

No. 650,032.

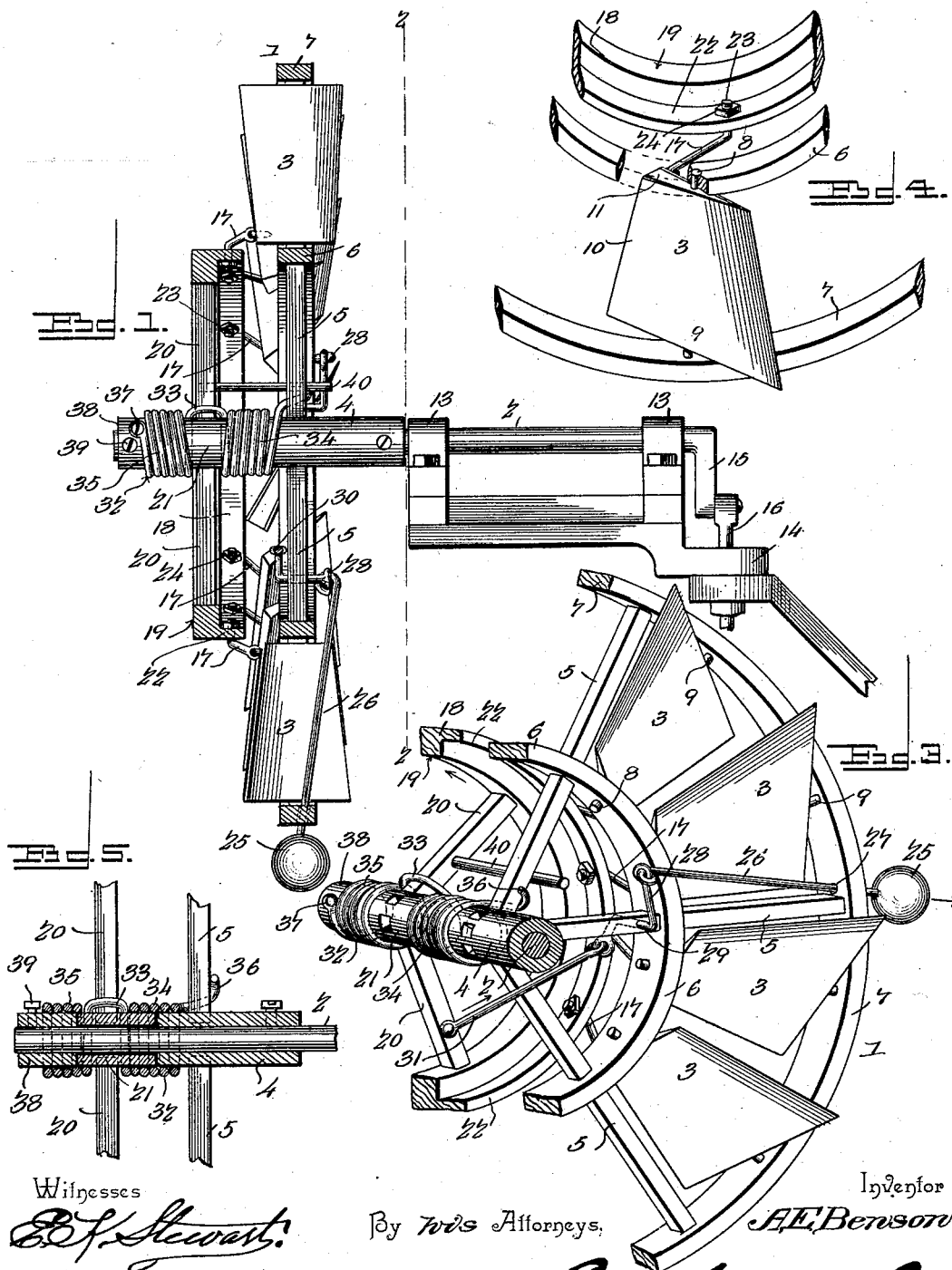
Patented May 22, 1900.

A. E. BENSON.
WINDMILL.

(Application filed Nov. 20, 1899.)

(No-Model.)

2 Sheets—Sheet 1.



Witnesses

E. Stewart

J. F. Riley

By *Two* Attorneys,

Inventor

A. E. Benson

Chas. H. Co.

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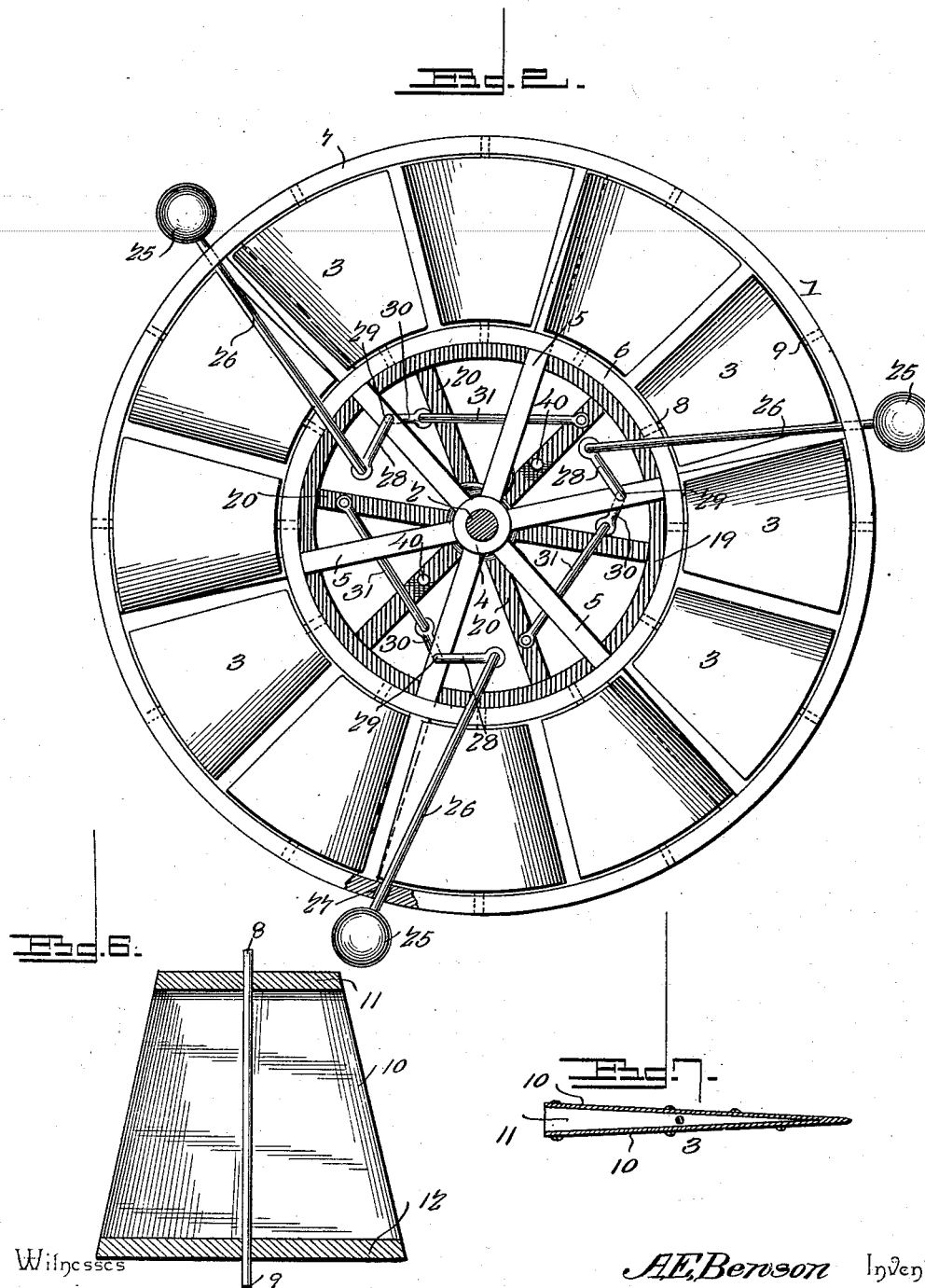
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Witnesses

E. J. Steward
J. H. Riley

By His Attorneys,

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C. A. Snow & Co.

UNITED STATES PATENT OFFICE.

ARTHUR EDGAR BENSON, OF HALL COUNTY, TEXAS.

WINDMILL.

SPECIFICATION forming part of Letters Patent No. 650,032, dated May 22, 1900.

Application filed November 20, 1899. Serial No. 737,673. (No model.)

To all whom it may concern:

Be it known that I, ARTHUR EDGAR BENSON, a citizen of the United States, residing in the county of Hall, in the State of Texas, (post-office Clarendon, Donley county, Texas,) 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, durable, and efficient one which will be comparatively inexpensive in construction and adapted to govern itself automatically, so that it will run at a uniform speed in high variable winds and will not be injured by the same.

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

In the drawings, Figure 1 is a vertical sectional view of a portion of a windmill constructed in accordance with this invention. Fig. 2 is a vertical sectional view on line 2 2 of Fig. 1. Fig. 3 is an enlarged perspective view of a portion of the wind-wheel, illustrating the construction of the governor. Fig. 4 is a similar view illustrating the manner of mounting one of the blades. Fig. 5 is a detail sectional view illustrating the manner of mounting the spring for closing the blades of the wind-wheel. Figs. 6 and 7 are sectional views illustrating the construction of the blades.

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

1 designates a wind-wheel mounted on a horizontal wind-wheel shaft 2 and comprising a frame and an annular series of pivoted or hinged blades 3, which are adapted to be automatically opened and closed, as hereinafter described, to present more or less fan-surface to the wind according to the force of the latter, whereby the speed of the windmill is regulated and rendered uniform. The frame of the wind-wheel comprises a central hub or

sleeve 4, a series of radial spokes 5, and inner and outer concentric rings 6 and 7, connecting the spokes and provided with bearings for the reception of the inner and outer pivots 8 and 9 of the blades 3. The blades 3 taper longitudinally and are wedge-shaped in cross-section, as clearly illustrated in Fig. 4 of the accompanying drawings, and while they may be constructed of any suitable material they are preferably composed of sides 10, of sheet metal, and inner and outer transversely-disposed tapering bars 11 and 12, secured to and interposed between the sides 10, which are arranged at an angle to each other.

The horizontal wind-wheel shaft 2 is journaled in suitable bearings 13 of a rotary frame or turn-table 14, which may be mounted on a tower in any suitable manner, and the said shaft 2 is provided at its inner end with a crank 15; connected by a pitman 16 with the pump-rod of a pump; but gearing of any desired construction and arrangement may be employed for transmitting motion from the wind-wheel shaft 2 to the pump-rod or other part to be operated.

The crank 15 is designed to be arranged at the center of the tower, and as the wind-wheel is located at one side of the same, as illustrated in Fig. 1 of the accompanying drawings, it will be apparent that it will always be in position to be operated upon by the wind, and it is unnecessary to employ a vane to effect this result. The blades are centrally pivoted and their rear or outer portions are connected by links 17 with the rim 18 of a wheel 19, mounted on the wind-wheel shaft at the outer or rear side of the wind-wheel and capable of a limited movement independent thereof, whereby it is adapted to swing the blades simultaneously to open and close them. The wheel 19, which consists of the rim 18, spokes 20, and a hub or sleeve 21, is provided at its periphery or rim with an annular flange 22, provided at intervals with perforations to receive the outer ends of the links 17, which are bent to form pivots 23. The pivots 23 are preferably threaded and engaged by nuts 24, which are arranged on

the inner face of the peripheral flange 22, as clearly illustrated in Fig. 3 of the accompanying drawings.

The governor-wheel 19 is actuated to open the blades by governor-weights 25, arranged at the periphery of the wind-wheel and preferably consisting of balls fixed to the outer ends of radial rods 26, which extend through guide-openings 27 of the outer ring 7. The inner ends of the radial rods are connected to arms 28 of bell-crank levers 29, which have their other arms 30 connected by links 31 with the governor-wheel 19. The bell-crank levers have central pivotal portions arranged in suitable bearing-openings of the spokes, adjacent to the inner ring 6 of the wind-wheel and at points between the said inner ring and the hub or sleeve 4. The centrifugal force of the weights incident to the rotation of the wind-wheel is adapted to throw them outward when the speed of the wind-wheel becomes sufficient for this purpose. The balls are held against outward movement to preserve the blades in their closed position while the wind-wheel is traveling at a predetermined rate of speed by a spring 32; but when the force of the wind exceeds the power of the spring the increased speed of the wind-wheel will operate to throw the governor-weights 25 outward, whereby the blades 3 will be opened to present less fan-surface to the wind. As the force of the wind decreases the blades will be gradually closed, and it will be apparent that by this construction the windmill will be caused to operate at a uniform speed.

The outward movement of the radial rods 26 and the governor-weights 25 swings the rear ends or portions of the blades in the direction of the pivots or in a direction which, if the movement is sufficient, will arrange the blades in a plane at right angles to that of the frame of the wind-wheel, so that no fan-surface will then be presented to the wind, and the spring operates to move the wheel 19 in the opposite direction to close the blades.

The spring 32 consists of a central loop 33 and opposite coils 34 and 35, arranged at the inner and outer sides of the governor-wheel and disposed on the hub of the same. The inner end 36 of the spring terminates in a hook which engages one of the spokes of the wind-wheel; but it may be connected with the latter in any other suitable manner. The outer end 37 of the spring is secured to a collar 38 by a screw or other suitable fastening device, and the collar is clamped to the outer end of the wind-wheel shaft by a screw 39 and is adjustable.

The governor-wheel is provided with arms 40, extending inward from its spokes, arranged parallel with the wind-wheel shaft, and extending between and adapted to engage the spokes of the wind-wheel to form stops for limiting the movement of the governor-wheel.

The movement of the governor-wheel is limited to prevent the blades in opening from swinging past a position perpendicular to the plane of the frame of the wind-wheel.

It will be seen that the windmill is simple and comparatively inexpensive in construction and possesses great strength and durability and that the governor mechanism is positive and reliable in operation and is adapted to operate the pivoted blades automatically to present more or less fan-surface to the wind, and thereby control the speed of the wind-wheel and render the same uniform.

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

What is claimed is—

1. In a windmill, the combination of a wind-wheel provided with spokes and having inner and outer rings 6 and 7, blades pivotally mounted on the rings and located between the same, a governor-wheel arranged at one side of the wind-wheel and capable of a limited rotary movement independent of the same, a spring connecting the said wheels, an arm arranged parallel with the wind-wheel shaft and rigidly mounted on the governor-wheel and extending between the adjacent spokes of the wind-wheel at a point between the hub thereof and the inner ring 6 and limiting the independent movement of the said governor-wheel, rock-shafts extending transversely of the wind-wheel and journaled thereon and provided at their ends with arms arranged parallel with the plane of the wind-wheel and at opposite sides of the latter, the arms at one side of the wind-wheel being connected with the governor-wheel, weights connected with the other arms of the rock-shaft, and connections between the governor-wheel and the pivoted blades, substantially as described.

2. In a windmill, the combination of a wind-wheel having pivoted blades, a governor-wheel located at one side of the wind-wheel and capable of a limited rotary movement independent of the same, a spring connecting the wheels, a rock-shaft extending transversely of the wind-wheel and journaled thereon, said rock-shaft being provided at its ends with arms located at opposite sides of the wind-wheel and arranged to swing in planes parallel with the latter, one of the arms being connected with the governor-wheel, a sliding rod mounted on the wind-wheel and connected with the other arm, a weight for actuating the sliding rod, and connections between the governor-wheel and the pivoted blades, substantially as described.

3. In a windmill, a wind-wheel provided with blades each composed of two sheet-metal sides tapering toward their inner ends and arranged at an angle to each other, the inner

and outer tapering or wedge-shaped transverse bars interposed between the sides and secured to the same, and a rod located between the sheet-metal sides and passing
5 through the transverse bars and forming pivots, 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.

ARTHUR EDGAR BENSON.

Witnesses:

J. B. McCLELLAND,
C. J. LEWIS.