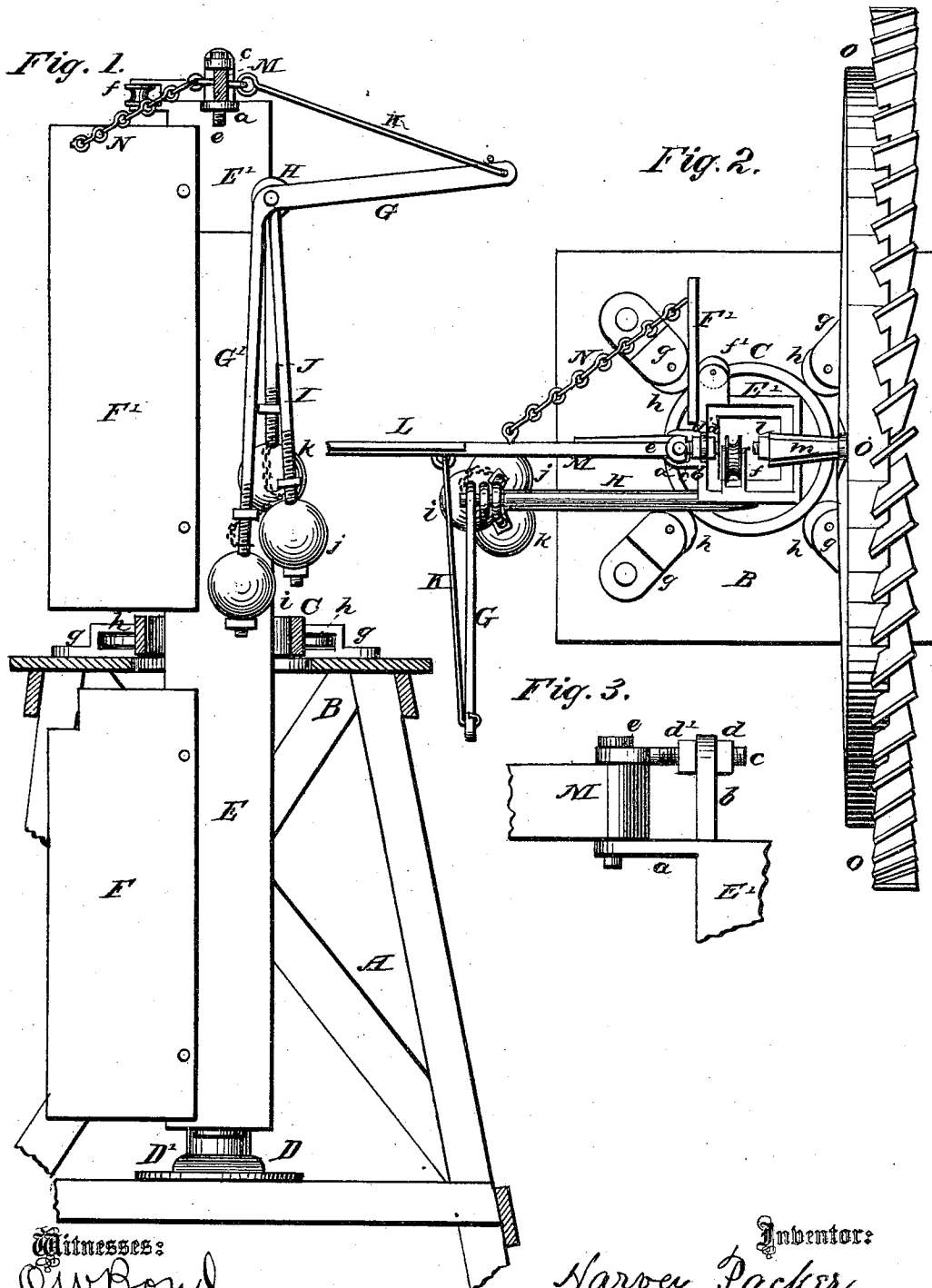


H. PACKER.
WIND-MILL.

No. 178,664.

Patented June 13, 1876.



Witnesses:
O. W. Bond.
William Kestlake

Inventor:
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Per: West & Bond Attorneys.

UNITED STATES PATENT OFFICE.

HARVEY PACKER, OF SANDWICH, ILLINOIS.

IMPROVEMENT IN WINDMILLS.

Specification forming part of Letters Patent No. **178,664**, dated June 13, 1876; application filed March 16, 1876.

To all whom it may concern:

Be it known that I, HARVEY PACKER, of Sandwich, De Kalb county, State of Illinois, have invented new and useful Improvements in Windmills, of which the following is a full description, reference being had to the accompanying drawings, in which—

Figure 1 is a rear elevation, partly in section; Fig. 2, a top or plan view; and Fig. 3, a detail of the vane-coupling.

The object of this invention is to so construct a windmill that it will start out of the wind easily and readily, so that the weights will allow the head to move toward the vane steadily without jerking or moving harder in some places than in others, and so any sagging of the vane can be taken up and the parts be kept in proper line.

In the drawings, A represents the base or frame work; B, its cap or top plate; C, a revolving band or bearing; D, hollow gudgeon; D', gudgeon-box, with a hole through the center; E, hollow revolving shaft or box; E', metal cup of revolving box; F F', fin or projecting side of the shaft or box E; G G', an L-lever; H, side arm or shaft; I J, rods supporting balls; K, rod for operating the L or bell-crank lever G; L, vane; M, vane shaft or bar; N, chain or cord for limiting the movement of the vane; O, wind-wheel; *a b*, arms on the head E' for supporting the vane; *c*, adjustable upper bearing for the vane-shaft; *d d'*, nuts for adjusting the bearing *c*; *e*, vane-shaft; *f f'*, pulley wheels, over which a cord passes for throwing and holding the wheel O out of the wind; *g*, castings for holding the anti-friction bearing-wheels *h*; *i j k*, balls; *l*, shaft of wind-wheel; *m*, bearing for wind-wheel shaft.

The frame A, which constitutes the supporting-base, is made and braced in any suitable form, and is made of any desired height.

The top B of this frame may be made of wood or metal, and it is provided with a central opening sufficiently large to permit the box-shaft E to pass through it. Immediately above this head or cap B, the box-shaft E is provided with a circular collar or bearing-band, *c*, which, when the box is square, is fastened to it at the angles. The anti-friction wheels *h* bear against this collar, and thereby

hold the box-shaft in a vertical position. The box-shaft is provided with a metal head or top, E', to which the shaft or arm H is attached, through the bearing *m* of the wind-wheel, and the arms *a b* of the vane hinge. The bar or arm H extends out to a line or nearly to a line with the inner end of the vane L. On the outer end of this bar, the bent bar or bell-crank lever G G' is pivoted, so that said bent bar stands at a right angle with the vane when it is in line, and a direct connection is made by means of the rod K. The ball stems or rods I J are pivoted to the bar or arm H by the side of the bent bar G, and they are all provided with metal balls *i, j*, and *k*, which are adjusted up and down upon their respective rods or stems by means of screws and nuts, as shown. This arrangement of the bar or arm H, rod K, and the vane with the arm G, gives an increasing leverage. As the balls rise and the leverage increases, the ball comes into play and increases the weight so that there is no jerking or jarring in the movement. The balls are connected together by chains, as shown, and the ball *i*, having its rod G' made in one piece with the lever G, moves at all times when there is any deflection of the vane. The box-shaft E is most conveniently made of four boards of equal width, and a pump or other shaft passes down through its center and through the gudgeon D and the gudgeon box or bearing D'. This central rod is connected with a crank or gearing (not shown) on the inner end of the shaft *l* of the wind-wheel. A thin board or fin, F F', is attached to the back of the box-shaft, as shown.

The lower section F may be omitted by making the upper one, F', a little wider; but I prefer to make it as shown, as the long narrow fin is out of the way, and in operation it at first takes the full strength of the wind, but, as it turns, the box makes it take less wind, and, after turning about one-quarter of the way around, the wind is so far deflected as not to effect it. Its object and purpose is to start the wheel out of line with the vane, and after the wheel is started its rotation will carry it out of any strong wind. It also, with the balls, acts as a regulator to equalize the work of the wheel. The chain N prevents the vane from passing too far in the wrong direc-

tion. Hinged vanes, as they wear, are liable to sag, and not only become unsightly, but also interfere with the working of the balls, and so as to bind and work hard. To avoid or regulate this, the upper part *c* of the hinge is made adjustable. It passes through the fixed arm *b*, and is held by the nuts *d d'*. In order to take up any sag, unscrew the nut *d'* and screw up the nut *d* until the vane is raised to position; then tighten the nut *d'*. The wheel *O* is made and attached to its shaft *l* in any of the well-known ways.

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

1. The long narrow side vane of fin *F F'*,

attached directly to the center shaft, substantially as specified.

2. The adjustable-bar *c*, of the vane hinge in combination with the fixed arms *a b* and pin *e*, substantially as and for the purpose set forth.

3. The combination of the bar *H*, bent arm *G G'*, and rods *I J*, with their balls, with the rod *K* and hinged vane *L M*, substantially as described.

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Witnesses:

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