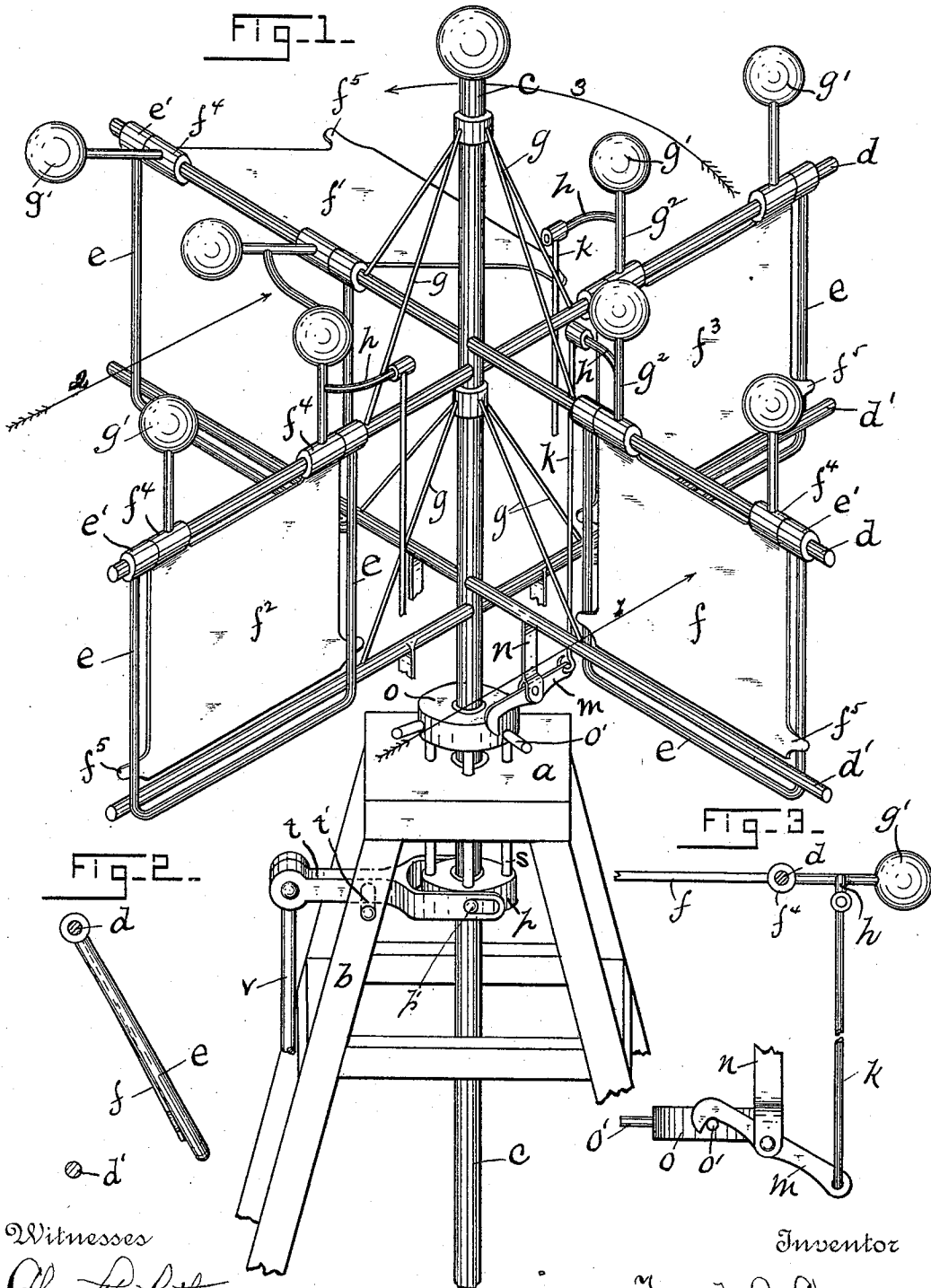


(No Model.)

J. A. CHAPMAN.
WINDMILL.

No. 584,986.

Patented June 22, 1897.



Witnesses

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WINDMILL.

SPECIFICATION forming part of Letters Patent No. 584,986, dated June 22, 1897.

Application filed June 26, 1896. Serial No. 597,007. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH A. CHAPMAN, a citizen of the United States, residing at Bay City, in the county of Pierce, State of Wisconsin, have invented certain new and useful Improvements in Windmills, which improvements are fully set forth and described in the following specification, reference being had to the accompanying sheet of drawings.

10 The object of this invention is to produce a windmill of the so-called "horizontal" type the fans of which shall at all times be in position to receive to the best advantage the current of air serving to drive the wheel, regardless of the direction in which said current of air may be passing, said wheel being
15 provided with a regulating device by means of which either a greater or less amount of power may be produced, as may be desired, and also with a device for locking the mill against rotation when necessary.

To assist in the explanation of my invention, I have provided the accompanying sheet of drawings, illustrating the preferred construction of my device.

25 In the drawings, Figure 1 shows in perspective my newly-invented windmill and explains clearly the manner in which it is acted upon by the wind; and Figs. 2 and 3 show detached the fan-frame and locking mechanism respectively employed in the construction of said windmill, which elements are hereinafter fully described in detail.

35 Referring to the drawings, the letter *a* denotes the upper portion or platform of the windmill-tower, and *a'* the framework of said tower. The tower is of the class usually employed or may be of any suitable construction.

40 The letter *c* denotes the vertical shaft of the windmill, which shaft extends upward in the tower through the platform *a* and has mounted thereupon near its upper end the fans or wind-wheel proper of the mill, the revolution of which wheel serves to impart motion to the shaft *c*.

45 Referring now particularly to the construction of the above-mentioned wheel of my newly-invented windmill, shaft *c* is the supporting-axis of the wheel, and radiating horizontally therefrom are several arms arranged

in pairs that are parallel to and in vertical alinement with each other, the upper and lower arms of each of said pairs being denoted in the drawings by reference-letters *d* and *d'*, 55 respectively.

It will be seen that one pair of fans is located slightly above the other pair, and this principle of varying the height of the fans may be so developed as to raise one pair of fans entirely above the level of the other pair, in order that the current of air acting upon the mill may not be prematurely shut off by the intervention of the fans as they successively follow around behind each other. 65

Suspended from each arm *d* near its free end and adapted to swing therefrom is a frame *e*, forming three sides of a rectangle. Hubs or bearings *e'* are secured to the upper ends of the shorter sides of said rectangular frame, 70 by means of which hubs the frame *e* is suspended from the arm *d* and may swing thereon. In width the frame *e* is somewhat greater than the distance between arms *d* and *d'*, and it will therefore be readily understood that when suspended from arm *d* the lower portion of frame *e* will come in contact with arm *d'*, and thus (for a reason hereinafter explained) the swinging of frame *e* is possible on one side only of the arm *d'*. 80

The fans of the wheel of my windmill are denoted by the letters *f f' f² f³*. These fans are substantially rectangular in shape and one is suspended from each arm *d* within its rectangular frame *e*. Fans *f f' f² f³*, like 85 frames *e*, may swing from arms *d* and, like said frames, are provided with hubs *f⁴* similar to the hubs *e'* already mentioned. These rectangular fans are in width somewhat less than the distance between arms *d* and *d'* and therefore when swung from arm *d* are unobstructed by arm *d'*.

Reference-letters *f⁵* denote projections on the fans, said projections *f⁵* of each fan being adapted to engage the frame *e* adjacent to said fan, for a purpose hereinafter explained, and the letter *g* denotes guys extending from shaft *c* to arms *d* and *d'* to help support said arms.

With the described arrangement of fans it will be readily seen that should a current of 100 air moving in the direction of arrows 1 and 2

come in contact with the windmill such current, engaging the fan f , will seek to drive said fan before it and will also force the projections f^5 of the fan into close contact with the frame e . The fan f' in the vicinity of arrow 2, being diametrically opposed to the fan f just mentioned, receives the impact of the current of air on its opposite face, and said current seeking to drive the fan before it results in swinging said fan upward on the arm d away from its frame e , thus allowing the current of air to pass unobstructed beneath it and between the arms d and d' . While the fans f and f' are being thus acted upon by the current of air denoted by arrows 1 and 2 the companion fans f^2 f^3 are in such positions that they are presented edgewise to the current of air and are therefore unaffected by it.

It will now be readily seen that the described current of air, when acting upon fans f and f' as explained, will result in driving the wheel in the direction of arrow 3, and therefore the shaft c will be correspondingly revolved.

While I have shown in the drawings a wheel provided with four fans only, it will be readily understood that a greater number could as well be employed, and it will also be understood that as the wheel revolves the several fans are automatically brought into positions to receive to the best advantage the current of air, and that when such fans pass around and are brought "face to" the wind they will be swung upward a distance proportionate to the force of the wind, allowing the wind to pass freely through.

Thus far in describing the manner in which the wheel is driven it has been assumed that the frames e have remained stationary, but these frames e constitute the regulator of my windmill, the manner in which they operate to perform this office being as follows: When the current of air engaging the fan f , as denoted by arrow 1, becomes sufficiently strong, said fan will be swung from its supporting-rod d , forcing before it said frames e , as shown in Fig. 2 of the drawings, the extent to which said frames may be forced upward by the fans being dependent, of course, upon the strength of the current and the resisting weight of the frames, and, providing frames e be of suitable weight, it will be obvious that a considerable amount of force or pressure of air must be exerted against them before they can be swung upward, and thus a required amount of power may be derived from the windmill before the escape of any portion of the current.

Should it be desired to produce great power, it will be obvious that the frames e should be heavy enough to withstand the pressure of air and thus present the fans to the wind to the best possible advantage; but if only small power be desired the frames e could be correspondingly lighter and would then be swung upward by the fans as soon as the desired

amount of power was produced by the windmill. It will therefore be seen that by means of frames e a very simple and effective regulator is provided.

In order that the fans may be easily rocked, either to bring them into a vertical position or into a horizontal position for the purposes already explained, I have counterbalanced said fans by means of weights (shown in the drawings as balls g') mounted upon rods g^2 , extending from hubs f' . These weights g' are adjusted so as to very nicely counterbalance the weight of the fans, so that scarcely any power is required to rock said fans upon arms d .

A device is also provided by means of which the windmill may be locked to prevent its operation when it is desired to do so. This locking mechanism is constructed as follows: Projecting from the arm g^2 nearest shaft c of each fan is a short arm h , the end of which is connected by a link k to the end of a lever m , pivoted midway its length to a downwardly-extending bracket n on arm d' , the free end of which lever is hook-shaped, as clearly shown in Figs. 1 and 3. Each fan is provided with the elements h , k , n , and m , but to avoid complication of the drawings in Fig. 1 only one of said fans is shown as fitted up completely. Mounted upon shaft c , above platform a , is a ring o , and below said platform is a similar ring p . Rings o and p are connected by several rods s , which pass loosely through the platform a and are parallel with each other and with the shaft c . Radiating from ring o are a number of studs o' , adapted to engage the hook end of lever m and equalizing said levers m in number. The letter t denotes a lever hung at t' midway its length to the frame b , and having one end bifurcated to straddle ring p , and the members of said bifurcated end are slotted to receive studs p' , projecting thereinto from said ring p . The opposite end of lever t is pivotally secured to the operating-lever v of the windmill.

It will now be readily understood that when the locking mechanism is in the position of Fig. 1 should rod v be drawn downward such action would result in so forcing upward the inner end of lever t and the rings p and o that the studs on the latter will engage the hook end of levers m , which hooks when forced upward accomplish (through the link k) the rocking of the several fans into a horizontal position, as shown in Fig. 3, when the fans will be unaffected by the wind and will therefore remain stationary.

When it is desired to again start the windmill into action, the operating-handle v is forced upward, and when (through the various intermediate elements described) the fans are allowed to return by gravity to a vertical position in order that they may receive the force of the wind and the mill again be set in motion.

My newly-invented windmill as a whole is

very simple in its construction and will not easily get out of order. At the same time it may be cheaply produced.

Having described my invention, I claim—

5 1. In combination, in a windmill, a vertical shaft having upper and lower radial arms *d* and *d'*, a frame hinged to each upper arm and a fan also hinged to each upper arm and having its lower portion located between the
10 lower arm *d'* and said hinged frame, substantially as specified.

2. In combination, a vertical shaft and its radial arms, fans hinged to the upper arms, weights controlling the fans and mechanism

for automatically throwing the fans in a horizontal position and locking the shaft against rotation, substantially as described. 15

3. In combination, a vertical shaft of a windmill having radial arms, fans hinged to the arms, frames surrounding the fans and
20 operated thereby in one direction and means for elevating the fans and locking the shaft, substantially as described.

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Witnesses:

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