No. 818,013. PATENTED APR. 17, 1906.

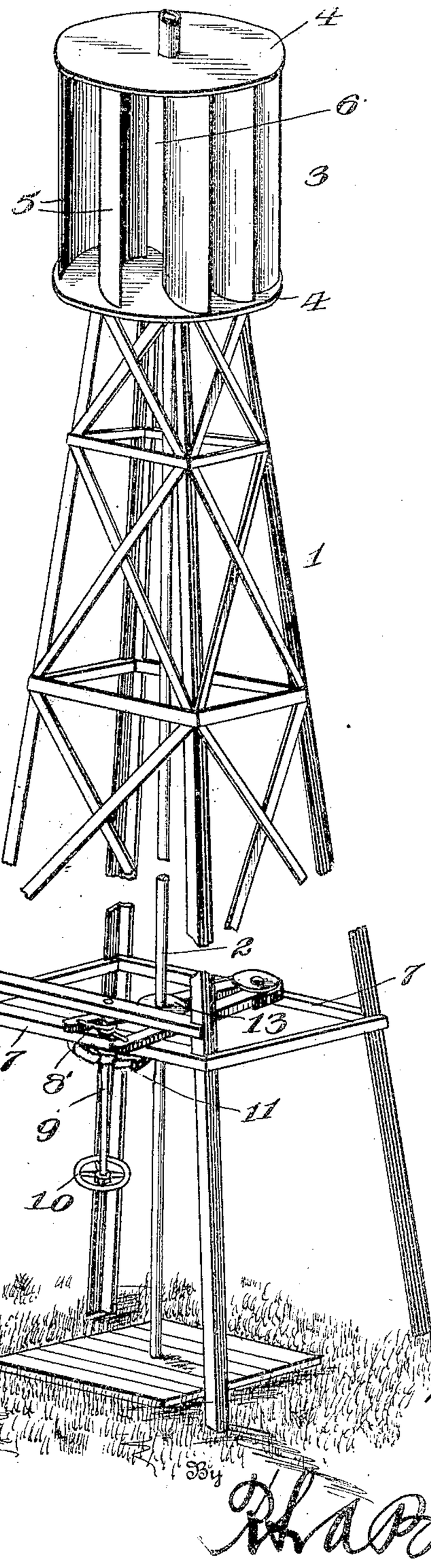
R. S. BARTLETT.

WINDMILL.

APPLICATION FILED OCT. 4, 1905.

2 SHEETS—SHEET 1.

Fig. 1.



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2 SHEETS—SHEET 2.

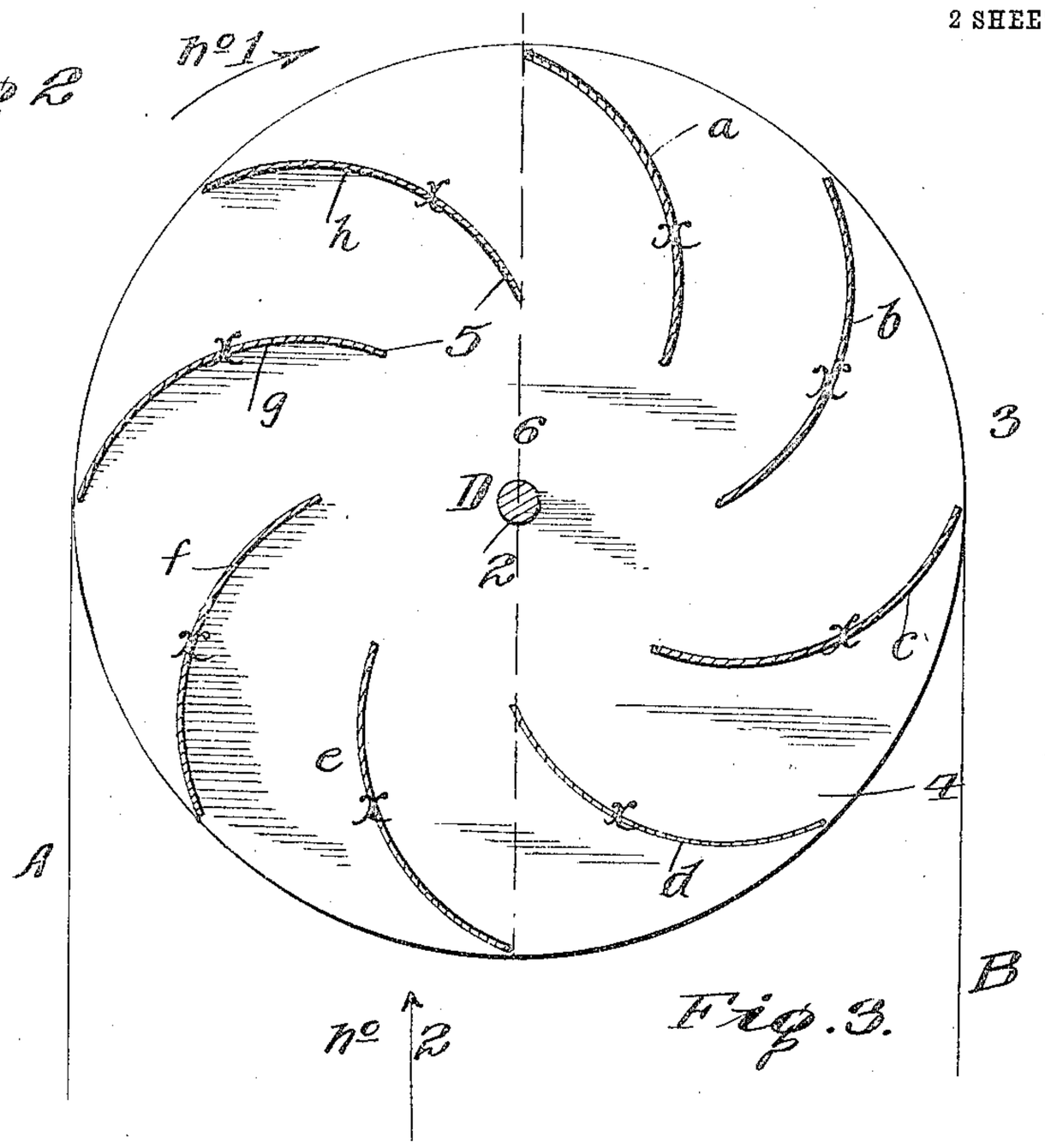
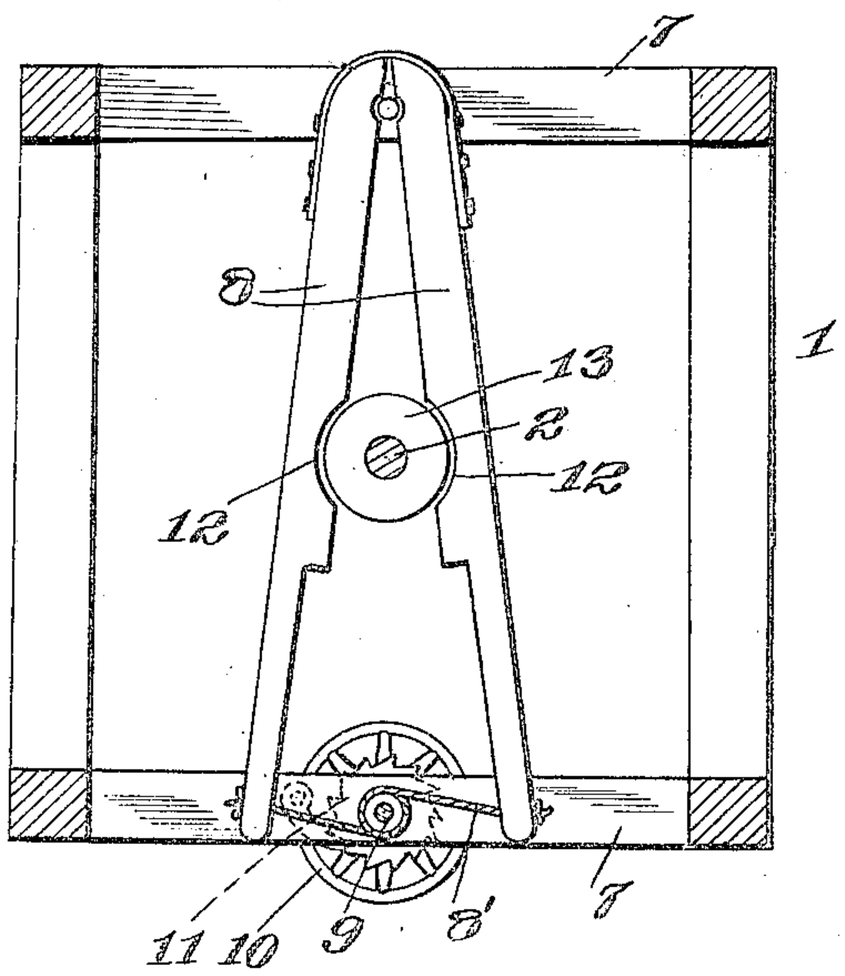


Fig. 3.



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UNITED STATES PATENT OFFICE.

ROBERT S. BARTLETT, OF NOCONA, TEXAS.

WINDMILL.

No. 818,013. Specification of Letters Patent. Patented April 17, 1906.

Application filed October 4, 1905. Serial No. 281,344.

To all whom it may concern:

Be it known that I, ROBERT S. BARTLETT, a citizen of the United States, residing at Nocona, in the county of Montague and State of Texas, have invented certain new and useful Improvements in Windmills, of which the following is a specification.

The object of my invention is to provide an improved windmill—a wind-driven wheel which will operate with the wind blowing in any direction and without the necessity of using the cumbersome vane usually employed and in which the construction of the wind-wheel produces a maximum velocity with a minimum of wind.

With this and other objects in view the invention comprises, primarily, a peculiar construction of wind-wheel which is not provided with any vane and in which the blades are so constructed and arranged that the wind will act thereon to the best possible advantage.

For a full description of the invention and the merits thereof and also to acquire a knowledge of the details of construction of the means for effecting the result reference is to be had to the following description and accompanying drawings, in which—

Figure 1 is a perspective view. Fig. 2 is a horizontal section taken through the wind-wheel. Fig. 3 is a similar view taken through the tower structure just above the brake device.

Corresponding and like parts are referred to in the following description and indicated in all the views of the drawings by the same reference characters.

Referring to the drawings, the reference-numeral 1 designates a suitable tower structure in which is mounted a vertical shaft 2, designed to drive a pump or any other desired device. The upper end of the shaft 2 projects above the top of the tower, and upon said shaft is mounted my improved wind-wheel 3, which comprises upper and lower horizontally-disposed heads 4, between which are rigidly secured a plurality of longitudinally-extending blades 5. The blades 5 are relatively narrow and do not extend with their inner edges to the center of the wheel, but are of such width that they provide within the wheel between the circle of the blades an open space or wind-chamber 6. In the present instance there are eight of these blades provided, and each blade has a concavo-convex form in cross-section, as shown in Fig. 2. To properly set this number of blades and to insure that their cross-sections shall assume the proper form to secure the best results, two concentric circles are struck in the heads, the innermost circle indicating the transverse area of the interior air-space or wind-chamber before described. Then arcs are struck from left to right, with the compasses set one-half the diameter of the wheel, said arcs beginning at the outside circle at the point it is desired the outer edge of each blade shall come and touching the inside circle at the point where section-lines drawn through the two circles and dividing the same into eight parts will cross the innermost circle. In other words, in laying the plan for the wheel the outer circumference of the wheel being determined said circumference will be divided into eight parts for eight blades, said parts being designated by section-lines passing through the center of the circle. Where each of these lines cuts the outer circle the outer edge of the blade is intended to be located, and to determine the proper cross-sectional shape of each blade and the proper location for the inner edge thereof the compasses are, as before described, set a distance apart equal to one-quarter the diameter of the outer circle, so that in striking from left to right the before-mentioned arc will be designated, beginning at the outside circle at the point where the sectional line crosses the same and passing across and intersecting the inside circle where the next sectional line crosses the latter. The blades are then formed and set to fit these arcs.

The shaft of the windmill is provided with suitable ball-bearings of other antifriction devices, so as to reduce friction as much as possible. At some convenient point within the tower structure the latter is provided with two cross-beams 7, to one of which two corresponding brake-levers 8 are fulcrumed together by a hinge-joint or the like, the free ends of said brake-levers being secured together by a rope or cable 8, designed to wind about a spindle 9, as shown, said spindle being provided with a hand-wheel 10 for the actuation thereof and being provided also with a ratchet and pawl 11. The brake-levers are provided, further, with concave cheeks 12 fitting around opposite sides of the drum 13, secured on the shaft 2, so that by manipulation of the spindle 9 said brake-levers may be brought together to bear upon said drum, thereby constituting a brake for the shaft.

The pawl is arranged so that it may be disengaged from its ratchet by any suitable means, so as to release the brake-levers when desired.

The main feature of my invention resides in the peculiar construction and arrangement of the wind-wheel.

In the operation of the device the blades of the wind-wheel being constructed and arranged as before described the wind may enter the wheel from any point and start acting against the windward blades on their concave sides and then pass into the wind-chamber and inside the circle of the blades after acting upon the most leeward blades, and also will react on the opposite sides of the blades which were initially windward ones. In this manner the wind acts within the circle of the blades as in a vortex and will drive the wheel with maximum velocity.

To arrive at a proper understanding of the advantageous results arising from the number and construction of blades hereinbefore described, reference is to be particularly had to Fig. 2 of the drawings, which includes with the features of construction shown a diagrammatic portrayal which I shall now describe. The space from A to B shows the volume of wind as it strikes the wheel. Arrow No. 1 represents the direction in which the wheel will revolve, and arrow No. 2 indicates the direction of the wind. The particular construction of blades produces by the curvature of said blades a shield that will throw off the wind that strikes the right-hand side of the wheel; otherwise this wind would greatly retard the motion. The reference-letter X indicates the points from which to the outer circle the blades form the shield as the blades come around to the right-hand side of the wheel. D indicates by the dotted line the line to be drawn through the center of the wheel, beginning at the outer edge of the blade *a*, then touching the inner end of blade *h*, also the inner edge of blade *d* and the outer edge of blade *e*. Similar lines are drawn across the wheel, so that it is divided into the eight sections, as before described. Now the position of the blades placed on these sections partly forms the shield before mentioned on the right-hand side of the wheel and also forms the opening to receive the wind on the left-hand side. Furthermore, this same position of blades feeds the wind received into the wheel to the blades that are at the right-hand side and rear portion of the air-chamber at the center of the wheel. Any other position of the blades would not properly feed the wind to the right-hand and rear blades. Hence it will be seen that the curvature of the blades partly forms the shield to throw off the wind on the right hand, thus protecting the wheel from wind that would otherwise retard the motion. If the curvature is less, it is evident that it will flatten the blade, and thereby increase the resistance on the right-hand side of the wheel and retard the motion. Again, if the curvature is greater than that described with my invention it will to some extent choke the left-hand side of the wheel that receives the wind, thereby also retarding the motion and lessening the force or working power of the wheel. The blades are individually distinguished from each other by reference-letters *a b c d e f g h*. It is of course to be understood that the wheel may be made of any length and diameter.

Having thus described the invention, what is claimed as new is—

A wind-wheel comprising spaced-apart heads, a circular series of transversely-curved blades secured to said heads and held therebetween, the outer edges of said blades being arranged in a circle and the inner edges of said blades being also arranged in an inner circle which forms a wind-chamber at the center of the wheel, the inner edge of each curved blade being located at a point where a line drawn therethrough and through the center of the wheel will intersect the outer edge of the next blade in advance, and each of said blades being concavo-convex in cross-section, the cross-section thereof lying in an arc struck from the outer circle of the wheel to the inner circle forming the wind-chamber, the radius of said arc being equal to one-quarter the diameter of the wheel.

In testimony whereof I affix my signature in presence of two witnesses.

ROBERT S. BARTLETT. [L. S.]

Witnesses:

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