

F. A. MATHEWS.  
WINDMILL.

No. 534,167.

Patented Feb. 12, 1895.

Fig. 5.

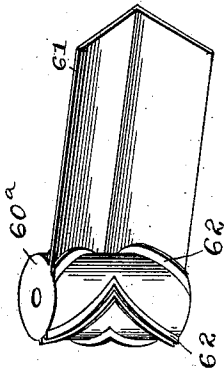


Fig. 3.

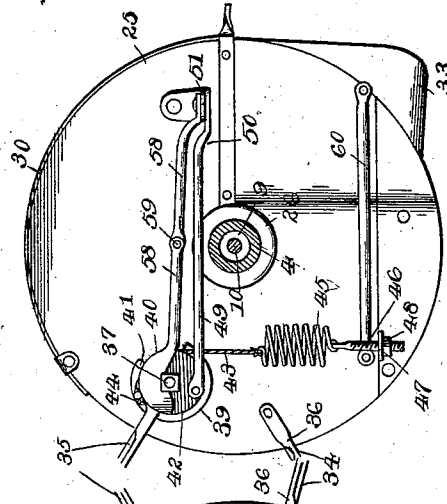


Fig. 2.

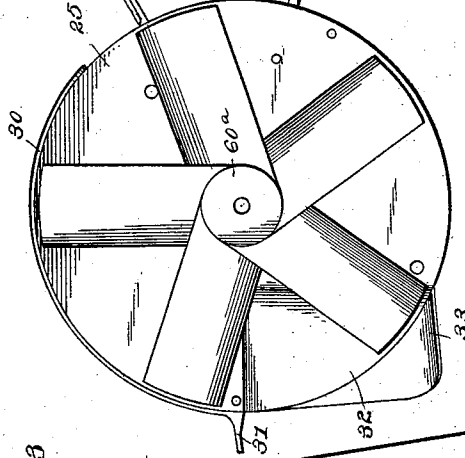
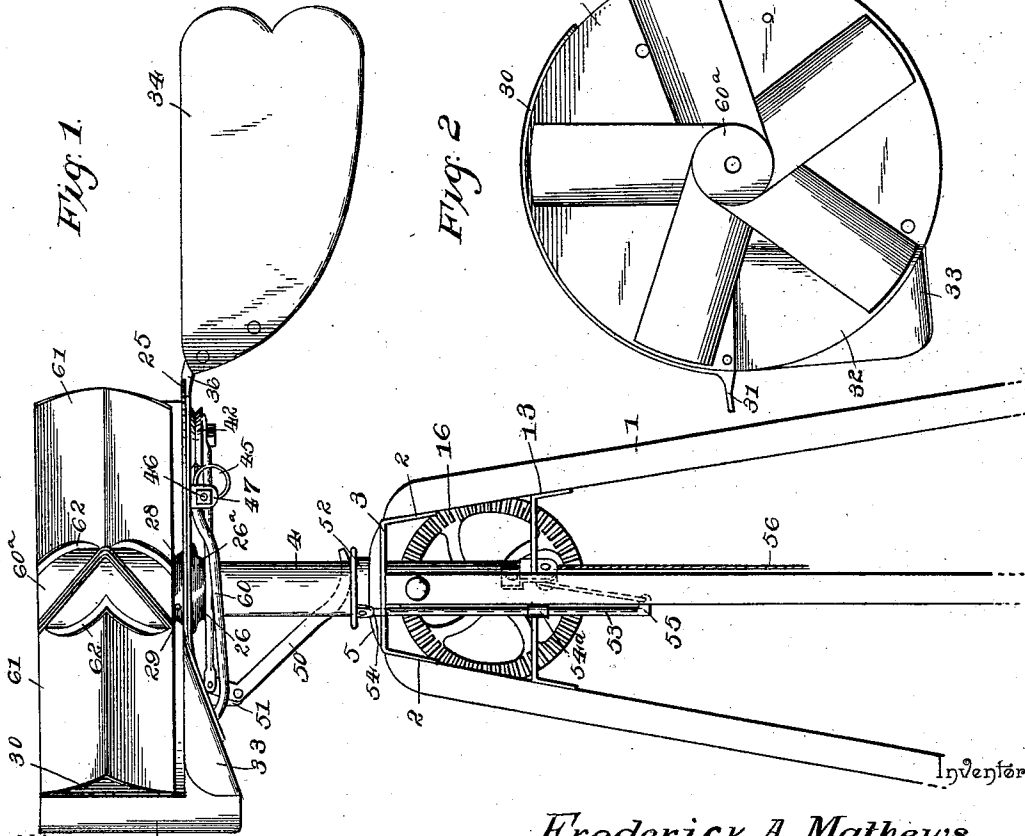


Fig. 1.



Witnesses  
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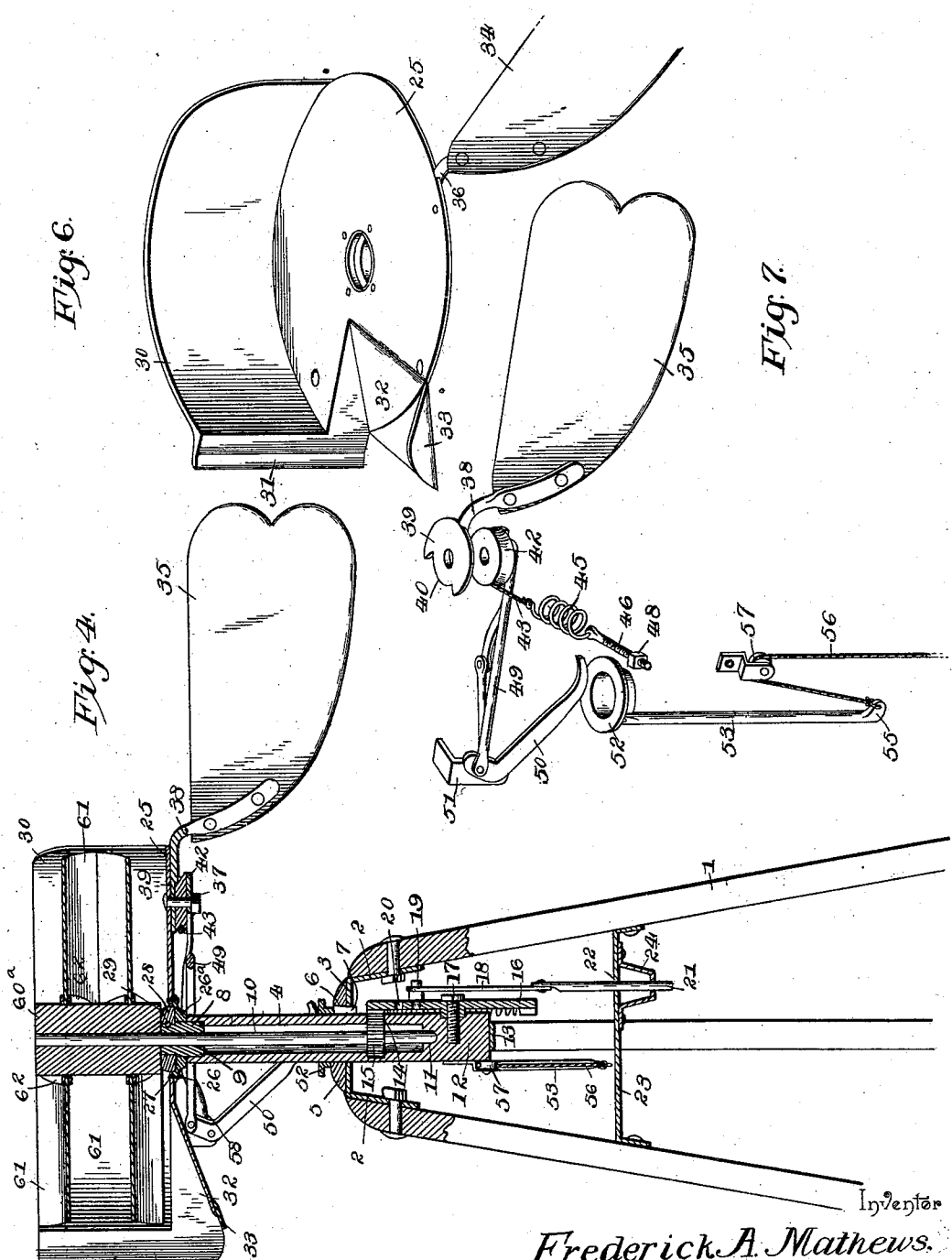
(No Model.)

2 Sheets—Sheet 2.

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Witnesses

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By his Attorneys,

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Inventor

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# UNITED STATES PATENT OFFICE.

FREDRICK A. MATHEWS, OF LA HARPE, KANSAS, ASSIGNOR OF ONE-HALF  
TO GEORGE STEVENSON, OF SAME PLACE.

## WINDMILL.

SPECIFICATION forming part of Letters Patent No. 534,167, dated February 12, 1895.

Application filed June 7, 1894. Serial No. 513,806. (No model.)

*To all whom it may concern:*

Be it known that I, FREDRICK A. MATHEWS, a citizen of the United States, residing at La Harpe, in the county of Allen and State of Kansas, have invented a new and useful Windmill, of which the following is a specification.

My invention relates to an improvement whereby the force of the wind may be applied to industrial purposes with greater efficiency and ease than ordinarily; and whereby the power so produced and applied will be greater than in other devices of this class, compared with the force of the wind. These ends are attained by certain improved features of construction and combination and arrangement of parts which will be the more fully described and finally embodied in the claims.

In the accompanying drawings: Figure 1 represents a side elevation of my invention; Fig. 2, a plan view; Fig. 3, a bottom plan of the platform; Fig. 4, a vertical section; Fig. 5, a detail perspective of one of the wind-blades, showing it attached to the hub of the wheel; Fig. 6, a detail perspective showing the construction of the platform; Fig. 7, a detail perspective showing the devices for attaching the adjustable vane.

The reference numeral 1 indicates the framework of the tower, which may, of course, be of any construction. The upper ends of the vertical standards of the frame 1 are rigidly secured to the downwardly-projecting studs 2, of the circular plate or disk 3. This disk 3 is disposed horizontally and provided with a central orifice through which the barrel 4 passes, while it is strengthened by the ring 5, arranged on its upper side and embracing the barrel. Formed in the ring 5 and disk 3, and vertically aligned in each, are the openings 6, in which the wedge-key 7 is arranged and by which the barrel is rigidly connected to the disk and ring.

The barrel 4 is hollow throughout its length and provided at its upper end with a block 8, which is secured rigidly in place and serves to close said end. Formed in the block 8, and axially coincident with the barrel, is the passage 9, in which the drive-shaft 10 of the machine is arranged, so as to be capable of rotary movement therein. The drive-shaft 10

extends vertically throughout the length of the barrel and is seated, at its lower end, in the cup-bearing 11, formed in the block 12, the block being arranged, in turn, in the lower end of the barrel and rigidly secured thereto and to the brace 13 of the frame 1.

Formed in the barrel 4, just below the disk 3, is the horizontally-elongated slot 14, which is adapted to furnish access to the small beveled gear 15, fixed to the shaft 10. The gear 15 is of a diameter which will make it possible to pass it through into the interior of the barrel, and it is by this means that the parts are placed in position. The gear 15 meshes with the large crown gear 16, mounted upon the stub-shaft 17, and this is, in turn, fixed to the lower end of the barrel by screwing it therein, or otherwise. By these means the motion and power attending the shaft 10 are transmitted to the wheel 16, and from the wheel 16 the power is communicated to the pitman 18, through the medium of the crank-pin 19, fixed to the wheel, and pivotally connected to the upper end of the pitman. The pin 19 is secured to the wheel 16 by means of one of the series of openings 20, which are arranged in radial alignment, and by this means the stroke of the pitman can be made long or short, to suit the conditions under which the machine is used. Pivotaly connected to the lower end of the pitman 18 is the pump-rod 21, which proceeds downwardly and is passed through the openings 22, in the horizontal brace-bar 23 and in the hanger 24. This rod is connected to the pump mechanism or to any other machine with which the invention may be used. Mounted revolubly upon the block 8, and resting upon the upper end of the barrel 4, is the platform 25, which is circular in shape and centrally perforated to permit mounting it. Located in the opening in the platform 25, and rigidly secured therein, is the bushing 26, which is formed with a downwardly-extending portion 26<sup>a</sup> and with a rabbet groove 27 on its upper side, in which groove the collar 28 is adapted to lie.

The collar 28 serves to hold the platform 25 in place, and it is itself retained by means of the key 29, passed diagonally through it and engaging the block 8. The platform 25 is preferably formed of sheet metal and pro-

vided at its periphery with the vertical flange or wall 30, which extends for a distance equal to little less than one-half that of the periphery of the platform, and is of a height equal to about the radius thereof. Formed at one end of the flange or wall 30, and extending radially therefrom, is the offset or secondary flange 31, and this is adapted to serve as a vane or guide for the wind, whereby it is guided into engagement with the wind-wheel, as will be hereinafter described.

Formed in the platform 25, and extending from the off-set 31 to a point near the center of the platform, is the downwardly-inclined side 32, which has one side extending radially on the platform, while the remaining side extends off laterally from the first and at right angles thereto to the periphery of the platform. Rigidly secured to or formed integral with the periphery of the platform, and extending around the edge of the portion 32, is the wing 33, which curves outwardly and upwardly and operates, with the offset 31, to guide the wind up the incline 32 and into engagement with the wheel.

The platform 25 is revolvably mounted so that it will be capable of adjusting itself to the direction in which the wind is blowing and this adjustment is effected by the vanes 34 and 35, one of which is rigid, while the companion is pivoted so that its angle may be varied for a hereinafter-described purpose. The vane 34 is the rigid vane, and is riveted or otherwise secured to the under side of the platform by means of the attached arm 36, which extends downwardly from the platform and is rigidly connected to the vane, whereby the vane is located below the plane of the platform.

The disposition of the vane 34 is approximately radial, and it is located at a peripheral point on the platform, about one-half the distance between the wing 33 and the end of the flange 30, which end is opposite the one having the offset 31. The vane 35 is arranged at the said end of the flange 30, and normally projects radially from the platform. The vane is pivoted to the stud 37, fixed in turn to the lower side of the platform, by means of the arm 38, rigidly secured to the vane at one end and to the disk 39 at the remaining end. The disk 39 is provided with a central opening which embraces the stud 37, whereby it is pivotally mounted, while its movements are limited within the extent of a quadrant by means of the peripheral slot 40, operating with the pin 41, fixed to the platform.

Rigidly secured to the disk 39, and concentric therewith, is the grooved pulley 42, to which the cable 43 is fixed and over which it operates. The cable 43 is fixed to the pulley 42 by means of the pin 44 and proceeds around one-half of the periphery of the pulley and is connected to the retractile spring 45. The spring 45 is connected at its remaining end to the spindle 46, which is passed through an opening in the arm 47, depend-

ing from the platform and screw-threaded throughout its length. Operating on the screw-threaded portion is the nut 48, by which the spindle is held from passing through the opening in the arm 47, and by which the spindle may be adjusted so as to increase or diminish the tension of the spring 45. By these means the pulley 42, and consequently the vane 35, is given a tendency toward the flange 30, the vane being capable of moving against the tendency of the spring and toward the companion 34. This movement is effected by means of the pitman 49, which is pivoted to the pulley 42, and which extends across the under side of the platform to the short arm of the bent lever 50. The lever 50 is pivoted at its bend to the arm 51, rigidly secured, in its turn, to the platform 25, and depending downwardly therefrom.

From the arm 51 the long arm of the lever 50 extends diagonally downwardly and normally lies alongside the barrel 4 and in engagement with the upper end of the collar 52. The collar 52 is loosely mounted on the barrel so as to be capable of vertical movement thereon, and this movement is effected by means of the vertically-reciprocating rod 53, arranged in the opening 54 of the disk 3, and in the eye 54<sup>a</sup> of the lower end of the barrel 4. The lower end of the rod 53 is provided with an apertured and horizontally-extending arm 55, to which the cord or cable 56 is connected.

From the arm 55 the cable 56 extends upwardly and over the pulley 57 of the barrel 4, and thence downwardly to the ground within reach of the attendant. Thus it will be seen that the collar 52 may be raised or lowered at will, which will result in a raising of the long arm of the lever 50, and in a consequent turning of the vane 35, whereby it may be moved toward the companion vane and its relation to the platform and said vane changed. This will result in a change in the relative positions of the platform and wind-wheel.

Thus, when the vanes are in their normal positions, the wind will pass over about one-half of the platform and therefore exert all the influence possible on the wheel mounted on it, the remaining half of the wheel being covered by the flange 30. If, however, the vane 35 be moved toward its companion, the offset 31 will be thrown to the right, so as to cut off the wind from the wheel, and to cause it to engage only with that part which is yet to the right of the said offset. This adjustment may continue until the wheel is nearly completely shaded from the wind, and will result in the varying of the speed at which the wheel is moving.

58 indicates two braces which are attached one to the stud 37 and the remaining one to the arm 51, and have their other ends joined to each other by means of the pin 59, passing into the platform 25. The inclined portion 32 is also braced by means of the arm 60, which extends from said portion to the plane

portion of the platform. The shaft 10 extends above the block 8, and the platform 25, and to a point about level with the upper end of the flange 30, where it is provided with the wind-wheel.

The wind-wheel consists of the hub 60<sup>a</sup>, which is cylindrical in shape and perforated longitudinally so that it may be fixed to the shaft 10. 61 indicates the blades of the wheel, and these are secured in place by means of the ribs 62, formed integral with or rigidly secured to the hub, the blades being bolted or riveted to the ribs. The blades are disposed horizontally and are V-shaped in cross-section, so that they will more effectually gather and retain the wind. The number of the blades may be any which will suit the exigencies of the occasion or the convenience of the manufacturer, and the blades are of a height about equal to the height of the flange 30.

It will be understood that the number of the blades 61 will not approach that of the blades of the feathering-blade wheel, since the two kinds operate on different principles, as will be understood. A further point regarding the principle of the invention lies in the fact that the machine is adjusted to the direction of the wind without moving the wheel, but by moving a shield or guard, and thereby covering and exposing the necessary parts, as will be apparent from the foregoing specification.

The operation and use of my invention will not need any detailed description, since it does not differ from that attending other windmills, and is, therefore, known. It will suffice for me to say that the machine is well adapted for driving all kinds of machinery, to which windmills are generally applicable.

The adjustment of the vane 35 is retained by securing the operating cord at the proper position to the frame 1, or to any other convenient object.

Having described my invention, what I claim is—

1. In a windmill, the combination with a frame, of a barrel extending vertically and rigidly and immovably mounted thereon, a shaft projected through the barrel and axially coincident therewith, the lower end of the barrel being closed, and in which end the corresponding end of the shaft is journaled a block arranged in the upper end of the barrel and projecting above the same and in which the shaft has a bearing, said block having a flange at its upper end a platform revolubly mounted upon the block and held in place by the flange on the block and provided at its edge with a vertical flange extending around a portion thereof, a vane fixed to the platform and capable of keeping the same in the proper relative position to the wind, a horizontal wind-wheel mounted on the shaft and directly above the platform, and means at the lower end of the shaft for converting the rotary movements thereof into reciprocating movements, substantially as described.

2. In a windmill, the combination with a frame, of a barrel extending vertically thereon, a shaft projected through the barrel and axially coincident therewith, the lower end of the shaft having a bearing in the corresponding end of the barrel a block in the upper end of the barrel and in which the shaft is journaled, a collar revolubly embracing the block and resting upon the upper end of the barrel, a platform fixed to the collar, the latter having formed in its upper end a rabbet groove, a collar fixed to the upper end of the block and seated within said rabbet groove, whereby said collar is held on the block, and whereby the collar is placed partially below the surface of the platform, wind wheel mechanism on the platform and connected to the shaft, substantially as described.

3. In a windmill, the combination with a frame, a barrel extending vertically thereon, a platform mounted revolubly upon the barrel, a shaft extending through the barrel, a wind-wheel on the shaft, a wing arising vertically from one side of the platform, a vane rigid on the platform and extending radially therefrom, a movable vane pivoted to the platform, a spring operating with the movable vane and for keeping the same away from the rigid vane, a pitman connected to the movable vane, a bent lever connected to the pitman and having one end extended alongside of the barrel, a collar movable vertically on the barrel and capable of engaging the bent lever, and means for giving the collar a vertical movement, substantially as described.

4. In a windmill, the combination with a frame, of a barrel extending vertically thereon, a platform revolubly mounted on the barrel, a wing arising from one side of the platform, a shaft projected through the barrel and revolubly mounted therein, a wind-wheel fixed to the shaft and located directly above the platform, a rigid vane on the platform and projecting radially therefrom, a movable vane, a pulley-wheel to which said movable vane is fixed, a spindle on the platform by means of which the pulley-wheel is revolubly mounted, a retractile spring connected to the pulley-wheel and operating to keep the movable vane away from the rigid vane, a pitman eccentrically connected to the pulley-wheel, a lever to which the remaining end of the pitman is connected, one end of the lever being extended alongside of the barrel, a collar movable vertically on the barrel and capable of engaging said end of the lever, a rod movable vertically in the frame and affixed to the collar, a pulley mounted on the barrel, and a cord connected to the rod and operated over the pulley, substantially as described.

5. In a windmill, the combination with a horizontal wind-wheel, of a platform revolubly mounted beneath the same, a wing arising from one side of the platform, a rigid vane fixed to the platform and projected radially therefrom, a movable vane, a disk to which

the movable vane is fixed, said disk having  
in its periphery an elongated notch, a pulley-  
wheel fixed to the disk and concentric there-  
with, a spindle fixed to the platform and by  
5 which the disk and pulley wheel are revolu-  
bly mounted, a stud fixed to the platform and  
arranged in the notch of the disk, whereby  
the movements of the movable vane are lim-  
ited, a retractile spring connected to the pul-  
10 ley and operating to hold the movable vane  
away from the rigid vane, a pitman eccentri-  
cally connected to the pulley, a bent lever to  
which the pitman is connected at its remain-  
ing end, one end of the lever being elongated

and extended downwardly, a collar movable 15  
vertically on the frame of the windmill and  
capable of engaging the extended end of the  
lever, and means for moving the collar verti-  
cally, substantially as described.

In testimony that I claim the foregoing as 20  
my own I have hereto affixed my signature in  
the presence of witnesses.

FREDRICK A. MATHEWS.

Witnesses:

A. M. EWING,  
FRANK L. TRAUS,  
A. C. G. SHOCKEY,  
F. A. HINZE.