

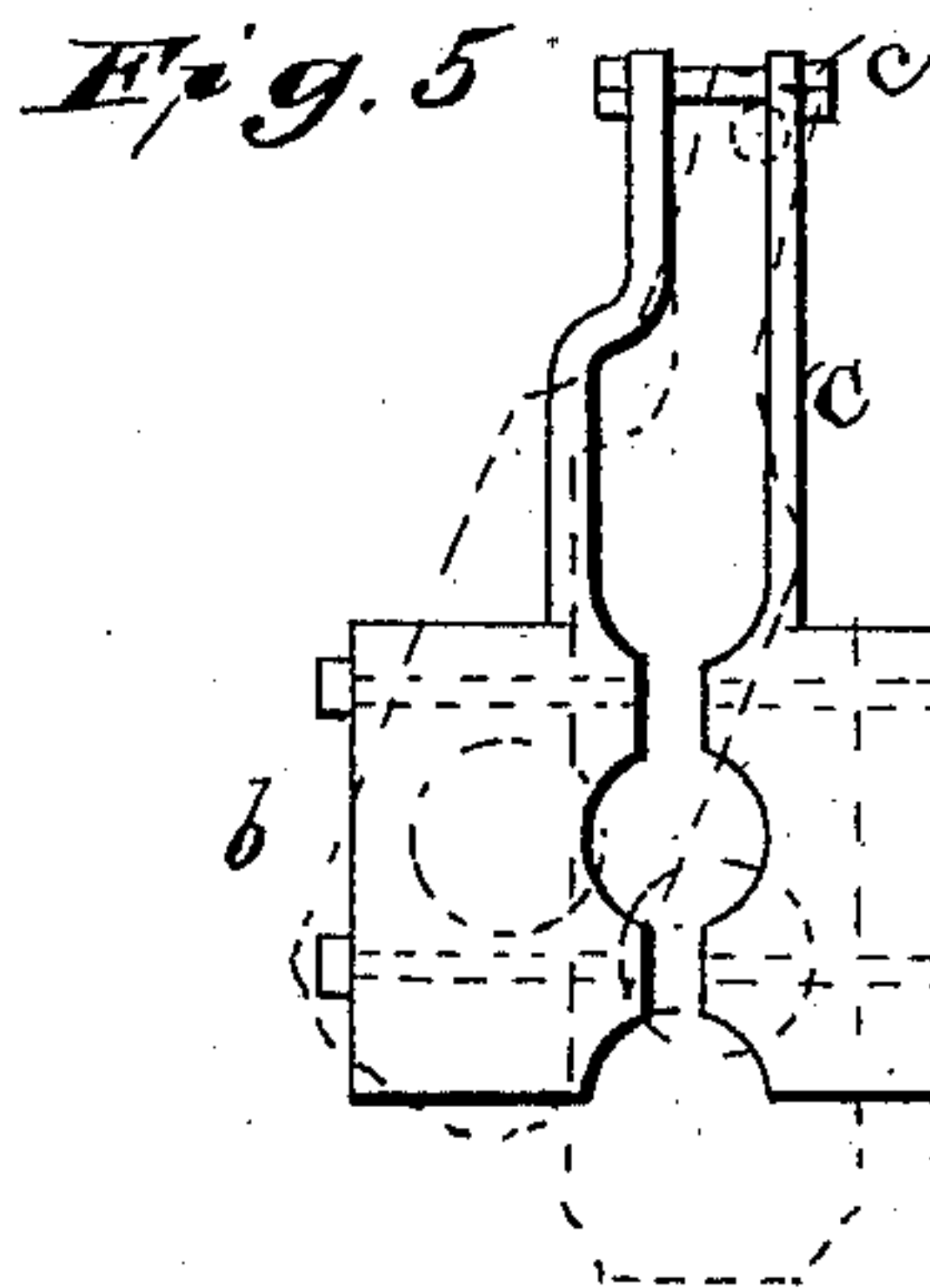
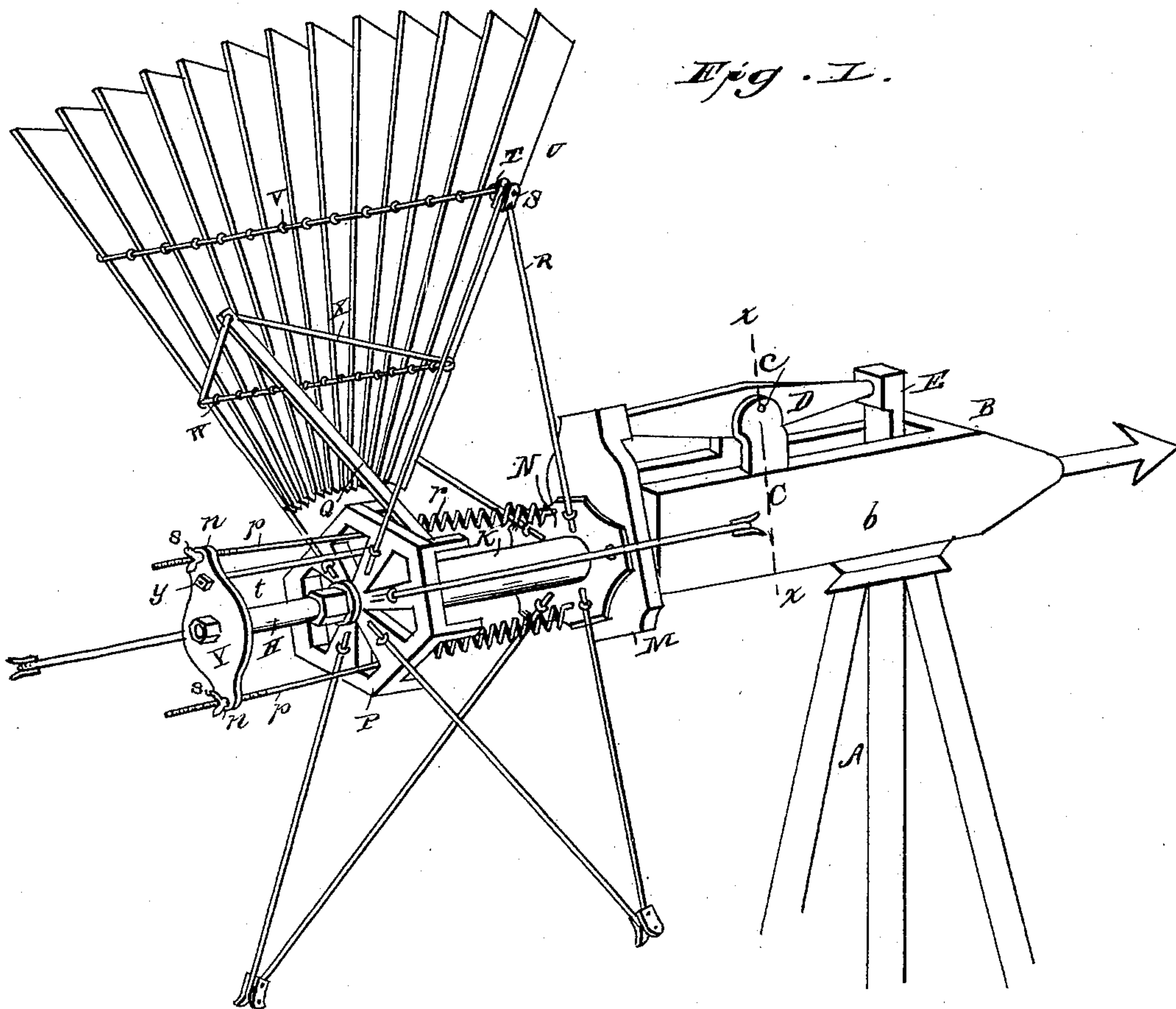
(No Model.)

2 Sheets—Sheet 1.

P. BERGMAN.  
VANELESS WIND ENGINE.

No. 463,025.

Patented Nov. 10, 1891.



Witnesses

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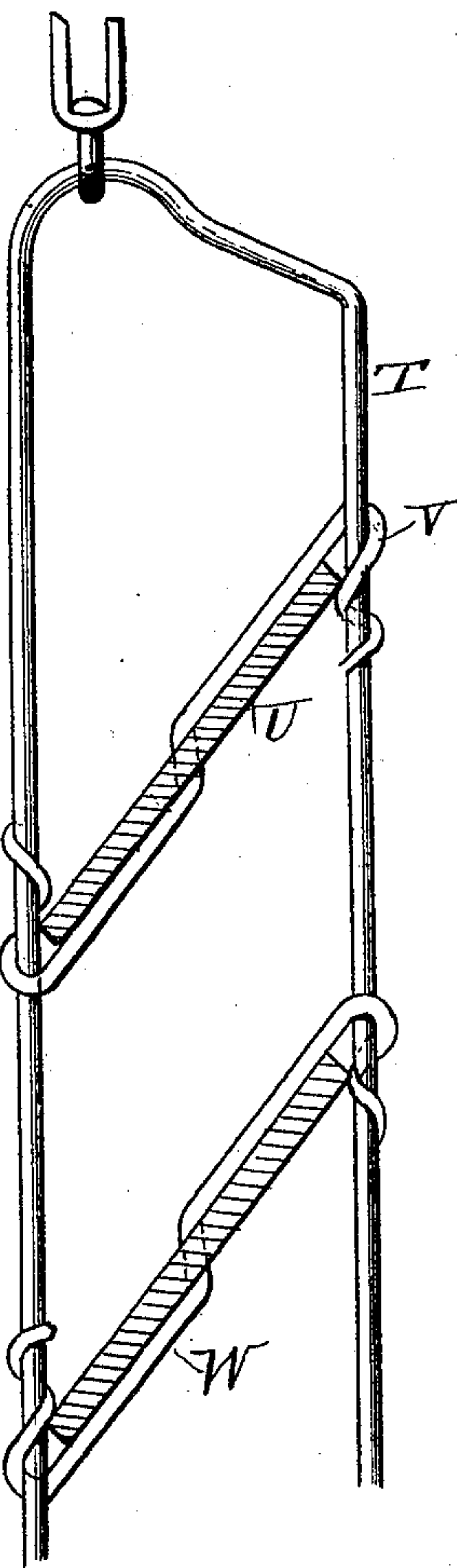
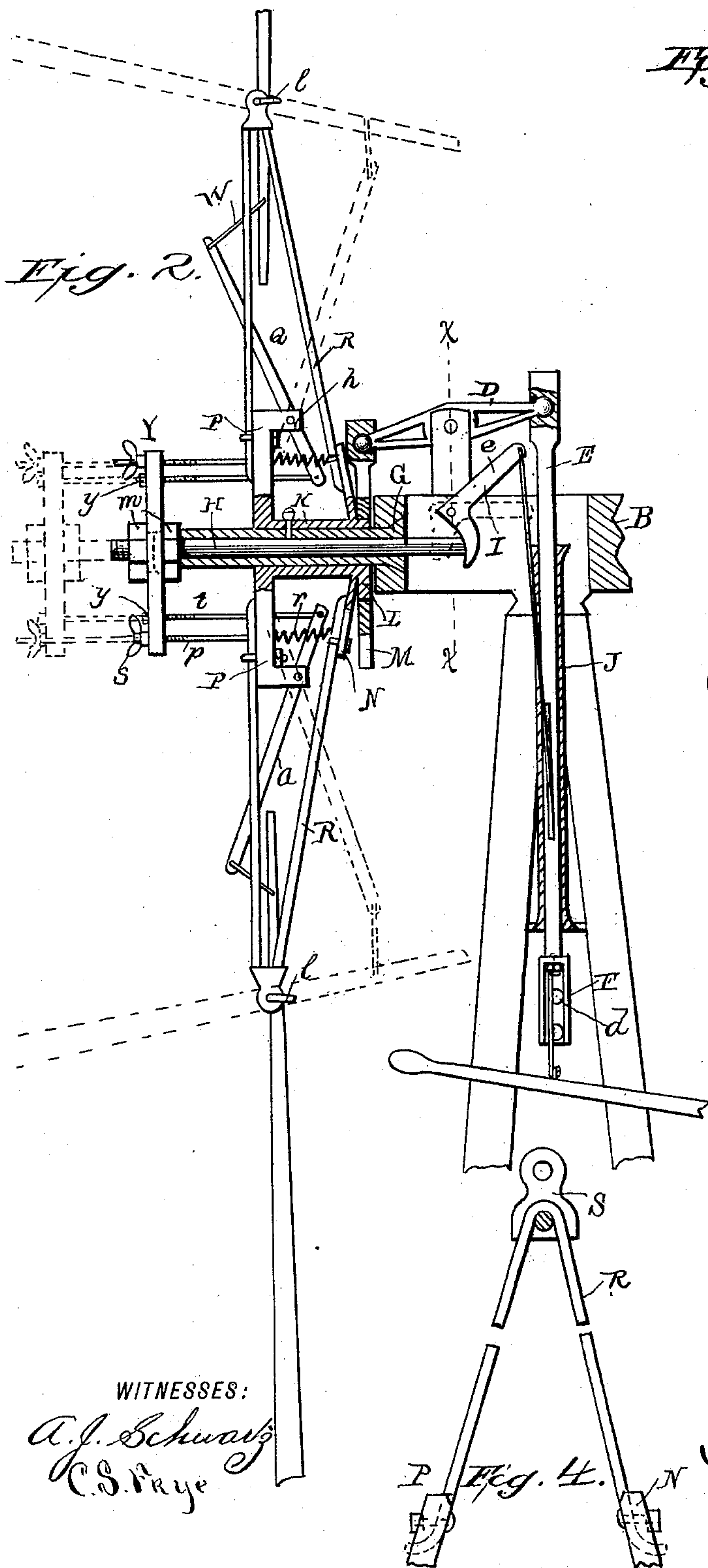
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BY *W. T. Fitzgerald & Co.*  
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# UNITED STATES PATENT OFFICE.

PETER BERGMAN, OF STROMSBURG, NEBRASKA.

## VANELESS WIND-ENGINE.

SPECIFICATION forming part of Letters Patent No. 463,025, dated November 10, 1891.

Application filed May 13, 1891. Serial No. 392,593. (No model.)

*To all whom it may concern:*

Be it known that I, PETER BERGMAN, a citizen of the United States, residing at Stromsburg, in the county of Polk and State of Nebraska, have invented certain new and useful Improvements in Vaneless Wind-Engines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention has relation to improvements in vaneless wind-engines; and it has for its primary object to provide an engine of the character stated embodying a compact and durable construction, in which the wings constituting the wheel are adapted to be thrown out of operation by the force of the wind when blowing a gale, as well as by an attendant, when desired, through the medium of intermediate devices.

A further object is to provide a construction in which the wings are governed by regulative devices, whereby the rotation of the wheel is automatically rendered uniform regardless of the force of the wind.

A still further object of the invention is to simplify the construction of the devices intermediate of the wheel and plunger-rod and to increase the efficacy thereof by providing a piston or eccentric-strap adapted in its downward movement to afford a straight vertical pull, whereby greater power is attained; and a final object is to afford connections of greater strength and durability between the spokes of the wheel and the hub thereof and between the blades of the wings and the spokes, whereby the wheel is rendered much stronger and more efficient.

To the attainment of the foregoing and other objects the invention consists in the construction, certain novel combinations, and the adaptation of parts hereinafter described and claimed.

In the accompanying drawings, Figure 1 is a perspective view of my improved wind-engine in an operative position. Fig. 2 is a vertical diametrical sectional view of the same with the adjustable parts shown in their adjusted positions by dotted lines. Fig. 3 is a detail view disclosing the method of connect-

ing the blades to the supporting-loops. Fig. 4 is a detail view illustrating the connection between the ends of the spokes and the hub-section, and Fig. 5 is a vertical cross-section taken on the line *xx* in Fig. 2.

In the said drawings similar letters indicate corresponding parts throughout the several views, referring to which—

A indicates the tower of a wind-engine, which may be of any approved construction suitable to the purposes of my invention. Pivotaly mounted upon the upper end of the tower is the pivot-base B of my improved engine, which base is preferably composed of two castings *b*, which are formed so as to afford play-space between them for certain parts and are connected together by several transverse bolts; but I do not desire to be confined to this construction, as the said base might be cast or otherwise formed in a single piece. Preferably formed integral with and rising from the base-sections *b* are two standards C, which are provided adjacent to their upper ends with adjustable aligned apertures to receive a fulcrum-bolt *c*, on which is journaled a walking-beam D, which has one end pivotaly connected to a plunger-rod E and the opposite end to a piston or eccentric-strap, presently to be described.

The plunger-rod E, which takes through and is guided in a vertical tubular section J, fixed in the tower, has attached to its lower end in a swiveled manner a socket F, which is provided at intervals with perforations *d*, whereby a pump-rod or the like may be adjustably connected to the plunger.

Rigidly fixed between the sections of the base B and extending forwardly therefrom is a horizontal sleeve G, which is of a length and diameter to receive and guide within it a horizontal reciprocating rod H, which is designed through the medium of intermediate devices to throw the wings of the wheel out of operation, as will be hereinafter set forth.

Pivotaly mounted between the castings or sections of the pivot-base B at a suitable point is an angular lever I, the forward depending branch of which is designed to engage the inner end of the rod H, while its other branch extends rearwardly and has connected to it a rope or bar which extends to within con-



venient reach of the ground. The said rope, when such is employed, takes through a vertical slot in the sleeve or tubular section J.

Mounted and secured in a suitable manner upon the sleeve G, before described, is the hub K of the wind-wheel, which is provided with closed oil-cups, as shown. Fixed upon the inner end of this hub K and rotating therewith is a cam L, which is about the proportional size illustrated and is adapted to operate a strap M, which is mounted thereon and has its upper end pivotally or loosely connected to the end of the walking-beam, before described. By this construction it will be seen that at each revolution of the wheel-hub the strap M will exert a straight downward pull upon the walking-beam, whereby greater power is attained, as is obvious.

Fixed upon or cast integral with the hub K immediately in advance of the eccentric cam L is a concavo-convex disk N, to which one end of the several looped or bent spokes is attached, and fixed upon or cast integral with the said hub at its outer end is an open-work vertical casting P, which is larger in diameter than the disk N, and is provided on its inner side at intervals adjacent to its edge with lateral forked arms *h*, to which are pivotally connected the wing-operating levers Q, presently to be described.

The bent or looped spokes R, which are formed of metal bars and are of the approximate form shown, have their respective ends, which are curved, as better shown in Fig. 4, attached to the disks N and P by means of transverse eyebolts, and the curved ends of the said bars take through the respective disks or castings, thus rendering the attachment durably strong. As is obvious, there are two spokes or spoke-sections to each wing constituting the wheel, and to the outer looped end of the said spokes, which are arranged relatively in the manner shown in Fig. 1, there are attached by a bolt two plates S, the outer ends of which are flared outwardly and are provided with apertures for the pivotal connection of a link *l*, which has an eye at its opposite end to receive the end of a wire loop T, which is better illustrated in Fig. 3 of the drawings, and is designed for the attachment of the several blades of the wing, to which it is connected about midway of their length, and serves to support them in a pivotal manner.

The connection between the supporting-loop T and the blades U, which are pitched at an angle to said loop, is effected by the wire binders V, which are twisted twice around the parallel bars of the loop and take transversely through the body of the blade, as shown, and as their twisted portions may be soldered or otherwise positively fixed upon the bars of the loop they form a cheap and simple flexible connecting medium of exceptional strength. By the pivotal connection between the blade-supporting loop T and the ends of the spoke-sections it will be readily

perceived that the wings are pivotally mounted upon the spokes, which is necessary to the attainment of one of the objects of my improvements.

W indicates another loop similar in form to the loop T, which is connected to the several blades of a wing adjacent to their inner ends in the manner shown in Fig. 3 and before described. Pivotaly connected to the ends of the loop W is an angular bent bar X, which takes through an eye in the end of the lever Q, of which there is one employed to each wing. These bars Q are pivotally mounted at a slight distance from their inner ends in the forked branches *h* of the casting P, and pivotally attached to their inner ends is a retracting horizontal rod, presently to be set forth.

The outer end of the reciprocating rod H is threaded, as illustrated, to receive two burrs or nuts *m*, upon and between which rotates a disk Y, and to afford a better bearing for the said disk I prefer to form annular collars upon the abutting faces of the burrs, upon which collars the disk is desired to rotate. The said disk Y is preferably provided at diametrically-opposite points with ears *n*, in which are formed apertures to receive the threaded ends of horizontal rods *p*, to the inner ends of which are connected coiled retracting-springs *r*, the opposite ends of which are attached to the face of the disk N. The threaded ends of these rods *p* are rendered adjustable by means of wing-nuts *s*, whereby they may be tightened or relaxed, as desirable. Passing through apertures in the disk Y adjacent to the ears thereof are retracting-rods *t*, the inner ends of which are pivotally connected to the inner ends of the levers Q. The outer ends of the rods *t* are threaded and are adjustably connected to the disk Y by nuts *y* for a purpose presently set forth.

As illustrated in Fig. 1, I design placing a horizontal arrow upon the rear end of the casting B to indicate the direction in which the wind is blowing.

By the construction described it will be seen that regardless of the force of the wind the speed of the wheel will be uniform at all times, for it will be seen that when the wind increases above the normal it will overcome the retracting, wing-regulating springs *r* and will pitch the wings forward, and thus decrease the impact of the wind thereon. Should the wind increase to a gale, the wings will be blown into the position illustrated by dotted lines in Fig. 2, whereby the wheel is thrown out of operation until the force of the wind decreases, when the retracting-springs *r*, through the medium of the rod H, disk Y, rods *t*, and levers Q, will cause the wings to resume their normal position, when the revolution of the wheel will be resumed.

Should the attendant of the mill desire to throw the wings of the wheel out of operation, it is simply necessary to pull upon the cord or rod attached to the angular lever I, which



pushes the rod H outwardly and with it the disk Y and the rods t, which latter rods shift the position of the levers Q, which throw the wings into the position shown.

5 Although I have specifically described the construction of the parts of my invention, yet it is desirable that in practice such modifications may be made as fairly fall within the scope of my invention.

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

1. The combination, with the spokes or spoke-sections of a wind-wheel, of a wing comprising several blades connected by binding-wires to a wire loop and the said wire loop pivotally connected to the ends of the spokes, whereby the wing is pivotally mounted, substantially as and for the purpose described.

20 2. In a wind-engine, the combination, with the blade of a wing and a wire loop adapted to support said blade, of a binding-wire taking transversely through the blade and having its ends connected in a twisted manner to the said wire loop, substantially as described.

25 3. In a wind-engine, the combination, with the spoke-sections of the wind-wheel and the castings fixed upon the outer end thereof, of a blade-supporting loop and the links having an eye at one end to receive said loop and having their opposite ends pivotally mounted in the castings upon the end of the spoke-section, substantially as specified.

30 4. In a wind-engine, substantially as specified, the combination, with the spokes or spoke-sections of a wind-wheel and the wings pivotally mounted thereon, of levers pivotally connected to the said wings intermediate of their

pivotal point and inner end and pivotally mounted near their inner end in the forked branches of the outer hub-disk, a reciprocating rod taking through the journal on which the hub is mounted and carrying a loosely-mounted disk at its outer ends, rods connecting the said disk and the inner ends of the wing-operating levers, and a suitable means for pushing the reciprocating rod outward, substantially as specified.

5. In a wind-engine, substantially as specified, the combination, with the spokes of a wind-wheel and the wings pivotally mounted thereon, of levers pivotally connected to the said wings adjacent to inner ends thereof and pivotally mounted near their inner ends in the forked branches of the outer hub-disk, the hub provided with the disks or castings at its ends, the sleeve fixed in the pivot-base of the engine, adapted to support the hub of the wheel, the reciprocating or slide rod taking through the said sleeve and carrying a loosely-mounted disk at its outer end, rods connecting the said disk and the inner ends of the wing-operating levers, rods and retracting-springs connecting said disk to the inner disk of the hub-casting, and the angular lever I, mounted in the pivot-base and having one end bearing against the inner end of the slide-rod and the other end connected with the ground by a string or rod, substantially as specified.

In testimony whereof I affix my signature in presence of two witnesses.

PETER BERGMAN.

Witnesses:

J. E. PETERSON,  
H. S. MCGAVREN.