(No Model.) 2 Sheets—Sheet 1.

G. A. MUSSELMAN.

WIND ENGINE.

No. 502,860. Patented Aug. 8, 1893.

Fig. 1.

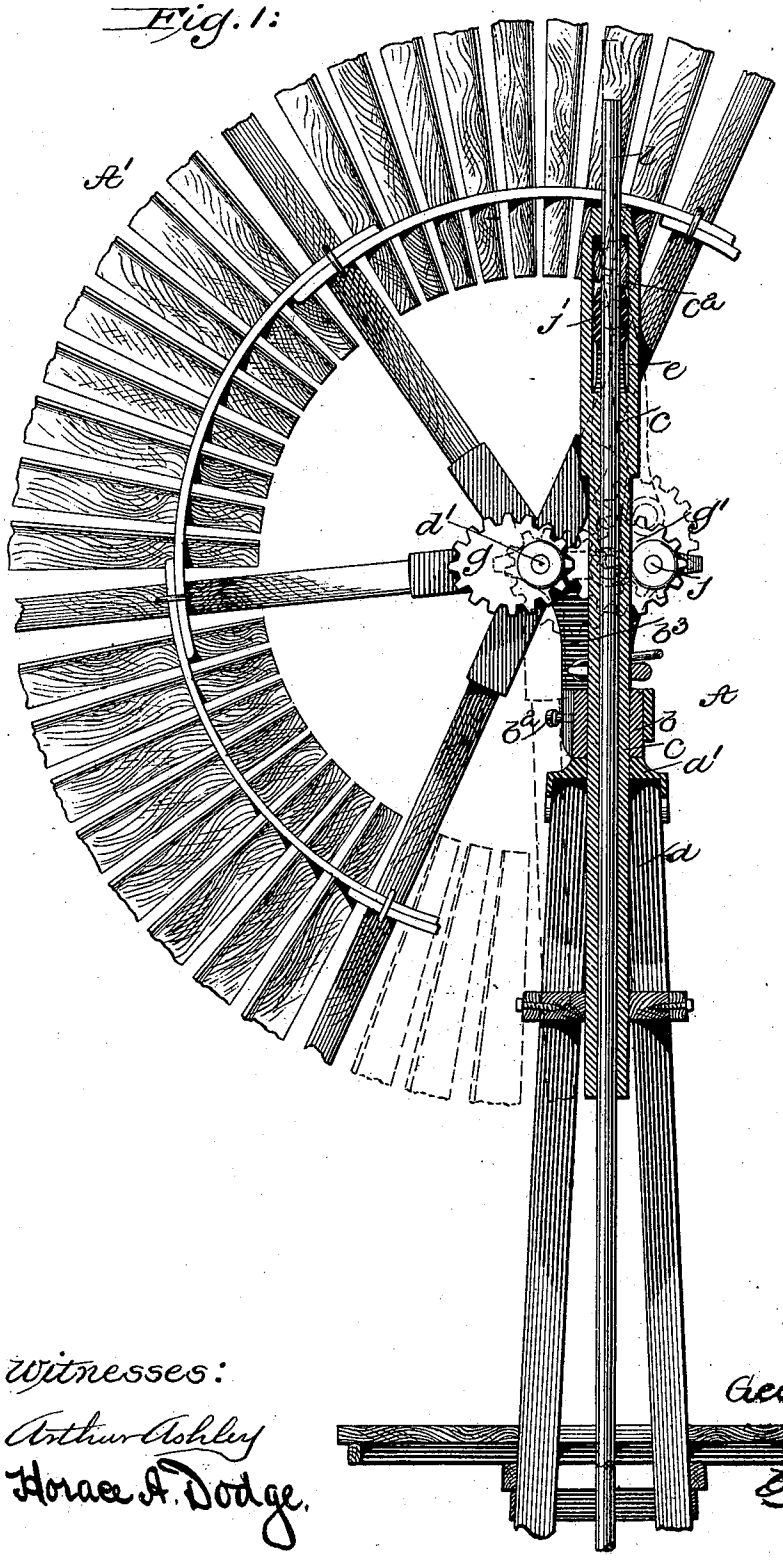
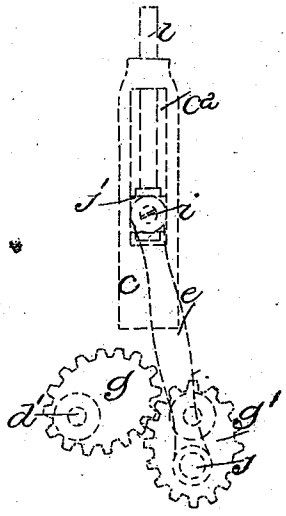


Fig. 2.



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Horace A. Dodge.

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Fig. 3.

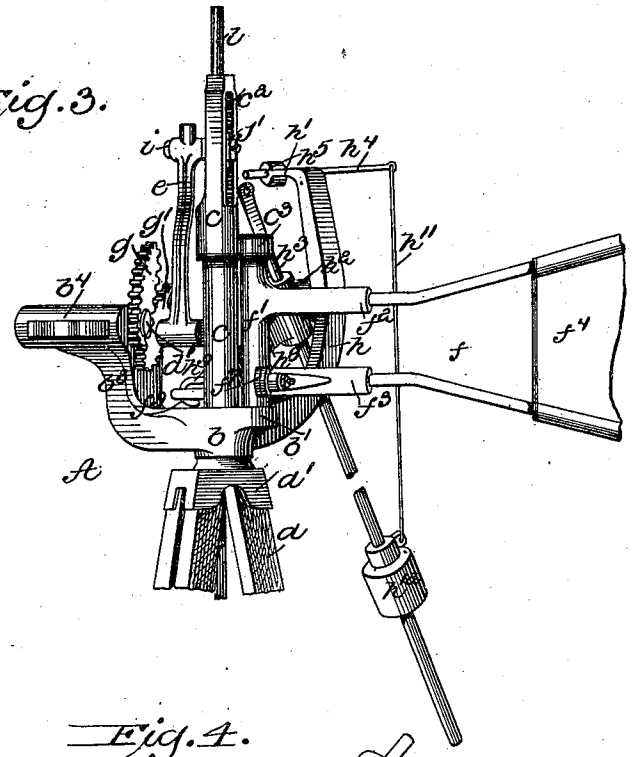
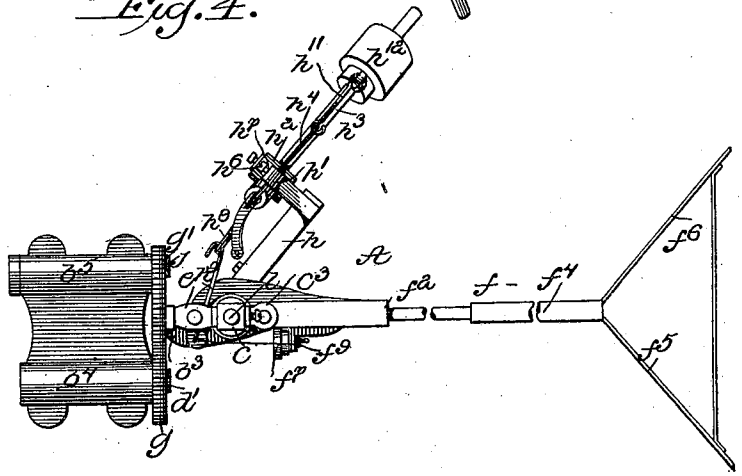


Fig. 4.



Witnesses:
Arthur Ashley
Horace A. Dodge.

Inventor:
Geo. A. Musselman
By Ashley & Ashley
Attys

UNITED STATES PATENT OFFICE.

GEORGE A. MUSSELMAN, OF RICHLAND COUNTY, OHIO, ASSIGNOR OF ONE-HALF TO JOHN WALTERS, OF SAME PLACE.

WIND-ENGINE.

SPECIFICATION forming part of Letters Patent No. 502,860, dated August 8, 1893.

Application filed June 14, 1892. Serial No. 436,699. (No model.)

To all whom it may concern:

Be it known that I, GEORGE A. MUSSELMAN, a citizen of the United States, and a resident of the county of Richland, in the State of Ohio, have invented a new and useful Wind-Engine, of which the following is a description.

The invention relates to improvements in that numerous class of engines in which the power of air currents is received primarily upon a vertically-arranged wheel, and is transmitted therefrom, through suitable intermediate mechanism, to a perpendicular rod which is operated to move up and down, to elevate water, or other bodies or materials.

The object of the invention is to produce an engine of the character described, of a simple and durable construction, and in which the power received through the wind-wheel shall be so directly exerted as to insure the least possible loss thereof through friction of the parts embraced in the transmitting mechanism.

The invention consists in various novel elements and in various novel combinations of elements in a wind-engine,—as will appear from the following detailed description and from the specific and distinct claims which succeed the same.

In the accompanying drawings, which constitute a part of this specification: Figure 1 represents an elevation partly in central, vertical section. Fig. 2 is a detail of the crank-arm and the elliptical gear-wheels. Fig. 3 is a detail perspective elevation. Fig. 4 is a detail plan.

The supporting-column, or standard a, of the wind-engine A, may be of any ordinary or approved construction. Upon the cap a', of the standard a, is seated the bearing or base b, which at its lower extremity is received upon, or which receives within itself the sleeve or cylinder c, of the lifting-rod l, and is provided at one side with a perforated bearing b', to receive the lower extremity of the journal f', of the tail-vane; and at its opposite side with a pinch-screw b^2, Fig. 1 by which the base and the sleeve are made revoluble together upon the cap a'. From the lower extremity, of the bearing b, and arm b^3 extends first outwardly and then upwardly to a point in a plane somewhat above the mid-height of the tail-vane, where it is provided with left and right cylindrical journal-bearings b^4 and b^5, the former of which receives the shaft d', of the wind-wheel d,—and its elliptical gear-wheel g, and the latter of which receives the journal of the elliptical gear-wheel g'. The gear-wheel g is received upon the outer extremity of the shaft d' of the wind-wheel, by one extremity of its ellipse, and the journal j of the gear-wheel g' is received in the corresponding extremity of its ellipse, the two journal bearings being separated by a space corresponding to the length of each elliptical gear-wheel. The crank or operating arm e, of the engine, is pivoted to the outer face of the gear-wheel g', at a point midway between its journal j and the opposite extremity of such wheel, the opposite extremity of the arm being pivoted upon the bearing-rod i, which is common to the arm, and to the sliding-block j', which carries the lifting-rod l, and has reciprocation in ways c^2, provided in the upper extremity of the cylinder or sleeve c. At a short distance below the ways c^2 the sleeve c is provided with a laterally extending vertically perforated bearing c^3,—coincident with the bearing b' upon the base or bearing b, to receive the upper extremity of the journal f', of the tail-vane f. The vane f embraces an upper bearing-arm f^2, and a lower bearing-arm f^3, between which, in their outer portion, is extended a vertical web f^4, from the outer extremity of which diverging wings f^5, f^6, extend at an angle, as shown. At the base of the journal f', at the left, is provided an elastic buffer f^7, which operates to relieve the shock of contact with the sleeve or cylinder c, and to produce recoil therefrom; while at the right, the arm f^3, is extended inward, is curved partially around the rod-sleeve, and is provided with a terminal perforation f^9. See Figs. 3 and 4.

Near its lower extremity the base b, is at its right provided with an outwardly and upwardly extending standard h, which has horizontally extending arms h' and h^2, the latter of which receives and serves as a pivot for a weight carrying-rod h^3; and the former of which has a perforation h^5, to receive a horizontally adjustable rod h^4, and a second perforation h^7, which is tapped to receive a set-

screw h^6 by which the rod h^4 is secured in position when adjusted. An arm h^8, which extends downwardly from the pivot-point of the rod h^3, is connected by a link h^9 or other loose connection to the perforation f^9, in the extension f^8, of the arm f^3; and the adjustable rod h^4, is connected by a rod h^{11} with the sliding weight h^{12}.

It will be understood that the wind-wheel proper A′, may, for the purposes of this invention, be of any approved construction.

It will be apparent that under the described construction and arrangement of the gear-wheels and their connections, a nearly direct application of the power applied to the wind-wheel is made available in the practical operation of the engine. When the lifting-rod is at the extremity of its down-stroke, the continued movement of the wind-wheel operates immediately to increase the leverage exerted by such wheel through its primary gear-wheel g, the short-side of that wheel being brought into contact with the long side of the crank-wheel g', until, as the lifting-rod reaches its greatest elevation, the relation of the ellipses is reversed, and the short side of the secondary gear-wheel becomes engaged with the longer portion of the primary wheel g,—these alternations facilitating the work to be peformed by exerting greatest force to produce a slow movement of the lifting-rod upon its upward movement, and permitting a quick depression, or return movement of the rod without affecting the regularity of the movement of the wind-wheel itself.

The attachment of the bearings of the vane, in immediate proximity to the rod and its sleeve insures the utmost facility of movement of the vane; and the provision of the divergent wings, projecting from the body or web, at an angle thereto, additionally increases the sensitiveness of the vane, and insures its movement under the operation of currents which would be ineffective to move the vane if unprovided with the wings; while under the operation of the slidable weight,—adjustable upon its rod by the means described,—regularity and steadiness in the movement of the engine are made certain.

The invention having been thus described, what is claimed is—

1. In a wind-engine, a wind-wheel; a primary elliptical gear-wheel, eccentrically attached upon the shaft or journal of the wind-wheel, and revoluble therewith; and a secondary elliptical gear-wheel, engaging the primary gear-wheel, eccentrically pivoted, revoluble in bearings parallel with the shaft of the wind-wheel, and carrying an eccentrically pivoted arm, which is by its opposite extremity connected with the lifting-rod of the engine, in combination, substantially as set forth.

2. In a wind-engine, a vertical wind-wheel, an elliptical gear-wheel which by one extremity is fixed upon the shaft of the wind-wheel; a secondary elliptical gear-wheel which is fixed upon a shaft or journal which is mounted in bearings alongside the shaft of the wind-wheel; and a crank-arm or lever which is eccentrically pivoted upon the outer face of the secondary gear-wheel;—and is operatively connected with the lifting rod of the engine.

3. In a wind-engine, the base or bearing b, having the arm b^3, which is provided with bearings b^4 and b^5; the vertically-arranged wind-wheel d, having shaft d', journaled in the bearing b^4; and the primary elliptical gear-wheel g, eccentrically fixed upon the inner extremity of the shaft d' of the wind-wheel, and revoluble therewith; combined with the secondary elliptical gear-wheel g', which is eccentrically journaled in the bearing b^5 of the arm b^3, and which is provided with an operating-arm e, which by its lower extremity is eccentrically-pivoted to the inner face of such secondary elliptical wheel, and which by its upper extremity is operatively connected with the lifting-rod l of the engine.

4. In a wind-engine, a base b, which is provided with an arm b^3, which has journal bearings b^4 and b^5, and has the wind wheel and power wheels with their shafts mounted in the bearings, and has a support b', for the tail-vane; and an arm h, which has perforated bearings h' and h^2, receiving the inner portions of a weight-carrying rod h^3, and of an adjusting-rod h^4—h^{11}; substantially as specified.

5. In a wind-engine, a base b which is provided with a vertically-perforated bearing b'; and a cylinder or sleeve c which encircles the lifting-rod of the engine and which is provided with a vertically-perforated bearing c^3; in combination with a tail-vane which is pivoted at its foot in the bearing b' of the base, and at its top in the bearing c^3 of the encircling sleeve c, and which has an upper and a lower arm, an intermediate web, and terminal divergent wings f^5 and f^6, at the rear extremity of the web.

6. In a wind-engine, a tail-vane the vertical journal of which is mounted in bearings upon the base b, and upon the sleeve or cylinder c of the lifting rod l and an arm f^3 of which is provided with an extension f^9 which partially encircles such rod-sleeve, combined with a pivoted weight-carrying rod h^3 which is pivoted upon a fixed supporting-arm, h which is connected to the extension f^9 upon the arm of the vane, and which has means substantially as set forth for adjusting in or out, the weight upon the pivoted rod.

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O. N. CLEMENS.