3 Sheets—Sheet 1.

S. E. ALDEN.
Wind-Wheel.

No. 215,035. Patented May 6, 1879.

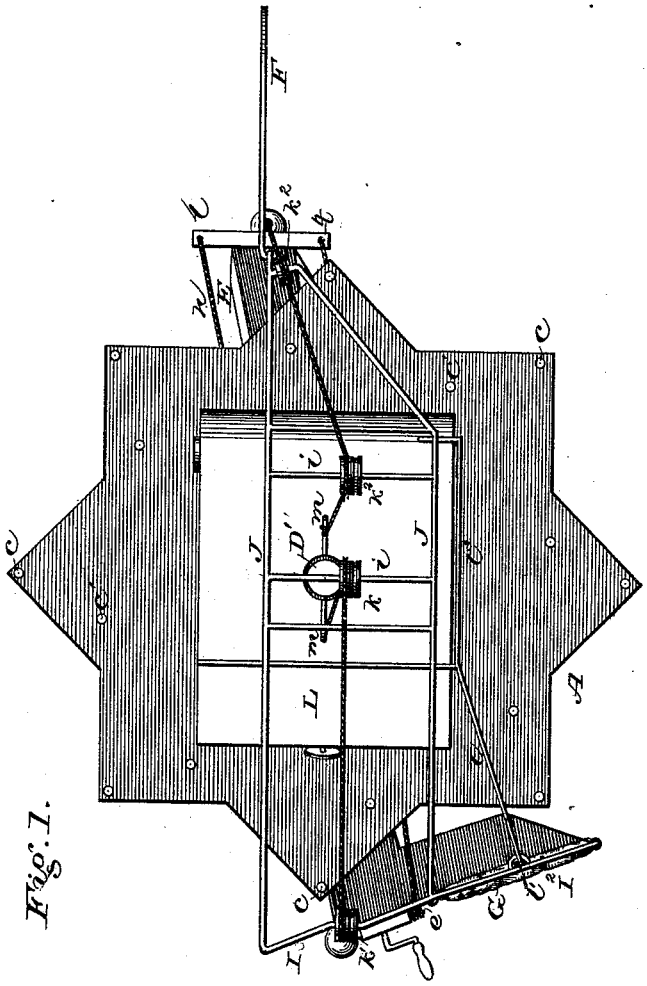

Fig. 1.

Witnesses:
A Newcomer
Isaac Rice

Inventor:
Samuel E. Alden

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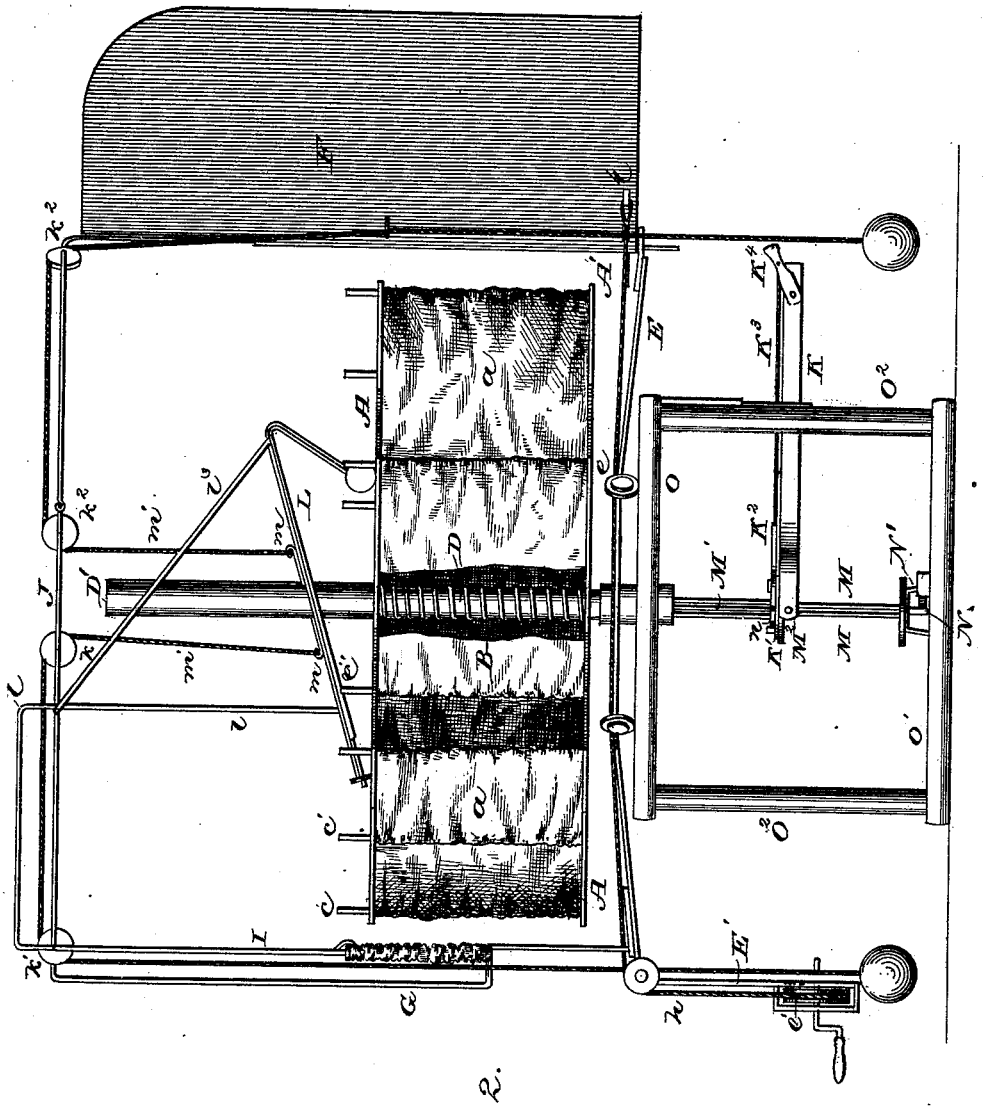


Fig. 2.

Witnesses:
A. Newcomer
Isaac Rice

Inventor:
Samuel E. Alden.

3 Sheets—Sheet 3.

S. E. ALDEN.
Wind-Wheel.

No. 215,035. Patented May 6, 1879.

Fig. 4.

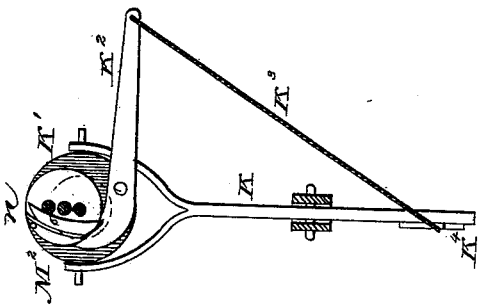
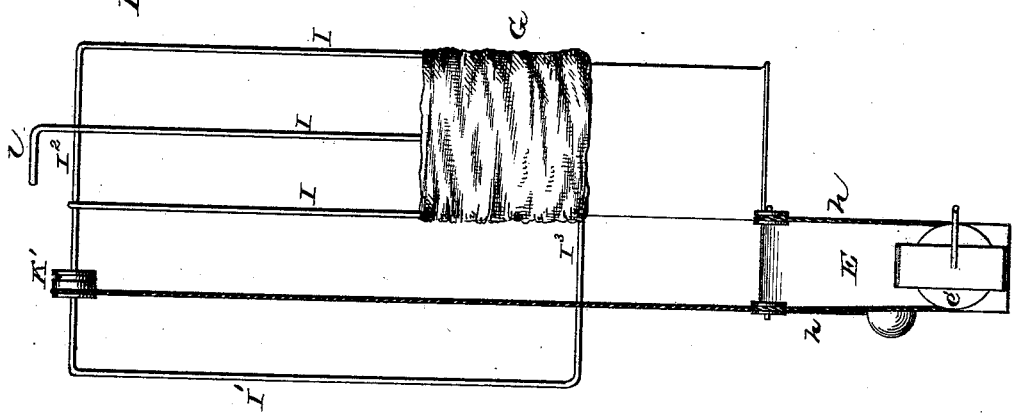


Fig. 3.



Witnesses:

A. Newcomer

Isaac Rice

Inventor:

Samuel E. Alden.

UNITED STATES PATENT OFFICE.

SAMUEL E. ALDEN, OF LEAF RIVER, ILLINOIS.

IMPROVEMENT IN WIND-WHEELS.

Specification forming part of Letters Patent No. **215,035**, dated May 6, 1879; application filed August 17, 1877.

To all whom it may concern:

Be it known that I, SAMUEL E. ALDEN, of Leaf River, in the county of Ogle and State of Illinois, have invented a new and useful Improvement in Wind-Wheels; and I do hereby declare that the following is a full and exact description of the same, reference being had to the accompanying drawings and to the letters of reference marked thereon.

Figure 1 is a top view of the invention. Fig. 2 is a side elevation, showing the hinged vane or rudder, &c. Fig. 3 is a front view of the regulating device. Fig. 4 is a plan view of the brake mechanism.

Similar letters of reference denote corresponding parts in all the figures.

The object of the invention is to provide a vertically-journaled wind-wheel that shall be self-regulating and preserve a uniform motion in high as well as in low winds; and consists of a wheel having vertical peripheral buckets made of flexible material inwardly inclined and secured at their upper and lower edges to the top and bottom floors of the wheel, with their ends loosely attached to vertical rods, and made to slide up and down upon the same. Between these floors and around the central shaft is coiled a spiral spring for regulating purposes, as will be hereinafter explained.

It further consists of a wind-gage held in position, with the face to the wind, by a hinged vertical rudder or vane, as will be described.

It still further consists of an inclined supplementary regulating-platform connected with the wind-gage in such a manner that a uniform, or nearly uniform, motion is given to the wheel.

It also consists of the details of construction, which will be hereinafter explained.

In the drawings, A is the upper floor of the wheel, and A′ the lower portion of the same. *a* are the sails or buckets; *c*, the outside vertical rods, upon which the flexible sails are sleeved, and *c′* are the inner sail-rods, and by means of which the buckets or sails may be made vertically adjustable. D is a hollow vertical shaft secured to the supporting-floor of the frame, designated O, and upon which the wheel revolves. D′ is still another vertical hollow shaft secured to the upper floor of the wheel, and having the inside diameter of sufficient size to encircle the upper portion of shaft D, and slides upon the same. B is a coiled spiral spring which encircles shaft D, and having ends resting against the inner sides of the top and bottom plates of the wheel. This spring is for the purpose of keeping the plates or upper and lower floors apart to their extreme limit, except when the same shall be drawn together by the action of the wind, as will be hereinafter explained.

E is a longitudinal bar underneath the wind-wheel, mounted upon anti-friction rollers *e*, and carrying at one of its ends the hinged rudder or vane F and at the other the adjustable wind-gage G. E′ is a downward bend given to the bar E, and having at its lower extremity a pulley carrying the cords *h*, and by which the rudder can be turned by an attendant, and thus regulate the motion of the wheel. This pulley may, if desired, be brought well down and within reach of a person from the ground.

The wind-gage G is secured to the bar E at the side of its center, so as to deflect the current of air directly into the mouth of the bucket next forward of the gage in the line of the revolution of the wheel. This gage is made partially of flexible material, so as to fold or slide upon the retaining-rods designated I. J are longitudinal rods, forming a part of the frame which supports the wind-gage and the upper end of the vane or rudder.

i are central cross-bars secured to the rods J, and upon which are mounted pulleys K. I^1 is a vertical rod parallel with rods I, and connected with the same by cross-rods I^2 I^3. The upper one, I^2, is provided with a pulley, designated K^1. K^2 is still another pulley, located at the converging point of the rods J, and at the end to which the upper portion of the rudder is secured. L is an inclined regulating-platform mounted upon rollers and resting upon the upper floor of the wheel. *l* is a rod having two vertical bends and one horizontal bend, which connects the inclined regulating-platform with the wind-gage. l^1 is an eye secured to rod I^2 centrally over the wind-gage, and through which the vertical portion of the rod which is attached to the wind-gage slides. l^3 is a diagonal brace, the foot of which

is attached to the upper inclined end of the platform L, while the other end of the same is made fast to the rear leg of rod *l*. *m* are eyes secured to the face of platform L, and to which are attached cords or chains *m'*. These cords pass over pulleys K, K^1, and K^2, and down through the necessary guides, and having weights attached to their lower ends. *t* are arms projecting laterally from the inner edge of the lower end of the rudder F, and to which the ends of the rudder cords or chains are fastened. By using this combination of cords, arms, rudder, and the pulley having a crank attached, located in the down-hanger E', and designated e^1, any necessary obliquity can be given the rudder, and the same can be held in position by a dog or otherwise acting upon the pulley e^1, as will be readily understood. When the rudder is turned so as to be parallel with the wind-gage, and edge to edge with the same, the regulating-frame to which the said rudder and gage are attached will swing around so as to present the edges of the rudder and gage to the wind as well as the edge of the inclined regulating-platform, so that it will not act upon the wheel.

For stopping the wheel and keeping the same in a state of rest, a brake beneath the wheel is used, which will now be described. K is a vibrating lever, bifurcated at its inner end, thus forming two legs, between which is pivoted an open center circular plate, K^1. K^2 is a concaved brake-lever pivoted to plate K^1. K^3 is a rod secured to the outer end of lever K^2 by one of its ends, the other end being pivoted to the hand-lever K^4. This hand-lever may be supplied with the usual detent, rack-bar, and spring-bolt, so as to securely lock the brake in position. M M are two vertical rods, forming the lower part of the wind-wheel shaft, and M^1 is a central rod extending upward and secured at the top within the sleeved portion of the main wind-wheel shaft—that is, the part which is fastened to the upper floor of the wheel.

M^2 is a circular plate or wheel secured to the lower end of the rod M^1, having perforations through the same for the reception of rods M M, and upon which the said circular plate slides.

n is a spring-dog upon the top of the plate or wheel M^2, which can be used for braking purposes. This open plate in the bifurcated lever may, if desired, be secured vertically with the plate M^2 or rod M^1, so as to rise and fall with the said parts; but it will, of course, be made so as to give a free rotary movement to the wheel M^2.

When it is desired to brake or stop the wind-wheel the concave lever K^2 is made, through the medium of the hand-lever and connecting-rod, to press against the periphery of the plate or wheel M^2, and by the friction thus engendered, in connection with the spring-dog, the wheel may be placed in a state of rest and secured in such position.

N is a friction drive-wheel secured to the lower end of the wind-wheel shaft, and N^1, the pinion brought in frictional contact with the same, and by which power may be imparted to the machinery to be driven. O is the upper floor of the supporting-frame, and upon which the longitudinal bar, with its rollers *c*, rest and revolve. O^1 is the lower floor of the supporting-frame, and O^2 the vertical posts connecting the said floors together.

When the wheel is in working position the rudder is placed in a horizontal position, and consequently will remain with its edge to the face of the wind.

When great force of wind is brought to bear upon the wheel it will press against the inclined platform, which rests upon the upper floor of the wheel, and by the inclination it will bear down upon the said floor, causing the same to sink, and thus draw the upper and lower portions of the wheel nearer together, and so present less vertical wind-surface to the flexible buckets, and with a consequent reduction in the revolution of the wheel. When the wind ceases to press with force upon the inclined platform the spring coiled around the wheel-shaft will cause the upper floor to rise, and thus a uniform, or nearly uniform, speed will be attained.

It will be observed that the inclined platform being connected by the rod with the wind-gage causes both to work vertically together, and by the coiled spring of the proper tension and length the upper and lower portions of the wheel may be brought nearer together.

Further description of the working of the mill will not be necessary, as all will be readily understood by persons skilled in the art to which it pertains.

Having now described my invention, what is claimed as new, and desired to be secured by Letters Patent, is—

1. In a wind-wheel having flexible buckets, the combination of one fixed plate or floor and one vertically-adjustable or movable plate or floor, and so arranged that the floors will automatically approach to and recede from each other, substantially as described, and for the purpose set forth.

2. In a wind-wheel having the movable top and vertically-adjustable sails or buckets, the inclined regulating-platform mounted upon anti-friction rollers, and vertically adjusted by the weighted cords or chains, substantially as described, and for the purpose set forth.

3. In a vertically-adjustable wind-wheel, the flexible wind-gage made to rise and fall with the movable floor of the wheel, substantially as described.

4. In a wind-wheel, the independently-rotating rudder and wind-gage frame, consisting of the lower longitudinal bar mounted upon anti-friction rollers, and upper frame, consisting of longitudinal rods, cross-rods, and pulleys, and having a hinged vane or rudder attached

to one end of the frame and a vertically-adjustable wind-gage attached to the other end, substantially as described, and for the purpose set forth.

5. In a vertically-adjustable wind-wheel, the telescopic rotating upright shaft, the adjusting-spring coiled about the main rotating shaft, the rotating rods forming the lower part of the said shaft, and the center shaft for raising the upper floor of the wheel, arranged substantially as described.

6. The combination of the bifurcated vibrating lever, the open center plate pivoted between the legs of the same, the concave brake-lever, and the brake-wheel attached to the rod connected with the upper floor of the wheel, all arranged and operating substantially as described.

7. In a wind-wheel whose upper and lower floors are made to recede from and approach each other, the combination of the vertical rods *c c'*, the flexible sails forming the buckets sliding upon the said rods, the lower fixed wheel floor and movable upper floor, all arranged and operating as described.

This specification signed and witnessed this 9th day of December, 1876.

SAMUEL E. ALDEN.

Witnesses:
A. NEWCOMER,
ISAAC RICE.