

(Model.)

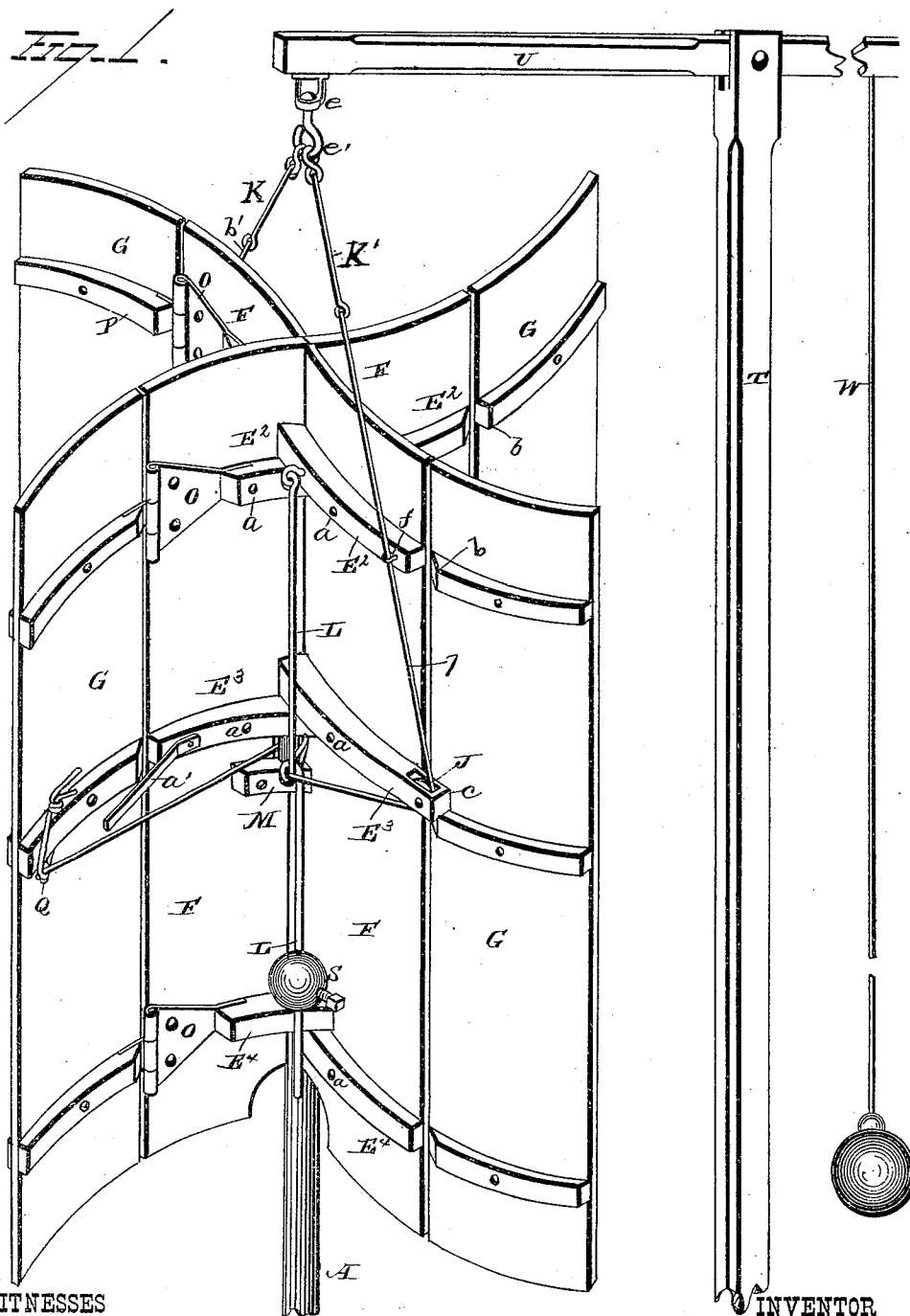
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A. W. JONES & A. H. SMITH.

WINDMILL.

No. 252,947.

Patented Jan. 31, 1882.



WITNESSES

Herman Moran
A. M. Bright.

INVENTOR

A. W. Jones.
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By H. A. Sumner, ATTORNEY

(Model.)

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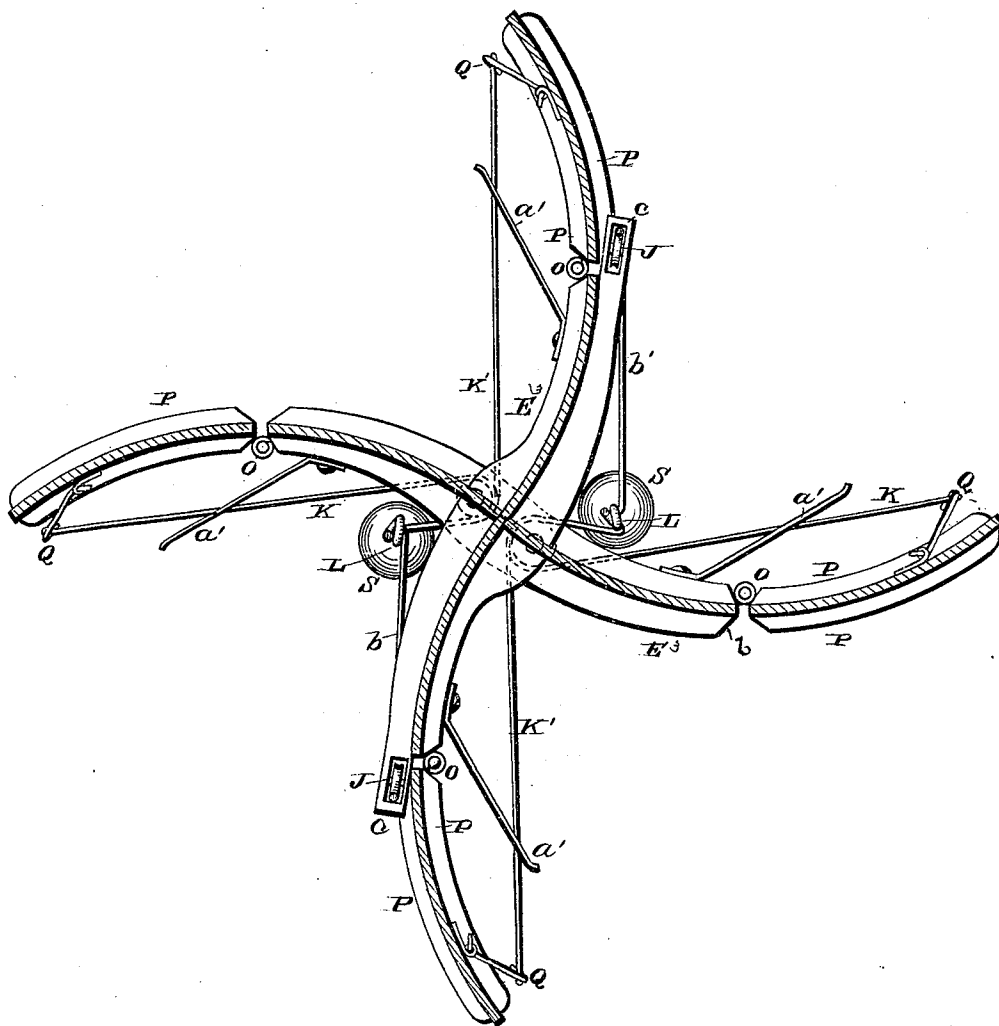
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FIG. 2.



WITNESSES

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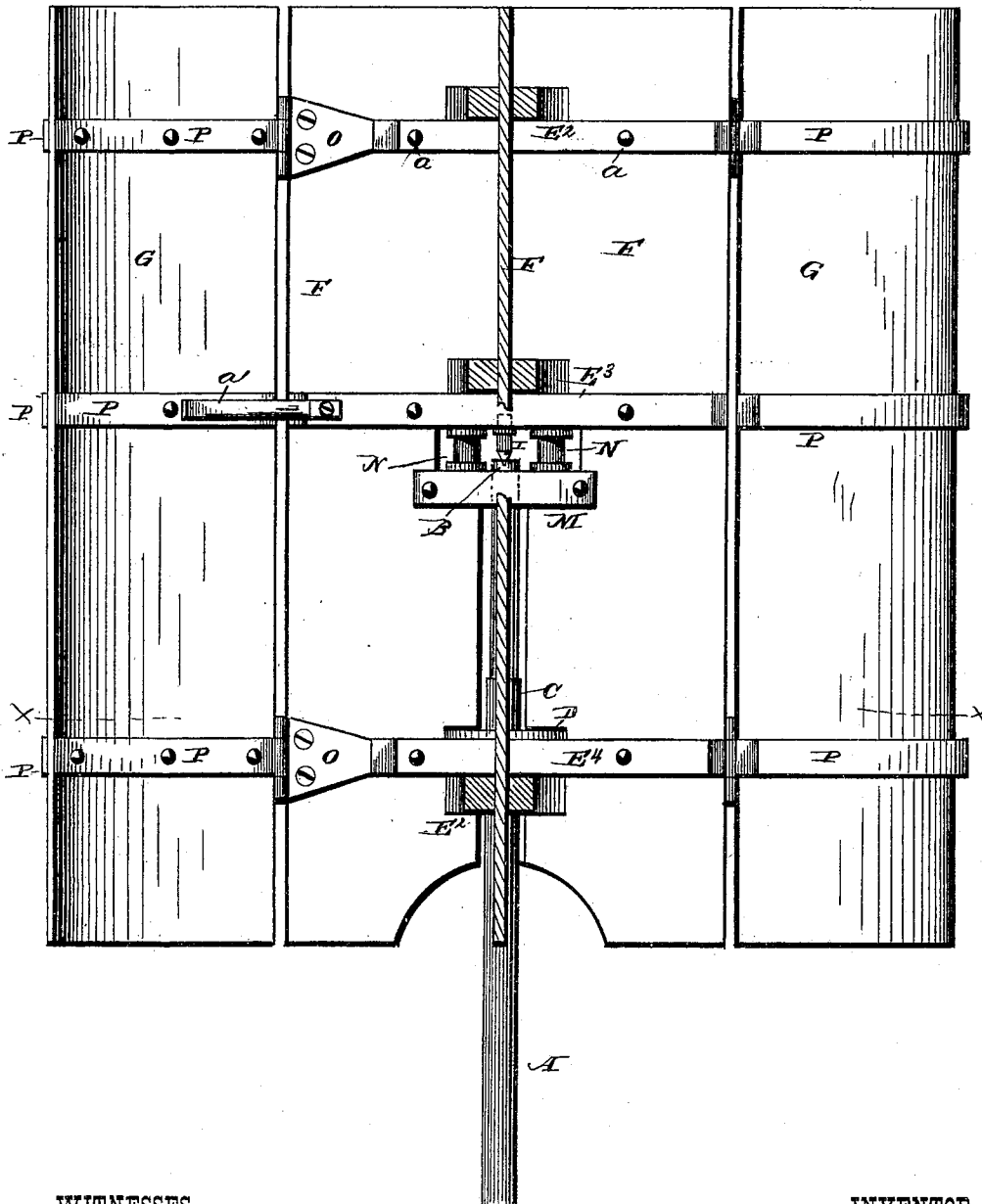
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Bernian Moran.
Am Bright

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 & Smith,
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(Model.)

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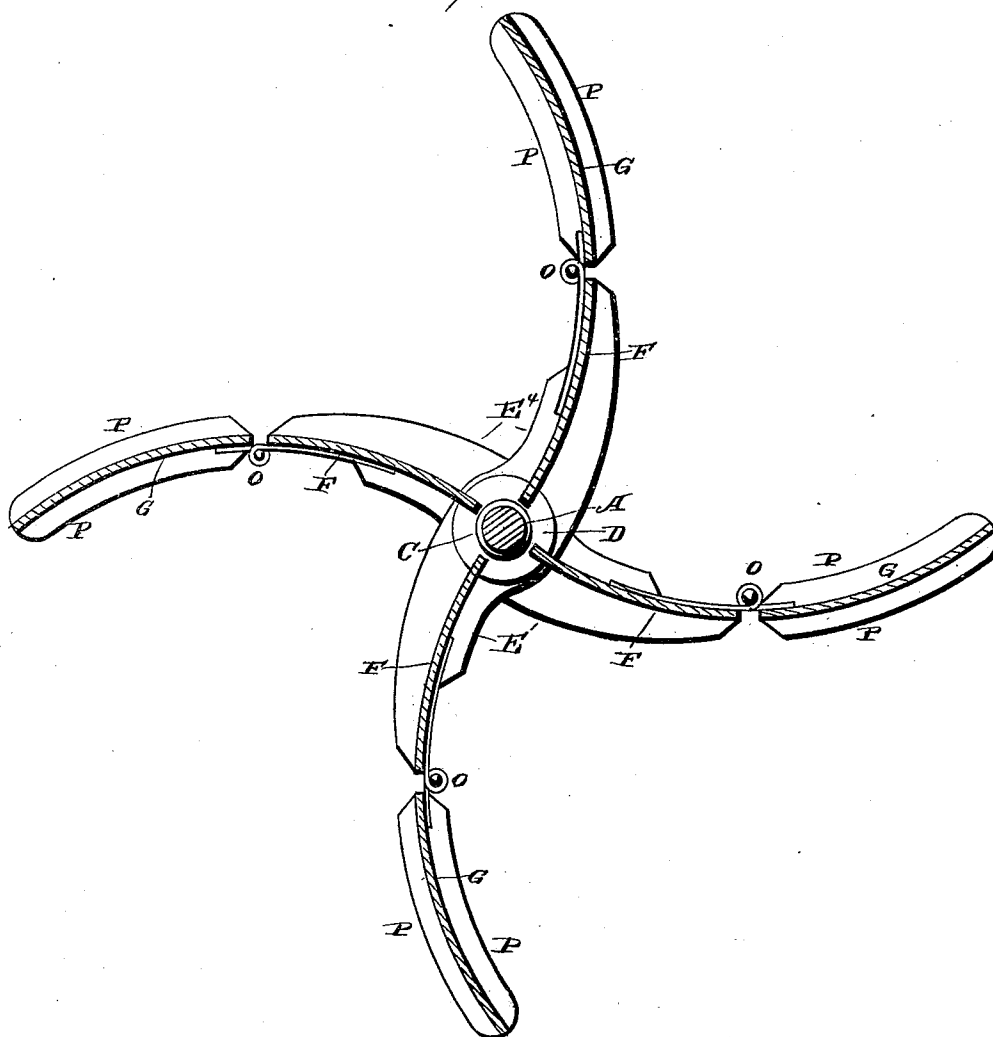
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Fig. 4.



WITNESSES

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UNITED STATES PATENT OFFICE.

ALFRED W. JONES AND ALLEN H. SMITH, OF BURLINGTON, KANSAS.

WINDMILL.

SPECIFICATION forming part of Letters Patent No. 252,947, dated January 31, 1882.

Application filed June 29, 1881. (Model.)

To all whom it may concern:

Be it known that we, ALFRED W. JONES and ALLEN H. SMITH, of Burlington, in the county of Coffey and State of Kansas, have invented certain new and useful Improvements in Windmills; and we 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 it, reference being had to the accompanying drawings, which form part of this specification.

Our invention relates to an improvement in horizontal windmills, the object of the same being to provide a windmill having combined stationary and hinged vanes, with automatic regulating mechanism whereby the speed of the machine is regulated and controlled.

A further object of our invention is to provide mechanism for throwing the hinged vanes out to the wind when the pressure to the convex surface thereof has been relieved, and with means for folding and closing in the hinged vanes when the mill is not required for use.

With these ends in view our invention consists in certain details in construction and combinations of parts, as will be more fully explained, and pointed out in the claims.

In the accompanying drawings, Figure 1 is a perspective view of our improved wind-wheel. Fig. 2 is a horizontal section of the same. Fig. 3 is a vertical section; and Fig. 4 is a horizontal sectional view through the lines *x x* of Fig. 3.

The upright shaft A is rigidly set in a solid post or bearing in a tower or derrick, and is provided with a socket or bearing, B, at its upper end, on which the whole weight of the wheel rests, and a collar, C, against which a metallic disk, D, bears, the latter being centrally perforated and rigidly secured to the lowest set of arms, E¹.

The vanes or fans are situated and adapted to move like those described and shown in the Patent No. 228,283, granted to A. H. Smith, June 1, 1880, and can also be, if desired, provided with the heads at the upper and lower end of the mill, as shown therein, for holding the parts together.

The vanes or wings are composed of the inner or rigid vanes, F, and the hinged vanes G, the rigid vanes being held in place by the arms

E² E³ E⁴, and the hinged vanes secured thereto by any suitable hinges that will make a close joint and prevent the wind from escaping too freely at the juncture of the rigid with the stationary vanes. In the present instance we have shown three sets of arms, E² E³ E⁴, the arms E², which bind the vanes together at the top, the central arms, E³, on which the weight of the mill rests, and the arms E⁴, having the perforated disk D secured thereon, which holds and balances the mill in position on the frame and receives all the lateral strain. Each arm is adapted to embrace and partly hold two rigid vanes, and is consequently made in two parts, or provided with an elongated curved slit at each end, into which the vanes are inserted and secured by screws *a* passing through the two parts of the arm and vanes. These arms E² are curved throughout their entire length and conform to the shape of two rigid vanes, when the latter are placed end to end in position, and very nearly resemble the Italic letter *f*. The other arm of the upper set is similar in construction to the one just described and holds the parts together in a like manner, and is secured to the other arm at right angles thereto by bolts and nuts, which binds the parts securely together and causes them to move simultaneously, the arms of the vanes, however, being cut away, as shown at *b*, sufficiently to allow the parts to fit closely together.

The second set of arms, E³, are shaped, hold the vanes F, and secured together similar to the upper set, but, in addition thereto, are provided with the pivot-bolt I, which latter is situated near the center of the mill, so as to nearly as possible balance same, the said pivot-bolt adapted to fit in the socket B at the top of the shaft A, the shaft passing upward for this purpose through the center of the mill. Each half or portion of the arms E³ is adapted to bear against the convex and concave surface of the vanes on the opposite sides of the machine, and the extremities *c* of one of the arms E³, which bear on the convex surface of the vanes F, are slightly lengthened, so as to overlap the joint formed by the hinged vanes, and are provided on this lengthened extremity with rollers J, through which the chains K and K' pass upward from the governor-rods L to the mechanism for closing up the mill, while

the extremity of the arms E^3 on the concave faces of all of the vanes are provided with any suitable form of spring or buffer, a' , to prevent the slamming and damaging of the parts by the closing of the hinged wings or vanes when turning to the wind, and to throw them open when the pressure of the wind on the convex surface thereof has been relieved.

Immediately below the middle set of arms another arm, M, is secured on both sides of two of the vanes F, which, together with the arms E^3 , afford bearings for rollers N, around which the governor-chains wind, and is also perforated for the passage of the shaft A, and assists in balancing and holding the mill thereon. The lower set of arms, E^4 , is also similar to those already described for the top set, excepting that they are perforate centrally for the passage of the shaft A, and provided with the disk adapted to bear on the collar fitted on the said shaft and balance and take all the lateral strain therefrom.

The hinges O, which secure the rigid and hinged vanes F and G together, are firmly clamped between the said vanes and inner faces of the arms, which shields and prevents them from becoming accidentally broken during the opening and closing of the hinged vanes. The hinged vanes G are about the same size and shape as the rigid ones, and are hinged thereto by the hinges O, and strengthened by the braces P, placed on both surfaces thereof.

On the outer end of the braces secured to the concave faces of the hinged vanes G springs Q are secured, to which the governor-chains are attached, which prevents all sudden and jerking movement to the hinged vanes, and consequently increases their durability.

The governor-rods L, with their attached balls S, are so constructed and connected that when the mill revolves rapidly they will be forced outward, carrying with them the chains K and K', which are secured at one end to the governor-rod, and by their opposite end to two hinged wings, G, which are controlled by the one governor. Each governor-rod is provided with a hooked upper end adapted to fit in a ring secured in top arm, E^2 , of the mill, and at its lower end with an adjustable ball or weight, S, and are allowed free movement between the vanes, and are provided near their center with a hooked or bent portion, to which the chains K and K' are secured.

As before stated, two hinged vanes are operated by one governor-rod, and each vane has a chain secured thereto at one end and to the governor-rod at the other. The chain K is secured at one end to the spring secured on the hinged vane, and passed toward the shaft A and around the roller, and then outward to the governor-rod, while the chain K' passes from the governor-rod partly around roller, and from thence to the hinged vane immediately preceding.

The construction and arrangement of the

other governor-rod is similar in every respect to the one just described, and are both connected to and adapted to be operated by the pivoted lever U when it is desired to close the mill up and exclude the wind. This lever is pivoted to the upright standard T, the latter being secured in any suitable manner at one side of the mill, and extending up slightly above the top of same. To the inner end of this pivoted lever U a bail, e , is secured, having the ring e' swiveled thereto, with which the metal bars are connected. These bars pass downward and outward, and are connected respectively to the chains K and K' on opposite sides of the mill, the said chains passing downward through the rings f and through the pulleys J to the governor-rods. On the opposite or outer end of the pivoted lever U a rope, W, is secured, which is grasped and pulled downward when it is desired to stop the machine. By pulling down on the outer end of the pivoted lever the inner end is elevated and the chains V and V' drawn upward, which pulls the governor-rods L outward, drawing with them the chains K and K', which latter close the hinged vanes and exclude the wind.

In practice it may be necessary to attach a light weight onto the outer end of the pivoted lever to keep that end of the lever down, and elevate the opposite end to keep the bail e up above the top of the mill, so as not to obstruct or retard the movement of the mill.

By providing our governor-rods with adjustable weights we are enabled to regulate the speed of the mill and the power necessary to close the vanes by simply elevating or lowering the weight on the rods and securing them by the thumb-screws. When the wind strikes the concave surface of the vanes it is held therein and the full force utilized in imparting rotary motion to the mill. A portion of the wind striking the convex surface of the following vane is deflected therefrom to the preceding one, where it is also utilized.

The speed of the mill is automatically regulated by the governor-balls, which are forced outward, carrying with them the chains K and K', which close the vanes when the speed is increased over a predetermined rate and fall to their original position when the said rate has been restored.

The different parts of our mill can be constructed of any suitable material best suited for the purpose, and instead of constructing the hinged vanes as shown they can be composed of a frame carrying canvas coverings, which, if properly held in position, would answer all the required purposes.

The power from this mill can be utilized for pumping or for any other desired purpose, and can be transmitted to the pump or machinery by means of a gear-wheel having a central opening for the passage of the standard A, the said wheel being rigidly secured to the under side or ends of the rigid vanes F, and adapted to mesh with a suitable gear-wheel secured to

a shaft or crank, which latter, directly or indirectly, drives the machinery or operates the pump.

It is evident that slight changes in the construction of our improved mill might be resorted to without departing from the spirit of our invention, and hence we would have it understood that we do not limit ourselves to the particular construction shown and described, but consider ourselves at liberty to make such changes as come within the spirit and scope of our invention.

Having fully described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. In a windmill, the combination, with a fixed vertical shaft having a socket in its upper end and a collar secured to its body, of a wheel having a pivot-bolt adapted to rest in the socket and a disk adapted to bear against the collar, substantially as set forth.

2. In a windmill, the combination, with a fixed vertical shaft having a socket or bearing in its upper end and a rigid collar secured to its body, of a wheel having rigid and pivotal vanes or fans secured to suitable arms, a pivot-bolt adapted to bear in the socket, and a disk to encircle the rigid collar, substantially as set forth.

3. In a windmill, the combination, with a shaft rigidly secured to a tower or derrick, the said shaft having a socket in its upper end and a collar rigidly secured to its body portion, of a wheel having curved rigid and hinged vanes or fans secured to suitable arms, a pivot-bolt on which the weight of the wheel rests, a disk adapted to encircle the collar and steady the machine, and means for automatically regulating the speed of the wheel, substantially as set forth.

4. In a horizontal windmill, the combination, with three sets of radial arms adapted to receive and retain four or more rigid vanes, the upper set having the governor-rods pivotally secured thereto, the middle set being provided with two rollers on the convex surface of the vanes, through which chains adapted to close the wheel pass, four springs on the concave surface, against which the hinged vanes abut, and a pivot-bolt on which the weight of the wheel rests, and the lower set having a central perforation through which the supporting-shaft passes, and a disk surrounding the said perforation to take up the wear, of hinged

vanes pivoted to the said rigid vanes and connected to the governor-rods in pairs by suitable chains, substantially as set forth.

5. The combination, with rigid and pivoted vanes, the rigid vanes being secured in radial arms, and the hinged vanes being secured to the said rigid vanes, of governor-rods having adjustable weights secured thereto, each governor-rod being connected to and adapted to operate two hinged vanes, and springs secured to said arms, against which the said hinged vanes are adapted to abut, substantially as set forth.

6. The combination, with rigid and hinged vanes, the said rigid vanes being secured in three sets of radial arms, and the hinged vanes being provided with braces on their concave and convex surfaces, and an arm running below and parallel to the lower arm of the middle set, between which two pulleys are secured, of governor-rods provided with adjustable weights, each rod having two chains secured thereto, one chain adapted to pass around one pulley and through one vane to the vane preceding, and the other chain adapted to pass around the pulley and return to the hinged vane adjacent to the governor-rod, substantially as set forth.

7. The combination, with rigid and hinged vanes secured together by suitable hinges, of governor-rods having chains secured thereto, which latter are connected to the said hinged vanes through the intervention of suitable springs, substantially as set forth.

8. The combination, with a standard having a lever pivoted thereto, one end of the said lever resting over the wind-wheel and provided with a bail and swiveled ring, and the opposite end provided with a hand-rope, of a wind-wheel having rigid and hinged vanes, governor-rods and suitable chains for controlling the speed of the machine, and chains and rods for connecting the said governor-rods to the said swiveled ring, substantially as set forth.

In testimony that we claim the foregoing we have hereunto set our hands this 14th day of June, 1881.

ALFRED W. JONES.
ALLEN H. SMITH.

Witnesses:

JOHN E. WATROUS,
R. H. ADAIR.