

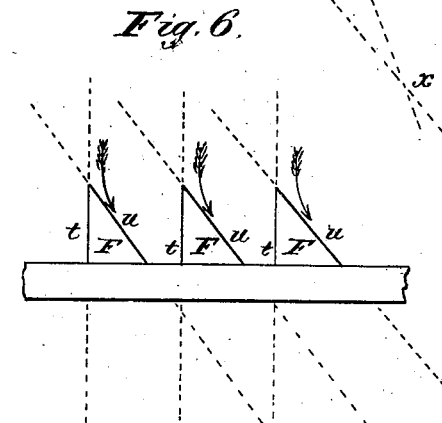
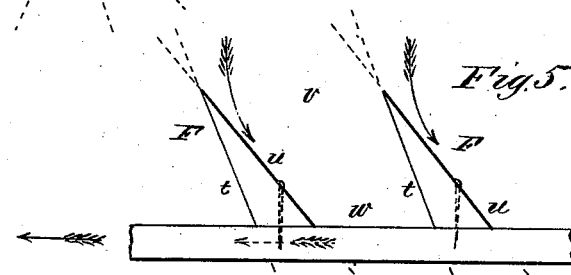
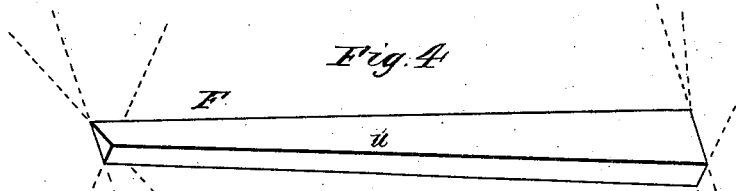
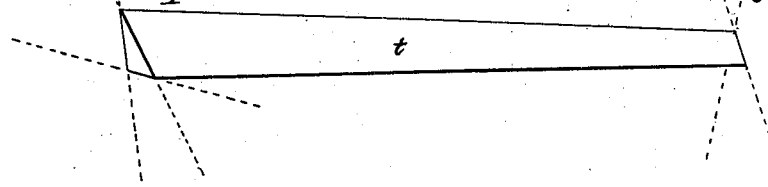
D. E. SHAW.

WIND MILL.

Fig. 3

Patented Aug. 29, 1876.

No. 181,542.



Witnesses.
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UNITED STATES PATENT OFFICE.

DAVID E. SHAW, OF CHATSWORTH, ILLINOIS.

IMPROVEMENT IN WINDMILLS.

Specification forming part of Letters Patent No. **181,542**, dated August 29, 1876; application filed February 24, 1876.

To all whom it may concern:

Be it known that I, DAVID E. SHAW, of Chatsworth, in the county of Livingston and State of Illinois, have invented a new and valuable Improvement in Windmills; and I do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the annexed drawings, making a part of this specification, and to the letters and figures of reference marked thereon.

Figure 1 of the drawings is a side view of my invention in section. Fig. 2 is a top or plan view; Fig. 3, a detached view, showing the front of one of the sails; Fig. 4, a similar view, showing the back of the same; Fig. 5, a view showing the outer ends, with their relative position and different degrees of inclination; Fig. 6, a similar view taken from the smaller or inner ends of the sails.

This invention has for its object to produce a windmill that will be self-regulating and perfect in its operation; and the invention consists in making the sails composing the wheel with a greater degree of angle at their backs than at their faces, thereby causing the wind to become wedged between the face of one and the back of the other, the inner edge of each sail being dressed up to a sharp edge, the sail-backs answering the twofold purpose of a fan to cause resistance against the air, and the angle of the face and back of the sail making a greater inlet than outlet for the air, causing a resistance to prevent the air from passing between the sails with too great a velocity.

My invention further consists in forming the opening in the plate through which the cylindrical turn-table passes sufficiently large, so that the wheel and vane will, by gravity, fold around, caused by the inclining from the perpendicular of the turn-table, as will be hereinafter more fully described.

My invention further consists in forming the lower edge of the cylindrical turn-table with a thin edge, in connection with a step having an annular recess of sufficient depth to form a receptacle for oil, as will be hereinafter more fully described.

In the accompanying drawings, A represents a hollow mill post or standard for sup-

porting the wind-wheel, the vane, and the several parts connected thereto for actuating the same. Secured within the post A is a step, B, having an annular groove, *a*, of sufficient depth to form a receptacle for the desired quantity of oil, so that the thin edge of the cylindrical turn-table C will be at all times submerged in the oil, and thereby reducing the friction to a considerable degree, and preventing the oil from becoming gummy, as is the case where the step has a flat bearing-surface. The edge of the turn-table C is reduced to a thin edge, as shown at *a'*, to present as little bearing-surface as possible, in order to decrease the friction between it and the step B.

At the upper end of the turn-table is an annular shoulder, *b*, which, with the plate *c*, forms a groove, *d*, for retaining the turn-table in its proper position within the post A by the lips or flanges *e* upon the plate *f*, secured over the opening in the post A. Upon the end of the plate or casting *c* is a brace, *c'*, the same having secured thereto groove-pulleys *g h*. The staff *i* of the vane D has bolted to its end a plate, *j*, and is secured between the plates *c* and brace *c'* by a bolt, *k*, said bolt being placed slightly out of the perpendicular, in such a manner as to cause the vane to fold around toward the wheel by its own weight.

This manner of hanging or placing the bolt out of the perpendicular is entirely unnecessary, as by my invention the same result is produced of folding the vane or wheel together or out of gear by forming the annular opening in the plate *f* somewhat larger than the diameter of the turn-table C, to allow considerable play. This construction, with the weight of the vane on one side and the weight of the wheel on the other, is such that when the vane is directly behind the wheel the shaft of the wheel and the vane are level from front to rear; but when relieved from the spring or weight the wheel and vane will, by gravity, fold around together, for reason that the lower part of the cylindrical turn-table will not be perpendicular, but will lean against one of the sides of the tower-plate *f*. If the wheel side of the turn-table should lean against the plate *f* the vane would be above a level, and would fold around to the

wheel; but if it should lean against the vane side the wheel-shaft would be above a level, and would seek to fold around to the vane by gravity.

A coil-spring, *l*, is attached to the vane-staff *i*, and has attached to one end a chain, *m*, which passes around a groove-pulley, *n*, secured to the under side of said staff, and connected to an arm, *o*, of the brace *c*, for the purpose of holding the mill in gear. Passing around the groove-pulleys *g h* is a cord, *p*, one end of which is attached to the staff *i*, the other end passing down through the hollow post *A* to the ground, for the purpose of throwing the mill out of gear. The plate or casting *c* is formed with a sleeve or box, *q*, through which the shaft carrying the wheel *e* works, said shaft having secured to its end a circular plate, *r*, and rod *s*, forming a crank-wheel for operating the pump.

The sails *F*, which form the wheel *E*, are of peculiar construction, having a greater angle at their back *t* than at their front *u*. In Fig. 5 of the drawings the wide or outer ends of the sails are shown, the inlet *v* for the wind being much greater than the outlet *w*, caused by the difference in the angle of the front of one and the angle of the back of the other, which is such as to bring the two dotted lines 1 2 to intersect, as shown at *x*. The wind, coming in the direction of the arrows, strikes the front of one, and is impelled toward the back of the next sail, and, it having a different angle, contracts the outlet at *w*, and prevents the too rapid escape of the wind. Fig. 6 is a view taken from the small or inner ends of the sails, showing their relative position and the different angles.

It will be seen that the backs of the sails are in exact line of the wind, and, as the wind becomes stronger, the resistance of the backs thereto is in the same ratio that it is when the wind is light, as it is not so much the speed in a windmill that is wanted in pumping as a slow and steady motion. A wheel

that will run in a light breeze and in a high gale without damage to the operating parts of the mill is the principal results sought after. A wheel constructed according to my invention will run in a strong gale not exceeding thirty-five revolutions a minute, and is of itself a most perfect regulator, not increasing in speed to more than five to eight revolutions from a light wind to a moderate gale, while all other wheels constructed with the spaces between their sails of the same width throughout would be blown to pieces, if not thrown out of gear.

The spokes and string-pieces used in securing the sails in their relative position are similar to those now in use; but instead of notching them into the string-pieces, as heretofore, I prefer securing them by nails or bolts, as illustrated in Fig. 5.

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

1. A wheel for windmills formed of a series of sails with their fronts and backs of different angles, substantially as and for the purpose set forth.

2. A plate, through which the turn-table of a windmill passes, having its opening larger than the diameter of said turn-table, so that the vane and wheel will fold together or out of gear by the inclination from the perpendicular of the turn-table, substantially as and for the purpose specified.

3. The combination, with a cylindrical turn-table having a thin edge, of a step with an annular recess to form a receptacle for oil, substantially as and for the purpose described.

In testimony that I claim the above I have hereunto subscribed my name in the presence of two witnesses.

DAVID E. SHAW.

Witnesses:

W. W. SEARS,
P. C. DAVIS.