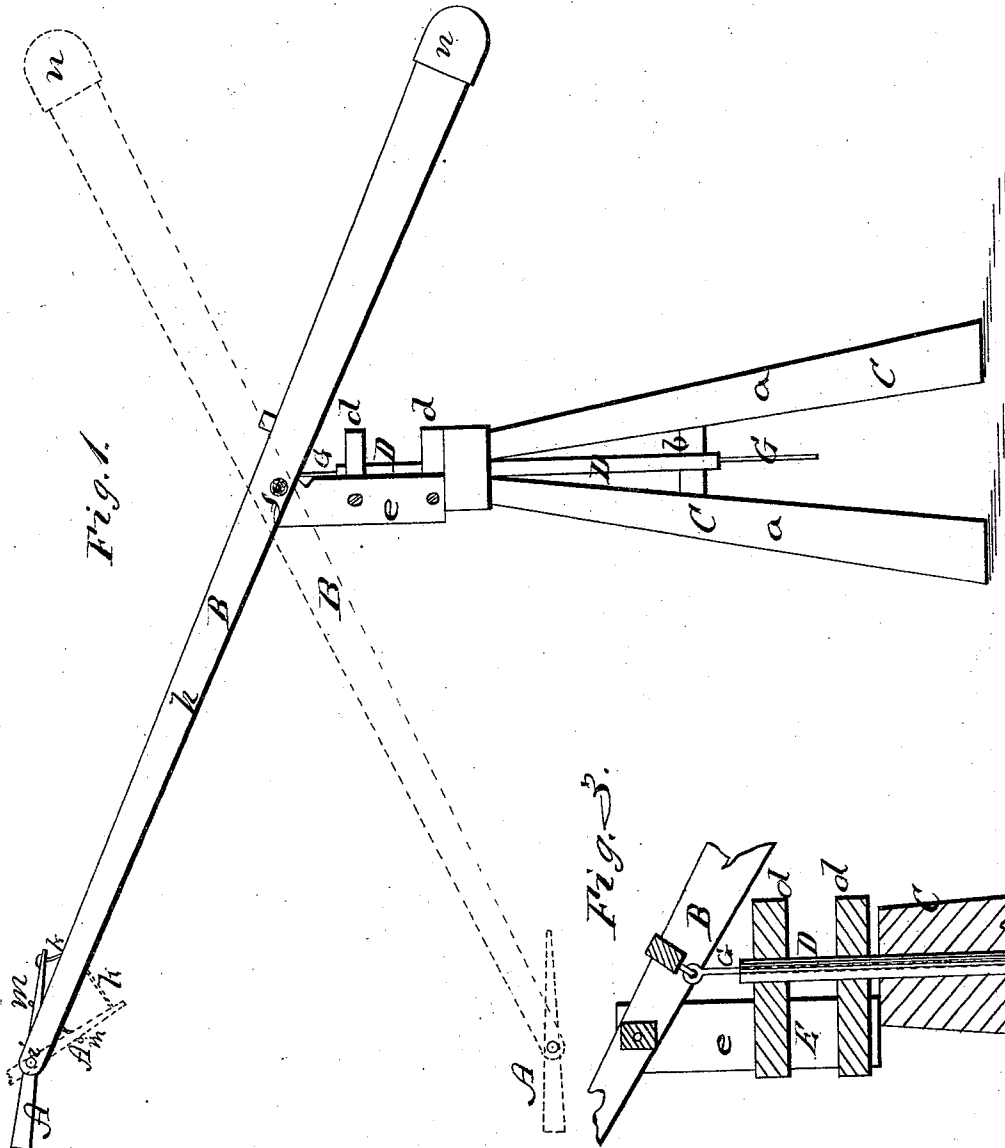


J. M. ARMOUR.
WIND-POWER.

Patented Nov. 23, 1875.

No. 170,326.



WITNESSES
C. Clarence Poole
G. B. Townsend

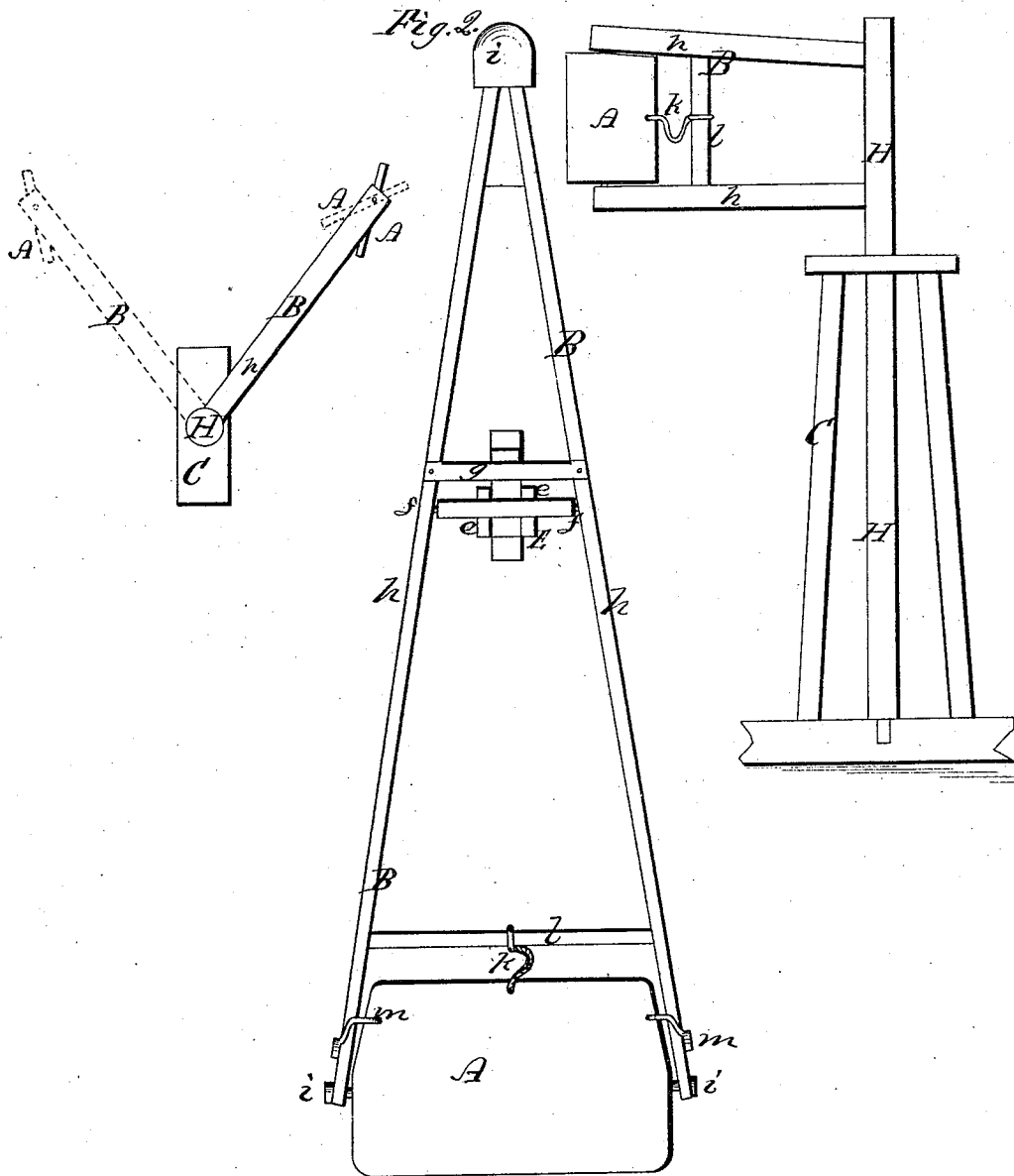
By

INVENTOR
John M. Armour,
J. S. Brown,
his Attorney

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UNITED STATES PATENT OFFICE.

JOHN M. ARMOUR, OF NORTHWOOD, OHIO.

IMPROVEMENT IN WIND-POWERS.

Specification forming part of Letters Patent No. **170,326**, dated November 23, 1875; application filed April 30, 1875.

To all whom it may concern:

Be it known that I, JOHN M. ARMOUR, of Northwood, in the county of Logan and State of Ohio, have invented a new and Improved Wind-Power; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, making part of this specification—

Figure 1 being a side view of the power; Fig. 2, a top view of the same; Fig. 3, a view in detail of a part of the same; Fig. 4, a top view of a modified construction of the power; Fig. 5, a side view thereof.

Like letters designate corresponding parts in all of the figures.

The nature of my invention consists in a new and improved method of utilizing the force of the wind for mechanical uses by a reciprocating movement instead of the ordinary revolving movement of windmills, the reciprocating motion being automatic.

As represented in Figs. 1 and 2 of the drawings, I employ a fan or wind-moving surface, A, which has a reciprocating motion up and down, being mounted on one end of a vibrating beam or lever, B, that is properly balanced on its fulcrum-support, so that the wind may act upon the fan with full effect in both the upward and downward movement. The support of the lever B may be of any convenient construction. It may be a building, or other common structure, or a tower, or high post, or column. I have represented in the drawings a suitable, strong, firm, simply-constructed tower or structure, C, for this purpose, consisting of two or more firm posts or timbers, *a a*, planted at the lower end in the ground, or otherwise stayed in position, being set apart some distance at the bottom, and converging toward each other; thence to the top, where they meet, or nearly meet. These timbers are secured together by cross bars or braces *b b*. This construction, besides being strong and steady, also is open and unobstructed in the middle, for communicating the power down to the work below. In the upper end of this support is secured a short tube, D, in a vertical position, both to serve as a pivot around which the fan-lever B may

turn, and also to furnish a central passage for the communication of the power from the lever downward by means of a shaft or connecting-rod, G. Around the pivot-tube D turns or swivels a fulcrum-seat, E, for the lever B, and rests upon the upper end of the support C as it turns. It has two bushes, *d d*, which surround the pivot-tube, and it has two short standards, *e e*, which furnish bearings for the fulcrum-shaft or journals *f* of the lever B. These standards are a little to one side of the pivot-tube, so that the connecting-rod G may be jointed to the lever directly over and in line with the center of the pivot-tube, and be far enough from the fulcrum of the lever to give the required reciprocating motion to the said connecting-rod as the fan-lever vibrates.

To form a proper connection between the connecting-rod and the lever, the former should be attached to a roller or cross-bar, *g*, turning in bearings of the lever, and there should also be a swivel at the upper end of the connecting-rod, to enable the lever to turn to any point of the compass, according to the direction of the wind, without turning the connecting-rod, which may not be practicable, as, for instance, if pumping water is the work to be done.

The fan lever or beam B is preferably made of two timbers, *h h*, spread apart at the end on which the fan A is mounted, and converging together at the other end, as shown in Fig. 2, the two timbers being connected by cross-pieces where necessary. The fan A is pivoted between the separated ends of the lever-timbers, its pivots *i i* being at the ends thereof, somewhat nearer to the outer than to the inner edge of the same, so that the wind, striking against either of its sides, will give more pressure against the part inside of the pivots than the outer part; but the outer part is either thicker than the inner, or otherwise weighted, so as to nearly or exactly balance the weight of the said inner part. The inner edge has a vibratory or swinging movement around the pivots *i i* to a distance of thirty degrees, more or less, both above and below the plane of the lever, the movement being limited by a cord, *k*, attached to the inner

edge of the fan, and to a cross-bar, *l*, of the beam, or by fixed stops *m m* at one end of the fan.

The lever *B* is constructed to have its two ends balance each other on its fulcrum-pivot, when the fan *A* is mounted thereon, so that the upward and downward vibrations thereof will be equal in effect; though, if it be desired to do any work which requires a greater power moving in one than in the other direction, the lever may be so weighted at one end as to adapt its action to the work.

A suitable counter-weight, *n*, may be attached to the end opposite to the fan end, and this weight may be adjustable in position nearer to or farther from the fulcrum of the lever.

With this simple construction, the power will operate in a wind automatically with continuous vibrations in the following manner: Suppose the fan end of the lever to have just reached the termination of its upward vibration, as shown by full lines in Fig. 1; when the upper surface of the fan *A* begins to present itself to the wind, then the pressure of the wind on the upper surface of the fan, acting most strongly on the part inside of the pivots of the fan, causes it at once to shift its position to that indicated by dotted lines in that position of the lever. Thereupon the wind has full effect on the fan to give it a downward motion, and to cause that end of the lever *B* to descend. This descending motion continues till the fan reaches a position where it begins to present its under surface to the wind, as shown by dotted lines, indicating the lower position of the fan and fan end of the beam. Then the force of the wind immediately changes the inclination of the fan, so as to act with full effect, to again raise the fan and lever, the upward vibration continuing till the lever reaches the position first mentioned. The vibrations are then repeated, as before described, continually. Thus the vibrations of the lever are not only continued automatically, but, since the wind strikes and shifts the inclinations of the fan at nearly corresponding moments in the vibrations of the lever, the result is that the length of the lever vibrations are nearly uniform, producing regularity of work.

The inclinations of the vanes may be varied by adjustment, so that the wind will take it and shift its inclinations quicker or later, thus shortening or lengthening the vibrations of the lever at will.

The inclinations of the fan, both above and below the plane of the lever, are represented as equal; but they may be unequal to almost any extent, so that instead of descending just as far below as above the horizontal plane, the vibrations may be nearly all above or below, or any degree of preponderance either way, as may be desired. By using the stops *m m* at the end of the fan, and making them

adjustable in position, this variation of effect may be produced at pleasure.

The action of the wind on the fan itself always keeps it faced to the wind, the other end of the beam always pointing to the wind. The swivel-seat *E* of the lever allows it to turn freely to the wind.

It is obvious that the number of fans and levers may be multiplied, say one placed above another; or more than one fan may be mounted on one fan-lever.

If the connecting-rod which communicates the force to the machinery below is connected with a crank movement, and two or more fan-levers are connected with the same movement, the cranks may be placed at different angles in the circle of revolution, so as to act alternately on the crank-shaft.

In Figs. 4 and 5 are shown the arrangement of the fan-lever and fan to vibrate on a vertical shaft, the operation of the fan and lever being the same in principle and effect as the arrangement on a horizontal shaft.

The fan-lever *B* is secured in a horizontal position fixedly to a vertical shaft, *H*, so that it can vibrate freely to any extent desired. The fan *A* is mounted on the outer end of this lever between its two arms, in the same manner as in the vertically-vibrating lever shown in the other figures, except that it is situated vertically endwise.

The shifting of the inclinations of the fan, as it reaches the termination of each vibration, and begins to present its forwardly-moving side to the wind, is just the same as in the other construction, and the limitations of its vibrations are determined in the same way. In this case no balancing of the lever on the shaft is necessary, though it may be so constructed. The lever and fan are also, by their own action, kept turned from the wind.

The power may be communicated from the vertically-rocking or axially-vibrating shaft *H* by any convenient means, which it is not necessary here to describe.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. A pivoted vibratory fan, *A*, mounted on an oscillating lever, *B*, arranged to act in both directions of the lever oscillations, and self-adjusting to the wind at the close of each oscillation, substantially as and for the purpose herein specified.

2. In combination with the fan *A* and fan-lever *B*, the pivot-tube *D* at the top of the support *C*, and the swiveled fulcrum-seat *E*, substantially as and for the purpose herein specified.

Specification signed by me this 1st day of April, 1875.

JOHN M. ARMOUR.

Witnesses:

A. R. ELLIOTT,
QUINCY GWYNN.