(No Model.)

# H. B. COLMAN.

## WINDMILL.

No. 346,582. Patented Aug. 3, 1886.

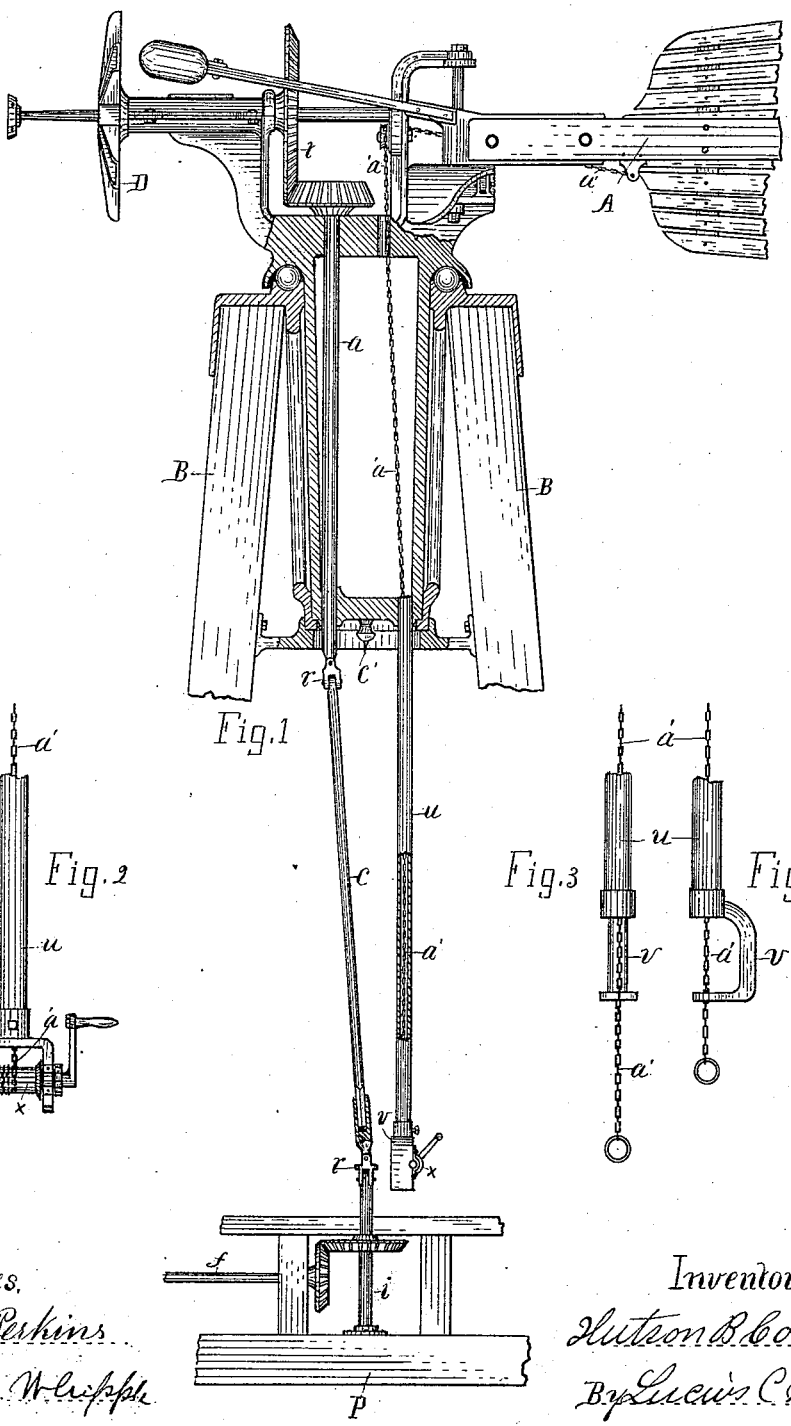


Fig. 1

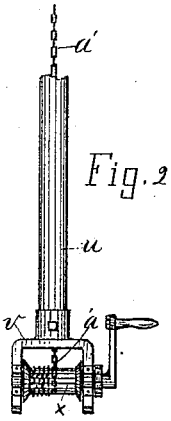


Fig. 2

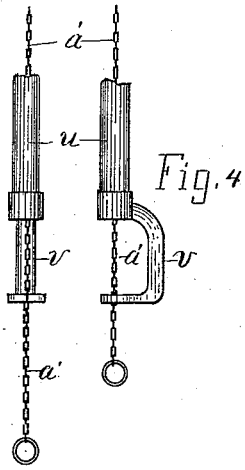


Fig. 3 Fig. 4

Witnesses.
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# UNITED STATES PATENT OFFICE.

HUTSON B. COLMAN, OF KALAMAZOO, MICHIGAN.

## WINDMILL.

SPECIFICATION forming part of Letters Patent No. 346,582, dated August 3, 1886.

Application filed April 27, 1886. Serial No. 200,305. (No model.)

*To all whom it may concern:*

Be it known that I, HUTSON B. COLMAN, a citizen of the United States, residing at Kalamazoo, county of Kalamazoo, State of Michigan, have invented a new and useful Windmill, of which the following is a specification.

This invention relates to windmills in which the power-shaft is connected with machinery to be driven by means of a shaft having universal-joint connections.

The object of the invention is to prevent the wind-wheel from being deflected out of its proper position in the wind, caused by the resistance of the driven machinery.

Another object is to prevent the chain which is employed in windmills for throwing the wheel out of the wind from becoming entangled with the connecting-shaft which has the universal joints, caused by the chain winding around said shaft when the upper end of the latter describes a circle or a fractional portion thereof during the rotation of the mill-head in its swiveled bearings.

These objects are attained by the improved means below described and claimed.

In the accompanying drawings, forming a part of this specification, Figure 1 is a side elevation of a construction embodying my invention, portions being in vertical section; Fig. 2, an enlarged detail of Fig. 1, pointed out by like letters, looking from a point at the right hand of Fig. 1; Fig. 3, an elevation looking from a point at the left of Fig. 4, and Fig. 4 an elevation looking from a point at the right of Fig. 3. The two latter-named figures show a change in the construction shown in Fig. 2.

Referring to the letters of reference marked on the drawings, B represents the derrick, in the top of which the mill-head has the ordinary swiveled or ball bearings; D, the wind-wheel, (with sails removed,) the shaft of which has bearings in the mill-head. Thus the mill-head constitutes the swiveled bearing-support of the wind-wheel shaft, as in other mills. The vane is shown at A, and *a'* is the chain attached to the vane for throwing the wheel out of the wind, the operation being well understood.

At P is shown a fixed bearing-support for machinery to be driven. The shafts *f i*, with their meshing gears, are merely shown to illustrate in a general way machinery to be driven by the power-shaft of the mill, and to indicate that it has fixed bearings, or stationary bearings.

One of my improvements in connection with the above features briefly referred to consists in placing the vertical power-shaft *a* at one side of the vertical center of the mill-head. A vertical line intercepting the point *c'* in Fig. 1 would indicate said center or axis of the mill-head. Of course the power-shaft *a* in this position has bearings in the head and tubular portion thereof, the same as a power-shaft would have at the vertical axis of the mill-head.

At *c* is shown a shaft connected with the lower end of the shaft *a*, and connected with the machinery having the fixed bearings by the universal joints *r r*. Of course the upper end of the power-shaft *a* gear-connects with the wheel-shaft in any suitable manner, Fig. 1. Both the shafts *a c* really constitute the power-shaft of the mill, when connected as shown.

The reason that the wind-wheel will not be deflected by the resistance of the driven machinery is, that the upper shaft, *a*, and the mill-head have not a center or axis in common.

The shaft *c* and universal joints *r r*, *per se*, are not new in this application; but by my new construction and arrangement I have dispensed with cumbersome and expensive mechanism and gearing, and greatly facilitated the operation.

At *u* is shown a hollow shaft suspended from the mill-head, down through which shaft the chain *a'* is passed. This shaft *u* might be a solid bar as well, to the lower end of which the end of the chain could be attached or anchored. A windlass is shown at *x*, the chain being attached thereto, and said windlass being used to anchor and wind up the chain.

At *v* in Figs. 3 and 4 an arm is shown having a recess to receive the chain-link and hold the chain. This is illustrated to show the idea of a suspended anchor for the end of the chain. The windlass may be used or not, as desired. When the mill-head turns in its bearings during the deflection of the wheel from one point of the compass to another, the upper end of the shaft *c* describes a circle or a fractional portion of a circle, according to how far the

mill-head turns. During this action the suspended chain anchor is carried around, and thus always preserves a like relation with the shaft *c*. For this reason, as the chain is carried with the anchor, the shaft *c* and the chain will not conflict, nor one become wound around the other.

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

1. In a windmill, a power-shaft composed of two shafts connected by a universal joint, the portion of the shaft above said joint being passed vertically through the mill-head and at one side of the vertical axis of said head, and the lower portion of the shaft being extended obliquely to and connected by a universal joint with machinery to be driven, substantially as set forth.

2. An anchor for the chain employed in windmills for throwing the wheel out of the wind, said anchor being suspended from the swiveled mill-head, whereby the rotation of the mill-head changes the location of the anchor without disturbing its relative position with a point which would be intercepted by a vertical line passing through the axis of the mill-head, substantially as set forth.

3. The combination, with a wind-wheel shaft, of the swiveled mill-head, machinery having a fixed bearing-support, a vertical power-shaft at one side of the vertical axis of the head, a shaft connected by universal joints with the power-shaft and with the machinery to be driven, and an anchor suspended from the mill-head for the chain employed to throw the wheel out of the wind, substantially as set forth.

4. A windlass serving as an anchor for the chain employed in windmills for throwing the wind-wheel out of the wind, said windlass being suspended from the mill-head, substantially as set forth.

5. The combination of a windmill-head and a hollow shaft suspended from the head, said shaft being provided at its lower free end with an anchor for the chain employed in throwing the wind-wheel out of the wind, substantially as set forth.

In testimony of the foregoing I have hereunto subscribed my name in presence of two witnesses.

HUTSON B. COLMAN.

Witnesses:
EUGENE C. SOUTHARD,
GEO. D. B. HALL.