

(Model.)

2 Sheets—Sheet 1.

T. E. PECKHAM.
WINDMILL.

No. 243,721.

Patented July 5, 1881.

Fig. 1.

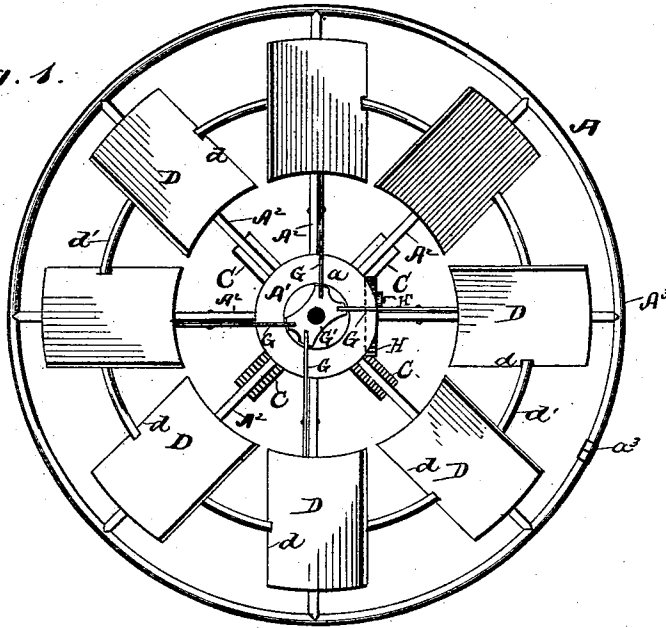
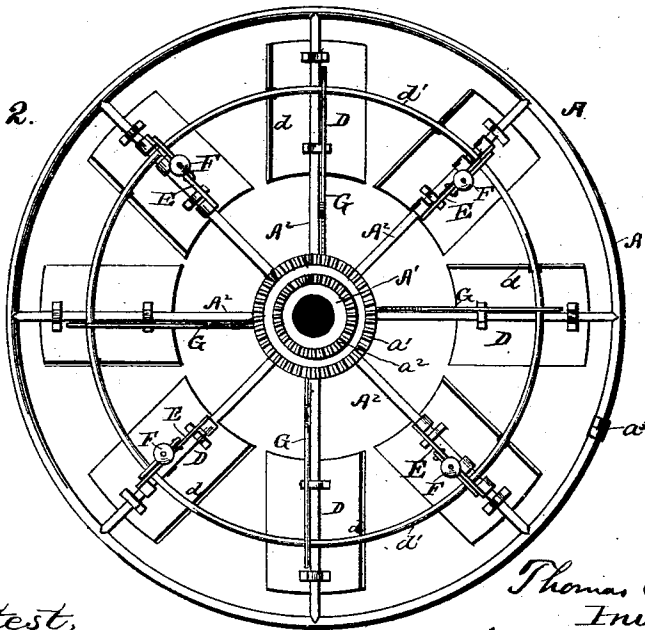


Fig. 2.



Attest,
W. N. H. Knight,
Not. P. Blunck.

Thomas E. Peckham
Inventor
by his Attys.
Edson Bros.

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2 Sheets—Sheet 2.

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Fig. 3.

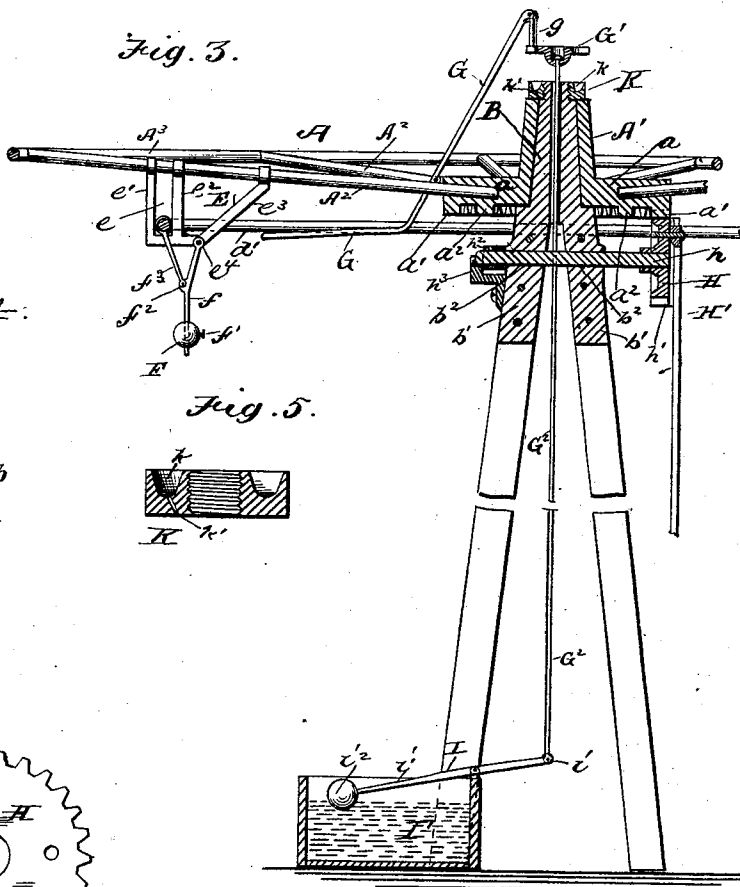


Fig. 4.

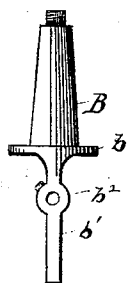


Fig. 5.

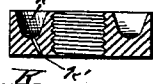


Fig. 6.

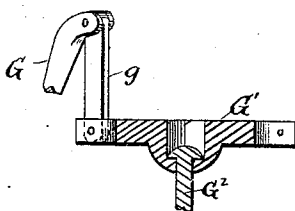
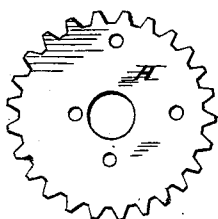
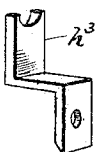


Fig. 7.

Fig. 8.



Attest,
W. H. N. Knight
Fred F. Church.

Thomas E. Peckham
Inventor,
by his Attys,
Edson Bros.

UNITED STATES PATENT OFFICE.

THOMAS E. PECKHAM, OF BUCKNER, MISSOURI.

WINDMILL.

SPECIFICATION forming part of Letters Patent No. 243,721, dated July 5, 1881.

Application filed January 29, 1881. (Model.)

To all whom it may concern:

Be it known that I, THOMAS E. PECKHAM, a citizen of the United States, residing at Buckner, in the county of Jackson and State of Missouri, have invented certain new and useful Improvements in Windmills; 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, reference being had to the accompanying drawings, and to letters or figures of reference marked thereon, which form a part of this specification.

In the drawings, Figure 1 is a top-plan view of a horizontal wind-engine provided with my improvement. Fig. 2 is a bottom-plan view of the wind-wheel detached from its axle. Fig. 3 is a vertical longitudinal section taken through the main axle and wheel; and Figs. 4, 5, 6, 7, and 8 represent detached portions of my improvement.

Similar letters of reference in the several drawings denote similar parts.

Owners and users of wind-engines have heretofore experienced much trouble and annoyance, as well as pecuniary loss, by the breakage or displacement of parts of said engines or their attached machinery, such breakage or displacement of parts being due in the majority of cases to the imperfect means employed to govern the extent of surface of the blades or fans exposed to the variable forces of the wind. Another and common cause of trouble and annoyance is the fact that wind-engines provided with very large as well as small wind-wheels sometimes, particularly in light or moderate winds, fail to exert the requisite amount of power to operate their attached machinery, such failure usually being caused by the reaction of the air upon the backs of the blades or fans, thus necessitating the expenditure of a considerable amount of power in the mere turning of the wheel. This is especially true of engines wherein the blades or fans are rigidly attached to the hub of the wheel, and many attempts have been made to overcome this defect; but in the majority of cases such attempts have only tended to complicate the parts, and thus render the wheel more easily disarranged or broken.

To remedy the above-named defects, and at the same time to provide a simple, durable, and

easily-operated wind-engine has been the object of this invention; and to this end it consists in a horizontal wind-engine provided with means whereby the extent of surface of the blades or fans exposed to the action of the wind may be and is regulated and governed by the force exerted upon such blades or fans, substantially as hereinafter set forth and described.

It further consists in means whereby the blades or fans, when returning against the wind, are caused to feather or present their edges to the wind, as hereinafter set forth.

It also consists in means whereby the blades or fans may be automatically feathered or closed, thus bringing the wheel to rest.

It also consists in means whereby the crank or pitman wheel may be made to revolve faster or slower at equal revolutions of the wind-wheel, substantially as hereinafter set forth; and it finally consists in the arrangement and operation of the various parts as a whole, substantially as herein described.

Referring to the drawings, A represents the wind-wheel, mounted upon a vertical axle, B; secured to the upper part of the derrick or frame C. The hub A' of the wheel A is outwardly flanged at its lower portion, as shown at a, Fig. 3, and is provided upon its lower surface with two concentric rows of gear-teeth, a^1 and a^2 , for a purpose hereinafter set forth.

Extending outwardly from the hub A' are a series of spokes or arms, A², the outer ends of which are hollowed out to receive and hold in place a band or hoop, A³, which passes about the spokes, and is secured together at its ends by a screw-connection, a^3 . I preferably construct the band or hoop A³ of small round iron rods, and in order to combine strength with lightness I construct the above-described wheel in concave form upon its upper side, as shown in Fig. 3.

I have found by experiment that wind-wheels having concave upper sides, as above described, are much stronger than wheels having their upper sides in the horizontal plane, inasmuch as in the former the spokes extending in an upwardly direction operate as struts or braces against the band or hoop surrounding the wheel, the weight of said band or hoop serving to more firmly bind the several parts together, while in wheels having the spokes extending out-

wardly from the hub in the horizontal plane the weight of the band or hoop would tend to sag or bend the outer ends of the spokes downward, thus injuring the wheel, as will be readily understood by those skilled in the art to which my invention appertains.

Pivoted in any suitable manner to the spokes A^2 is a series of blades or fans, D , one edge of which, d , is slightly heavier than the other, and normally rests upon a second band or hoop, d' , of smaller diameter than the hoop A^3 , and placed below the spokes, as shown. The hoop d' is held in place by suitable guideways, e , in a frame or frames, E , attached to and depending below the spokes A^2 . The frame E may be in form as shown, having the upwardly-extending parts e' e^2 e^3 , or in any other suitable form, provided always the same result be attained.

Pivoted at e^4 to the lower side of the frame E is a rod or rods, f , provided at its lower end with a governor-ball, F , provided with a set-screw, f' , whereby it may be secured at any point upon the rod f . Pivoted at f^2 to the rod f is a second rod or link, f^3 , which extends to the band or hoop d' , its end being loosely turned about the latter, as shown.

From the foregoing description it will be clearly seen that when the wheel is rotated rapidly the ball F will, from centrifugal force, swing outward, and thus, through the link f^3 and loop d' , close or feather the blades or fans; and it will be also readily understood that the outward swing of the balls may be varied in regard to the speed of the wheel by placing the balls at different heights upon the rod f .

I preferably employ four of the above-described governors at points equidistant from each other; but I do not wish to limit myself to that exact number, inasmuch as the number may properly vary in proportion as the wheel is larger or smaller.

Pivoted to each alternate arm or spoke, and near the inner ends thereof, is a series of bent levers, G , the lower ends of which pass outward below the ring or hoop d' . The levers G extend upward above the hub A' , and are connected by a link, g , to a plate, G' , as shown.

The main axle B is provided with a flange, b , that rests upon the heads of the derrick-frame timbers, and with a bifurcated lower portion, b' , that is secured between said heads by bolts or their equivalents. The center of the axle is hollow throughout its length for the accommodation of a rod, G^2 , which extends from the plate G' , through the axle B , to the ground or to the outer end, i , of a lever, I , fulcrumed upon one side of a water-tank, I' . The opposite end, i' , of the lever I is provided with a float, i^2 , by which, when the water rises in the tank, the fans D are closed through the medium of the rod G^2 and levers G , as will be readily understood.

The bifurcated lower part of the axle B is provided with suitable boxes or bearings, b^2 , in which is journaled the shaft h of the geared pitman or crank wheel H , the gear-teeth h' of

which mesh into and derive motion from the gear-teeth a' a^2 upon the hub A' .

Upon the end of the shaft h , and opposite the wheel H , I secure a collar, h^2 , and to the frame C , below the collar, I attach a bracket, h^3 , in the manner shown in Fig. 3. The drawings show the wheel H as being in engagement with the outer row of gear-teeth, a' , upon the hub A' . When it is desired to change to the inner row of gear-teeth it is only necessary to remove the bracket h^3 and draw the shaft h back until the wheel H registers with the teeth a^2 , and then replace the bracket, with the collar h^2 bearing against the outside of the bracket.

The wheel A is held in position upon the axle B by a nut, K , the upper surface of which is hollowed, as shown at k , Fig. 5, for the purpose of holding lubricants, suitable vents, k' , being provided in the nut, through which said lubricants reach the axle-bearing.

In order that the pitman-rod H' may be made to take greater or less extent of stroke, I provide a series of holes in the crank-wheel H at different distances from the center of said wheel, as shown in Fig. 6, the wrist-pin being changed from one to another as desired.

I provide the wrist-pin of the crank-wheel, and also the bearings b^2 of the shaft h , with suitable oil-boxes.

From the foregoing description the operation of my improved wind-engine will be readily understood by those skilled in the art to which it appertains.

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

1. In a horizontal wind-engine, the concave wind-wheel A , having the flanged and geared hub A' , spokes A^2 , of metal rods, and provided with blades or fans D , and firmly bound together by the binding rod or band A^3 , substantially as herein described.

2. In a horizontal wind-engine, the blades or fans D , loosely pivoted independently of each other to the spokes A^2 in such manner that one edge of said fans or blades shall be heavier than their opposite sides, said heavy sides or edges normally resting upon a hoop, d' , below the spokes, substantially as described.

3. In a horizontal wind-engine, a band or hoop, d' , of smaller diameter than the wheel, and operating in guideways e in the pendent frame E , whereby the blades or fans D may be maintained in more or less closed position, substantially as described.

4. In a horizontal wind-engine, the combination of a band or hoop d' , situate in pendent frames E , attached to the spokes A^2 , with the connecting rod or link f^3 , rod f , and ball F , whereby the band or hoop d' may be raised when the wind-wheel is rapidly revolved, substantially as described, for the purpose specified.

5. In a horizontal wind-engine, the bent levers G , pivoted to the arms or spokes A^2 , and

operating through the links *g*, cap *G'*, and rod *G*² to close or feather the fans *D* when desired, substantially as described.

5 6. In a horizontal wind-engine, the combination of the fans or blades *D*, hoop *d'*, bent levers *G*, and rod *G*² with the lever *I*, fulcrumed on the water-tank *I'* and provided with the float *i*², whereby, when said float is raised by water, the fans *D* may be automatically closed or
10 feathered, substantially as described.

7. In a horizontal wind-engine, the vertical hollow axle *B*, having the bifurcated lower portion, *b'*, and flanges *b*, and provided at its upper end with the nut *K*, substantially as described.
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8. In a horizontal wind-engine, the combina-

tion of the geared hub *A'*, geared pitman-wheel *H* on shaft *h*, said shaft having bearings in the bifurcated lower portion of the axle *B*, and provided with a collar, *h*², with the bracket *h*³ on the derrick-frame *C*, whereby by moving the collar from one to the other side of said bracket the wheel may be made to engage with the inner or outer gear-segments, *a'* *a*², on the hub *A'*, substantially as described. 20 25

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

THOMAS E. PECKHAM.

Witnesses:

C. S. McMILLIN,
W. A. JOHNSON.