(No Model.)

D. H. BAUSMAN.

WIND ENGINE.

No. 313,646. Patented Mar. 10, 1885.

Fig. 1.

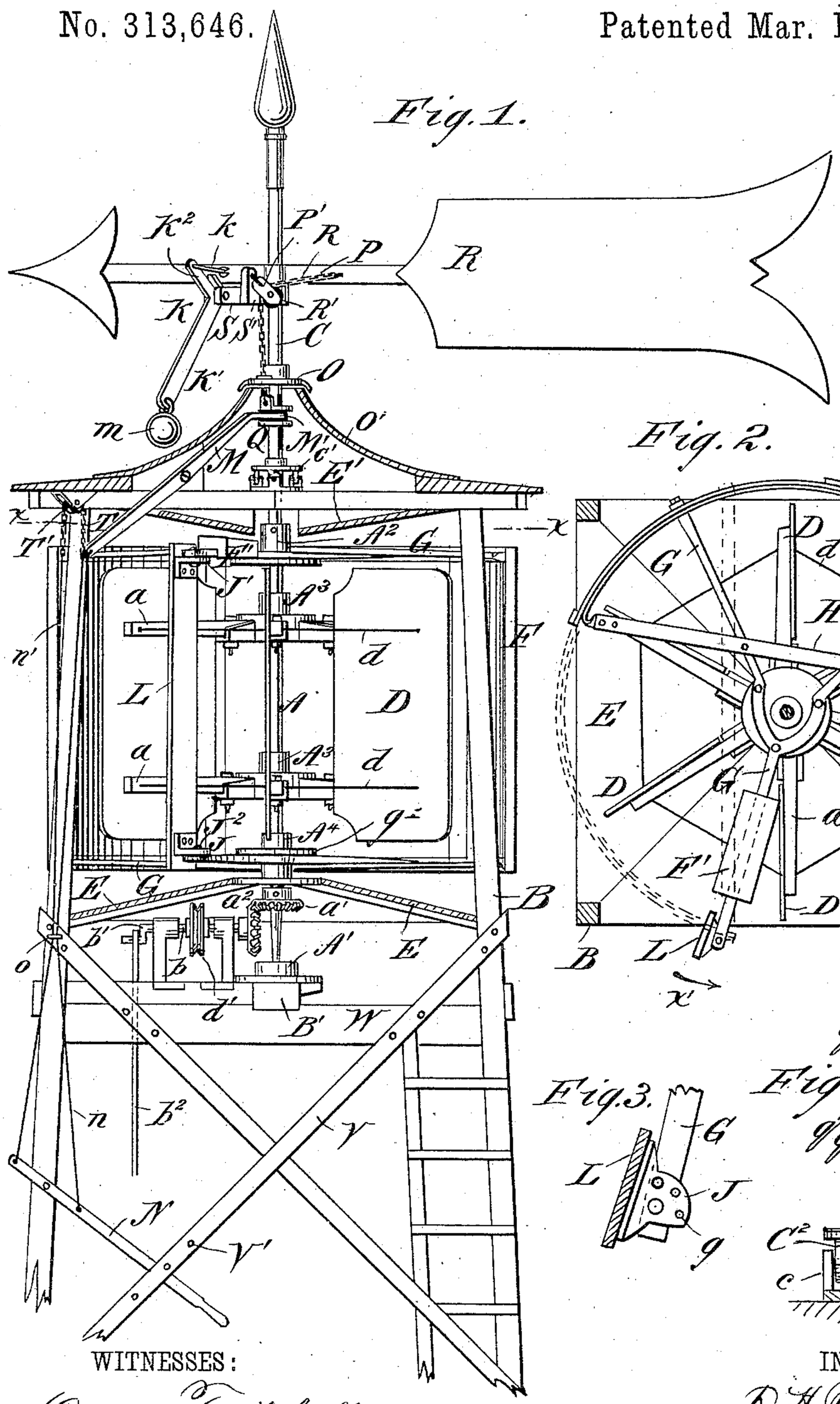
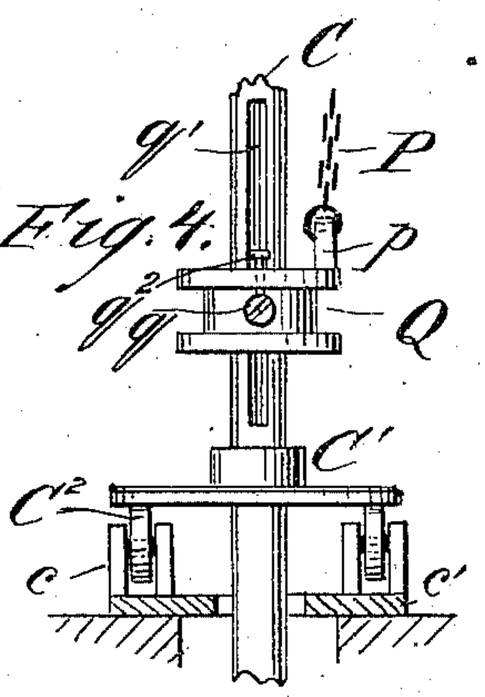


Fig. 2.

Fig. 3.

Fig. 4.



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DAVID H. BAUSMAN, OF LANCASTER, PENNSYLVANIA.

WIND-ENGINE.

SPECIFICATION forming part of Letters Patent No. 313,646, dated March 10, 1885.

Application filed June 11, 1884. (No model.)

To all whom it may concern:

Be it known that I, DAVID H. BAUSMAN, of Lancaster, in the county of Lancaster and State of Pennsylvania, have invented a new and Improved Wind-Engine, of which the following is a full, clear, and exact description.

The object of my invention is to provide a new and improved wind-engine or wind-motor which is simple in construction, regulates itself automatically, and adjusts itself according to the direction from which the wind blows.

The invention consists in certain new and useful improvements in the wind-engine for which Letters Patent No. 299,325 were issued to me on the 27th day of May, 1884, all as hereinafter fully described, and pointed out in the claims.

Reference is to be had to the accompanying drawings, forming part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 is a side view of my improved wind-engine, parts being broken out and others shown in section. Fig. 2 is a sectional plan view of the same on the line *x x*, Fig. 1. Fig. 3 is an enlarged plan view of the device for adjusting the regulating-wing. Fig. 4 is an enlarged detail view of the lower end of the vane-shaft.

The lower end of a vertical shaft, A, is journaled in a step, A′, supported by a cross-piece, B′, of an upright frame or tower, B. The upper end of the shaft A is journaled in a hub, A^2, mounted rigidly on the lower end of a vertical shaft, C, projecting from the roof of the tower or frame B, and provided with a horizontal disk, C′, which runs on rollers C^2, journaled in jaws *c*, projecting upward from a plate, *c′*, which is fastened on the top cross-beams of the tower.

On the shaft A hubs A^3 are mounted, and from the said hubs a series of radial arms, *a*, project, to which vertical wings D are fastened, which arms and wings are braced by cables *d*, uniting the arms *a* and the wings D near their upper and lower ends, *s*, whereby a very stiff and rigid wheel is formed which revolves with its vertical shaft A.

Some distance below the lower hub, A^3, a bevel cog-wheel, *a′*, is rigidly mounted on the shaft A, and engages with a beveled cog-wheel, a^2, mounted on a horizontal shaft, *b*, journaled in suitable standards on the frame B, and provided at the opposite end with a crank, *b′*, with which a connecting-rod, b^2, for transmitting the motion, is connected.

On the shaft *b* is also mounted a belt-pulley, *d′*, for transmitting the motion or power by means of a belt, cable, or rope.

Directly above the cog-wheel *a′* a floor, E, is formed between the standards of the tower B, which floor is inclined upward from the outside of the tower toward the middle, thus forming a deflector which throws the wind striking the said floor up against the wings D of the wind-wheel. A deflecting-roof, E′, inclined downward from the edges of the tower toward the middle of the same, is arranged above the wheel, which roof deflects the wind that strikes it down upon the wings of the wheel.

On the highest point of the floor E a hollow hub, A^4, is mounted, and on a disk, *g′*, revolving around the hub A^4, and on the hub A^2, three radial arms, G, are secured, which are made in one piece having the shape of the letter Y, as shown in Fig. 2.

A transverse beam, H, is secured across two corresponding arms, G G, above and below the wheel, and to the ends of the arms G to which the beam or bar H is secured, and to the ends of the cross-bar H, a segmental or semicircular rim-piece, H′, is secured, and to the top and bottom rim-pieces sheet metal or thin strips of wood are secured, thereby forming a segmental or semicircular shield, F, which is held on the Y-shaped pieces formed by the united arms G G.

On one of the upper arms G projecting from the shield a weight, F′, is secured for the purpose of counterbalancing the shield, and on the free end of the said arm which carries the weight F′ and the corresponding arm G below it, lugs J and J′ are pivoted, which project from clips or plates secured to an upright wing, L, which is thus adapted to turn on the ends of the arms G G, and is opposite the middle of the opening of the shield F. The bottom lug, J, is provided with a series of apertures, *g*, arranged on a circular line around the pivot, through one of which apertures a pin, J^2, can be passed, which is also passed through an aperture in the bottom arm

G, thus permitting of adjusting and locking the wing L at any desired inclination in the horizontal plane to the arms G.

The vane R is mounted loosely on the shaft C, and rests on a hub, R′, rigidly mounted on the shaft C, which hub is provided with two arms, S and S′, at right angles to each other.

On the arm S′ a pulley-block, P′, is held, over which a chain, P, passes, which is secured to the vane at one side of the shaft, the other end of the chain P being secured to an upwardly-projecting lug, *p*, of an annularly-grooved collar, Q, held to slide vertically on the shaft C, and provided with a pin, *q*, held in place by a pin, q^2, and projecting into a vertical groove, *q′*, in the shaft C, to cause the collar Q to turn with the said shaft. The chain P passes through an aperture in a bushing or circular plate, O, arranged on the top and middle of the roof O′ of the tower.

In the end of the arm S an elbow-lever, K, is held, which has a long shank, K′, and a short shank, K^2, which short shank K^2 is connected by a link, *k*, with the vane R on that side of the shaft C opposite the one at which the chain P is connected with the vane. A weight, *m*, is suspended from the free end of the long shank or arm K′ of the lever K.

A lever, M, pivoted in the top of the frame or tower, has a forked end, M′, the prongs of which fork pass into the groove in the collar Q, and the opposite or outer end of the lever M is connected by a wire cable or rope, *n*, with a lever, N, pivoted on one of the standards of the frame or tower B.

A chain, T, secured to the free end of the lever M, passes over a pulley, T′, above the said free end of the lever, and has its opposite end secured to a wire rope or cable, *n′*, the lower end of which is secured to the lever N on the side of the pivot of the lever opposite the one at which the wire *n* is secured. The wires *n* and *n′* pass through a staple, loop, or eye, *o*, on one of the standards.

The braces V of the tower are secured to the horizontal beams W, short distances from the ends of the same, and the upper ends of the braces V are secured to the standards or end posts of the tower short distances above the horizontal beams W, whereby the structure is stiffened and made more durable. On one of the braces V, a series of pins or studs, V′, is arranged for locking the lever N in the desired place.

The operation is as follows: The wind, striking the wings D, revolves the wind-wheel entirely independent of the shield F; but as the wind strikes the wings of the wind-wheel it also strikes the vane and swings the same until the point of the vane extends in the direction from which the wind blows. As the vane is connected by the chain P and the link *k* and the arms S S′ with the rigid hub R′ on the shaft C, the shaft C will move with the vane, and as the shield F is held rigidly on the shaft C the said shield will turn with the shaft, and the plane uniting the end edges of the shield will be parallel with the vane, and as the vane points in the direction from which the wind blows the plane uniting the end edges of the shield will be in the same direction, and thus the shield covers one-half of the wind-wheel, thus permitting the wind to act only on the exposed half of the wheel. When the wind shifts, the position of the vane is changed, and at the same time the position of the shield is changed.

If the wheel is to be thrown out of gear, the shield must be shifted in such a manner as to prevent the wind from acting on the wings of the wheel. This is accomplished by raising the free end of the lever N, and thereby pulling the wire *n′* downward, the outer end of the lever M upward, and the inner end of the lever M downward, and the forked end of the lever M pulls the collar Q downward, thus causing the chain P to pull the vane against the arm S′. By this movement of the vane the link *k* is pulled in the direction from the free end of the arm S, the upper short arm, K^2, of the elbow-lever K is swung toward the vane, and thereby the long arm K′ and its weight *m* are swung upward and the vane will no longer be parallel with the plane uniting the side edges of the shield, but will be at an inclination to the said plane. The vane projects in the direction from which the wind blows, and as a point at or near the middle of the top edge of the shield is now below the point of the vane the shield F will be presented to the wind and thus prevent the wind from acting on the wings of the wind-wheel.

If the wheel is to be started, the lever N is depressed, thereby moving the wire *n′* upward and causing the wire *n* to pull the outer end of the lever M down, thereby raising the inner end of the same and permitting the weight *m* to swing the vane from the arm S′ and toward the arm S, thus bringing the parts back to their normal positions.

The regulator-wing L is provided to prevent the wheel from revolving too rapidly under the action of a sudden gust of wind. If the wind strikes the wing L it moves the same suddenly in the direction of the arrow *x′*, thereby the shield F is moved in the direction of the arrow *x′* and caused to face the wind more or less, so that a smaller part of the wheel is exposed. The wind prevents the vane from changing its position; but the shaft C and the arms S S′ are turned by the action of the sudden gust of wind on the wing L, and thereby the arm S will be moved from the vane, whereby the weight *m* will be raised, and will remain raised as long as the increased pressure of the wind exists. When the pressure of the wind is normal again, the weight *m* drops and swings the vane back to the normal position.

The regulator-wing L can easily be adjusted so as to present a greater or less surface to the wind—that is, its inclination to the arms G holding it can be increased or decreased. If the plane of the wing L is parallel to the arms

G, the wing presents a greater surface to the action of the wind and the wind will turn the shield a greater distance than if the plane of the wing L is at an inclination to the arms G, so that the wing L will present less surface to the action of the wind.

The wing L is locked in the desired position by means of the pin J^2, which is passed through the apertures *g* in the bottom lug, J, of the wing.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a wind-engine, the combination, with a hub, of three arms, G, arranged in the shape of a letter Y on the said hub, a cross-piece secured on two of the arms, and a segmental rim secured on the ends of the cross-piece and on the ends of the arms crossed by the cross-piece, and of a shield secured to top and bottom rims, substantially as herein shown and described.

2. In a wind-engine, the combination, with a segmental shield, of arms projecting from the open side of the shield at the top and bottom, and a wing, L, pivoted to the said arms, which wing L is provided at the bottom with a lug, J, having a series of apertures, *g*, arranged in a circular line, and of a pin or bolt adapted to be passed through one of the apertures *g*, and through an aperture in the corresponding arm, for the purpose of locking the wing in the desired position and at the desired inclination to the arms, substantially as herein shown and described.

3. In a wind-engine, the combination, with a tower or other suitable structure, of a vertical shaft, a vane mounted on the shaft, a shield connected with the said shaft and partly surrounding a horizontal wind-wheel on an independent shaft, two arms rigidly mounted on the vane-shaft and projecting from the same, a lever pivoted in one arm and carrying a weight at one end and having the other end connected with the vane, a chain connected with the vane and passing over a pulley on the end of the other arm, and means for moving the chain up and down, substantially as herein shown and described.

4. In a wind-engine, the combination, with the shaft C and the shield F connected with the same, of a horizontal wind-wheel, partly surrounded by the shield, the vane R, mounted loosely on the shaft C, the arms S S′, mounted rigidly on the shaft, the elbow-lever K, having one end connected by a link, *k*, with the vane R, and having a weight, *m*, on the opposite end, the pulley P′ on the end of the arm S′, the chain P, connected with the vane and passed over the pulley P′, the sliding collar Q on the shaft C, and means for moving the sliding collar up and down, with which sliding collar the chain P is connected, substantially as herein shown and described.

5. In a wind-engine, the combination, with the shaft C and the shield F connected with the same, of a horizontal wind-wheel partly surrounded by the shield, the vane R, mounted loosely on the shaft C, the arms S S′, mounted rigidly on the shaft, the elbow-lever K, having one end connected by a link, *k*, with the vane R, and having a weight, *m*, on the opposite end, the pulley P′ on the end of the arm S′, the chain P, connected with the vane and passed over the pulley P′, the sliding collar Q on the shaft C, to which sliding collar the chain P is connected, and the pivoted lever M, having a fork the prongs of which are in the groove of the collar Q, substantially as herein shown and described.

6. In a wind-engine, the combination, with the shaft C and the shield F connected with the same, of a horizontal wind-wheel partly surrounded by the shield, the vane R, mounted loosely on the shaft C, the arms S S′, mounted rigidly on the shaft, the elbow-lever K, having one end connected by a link, *k*, with the vane R, and having a weight, *m*, on the opposite end, the pulley P′ on the end of the arm S′, the chain P, connected with the vane and passed over the pulley P′, the sliding collar Q on the shaft C, to which sliding collar the chain P is connected, the pivoted lever M, having a fork the prongs of which are in the groove of the collar Q, the wires or ropes *n n′*, the chain T, and the pulley T′, substantially as herein shown and described.

7. In a wind-engine, the combination, with the shaft C and the shield F connected with the same, of a horizontal wind-wheel partly surrounded by the shield, the vane R, mounted loosely on the shaft C, the arms S S′, mounted rigidly on the shaft, the elbow-lever K, having one end connected by a link with the vane R, and having a weight, *m*, on the opposite end, the pulley P′ on the end of the arm S′, the chain P, connected with the vane and passed over the pulley P′, the sliding collar Q on the shaft C, to which sliding collar the chain P is connected, the pivoted lever M, having a fork the prongs of which are in the groove of the collar Q, the wires or ropes *n n′*, the chain T, the pulley T′, and the lever N, to which the chains *n n′* are secured on opposite sides of the pivot, substantially as herein shown and described.

8. In a wind-engine, the combination, with a tower or other structure, the shaft C and the shield F secured on the same, of a horizontal wind-wheel partly surrounded by the shield F, the vane R, loosely mounted on the shaft C, the arms S S′, the elbow-lever K, pivoted on the arm S, the link *k*, the weight *m*, the pulley P′ on the end of the arm S′, the chain P, secured to the vane R and passed over the pulley P′, the sliding annularly-grooved collar Q on the shaft C, the pin or stud *q*, passing from the collar Q into a vertical groove, *q′*, in the shaft C, the lever M, engaged with the collar Q, and means for moving the outer end of the lever M up or down, substantially as herein shown and described.

9. In a wind-engine, the combination, with a tower or other suitable structure, of a ver-

tical shaft projecting from the top of the same, a vane loosely mounted on the shaft and connected with a lever pivoted in an arm rigidly mounted on the shaft, which lever carries a weight, a segmental shield held on the vane-shaft, and of a wing held on arms of the shield opposite the opening of the said shield, substantially as herein shown and described.

10. In a wind-engine, the combination, with a tower or other suitable structure, of a vertical shaft projecting from the top of the same, a vane loosely mounted on the shaft and connected with a lever pivoted in an arm rigidly mounted on the shaft, which lever carries a weight, a segmental shield held on the vane-shaft, a wing held on the arms of the shield opposite the opening of the said shield, and of means for adjusting the inclination of the plane of the wing to the arms on which the wing is pivoted, substantially as herein shown and described.

DAVID H. BAUSMAN.

Witnesses:
M. S. CHAMBERLIN,
WESLEY H. JUDKINS.