(No Model.) 2 Sheets—Sheet 1.

E. HOWLAND.

WIND ENGINE.

No. 258,650. Patented May 30, 1882.

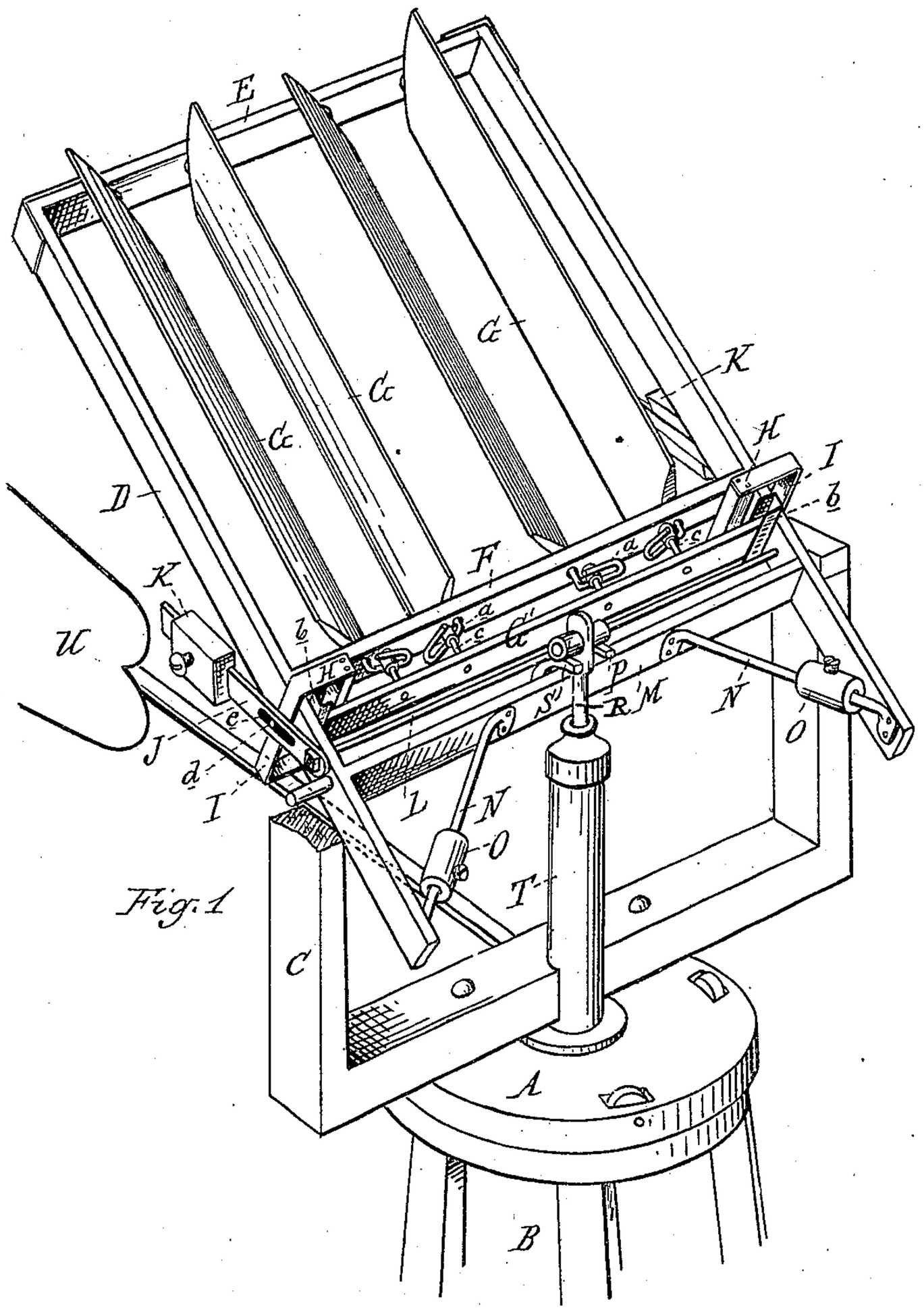

Fig. 1

Attest:

A. Barthel

Charles J. Munn

Inventor:

Ephraim Howland.

per Thos. S. Sprague

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(No Model.) 2 Sheets—Sheet 2.

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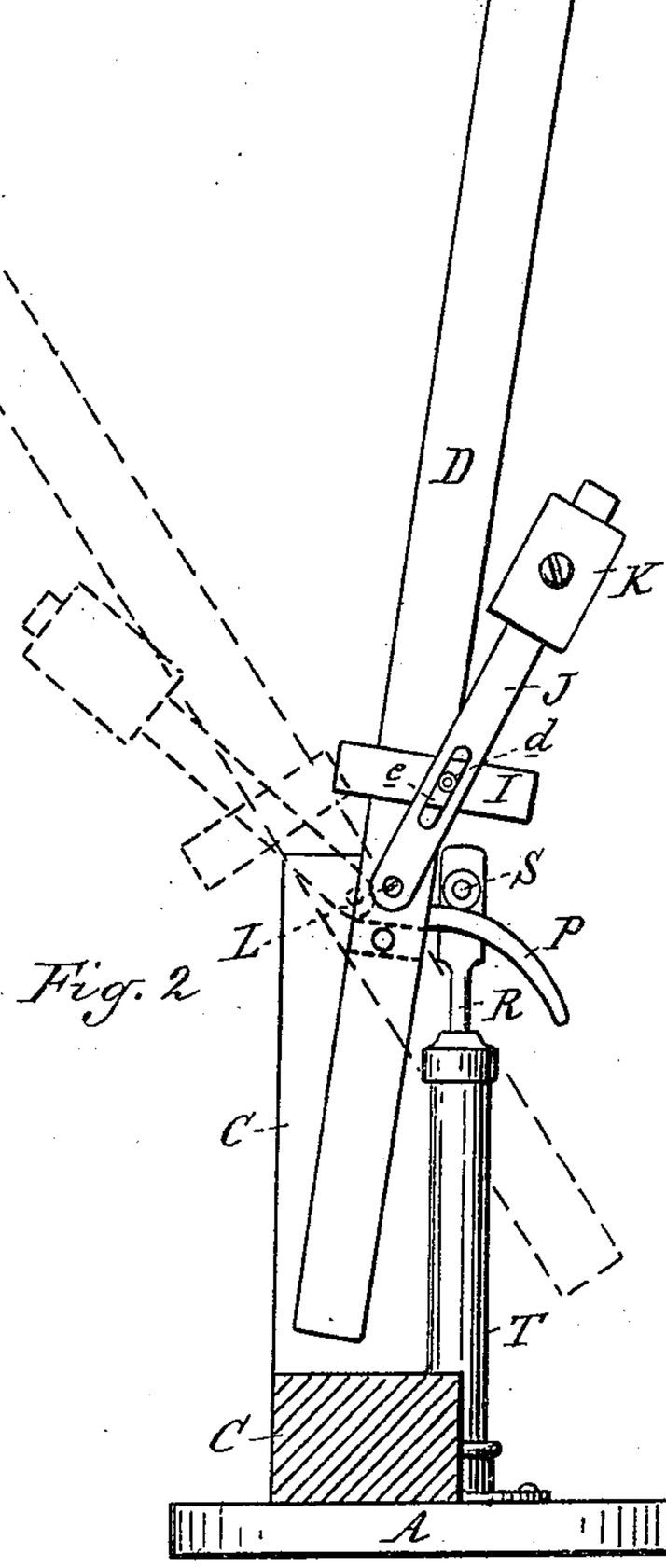

Fig. 2

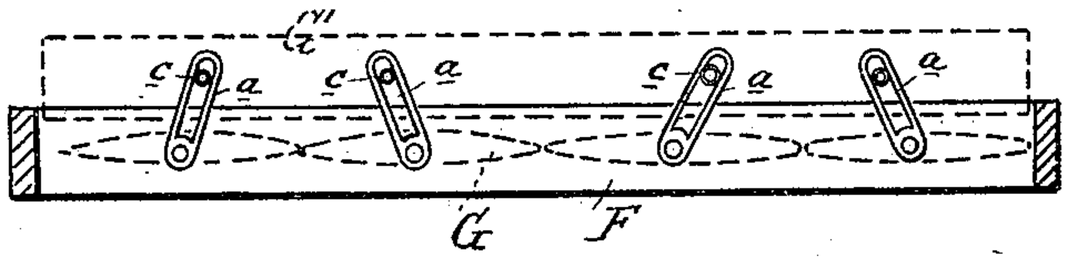

Fig. 3

Attest:

A. Barthel

Chas. J. Hauch

Inventor:

Ephraim Howland

per Phil. S. Sprague

Att'y

UNITED STATES PATENT OFFICE.

EPHRAIM HOWLAND, OF PONTIAC, MICHIGAN.

WIND-ENGINE.

SPECIFICATION forming part of Letters Patent No. 258,650, dated May 30, 1882.

Application filed December 1, 1881. (No model.)

To all whom it may concern:

Be it known that I, EPHRAIM HOWLAND, of Pontiac, in the county of Oakland and State of Michigan, have invented an Improvement in Wind-Engines, of which the following is a specification.

The nature of this invention relates to certain new and useful improvements in the construction of wind-engines; and the invention consists in the peculiar construction, arrangement, and various combinations of the parts, all as more fully hereinafter set forth.

Figure 1 is a perspective view. Fig. 2 is a vertical central cross-section. Fig. 3 is a sectional elevation.

In the accompanying drawings, which form a part of this specification, A represents a turn-table mounted upon a suitable frame, B. Upon this turn-table is erected the carrying-frame C, between the standards or vertical side bars of which is pivotally secured the frame D, eccentric to its longitudinal center, and which carries the operating parts of my device. Between the top girt, E, and girt F of this frame are pivotally secured the sails G, the lower journals of which project downward through such girt, and are provided with the links *a*, which project at right angles to said journals, for the purposes hereinafter described.

G′ is a guide-bar, the ends of which travel in suitable boxes, *b*, secured to the frame D; and said guide-bar is provided with outwardly-projecting pins or studs *c*, which enter the eccentric loops *a*. Projecting from this guide-bar G′ are two arms, H, the outer ends of which are connected by means of a yoke or strap, I, which embraces loosely the vertical sides of the frame D; and from the outer faces of these yokes project pins *d*, which enter slots *e* in the levers J, which are provided with the adjustable weights K, the lower ends of these levers being rigidly secured to the outer ends of a cross-rod, L, which is properly journaled in the sides of the frame D in such a manner that the operation of the two levers and their attachments upon each end of this rod shall be simultaneous. The lower ends of the side bars of the frame D project downward, and are braced from the girt M by means of the braces N, which are provided with the counter-weights O; and from this girt M, at the longitudinal center thereof, projects a bifurcated segmental yoke, P, which receives the head of the pump-rod R, which is provided with the cross-head S, upon which are arranged frictional rollers which come in contact with the upper face of the segmental yoke P, while the pump-rod projects downward through a proper barrel, T, rising from the turn-table A. While this form or manner of connection between the pump-rod and the girt M is shown in my drawings, I do not desire to limit myself to this construction, as there are various means by which this connection could be made which would perform the functions fully as well as the ones represented, while their cost would be materially less. The turn-table A is provided with the vane U, as in the ordinary construction of windmills.

In practice the operation of this device is as follows: Supposing the frame D, with its various connections, to be standing inclined toward the wind, which would of necessity cause the weighted lever J to stand at a proportionately greater angle from the vertical center than that assumed by the frame, and that the sails from this disposition of parts are closed, as represented in dotted lines in Fig. 3, the wind then coming from the direction shown by the arrow, striking against the sails, forces the frame over into the position shown in dotted outlines, Fig. 2, while the various other parts assume the positions shown in dotted outlines, same figure; and that as the lever J in this movement is carried past the vertical plane it must by force of gravity fall into the position shown in Fig. 2, and must necessarily, in its movement, owing to its being shorter than the frame, increase its velocity as it passes such center, overtake and pass the frame D in its movement from the wind, and exert a force by means of the pins *d* and slots in the levers to cause the guide-bar G to slide in its guides *b*, necessarily compelling the pins *c*, in their engagement with the eccentric links *a*, to turn the sails G out of the wind, as shown in Fig. 1; and in this movement of the parts, while the top of the frame D is thrown to the rear, the foot thereof, below the pivotal point of the frame, must necessarily be thrown forward, and as a natural result an upward stroke of the pump-rod, by reason of its connection,

must be made. At this point, the sails having been turned so that the wind will have little or no effect against them, the weight of the pump-rod and the counterbalance-weights O upon the braces N is and must be sufficient by gravitation to again elevate the frame to a position approaching that from which it started, and at a given time in the movement of the device the levers J, with the weights K, by passing over the vertical center of the pivot, necessarily assume their original position, and in consequence of the connections hereinbefore named compel the sails to close, when the device is again ready to receive motion through the action of the wind.

What I claim as my invention is—

1. In a wind-engine, a counterbalanced frame supported on journals upon the turn-table, and provided with a series of pivoted wings adapted to be opened or closed by the downward or upward movement of the frame, substantially as described.

2. The pivoted and counterbalanced frame B, provided with a series of pivoted sails or wings, G, in combination with the pivoted weight-arm J and connections, substantially as described, between said weight-arm and the sails, whereby the movement of the frame and the weight-arm opens and closes the sails, as and for the purpose specified.

3. In a wind-engine, substantially as described, the pivoted frame D, brace-rods N, and adjustable counter-weights O, as and for the purpose specified.

4. In combination with the pivoted and counterbalanced frame D, the pivoted sails G, provided with links *a*, the sliding bar G′, provided with pins *c*, and the pivoted weight-arm J, substantially as described.

5. In combination with the pivoted and counterbalanced frame D, the pivoted sails G, and means, substantially as described, for turning said sails by the upward and downward movement of the frame, the bifurcated arm P, secured to the frame D, the rod R, and the side projections, S, on said rod, as and for the purpose specified.

6. In combination with the frame D, carrying the sails G, the sliding bar G′, weight-lever J, and connections, substantially as described, between the bar G′ and sails, as set forth.

7. The pivoted and counterbalanced frame D, carrying the sails G, in combination with the links *a* of said sails, the sliding bar G′, the yokes I, and the pins *c* and *d* on said bar, the guides *b*, and the slotted and weighted lever J, substantially as and for the purpose specified.

8. In combination with the frame D, provided with guides *b*, and the sliding bar G, the weight-arms J and the rod L, rigidly connecting said weighted arms, whereby the bar G is caused to move exactly the same at both ends, substantially as described.

EPHRAIM HOWLAND.

Witnesses:
H. S. SPRAGUE,
CHAS. J. HUNT.