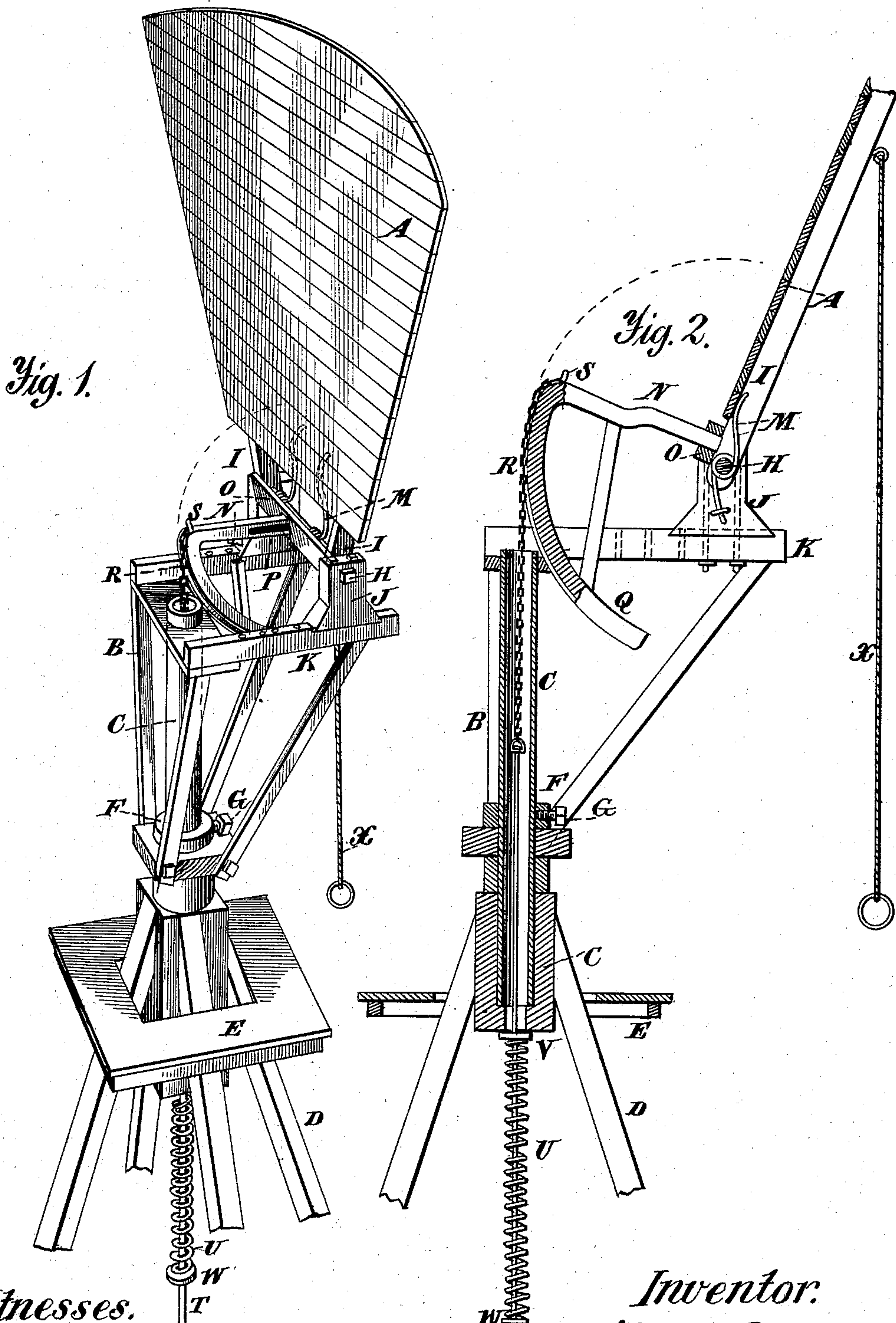


(No Model.)

A. H. SMITH.  
WINDMILL.

No. 263,069.

Patented Aug. 22, 1882.



Witnesses.  
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# UNITED STATES PATENT OFFICE.

ALLEN H. SMITH, OF BURLINGTON, KANSAS.

## WINDMILL.

SPECIFICATION forming part of Letters Patent No. 263,069, dated August 22, 1882.

Application filed July 28, 1882. (No model.)

*To all whom it may concern:*

Be it known that I, ALLEN H. SMITH, of Burlington, in the county of Coffey and State of Kansas, 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 pertains to make and use the same.

My invention relates to an improvement in windmills, and more particularly to that class thereof which employ a single vibrating blade, the object of the invention being to construct a device of this character which shall combine simplicity and cheapness of construction with durability and efficiency in use.

With these objects in view, my invention consists in certain details of construction and combinations of parts, as will be hereinafter described, and pointed out in the claims.

In the accompanying drawings, Figure 1 is a view in perspective of a device embodying my invention; and Fig. 2 is a view in vertical section thereof, said figure embodying a modification of the device shown in Fig. 1.

My invention relates, as aforesaid, to an improvement in that class of wind-wheels in which the motive force is derived from the vibration of a single fan-blade. In embodying this principle of construction in a wheel a suitable blade, A, is pivotally mounted upon a rotating carriage, B, eccentrically pivoted to a standard, C, supported to a frame-work composed of a series of converging bars, D, the upper ends of which are surrounded by a platform, E. The said carriage is prevented from being lifted from the hollow standard by means of a collar, F, encircling the same and held in place by a set-screw, G.

The opposite ends of the shaft H, which is mounted in the arms I of the fan A, are journaled in the bearings J, adapted to be secured to and laterally adjusted upon the horizontal arms K of the carriage B. Springs M, secured to the inner face of the said bearings J and loosely coiled around the shaft H, are arranged to impinge against the rear face of the fan-blade and maintain it in a normal position of readiness to be deflected by the wind. The vibrating motion derived from the action of the blade is converted into reciprocating motion through the medium of the lever N, which is mounted

in a beam, O, uniting the lower ends of the arm I, and located directly in front of the shaft H. The said fan and lever are always maintained in a relative position of ninety degrees to each other, the lever, however, being adapted to be adjusted laterally to compensate for any changes in the adjustment of the bearings J upon the arms K of the carriage. The adaptation of the lever to be adjusted as aforesaid consists in providing its rear extremity with a slot, P, to receive the shaft H. The said lever terminates in a segmental section, Q, which is provided with a grooved periphery to adapt it to guide the chain R, which is attached to the pin S, secured to the outer end of the lever, and which enters the upper end of the hollow standard. The rod T, attached to the lower end of the chain, extends through the standard and transmits the motive force derived from the action of the blade to the engine to be operated.

In order to maintain the engine in a normal position of readiness to be actuated by the reciprocation of the rod aforesaid, the same is encircled by a spring, U, interposed between two disks mounted upon it, and designated by V and W, respectively, the disk V, which impinges against the lower end of the standard C, being loosely mounted on the rod, while the disk W is rigidly secured thereto. When the blade is deflected by the wind from its normal position the rod will be elevated against the force of the spring U; but as soon as the wind dies away, or as soon as its deflecting force falls below the power represented by the expansive force of the spring, the same will immediately act to depress the rod, and thus restore it to a position of readiness to be elevated again by the next succeeding deflection of the blade.

It will thus be seen that, while the springs M exert a constant tendency to maintain the fan in a normal position of readiness to be deflected by the wind, the spring U maintains the rod T, connected with the engine to be driven, in a normal position of readiness to receive and apply the motion which it derives from the action of the blade to the actuation of the said engine. By these springs a very nice balance of adjustment is secured and the device is rendered very sensitive to fluctuation in the power of the wind, which occurs



incessantly. Therefore, in practice, the deflections and restorations in the device will follow each other in such rapid succession that its action will be virtually vibratory. The blade  
5 is accommodated in position to changes in the direction of the wind by the rotation of the carriage B on the hollow standard C.

For the purpose of throwing the fan out of operating adjustment, it is provided with a tie-  
10 cord, X, which is attached to it near its upper end. By means of this the fan-blade may be deflected into a position horizontal with the wind and so sustained by attaching a weight to the cord.

15 The construction of the fan may be considerably varied. It may be built to present a plane, a convex, a concave, or a waving or corrugated surface to the wind, the corrugated surface being, perhaps, to be preferred, as it as-  
20 sists the vibration of the blade.

In Fig. 2 of the drawings the inner end of the lever N is arranged to pass over the shaft H, thus avoiding the necessity of slotting the lever, as shown in Fig. 1.

25 The fan and the devices immediately associated with it are susceptible of several changes within the spirit of the invention. The fan, for instance, may be depended in a vertical position from the lower faces of the arms K of the carriage. By adjusting the bearing J upon  
30 the arms K and also the lever N in the beam O the stroke or reciprocating action of the rod T may be regulated as desired. The motion derived from the vibration of the blade may  
35 be utilized to revolve a pulley mounted on a crank-shaft connected with the engine to be operated by means of a belt or cord encircling said pulley and having its opposite ends at-  
40 tached to the ends of the segmental extension before described. Again, the periphery of said extension may be provided with cogs arranged to mesh with a pinion mounted upon a shaft and provided with pin or stud for the attach-  
45 ment of a rod connected with the engine to be actuated, said pin or stud being made radially adjustable on the pinion to change the length of the stroke of the rod aforesaid.

In view of the changes above suggested and others of like nature, which it is apparent may  
50 be made, I would have it understood that I hold myself at liberty to make such changes and alterations as may be considered to fairly fall within the spirit and scope of my invention.

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

60 1. In a windmill, the combination, with a vibrating blade, of devices to maintain it in a normal position of readiness to be deflected, a system of levers to transmit the motion of the blade to the device or machine to be driven, and devices to maintain said levers in

a normal position of readiness to be operated by the motion of the blade, substantially as  
65 set forth.

2. In a windmill, the combination, with a hollow standard, a fan-blade pivotally secured to said carriage in a position eccentric to the standard, a system of levers to transmit the  
70 motion of the fan-blade to a rod located in the hollow standard and connected with the device or machine to be driven, and a spring to maintain said levers in a normal position of readiness to be operated by the motion of the blade,  
75 substantially as set forth.

3. In a windmill, the combination, with a blade pivotally mounted on a rotating carriage, of springs adapted to maintain said blade in a normal position of readiness to be deflected  
80 by the wind, connections between said lever and the engine to be driven, and a spring to maintain said connections in a normal position of readiness to receive and apply the impulses of the lever, substantially as set forth. 85

4. In a windmill, the combination, with a hollow standard, of a rotating carriage mounted on said standard, a fan-blade pivotally secured to said carriage, a lever secured to the lower  
90 portion of said blade, flexible connection between the lever and a rod located in a hollow standard, and a spring encircling said rod and arranged to exert a constant tendency to depress it in the standard, substantially as set forth. 95

5. In a windmill, the combination, with a standard, of a rotating carriage, bearings mounted on said carriage and arranged to be laterally adjusted thereupon, a fan-blade jour-  
100 naled in said bearings, a lever projecting from the lower end of the blade and made laterally adjustable therein, and devices connecting said lever with the device or machine to be driven, substantially as set forth.

6. In a windmill, the combination, with a  
105 vibrating blade mounted on a rotating carriage, a lever attached to the lower end of said blade and terminating in a grooved segmental extension, flexible connection attached to the outer end of the lever, and a reciprocating rod  
110 attached to the free end of said connection and connecting with the machine or device to be driven, substantially as set forth.

7. In a windmill, the combination, with a vibrating fan-blade, of a tie-rope attached di-  
115 rectly to it and adapted to secure it in a position horizontal to the wind, substantially as set forth.

In testimony whereof I have signed this specification in the presence of two subscribing wit-  
120 nesses.

ALLEN H. SMITH.

Witnesses:

GEO. D. SEYMOUR,  
F. O. McCLEARY.