No. 754,477. PATENTED MAR. 15, 1904.

C. H. MIKKELSEN.

WINDMILL.

APPLICATION FILED DEC. 22, 1903.

NO MODEL. 2 SHEETS—SHEET 1.

Fig. 1.

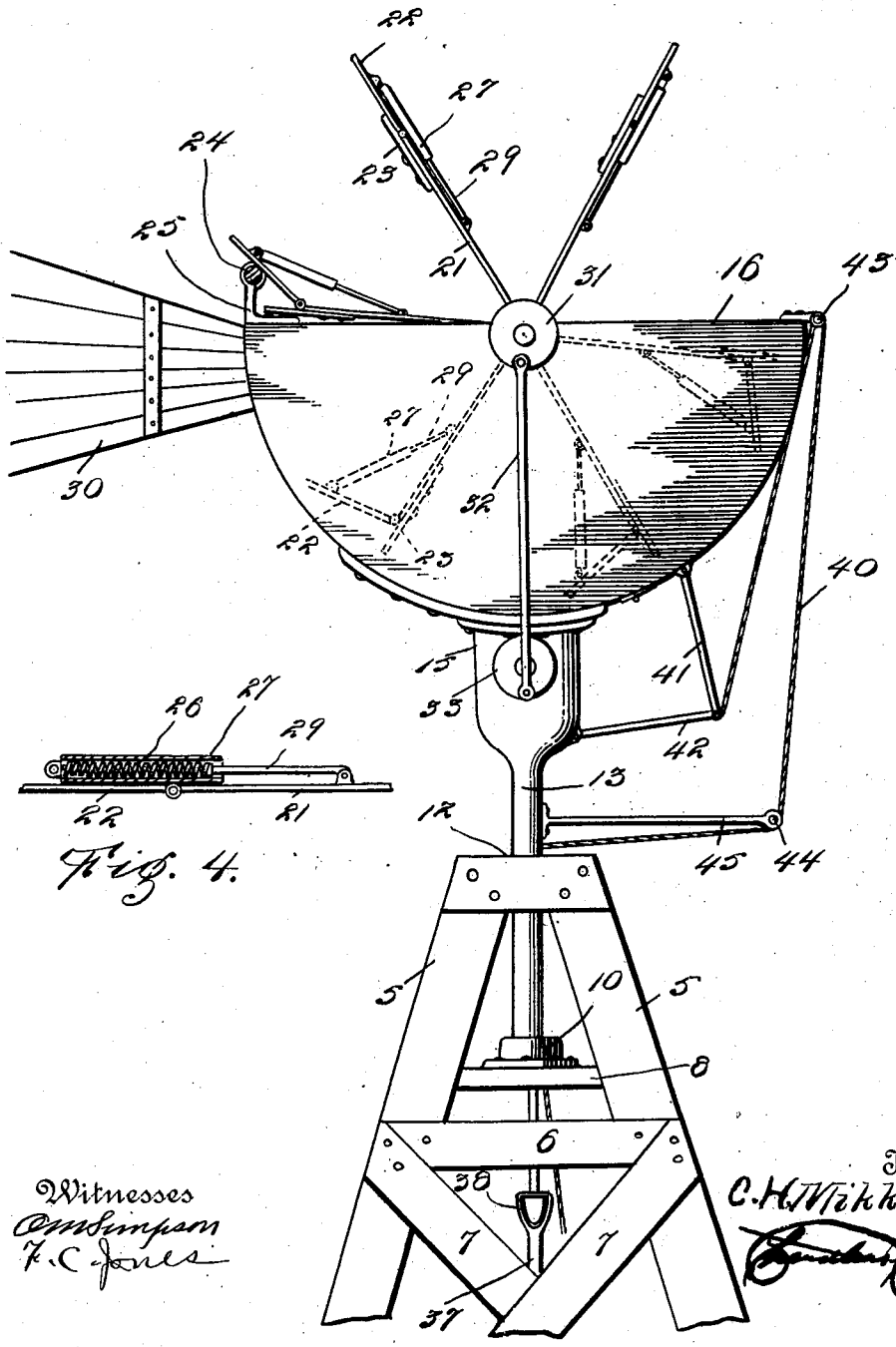


Fig. 4.

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NO MODEL. 2 SHEETS—SHEET 2.

Fig. 2.

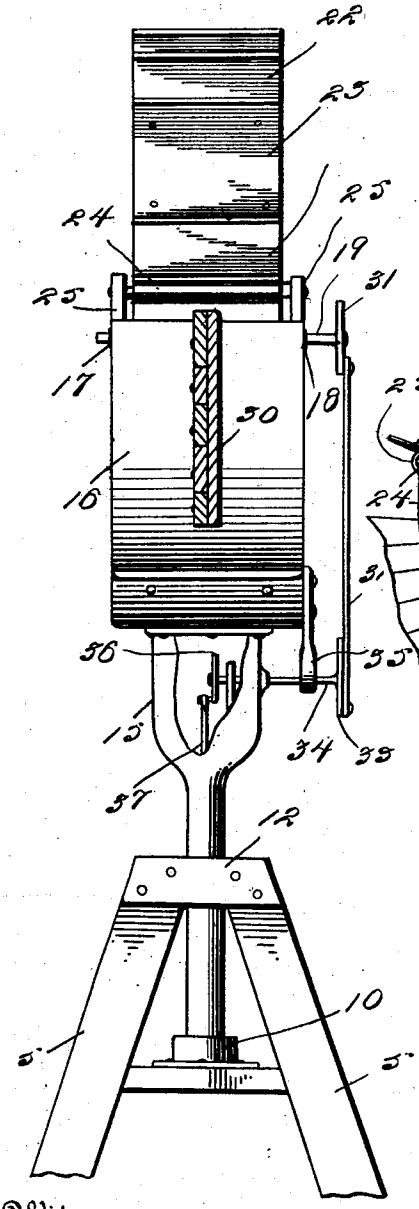
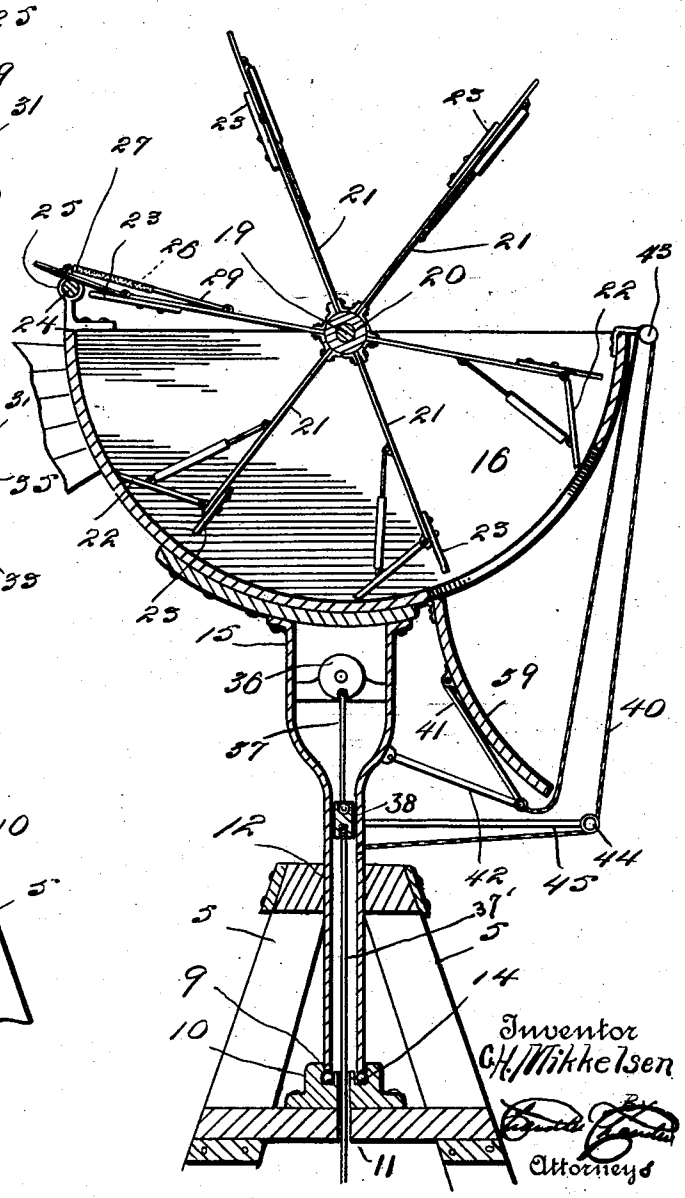


Fig. 3.



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No. 754,477. Patented March 15, 1904

UNITED STATES PATENT OFFICE.

CHARLES H. MIKKELSEN, OF GEDDES, SOUTH DAKOTA.

WINDMILL.

SPECIFICATION forming part of Letters Patent No. 754,477, dated March 15, 1904.

Application filed December 22, 1903. Serial No. 186,241. (No model.)

To all whom it may concern:

Be it known that I, CHARLES H. MIKKELSEN, a citizen of the United States, residing at Geddes, in the county of Charles Mix, State of South Dakota, have invented certain new and useful Improvements in Windmills; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to windmills; and it has for its object to provide a mill wherein the blades of the wheel will successively receive direct pressure of the wind to rotate the wheel and in which the effective area of each blade will be varied and will be at its maximum when in action and at its minimum when out of action.

A further object of the invention is to provide a wind-wheel wherein the mechanism for transmitting motion from the wheel-shaft to a reciprocatory pump-rod will be both simple and efficient.

In the drawings forming a portion of this specification, and in which like numerals of reference indicate similar parts in the several views, Figure 1 is a side elevation showing a windmill embodying the present invention. Fig. 2 is a front elevation of the windmill. Fig. 3 is a vertical section through the casing of the wheel with the door of the casing in open position. Fig. 4 is a detail sectional view.

Referring now to the drawings, there is shown a windmill comprising a tower, including upwardly-converging beams or posts 5, having connected thereto transverse braces 6 and diagonal braces 7, the general form of this tower being the same as that ordinarily employed for windmills. Slightly below the upper end of the tower is a platform 8, having thereon a bearing including a raceway 9, which is surrounded by a flange 10. The raceway 9 is annular and concentric therewith is an opening 11 for a purpose to be presently explained. At the upper end of the tower is a vertical bearing 12, in which is rotatably received a tubular support 13, the lower end of which rests upon balls 14 in the raceway 9, the tubular support being in turn supported upon these balls in such manner that it may freely rotate.

At the upper end of the support 13 is an enlargement or bracket 15, upon which is mounted a semicircular casing 16, disposed with its flat open side upwardly and horizontal, this casing having at the center of its curvature the bearings 17 and 18, in which is received the horizontal wheel-shaft 19, which carries the wind-wheel. The wind-wheel comprises a hub 20, which is fixed upon the shaft 19 and from which radiate the blades of the wheel. Each blade consists of a flat sheet 21 of suitable material of required stiffness, attached directly to the hub 20 and to the outer end of which is hinged a supplemental section 22, there being stops 23 upon each section 21, which prevent movement of the section 22 from alinement with the section 21 when in service and under the action of the wind-pressure. The relative proportions of the parts are such that when the wheel is rotated the supplemental sections 22 successively strike against the roller 24, mounted in brackets 25 at the rear end of the casing 16, and as the wheel is further rotated the section 22 in contact with said roller is folded inwardly, so that it passes with the section 21 into the casing, it being noted that when the supplemental section is distended the distance from the axis of the wheel to the outer end of said section is greater than the radius of the casing 16. The folding movement of each section 22 is against the action of a helical spring 26, disposed in a tubular casing 27, pivoted at one end to the section 22 and containing a helical spring 28, against which acts a plunger 29, which is pivoted to the corresponding section 21. As each blade of the wheel moves from the casing 16 the corresponding spring 28 actuates the casing 27 and moves the section against the stop 23.

The casing 16 carries a vane 30, which holds the casing into the wind, so that the face of each blade when in vertical position out of casing is at right angles to the direction of the wind, the casing being permitted to swing readily owing to the ball-bearing upon which the lower end of the tubular support 13 is mounted.

The shaft 19 carries a crank-disk 31, to which is attached a pitman 32, connected in

turn to a crank-disk 33, mounted on a shaft 34, having a bearing in the bracket 15, as also in the bracket 35, which depends from the casing 16. At the inner end of the shaft 34, within the inclosure of the bracket 15, is a crank-disk 36, to which is connected the pitman 37, which extends downwardly through the tubular support 13 and has connected to its lower end the pump-rod 37', through the medium of the swivel 38, the pump-rod passing down through the opening 11 and thence to the pump. (Not shown.)

With the construction above described it will be seen that the wind has effect only on those blades that are exposed, while those blades that are within the casing are not effected by the wind, so that as the blades at one side only of the wheel are exposed the wheel is rotated.

To stop the wheel, it is only necessary to admit the wind to the lower side of the wheel, and for this purpose the front end of the casing 16 is provided with a door 39, which is hinged at a point near to the bottom of the casing, so that it opens in a vertical plane, and the door is held in closed position by means of a cord 40, which is attached to a bar 41, which is pivoted at one end to the door and at its opposite end is pivoted to the bar 42, which is hinged to the support 13. The cord 40 extends upwardly and over a pulley 43 at the upper edge of the casing and then downwardly and around a pulley 44, carried by an arm 45, extending from the support 13, and then downwardly through the tower. The weight of the door causes it to normally lie in open position, so as to permit of access of wind to the bottom of the casing, so that when the rope is slack the door will remain open, and when it is desired to start the wheel, or rather to permit it to start by the action of the wind, it is only necessary to draw downwardly upon the rope or cord, with the result that the door will be closed and the wind then impinging only upon the blades at the upper side of the wheel will serve to rotate the wheel.

It will be understood that in practice modifications of the specific construction shown may be made and that any suitable materials and proportions may be used for the various parts without departing from the spirit of the invention.

What is claimed is—

A windmill comprising a casing mounted for rotation upon a vertical axis, a wheel comprising a hub mounted transversely of the casing and blades radiating from the hub and movable into and out of the casing, each of the blades including an inner section and an outer section hinged thereto and adapted to aline therewith and to move out of such alinement in one direction only, means for holding the outer sections yieldably in alinement with the inner sections, and a striker carried by the casing in the path of movement of the outer sections of the blades and adapted to fold them in the direction of inner sections as they pass into the casing.

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

CHARLES H. MIKKELSEN.

Witnesses:
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