(No Model.)

L. M. GODFREY.

WINDMILL.

No. 356,634. Patented Jan. 25, 1887.

Fig. 1

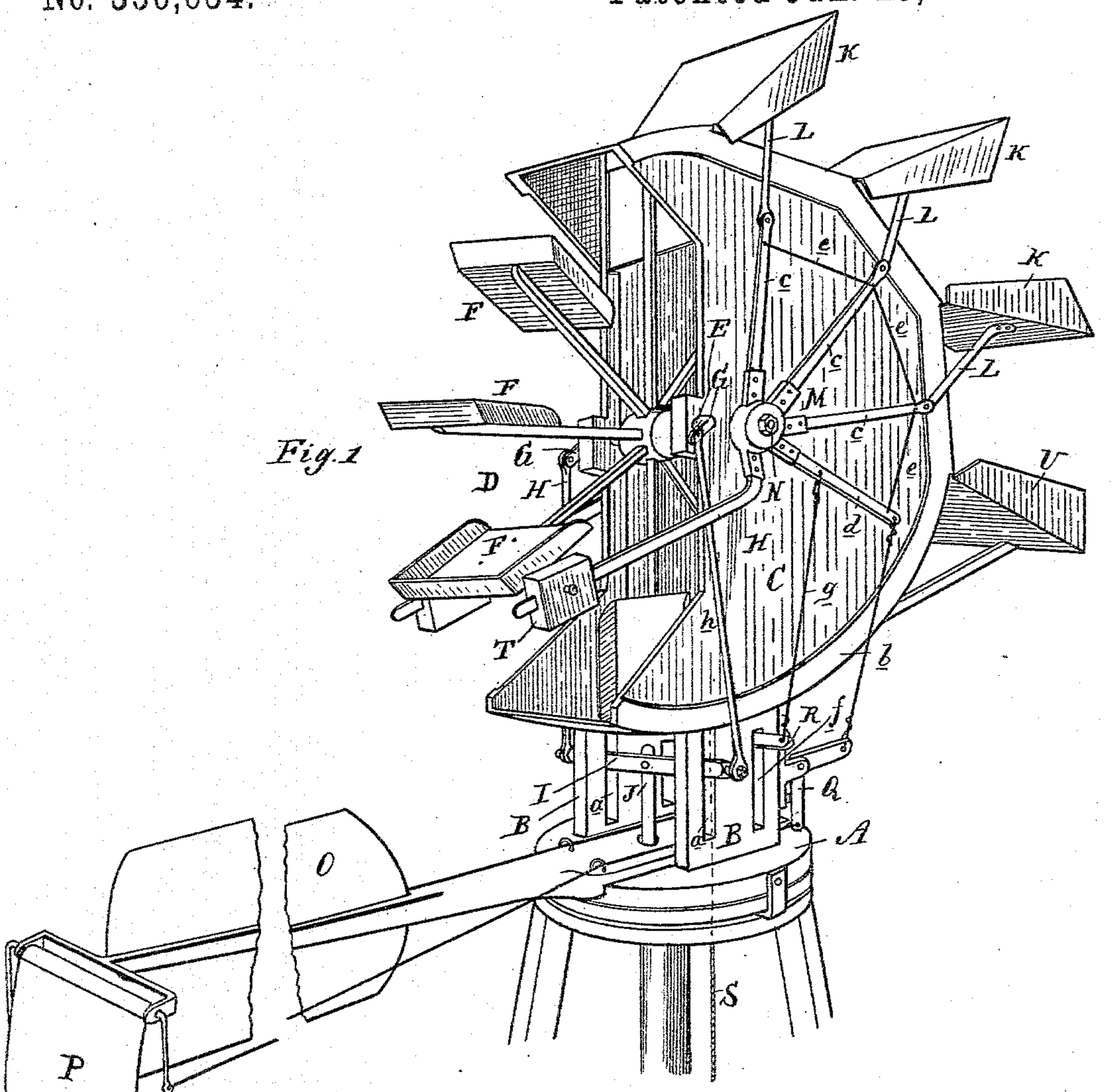
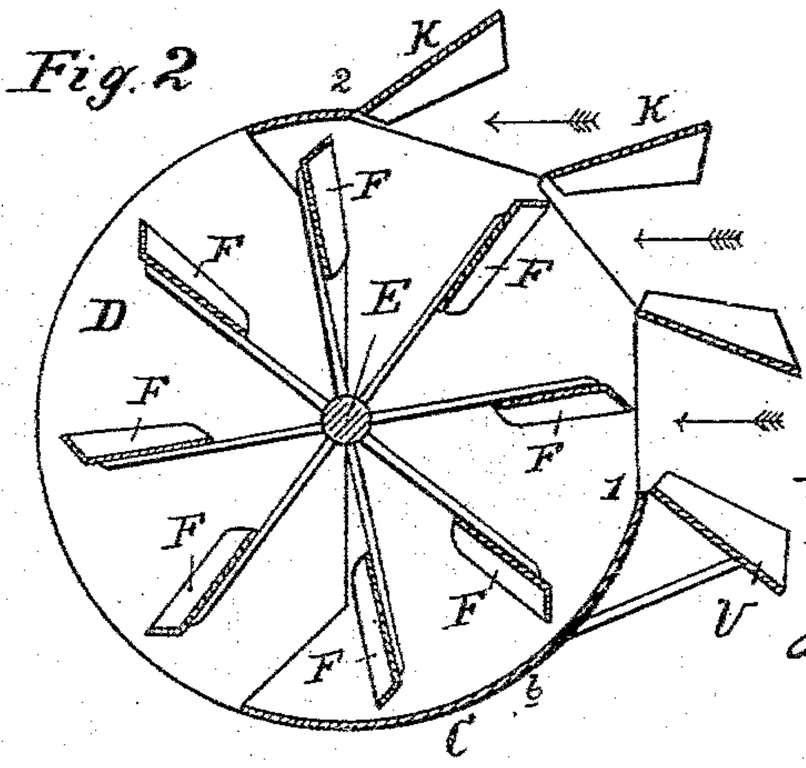


Fig. 2



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UNITED STATES PATENT OFFICE.

LUMAN M. GODFREY, OF COLON, MICHIGAN, ASSIGNOR OF ONE-HALF TO GILBERT LIDDLE, OF SAME PLACE.

WINDMILL.

SPECIFICATION forming part of Letters Patent No. 356,634, dated January 25, 1887.

Application filed July 29, 1886. Serial No. 209,410. (No model.)

To all whom it may concern:

Be it known that I, LUMAN M. GODFREY, of Colon, in St. Joseph county and State of Michigan, have invented new and useful Improvements in Wind-Engines; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, which form a part of this specification.

This invention relates to certain new and useful improvements in wind-engines; and the invention consists in the peculiar construction and operation of a wind-wheel rotating in a vertical plane within a partially-inclosing case; in the peculiar means employed for regulating the air-current to the buckets of the wheel, and in the peculiar construction, arrangement, and combinations of the various parts, all as more fully hereinafter set forth.

Figure 1 is a perspective view of my improved wind-engine. Fig. 2 is a vertical section through the wheel and case at right angles to the shaft.

In the accompanying drawings, which form a part of this specification, A represents a suitable turn-table, designed to be erected upon any proper structure upon which it can freely revolve.

B are two standards rising from the turn-table, and upon these standards is erected the case C, substantially of the form shown, and partially inclosing the wind-wheel D, secured upon the shaft E, journaled in proper bearings in the side walls of the case C, as shown. To the outer ends of the arms or spokes of the wind-wheel are rigidly secured the buckets F. Upon each end of the shaft E, outside the case, is secured a crank-arm, G, which is connected by means of the connecting-rods H to the outer ends of a cross-head, I, which has a vertical movement in slots *a* in the standards B, and to this cross-head I the pump-rod J is attached. The crank-arms G are so arranged upon the shaft E that in the rotation of the wheel the connecting-rods will simultaneously operate the cross-head I to reciprocate and impart the proper "stroke" to the pump-rod.

It will be observed that the case C incloses the front half or portion of the wind-wheel only, the rear portion of the wheel being exposed. The lower portion of the case C is closed, as at *b*, while the remaining portion of the edge of the case, from 1 to 2, is designed to be closed by the chutes or wings K, which are pivotally secured at their heels to the case. These chutes are connected by rods L to the arms *c* of the spiders M, journaled upon the stub-shafts N, projecting from each side of the case C.

O is the tail-vane, rigidly secured to the turn-table, as shown, and has to its free end pivotally secured a vertical vibrating vane, P. From this vane P suitable connections are made to bell-crank levers Q, which are in turn connected to the arms *d* of the spiders M. The arms *c* and *d* are connected together by rods or cables *e*.

R is a cross-head, having a vertical movement in the vertical slots *f* in the standards B, and to the outer ends of this head the arms *d* of the spider M are connected by means of cables *g*, while to the cross-head is secured a rope or cable, S. To the arm *h* of the spider M is secured an adjustable weight, T.

U is a stationary chute secured to the case, and is so inclined as to direct the force of the wind toward the upper part of the wheel.

In practice the normal positions of the parts are as shown in Fig. 1. The wind is directed to the buckets of the wind-wheel by the chutes K, the force of the wind striking the buckets above the center of the wheel. The weight upon the arm *h* is adjusted so as to counterbalance the chutes and keep them thrown open and to increase or diminish the speed of the wheel under the action of the wind. If the wind blows sufficiently hard to cause the vane P to assume a horizontal position, or nearly so, the chutes K will, by the connections named, be closed or partially closed.

If it is desired to put the wheel "out of the wind," the rope S is pulled upon, thus compelling the chutes to close and shut off all ingress of the wind to the wheel, which will then stop turning.

As the wheel revolves the crank-arms of its shaft impart a reciprocating motion to the pump-rod.

It will be noticed that in a mill of this construction the wheel has the advantage of all the wind exerted upon its buckets, while it is

free from all back-pressure as soon as the buckets enter the case.

What I claim as my invention is—

1. In a wind-engine, the combination, with the case provided with pivoted chutes, of a weighted spider journaled upon stub-shafts projecting from each side of said case, a turn-table, a tail-vane rigidly secured to said turn-table, a vibrating vane at the free end of the tail-vane, and connections between said spider and vibrating vane, substantially as and for the purpose specified.

2. In a wind-engine, the combination of the case C, provided with chutes K, connected to the arms of a counterweighted spider, with a vibrating vane, P, weighted spider M, and means, substantially as described, for automatically operating said chutes from said vibrating vane P, as set forth.

3. In a wind-engine, the combination, with the case C, provided with pivoted chutes K, of the weighted spider M, cross-head R, and connections between said spider and the cross-head, substantially as and for the purpose specified.

4. In a wind-engine, the combination, with the case C and chutes K, pivoted thereto, of the weighted spider M, provided with arms *c d*, the former pivotally connected with said chutes, the tail-vane O, vibrating vane P, bell-crank lever Q, connections between said vibrating vane, lever, and arm *d*, and the cords *e*, joining the arms *c d*, substantially as and for the purpose specified.

LUMAN M. GODFREY.

Witnesses:
DAVID L. AKEY,
HENRY LANE.