2 Sheets—Sheet 1.

E. H. EARLE.

WIND-MILL.

No. 190,296. Patented May 1, 1877.

Fig. 1.

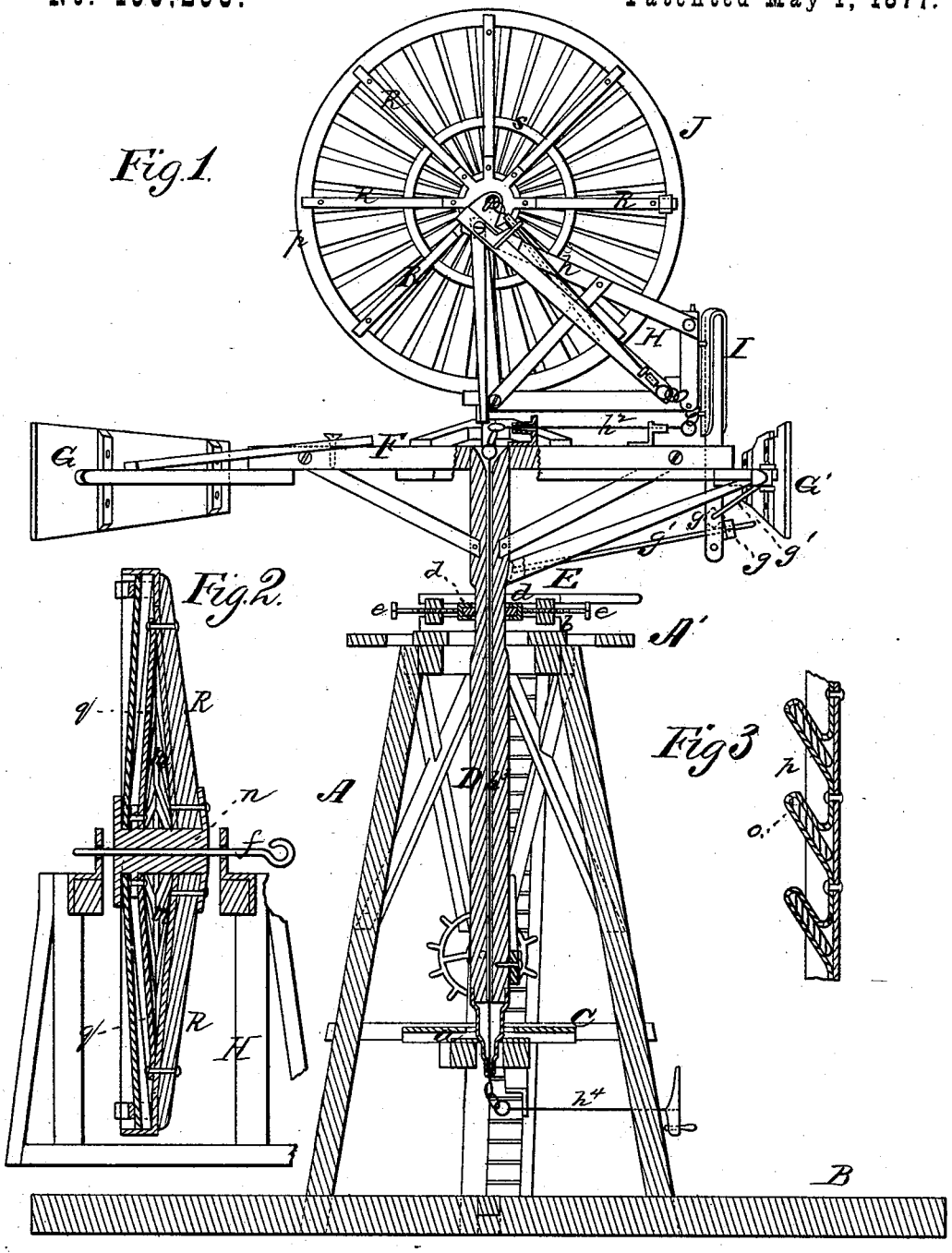

Fig. 2.

Fig 3

WITNESSES

Villette Anderson.

F. J. Masi

INVENTOR

Ethan H. Earle,

by E. W. Anderson,

ATTORNEY

2 Sheets—Sheet 2.

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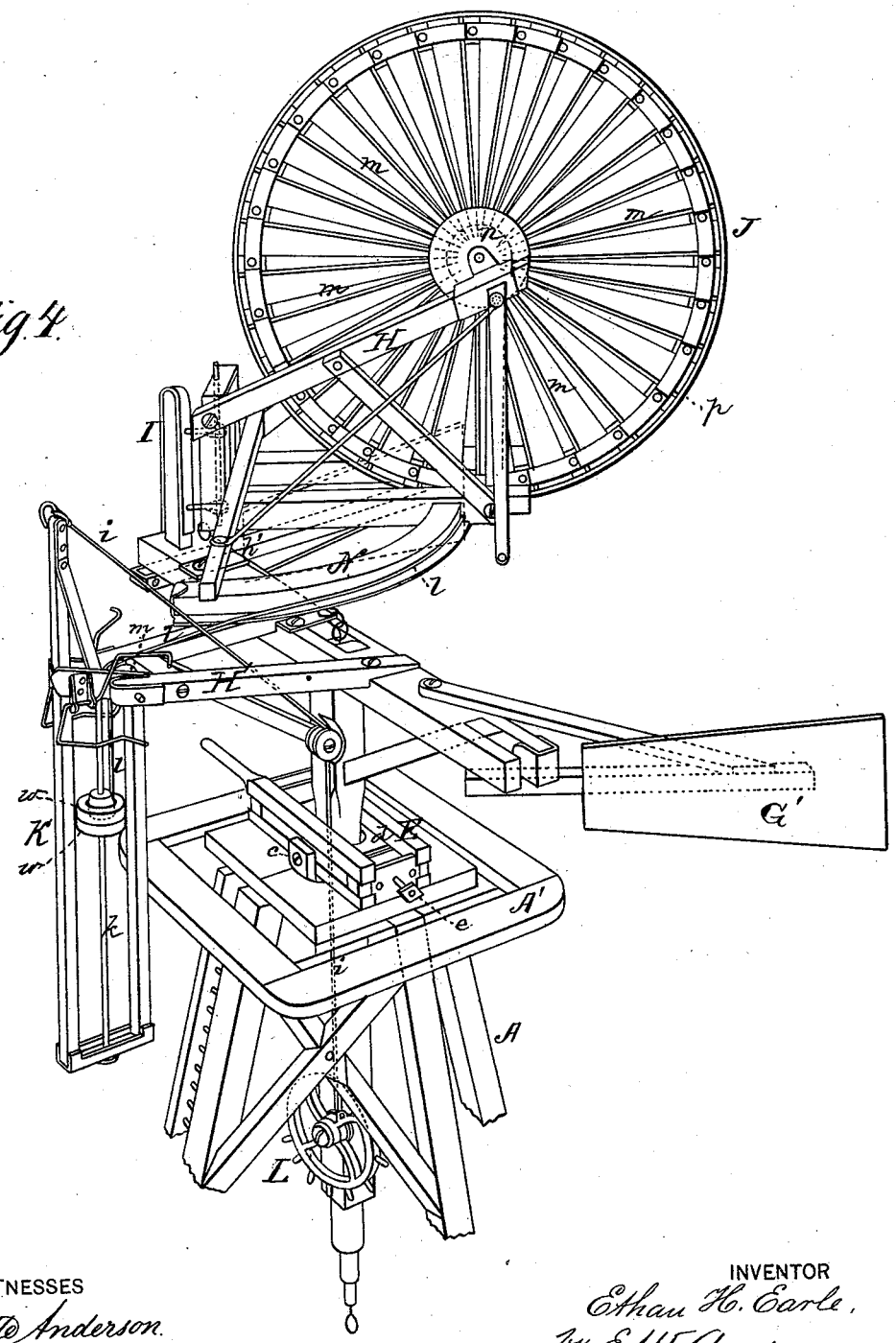
Fig 4.



WITNESSES

Villette Anderson.

F. J. Masi

INVENTOR

Ethan H. Earle,

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ATTORNEY

UNITED STATES PATENT OFFICE.

ETHAN H. EARLE, OF CAMERON, MISSOURI, ASSIGNOR OF ONE-HALF HIS RIGHT TO WILLIAM HOLLINGTON, OF SAME PLACE.

IMPROVEMENT IN WINDMILLS.

Specification forming part of Letters Patent No. **190,296**, dated May 1, 1877; application filed February 10, 1877.

To all whom it may concern:

Be it known that I, ETHAN H. EARLE, of Cameron, in the county of Clinton and State of Missouri, have invented a new and valuable Improvement in Windmills; and I do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the annexed drawings, making a part of this specification, and to the letters and figures of reference marked thereon.

Figure 1 of the drawings is a representation of a longitudinal central section of my improved windmill. Figs. 2 and 3 are detail sectional views, and Fig. 4 is a perspective view thereof.

This invention relates to windmills of the self-regulating kind; and the nature of my invention consists, first, in the employment upon the gallery of the tower of novel means whereby the main rotating shaft can be adjusted and held in a perpendicular position, and a substantial upper bearing afforded said shaft, as will be hereinafter explained; second, in sustaining the vibrating wheel-frame by means of an upright, which is located at one end of a horizontal beam fixed to the main rotating shaft, and which is adjustable by means of brace-rods, for a purpose hereinafter explained; third, in a vertically-vibrating arm, having governing-weights adjustably applied to it, which weights can be moved nearer to or farther from said arm by means of a rope or chain and a windlass, as will be hereinafter explained; fourth, in a novel construction of wind-wheel, which can be readily taken apart for transportation, and when put together will be strong and substantial.

In the annexed drawings, A designates the main frame or tower, constructed with a gallery, A′, and mounted on sills B. C is a platform, which is supported upon two horizontal beams, on which is a step-plate, *a*, for the lower end of an upright rotating shaft, D, which I shall hereinafter designate the main shaft of the mill. At the upper end of the tower A, and strongly secured thereto, is a platform, *b*, through which the main shaft D passes, and on which is supported a slotted frame, E. This latter frame E is held down in its place by under-hooking fingers *c c*, which allow it to be turned around toward the right or left, and to facilitate these adjustments a handle is provided, as shown in the drawings. Frame E contains two sliding half-boxes, *d d*, which embrace the main shaft D, and which serve as a journal-box therefor. The end pieces of frame E have screws *e e* tapped through them for the purpose of adjusting the half-boxes *d d*, and with them the upper end of the main shaft. By these means the main shaft can be adjusted in a vertical position whether the mill be in operation or at rest, and while this is the case a firm bearing is obtained.

F designates a horizontal beam, which is rigidly secured at the middle of its length to the main shaft D some distance above the gallery A′, and G G′ designate two wind blades, which are respectively secured to the ends of the beam F, and properly braced. The blade G is at right angles to the beam F, and the blade G′ may be adjusted and set at any desired angle with respect to said beam. These blades, when they are acted on by the wind, cause the main shaft to turn about its axis, and bring the wheel J into wind.

The wind-wheel shaft *f* has its bearings in the overhanging portions of a frame, H, which is suitably pivoted to an upright, I, located at that end of the horizontal beam F nearest to the wind-blade G. The upright I extends both above and below the beam F, and it is pivoted to the latter, so that it can be adjusted by means of nuts *g g* on brace-rods *g′ g′*, and thus sagging of the wheel-frame H prevented.

By means of rods *h* h^1 h^2 h^3 the rotary motion of the wheel J can be transmitted to various kinds of machines, and the power of the wheel in motion thus utilized. The ends of the several rods last referred to are connected together by means of link or universal joints.

K designates an open or slotted arm, which is pivoted to a frame, H′, springing from the beam F at the middle of its length, and which is free to vibrate vertically like the governor-arms of a steam-engine. The longest portion

of arm K can be raised or lowered by means of a rope, *i*, attached to the shortest arm and carried down to and around a windlass, L, near the platform C. After adjusting the arm K the windlass L can be held in check by any suitable device.

Fixed centrally to the ends of the slotted arm K is a rod, *k*, on which are loosely applied weights *w w*, attached to a rope, *l*, that is carried up over a pulley, *m*, and attached to the inner angle of a horizontal arc, N, rigidly secured to the frame H. By the combination of parts just described the weights *w* will operate on the wheel-frame H, so as to cause the wheel to edge more or less to the direction of the wind, or to squarely face the wind according as its force may increase or diminish.

The wheel J is made up of detachable sections, and the blades *m* thereof are secured between the flanges of a hub, *n*, and also in loops *o* formed on narrow segmental strips shown in Fig. 3. The looped strips are secured to a rim, *p*, bolted to the spokes R at the back of the wheel. The wheel is double-dished, and the dishing of the blades *m* is maintained by means of radial braces *q*, secured at their inner ends to the hub *n*, and at their outer ends to the spokes R. A ring, *s*, stiffens the braces *q*.

What I claim as new, and desire to secure by Letters Patent, is—

1. In a self-regulating windmill the slotted frame E, on platform C, adjustable, as described, and provided with adjustable half-boxes *d d*, in combination with the main shaft D, substantially as set forth.

2. The upright I, adjustable on the beam F, as described, in combination with the horizontally-swinging frame H, and with the movable weight *w* and rope *l*, substantially as described.

3. The arm K, pivoted to a frame, H′, springing from beam F, and provided with an adjustable weight, *w*, in combination with the vibrating wheel-frame H, substantially as described.

4. Wheel J, having its blades secured to a flanged hub, *n*, and also to loops *o*, in combination with dished or bracing spokes R, and radial braces *q*, all put together as described and shown.

5. In combination with the vibrating wheel-carrying frame H and its loaded governing-arm K the wind blades or vanes G G′ applied to the beam F, substantially as described.

In testimony that I claim the above I have hereunto subscribed my name in the presence of two witnesses.

ETHAN HENRY EARLE.

Witnesses:
S. N. CORN,
T. P. DUFFEY.