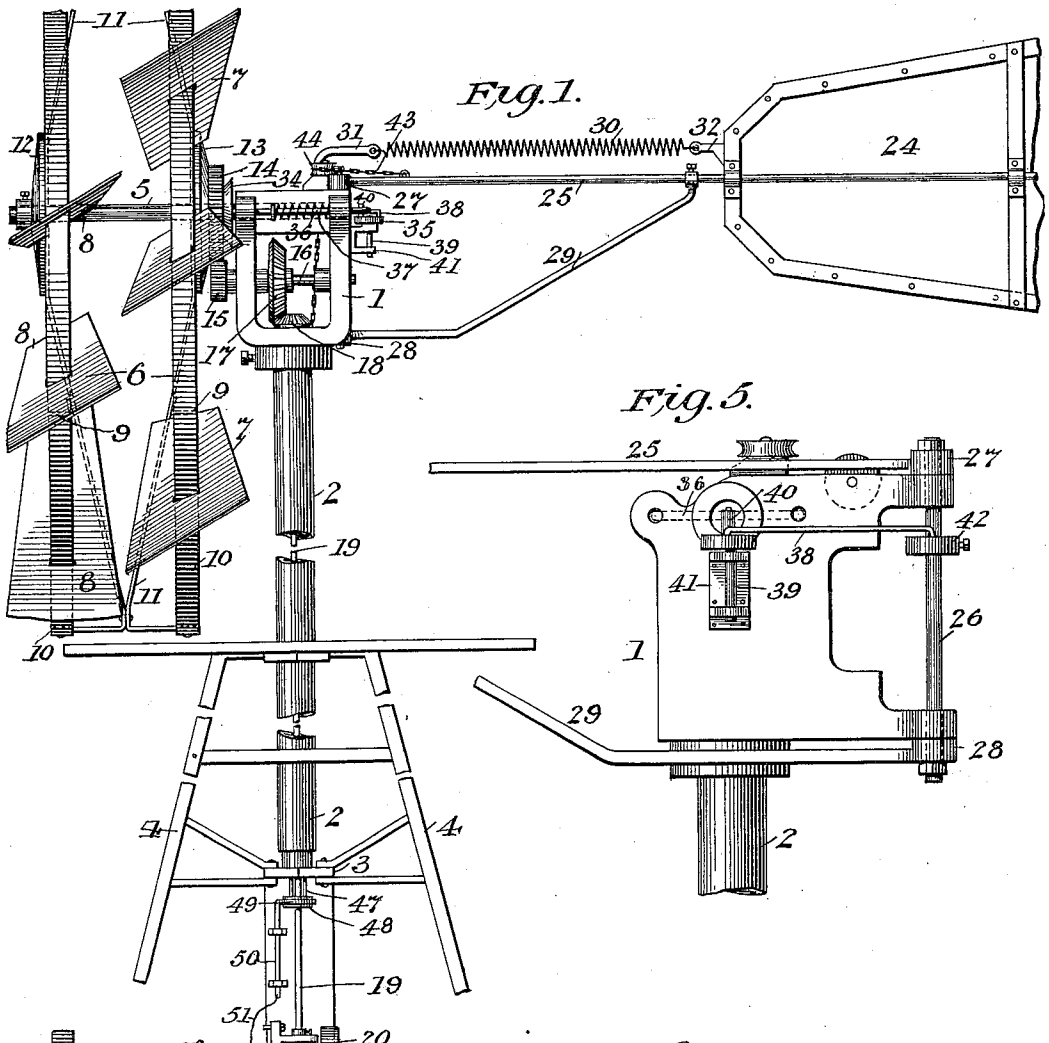
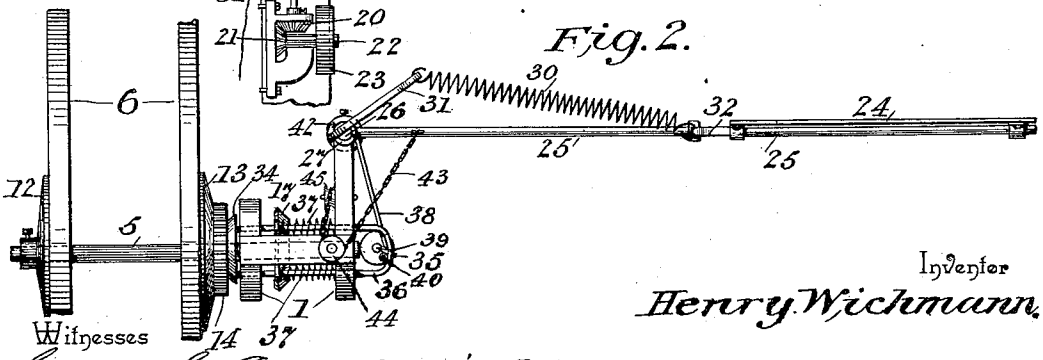


Fig. 5.

Fig. 2.



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Fig. 3.

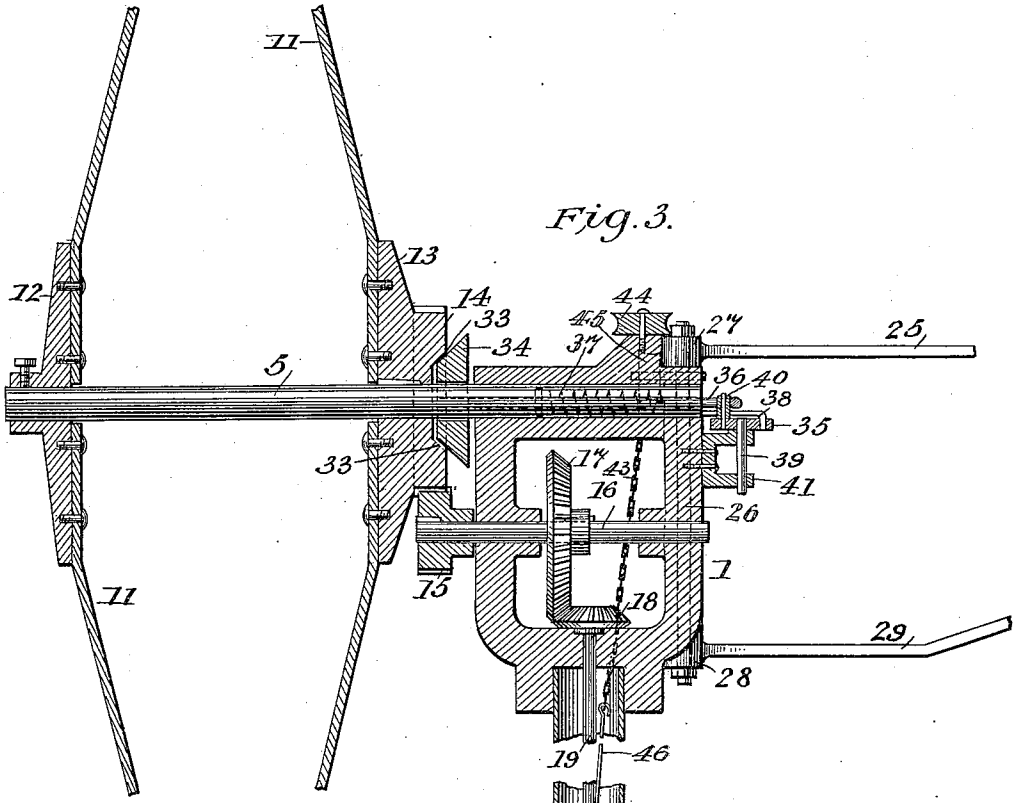
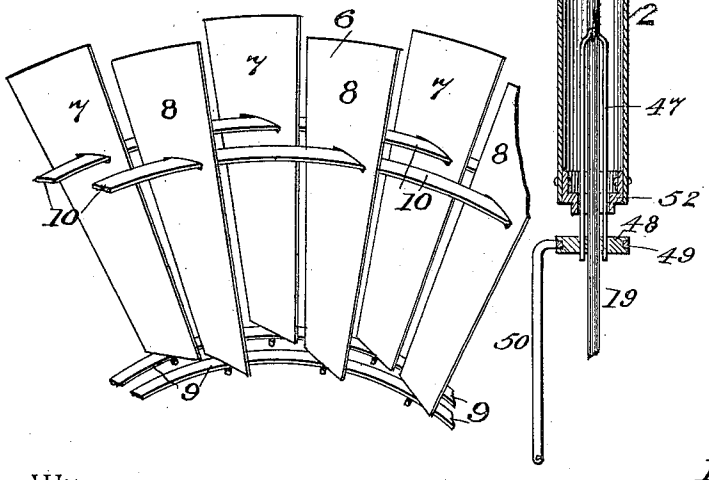


Fig. 4.



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UNITED STATES PATENT OFFICE.

HENRY WICHMANN, OF NEW HOLSTEIN, WISCONSIN.

WINDMILL.

SPECIFICATION forming part of Letters Patent No. 607,151, dated July 12, 1898.

Application filed May 29, 1897. Serial No. 638,776. (No model.)

To all whom it may concern:

Be it known that I, HENRY WICHMANN, a citizen of the United States, residing at New Holstein, in the county of Calumet and State of Wisconsin, have invented a new and useful Windmill, of which the following is a specification.

The invention relates to improvements in windmills.

The object of the present invention is to improve the construction of windmills and to provide a simple and comparatively inexpensive one adapted to govern itself automatically and run at a uniform speed in variable winds and capable of producing great power.

A further object of the invention is to improve the construction of brake mechanism for wind-wheels and to provide a simple and effective brake adapted to be thrown into and out of operation by the vane swinging toward and from the wind-wheel and capable of holding a wind-wheel stationary when the windmill is not in operation.

The invention consists in the construction and novel combination and arrangement of parts, as hereinafter fully described, illustrated in the accompanying drawings, and pointed out in the claims hereto appended.

In the drawings, Figure 1 is a side elevation of a windmill constructed in accordance with this invention. Fig. 2 is a plan view. Fig. 3 is a longitudinal sectional view. Fig. 4 is a detail perspective view of a portion of the wind-wheel. Fig. 5 is a detail view illustrating the construction of the brake-operating mechanism.

Like numerals of reference designate corresponding parts in the several figures of the drawings.

1 designates a bearing-bracket secured to the upper end of a vertical bearing-tube 2, which is stepped at its lower end in a suitable bearing 3 of a tower 4 at a point between the top and bottom thereof, the top of the tower being provided with a suitable bearing for the tube 2, which extends a considerable distance above the same. The bearing-bracket is provided with suitable bearings for a wind-wheel shaft 5, which extends from one side of the bracket and carries a wind-wheel 6.

The wind-wheel is provided with a double set of blades 7 and 8, arranged in two annular series, the blades of one series being disposed opposite the intervals of the blades of the other series in order that the air passing through the wind-wheel will engage the two sets of blades successively and thereby increase the power of the windmill. The blades are supported by circular braces 9 and 10 and radial spokes 11, which are composed of oppositely-inclined outwardly-converging sides secured at their inner terminals to collars or hub portions 12 and 13. The spokes 11 are arranged in pairs, and the members of each pair are secured together at the periphery of the wind-wheel, and the outer ends of the spokes are extended and bent laterally. The braces 9 and 10 are arranged in pairs at the inner and outer portions of the blades and are parallel, the inner braces 9 having the inner ends of the blades secured to them and the outer braces 10 passing through openings of the blades near the outer ends thereof, as illustrated in Fig. 4 of the accompanying drawings. The outer braces 10 are also secured to and supported by the laterally-bent outer ends of the spokes 11.

The inner hub portion or section 13 is rigid with a gear-wheel 14, disposed vertically and meshing with a pinion 15 of a counter-shaft 16, and the latter, which is journaled in suitable bearings of the bracket 1, is connected by beveled gears 17 and 18 with a vertical main shaft 19. The main shaft 19, which is journaled in suitable bearings, is connected by bevel-gears 20 and 21 with a lower horizontal shaft 22, and the latter, which is located at the lower end of the main shaft, is provided with a drive-pulley 23, which is adapted to communicate motion to any desired machine or device.

The wind-wheel is held in the wind by a vane 24, provided with a rod 25 and hinged to the bracket 1 at one side of the center of the wind-wheel by a vertical pintle 26, arranged in suitable eyes of the said bracket and passing through corresponding eyes 27 and 28 of the rod 25 and a brace 29, which supports the said rod and which extends from the lower end of the pintle 26 to the rod and is secured to the same at a point between the ends thereof.

The vane is normally held at right angles to the plane of the wind-wheel by a spiral spring 30, having one end secured to an arm 31 and its other end attached to an arm 32 of the body of the vane. The arm 31 is mounted on the bearing-bracket, and the spring is disposed at an angle to the rod of the vane to hold the latter in operative position; but when the force of the wind exceeds the power of the spring the vane is swung toward the wind-wheel to a greater or less extent and the wind-wheel is thereby partially turned out of the wind, exposing less of its surface to the action of the same and checking the windmill and causing the same to run at a uniform speed in high winds.

The gear-wheel 14 is provided with a concavity 33 and is adapted to be engaged by a beveled brake shoe or disk 34, which is slidingly mounted on the bracket and is connected with a centrally-arranged crank 35 by a substantially U-shaped rod or frame 36. The U-shaped rod or frame, which is slidingly mounted in suitable perforations of the bearing-bracket at opposite sides of the wind-wheel shaft, is spring-actuated and has coiled springs 37 disposed on its sides and adapted to force the brake shoe or disk against the gear of the hub of the wind-wheel. The springs which engage suitable stops or pins of the U-shaped frame or rod also bear against the bearing-brackets, and when the windmill is in operation the brake shoe or disk is withdrawn from engagement with the wind-wheel by the crank 35, which engages the bend of the U-shaped rod or frame and which is connected by a link-rod 38 with the pintle of the vane. The crank 35 consists of a plate provided with a depending pivot 39 and having an eccentrically-arranged pin 40, which engages the bend of the connecting rod or frame 36. The pivot 39 is journaled in suitable perforations of horizontal arms of a supporting-bracket 41, and the link-rod 38 is eccentrically pivoted to the plate of the crank and also to a collar 42 of the pintle-rod 26. By this construction the brake is automatically operated by the swinging of the vane, and the springs 37, when free to act, are capable of locking the wind-wheel against rotation in the heaviest winds and storms.

A chain 43, which passes over guide-pulleys 44 and 45, has one end secured to the vane-rod and its other end attached to a wire 46, which extends through the bearing-tube to within a short distance of the lower end thereof and is connected by rods 47 with a sliding collar 48, and the latter, which is located below the bearing-tube, is mounted on the main shaft and is provided with a circumferential groove which is engaged by a forked arm 49 of a rod 50. The rod 50 is connected with a wire 51, which extends to the base of the tower and which enables the vane to be readily swung around against the action of the spring 30 when it is desired to throw the windmill out of operation. The rods 47, which are preferably constructed of a single piece of metal, are connected at their upper ends by a curved bend which conforms to the configuration of the main shaft, and the lower end of the bearing-tube is provided with a casting 52, which has suitable perforations for the passage of the rods 47.

It will be seen that the windmill is simple and comparatively inexpensive in construction, that it is positive, reliable, and automatic in its operation, and that it is capable of producing great power, owing to the increased surface of the wind-wheel caused by the double series of alternately-arranged blades. It will also be apparent that the brake is automatic in its operation and that it possesses sufficient power to hold the wind-wheel stationary when it is thrown out of the wind.

Changes in the form, proportion, and minor details of construction may be resorted to without departing from the spirit or sacrificing any of the advantages of this invention.

What I claim is—

1. In a windmill, the combination of a bearing-bracket, a wind-wheel shaft journaled thereon, a wind-wheel, a brake-shoe arranged to engage the hub of the wind-wheel, a vertical crank journaled on the bearing-bracket and located centrally of the wind-wheel, a rod connecting the brake-shoe and the crank, a vane hinged to the bearing-bracket at one side of the center of the wind-wheel, and a link connected with the crank and with the vane, whereby the crank will be partially rotated when the vane swings to and from the bearing-bracket, substantially as described.

2. In a windmill, the combination of a bearing-bracket, a wind-wheel shaft, a wind-wheel, a vane hinged to the bearing-bracket at one side of the center of the wind-wheel, a brake-shoe arranged to engage the hub of the wind-wheel, the horizontal U-shaped connecting-rod slidingly mounted on the bearing-bracket, extending along both sides of the wind-wheel shaft and connected to the brake-shoe, springs disposed on the sides of the connecting-rod, a centrally-arranged crank mounted on the bearing-bracket and engaging the bend of the U-shaped connecting-rod, and a link connecting the vane and the crank, substantially as and for the purpose described.

3. In a windmill, the combination of a bearing-bracket, a wind-wheel, a vane hinged to the bearing-bracket at one side of the center of the wind-wheel, a brake-shoe arranged to engage the wind-wheel, the centrally-arranged crank 35 consisting of a plate or disk, a depending pivot 39 journaled in suitable bearings and the eccentrically-arranged pin 40 connected with the brake-shoe, a collar adjustably secured to the pintle of the vane, and a link eccentrically connected to the collar and to the plate or disk of the crank, substantially as and for the purpose described.

4. A wind-wheel comprising a double set of blades arranged in two annular series, the

blades of one set being disposed opposite the intervals of the blades of the other set, the outer circular braces 10 arranged parallel with each other and passing through openings of the blades near the outer ends thereof, the inner parallel circular braces 9 supporting the inner ends of the blades and having the same secured to them, hub portions designed to be mounted on the wind-wheel shaft, and the radial spokes secured to the hub portions, converging toward the periphery of the wind-wheel and connected in pairs at that point, the outer terminals of the spokes being bent laterally and secured to the outer braces 10, substantially as described.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

HENRY WICHMANN.

Witnesses:
T. E. CONNELL,
HENRY AGGEN.