E. Savoral,

Wind Wheel.

No. 110,683. Patented Jan. 3. 1871.

Fig. 1.

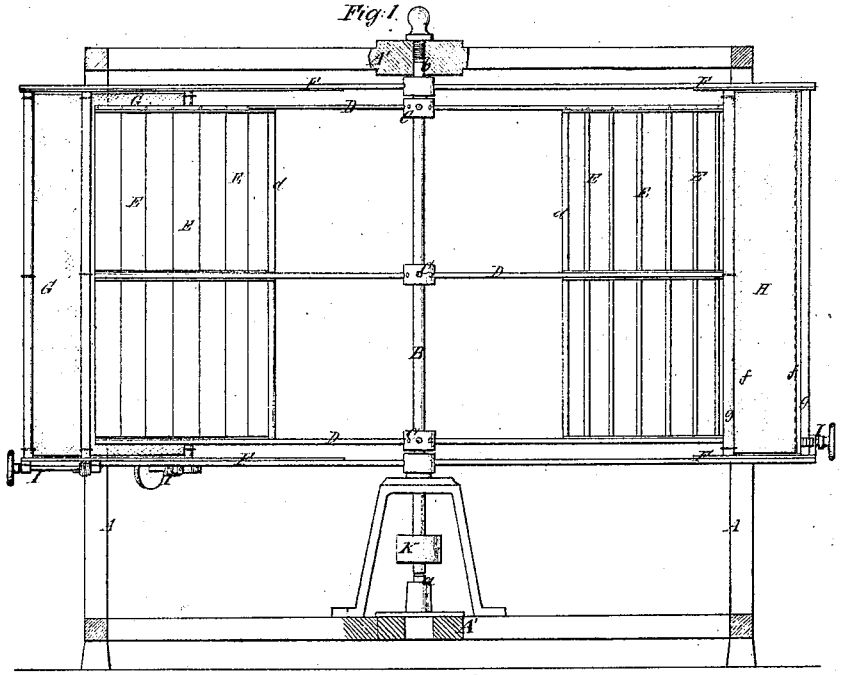
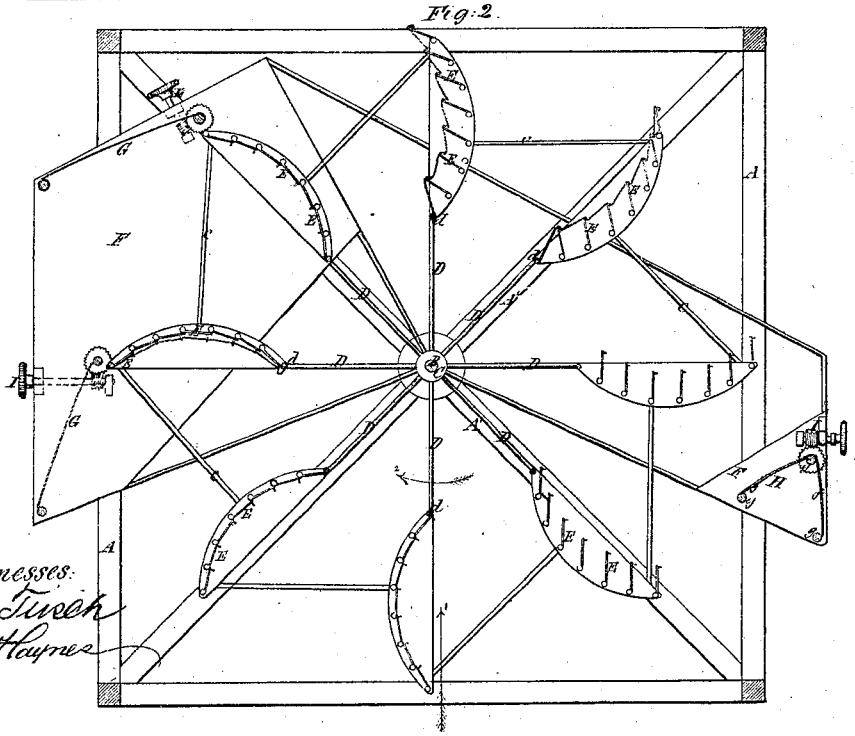


Fig. 2.



Witnesses:
Fred Tusch
F. B. Haynes

Inventor Edward Savoral

United States Patent Office.

EDVARD SAVORAL, OF NEW YORK, N. Y.

Letters Patent No. 110,683, dated January 3, 1871; antedated December 31, 1870.

IMPROVEMENT IN WINDMILLS.

The Schedule referred to in these Letters Patent and making part of the same.

To all whom it may concern:

Be it known that I, EDVARD SAVORAL, of the city, county, and State of New York, have invented certain new and useful Improvements in Windmills; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawing forming part of this specification, and in which—

Figure 1 represents a vertical central section of a windmill constructed in accordance with my invention; and

Figure 2, a horizontal section of the same corresponding to fig. 1.

Similar letters of reference indicate corresponding parts in both figures.

This invention relates to that class of windmills known as the vertical kind, and

It consists in the novel arrangement of a number of pivoted vanes at the outer ends of a series of arms secured upon a vertical shaft; and

It further consists in a novel device for catching that portion of the wind which would pass close by the vanes without acting on the same, and throw it onto said vanes, thereby increasing the velocity of the wheel and its power.

To enable others skilled in the art to construct windmills in accordance with my invention, I will proceed to describe the same with reference to the drawing.

A is an upright frame, of sufficient strength to carry the horizontal wheel, and wide enough to allow the same a free rotation.

In the middle of said frame a vertical shaft, B, is placed, to rotate freely between the lower bearing *a* and the upper bearing *b*.

These bearings are secured to the upper and lower cross-beams A′ A′ of the frame A, and may be constructed as usual.

To the vertical shaft B, hubs C C C are rigidly fastened for the purpose of sustaining a certain number of radiating arms D D, of equal length.

The ends of said arms are all connected, and firmly united by means of horizontal braces C C, and upright rods *d d*.

Between and at the outer ends of the arms D D, one or more series of pivoted vanes E E are arranged, so that when they are in a closed position, as shown on one side of the figures, they will present a concave surface to the action of the wind.

These vanes E E may be made of metal, canvas, or any other suitable material, and are connected with each other by means of links, or any flexible connection, as shown in the drawing, the last one of the vanes being connected to the upright rod *d*, whereby said vanes can be made to open only such a distance, as will prove to be most efficient.

F is a swinging frame secured loosely to the vertical shaft B, around which it is allowed to turn.

At one end of said frame and outside of the vanes, but close to them, one or more sails, G G, are spread between the upper and lower part of the frame F, and secured to upright bars *e e*, at a proper angle, so as to throw wind passing outside of the vanes E E upon the same.

To counteract the pressure of the wind on the sails G G, and balance the frame F, a wind-trap, H, is established at the opposite end of the frame F.

This wind-trap consists of two sails, *f f*, being spread between the upper and lower part of the frame F, and secured to three upright bars *g g*, in such a manner and at such an angle that they will meet at one of the bars *g*, and form an abutment to the action of the wind.

To regulate the amount of surface of the sails G G and *f f*, a mechanism, I I, as shown in the drawing, is provided to the under side of the frame F.

Now it will be seen that the action of the wind, from whatever direction it may come, will always be of the same effect on the wheel, the frame F, accommodating itself to any change of direction of the wind.

The connection of the vanes with each other and one of the upright fixed rods *d*, in the manner and for the purpose hereinbefore described, serves to enable the wind to act on more series of vanes at the same time than if they were disconnected, as is clearly shown in fig. 2.

The arrow 1 shows the direction in which the wind is coming, and arrow 2, the direction the wheel is turning.

To transmit motion, a pulley, K, is mounted on the shaft B, or some other ordinary means provided.

From the nature of its construction, this windmill is very much adapted to be used as a transportable motor.

What is here claimed, and desired to be secured by Letters Patent, is—

1. The connection of the vanes E E with each other and the upright rod *d*, by means of links or other flexible materials, substantially as and for the purposes herein described.

2. The swinging frame F, sails G G, and wind-trap H, substantially as and for the purpose herein set forth.

EDVARD SAVORAL.

Witnesses:

FRED. HAYNES,

HENRY PALMER.