

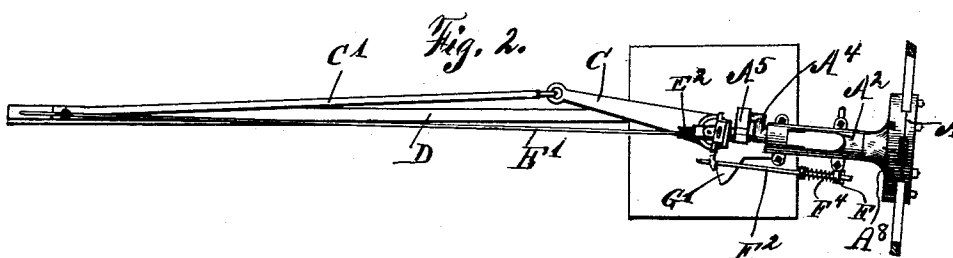
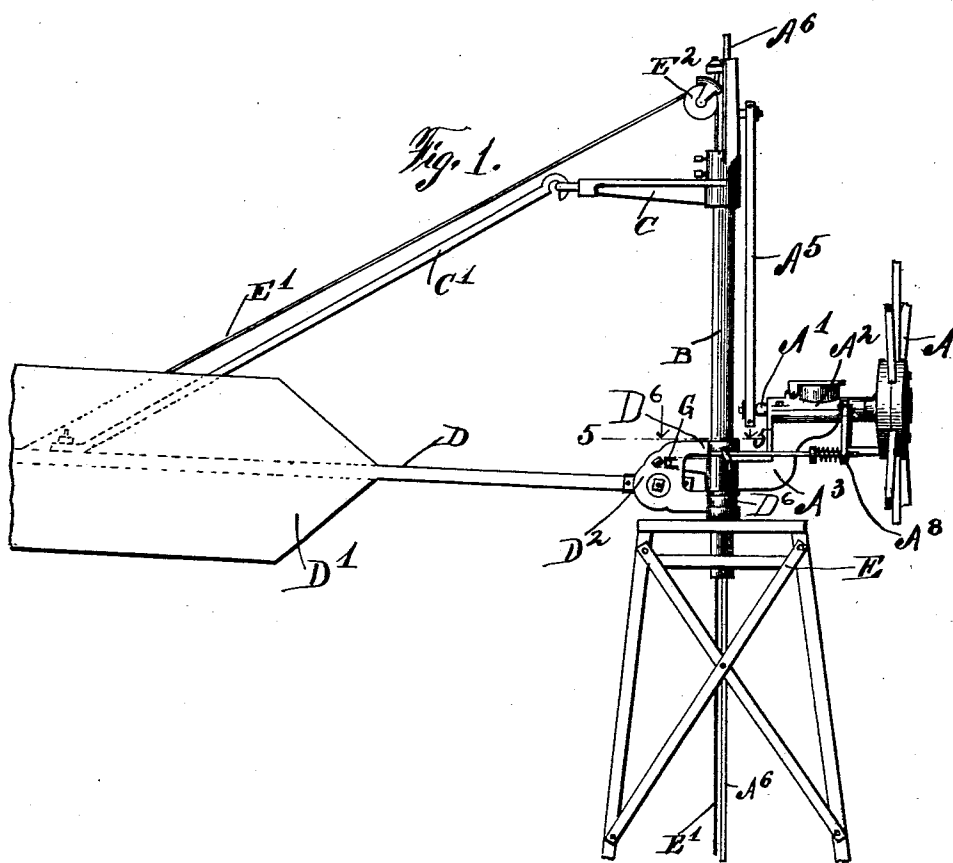
(No Model.)

2 Sheets—Sheet 1.

F. M. GOODHUE.
WINDMILL.

No. 573,510.

Patented Dec. 22, 1896.



Witnesses.
at test.
Donald M. Carter.

Frank M. Goodhue, Inventor.
by Francis A. Parker, Atty.

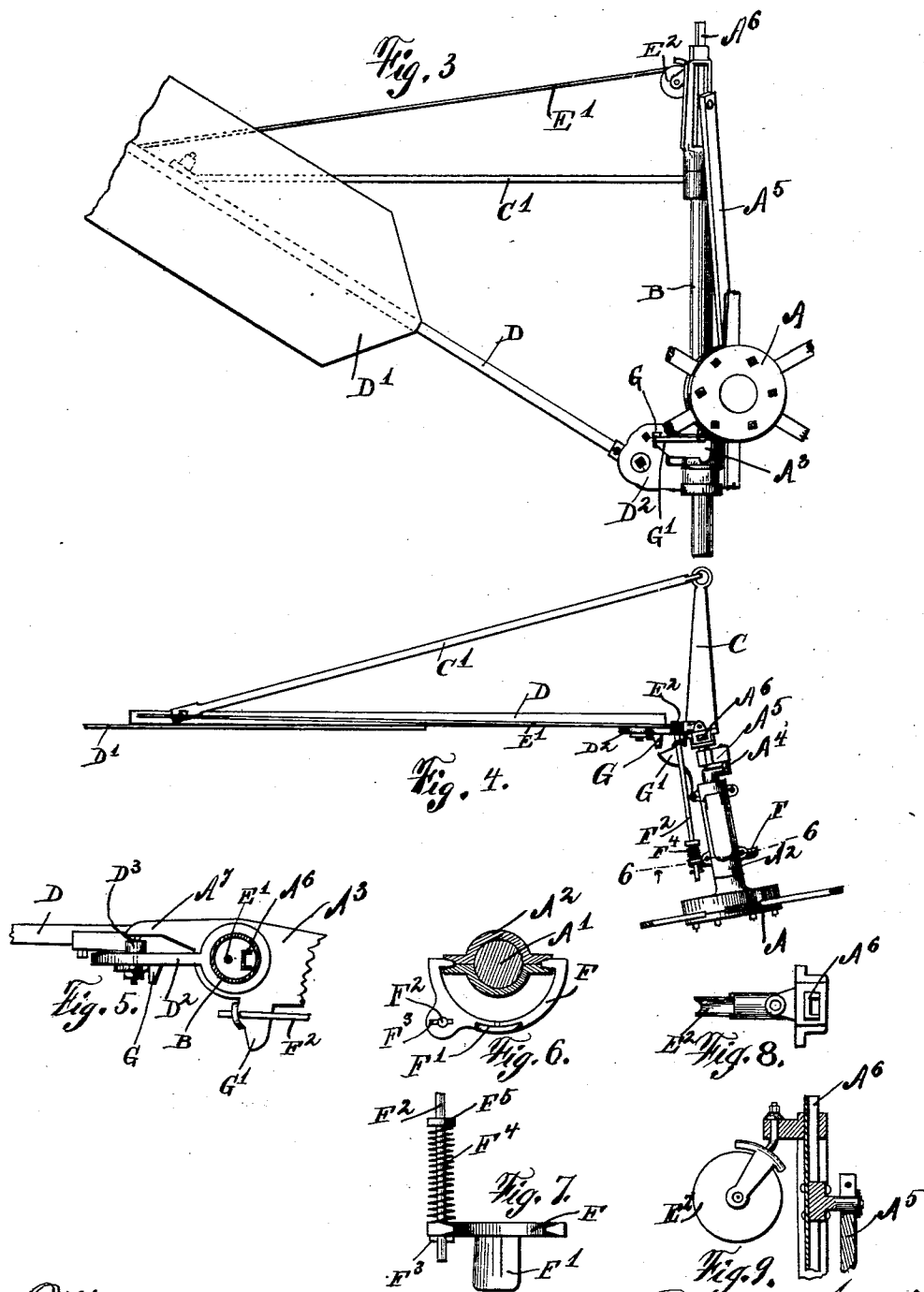
(No Model.)

2 Sheets—Sheet 2.

F. M. GOODHUE.
WINDMILL.

No. 573,510.

Patented Dec. 22, 1896.



Witnesses:
A. E. Reinkens,
Donald M. Carter,

Inventor:
Frank M. Goodhue
by Francis W. Parker,
Att'y.

UNITED STATES PATENT OFFICE.

FRANK M. GOODHUE, OF ST. CHARLES, ILLINOIS.

WINDMILL.

SPECIFICATION forming part of Letters Patent No. 573,510, dated December 22, 1896.

Application filed October 14, 1895. Serial No. 565,611. (No model.)

To all whom it may concern:

Be it known that I, FRANK M. GOODHUE, a citizen of the United States, residing at St. Charles, in the county of Kane and State of Illinois, have invented certain new and useful Improvements in Windmills, of which the following is a specification.

My invention relates to windmills, and has for its object to produce a new and improved windmill, of which the following is a description, reference being had to the accompanying drawings, wherein—

Figure 1 is a side elevation of the mill when in its normal position with the parts broken away. Fig. 2 is a plan view of the same. Fig. 3 is a side elevation of the mill when thrown out of gear. Fig. 4 is a plan view of the same. Fig. 5 is a cross-section on line 5 5, Fig. 1. Fig. 6 is a cross-section on line 6 6, Fig. 4. Fig. 7 is a detail of the brake. Fig. 8 is a plan view of the upper end of the wheel-supporting device. Fig. 9 is a vertical section of the same.

Like letters refer to like parts throughout the several figures.

The wheel A of the windmill, which I have only shown in part, is rigidly connected with the shaft A', working in the bearing A² on the end of the arm A³, said arm being rigidly connected to the upright post or pipe B. The shaft A' is provided with the crank A⁴, said crank being connected by rod A⁵ with the pump-rod A⁶, contained within the pipe B. Rigidly connected to the upper end of the pipe B is an arm C, to which is connected the rod C'. Said rod is connected to said arm so as to be free to move with relation thereto. The lower end of the rod C' is connected with the arm D, which carries the vane D'. Said arm is pivotally connected to the piece D², said vane hinge or piece being connected to the pipe B, so as to be capable of rotation thereabout. The arm A³ is provided with the projection A⁷, which engages the projecting part D³ on the piece D² and limits the rotation of said latter piece about the pipe B. Said pipe is connected with the windmill-frame E, so as to be capable of rotation. A rope or other controlling device E' is connected with the arm D and passes over the pulley E² and thence down through the pipe B to the ground or to a position where it may

be controlled from the ground. A curved piece F is pivotally connected to the bearing A² (see Fig. 6) and is provided with a brake-shoe F', which is opposed to the hub of the wheel A. A spring-actuated rod F² is connected at one end with the curved piece F, the other end being in the path of the vane hinge or piece D², so that when the parts are in the position shown in Fig. 4 the said rod will be forced toward the wheel A and the brake-shoe F' will be forced into contact with the hub of said wheel, so as to prevent its rotation. The rod F² may be connected with the brake-shoe in any convenient manner. As shown in the drawings, said rod passes through a hole in the curved piece F and is provided with a pin F³, which prevents its withdrawal. A coil-spring F⁴ surrounds said rod and bears at one end against the curved piece F and at the other end against the collar F⁵.

The brake-shoe is supported so that it is normally kept out of contact with the hub of the wheel by its weight, for as the piece F, to which said brake-shoe is connected, is pivotally suspended the brake-shoe, being on one side of the pivot, will tend to move away from the wheel.

The spring F⁴ allows for the wear of the brake-shoe or the hub of the wheel, for when the brake is set it is forced against the hub by the spring, the end of the rod F² projecting beyond the piece F, and hence the wearing away of the parts only decreases the amount that said rod projects beyond the piece F.

When the shaft A' is moved so as to be substantially at right angles to the vane, further movement in this direction is prevented by the engagement of the lugs G G'.

I may provide the hub of the wheel against which the brake-shoe bears with indentations or recesses, as shown at A⁸, Fig. 2. When the wheel is so constructed, the brake-shoe will be forced into one of said indentations, when the brake is set, and hence the wheel will be rigidly held in a stationary position. The vane hinge or piece D², to which the vane is pivotally connected, is provided with two separated arms D⁶ D⁶. The pipe or support B passes through the ends of these arms, so that the vane hinge or piece D² may be moved with relation thereto. The arm A³, which

carries the wind-wheel, is rigidly connected to the pipe or support B between the separated arms D⁶. The lower arm D⁶ rests upon the top of the tower, and although free to rotate, so that the vane may take a position which makes the wheel face the wind, its relation is retarded by the friction due to the entire weight of the windmill and associated parts. The arm A³ is supported upon the lower arm D⁶ and makes contact therewith. It will be seen that the weight supported by the arm A³ is less than the weight supported by the lower arm D⁶, and hence the friction between the lower arm D⁶ and its supporting device upon the tower will be greater than the friction between the arm A³ and the lower arm D⁶, and hence I have found that when the angular relation between the wheel-arm and the vane-arm is changed the vane will remain stationary while the wheel moves around toward it. It will be seen by the above description that the vane has a pivotal connection with the supporting device, whereby it is adapted to be moved in a vertical plane, and that it also has a second pivotal connection with said supporting device, whereby it is adapted to have a relatively horizontal motion with said supporting device. I have described these several parts in detail, but it is evident that they may be greatly varied in form, construction, and arrangement without departing from the spirit of my invention, and I therefore do not wish to be limited to the construction herein shown and described.

The use and operation of my device are as follows: The velocity of the wind by which windmills are driven varies greatly, and hence the speed of the windmill will also vary greatly unless provided with some governing device. When a windmill is constructed as herein shown and described, the parts may be so proportioned that the wheel will run at a substantially constant speed at all times, provided, of course, there is sufficient wind to rotate the wheel at this speed. By referring to Fig. 2 it will be seen that the shaft carrying the wheel is normally at an angle to the vane. Alinement of said shaft and said vane is prevented by the projection A⁷ on the arm A³. (See Fig. 5.) It will therefore be seen that the wheel does not fully face the wind, and the fans of the wheel are so constructed that the wind tends to force the wheel around so as to vary the angle between the shaft A⁷ and the rod carrying the vane.

The parts are so constructed that this angle is not varied until the velocity of the wind increases to an amount sufficient to increase the speed of the wheel, so as to cause such speed to become greater than the predetermined or constant speed at which the wheel is designed to run. As the wheel veers around the effect of the wind decreases, and hence the speed of said wheel will be less than if facing the wind. As said wheel moves around the arm C and pipe B move therewith, and hence the rod E¹ is shortened and the vane is tilted or moved from its horizontal position. If the wind decreases, the vane lowers so as to move the wheel back in order that it will more nearly face the wind. It will therefore be seen that by the correct proportion of these parts the wheel may be automatically kept in a position where its speed will be practically constant. When it is desired to stop the windmill, the parts are brought to the position shown in Fig. 4 by pulling down on the cord E¹. When in this position, the wind has very little tendency to rotate the wheel, and any rotation whatever is prevented by brake-shoe F¹ coming in contact with the hub of the wheel. It will therefore be seen that the wheel is automatically locked in a stationary position.

The casting or piece to which the vane-stem D is bolted is loosely attached to the vane-hinge D², the adjacent faces of the casting and vane-hinge being substantially parallel planes. By this construction the vane is kept in vertical alinement when horizontal or elevated without the addition of other parts, and cramping is also prevented.

I claim—

A windmill comprising a wheel connected with a shaft revolvably mounted in an arm rigidly attached to a supporting device, a curved piece F pivotally connected to said arm provided with a brake-shoe F¹ projecting on one side thereof, a rod connected with said brake-shoe, a spring F⁴ interposed between said rod and brake-shoe, a vane connected with a vane-hinge D² rotatably mounted upon said supporting device, said vane-hinge adapted to engage said rod when the parts are in a predetermined position and force the brake-shoe against the hub of the wheel.

FRANK M. GOODHUE.

Witnesses:

JOHN F. DEWEY,
JAMES E. GOODHUE.