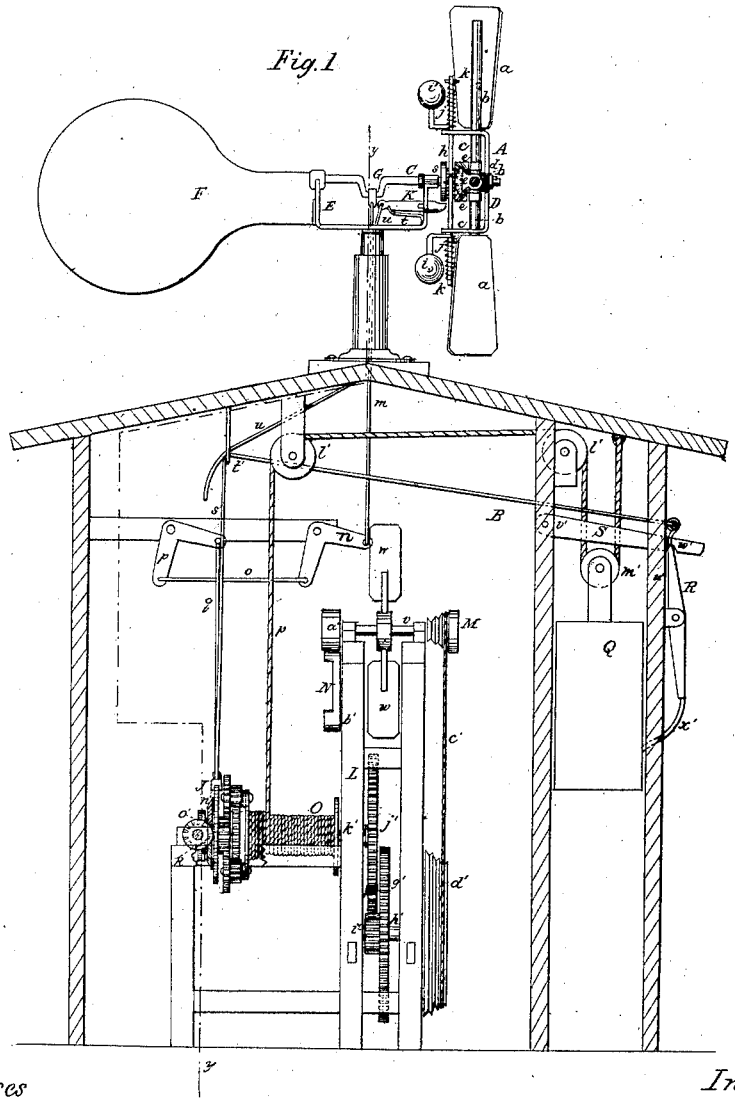
Sheet 1- 2 Sheets.

R. L. Smith

Wind Wheel,

No. 45,530. Patented Dec. 20, 1864.

Fig. 1



Witnesses
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Inventor
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Sheet 2-2 Sheets.

R. L. Smith,

Wind Wheel,

No. 45,530, Patented Dec. 20, 1864.

Fig. 2

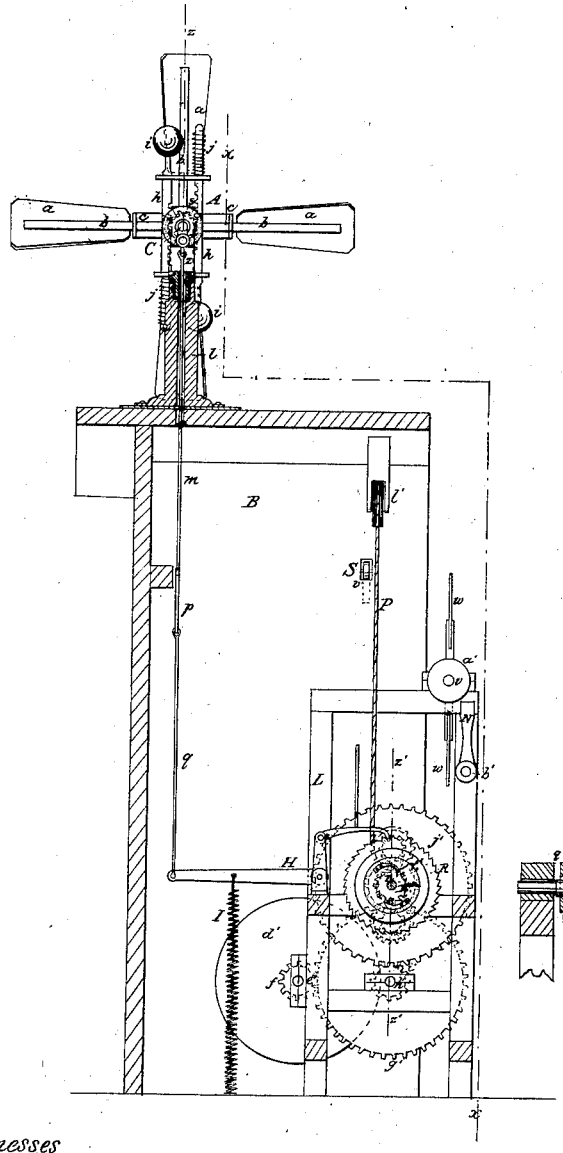


Fig. 3

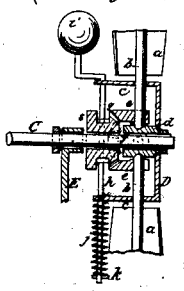
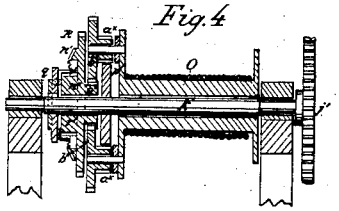


Fig. 4



Witnesses
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UNITED STATES PATENT OFFICE.

ROBERT L. SMITH, OF STOCKPORT, NEW YORK.

IMPROVEMENT IN WIND-WHEELS.

Specification forming part of Letters Patent No. **45,530**, dated December 20, 1864.

To all whom it may concern:

Be it known that I, ROBERT L. SMITH, of Stockport, in the county of Columbia and State of New-York, have invented a new and useful Improvement in Mechanism for Obtaining Power from Wind; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable those skilled in the art to make and use the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1, Sheet No. 1, is a vertical section of my invention taken in the line *x x*, Fig. 2; Fig. 2, Sheet No. 2, a vertical section of the same taken in the line *y y*, Fig. 1; Fig. 3, a vertical section of a portion of the same taken in the line *z z*, Fig. 2; Fig. 4, a vertical section of a portion of the same taken in the line *z' z'*, Fig. 2.

Similar letters of reference indicate corresponding parts.

The object of this invention is to obtain a cheap, safe, and reliable mechanism for obtaining power from the wind, designed more especially for driving light machinery for household or domestic purposes—such as churns, washing-machines, grindstones, wood-sawing machine, &c.

The invention consists in combining with a wind-wheel of novel construction a mechanism provided with a weight, all being arranged in such a manner that the wind-wheel when in operation may raise the weight and render the mechanism aforesaid available as a motor, which may be used when there is no wind, and the wind-wheel consequently inoperative.

A represents a wind-wheel placed on the top of a building, B, and provided with wings or sails, *a*, attached to rods *b*, which pass through bearings *c*, attached to the wind-wheel shaft C, and have their inner ends fitted in a head, *d*, on said shaft, the rods *b* being allowed to turn freely in their bearings. Each rod *b*, near its end, has a bevel-toothed segment, *e*, upon it, and these segments gear into a bevel-wheel, *f*, placed loosely on shaft C, and having attached to it a pinion, *g*, which gears into racks *h h*, placed at opposite sides of it, said racks having balls *i* at their ends, one on each, and spiral springs *j* on them, the springs being placed between pins *k* in the outer ends of the racks and the frame D, to which the bearings *c* are attached. These springs *j* have a tendency to keep the racks *h h* and their balls drawn inward to their fullest extent and to keep the wings or sails *a* at a proper oblique position relatively with the wind, so as to get the most effective force or power from the latter. The wind-wheel shaft C has its bearings in a frame, E, which is provided with a pendent tube, *k*, to serve as a pivot, said tube being fitted loosely in a stationary tube, *l*, on the building B. The frame E is provided with a vane, F, to keep the wheel A to the wind. The wind-wheel shaft C is formed with a crank, G, to which a wire, *m*, is attached, said wire passing down through the tubes *k l* and attached at its lower end to a bell-crank, *n*, the latter being connected by a wire or rod, *o*, with another bell-crank, *p*, which is connected by a wire, *q*, with a bent lever, H, the latter being connected at one end to a spring, I, and the opposite end having a pawl, J, attached to it by a pivot, *r*. The wind-wheel is self-regulating, the racks *h h*, with the balls *i i*, and springs *j*, forming a governor, which is connected with the wings or sails *a* through the medium of the gearing *f g* and segments *e*.

The springs *j*, as before stated, have a tendency to keep the racks *h h* and balls *i* drawn inward, and the wings or sails presented with their greatest area to the wind—that is to say, with the greatest area for obtaining power, the position being an oblique one, and in case of the wheel revolving too rapidly the balls *i i* and racks *h h* will be moved outward under centrifugal force, and the sails presented move obliquely to the wind. By this means the wheel may be made to rotate with a constant speed under different degrees of velocity of the wind. The advantage of this arrangement over others for the same purpose consists in the fact that the governor is applied directly to the wheel, is simple in its construction, and is more sensitive, as much friction is obviated.

To the wheel *g* there is attached a circular disk, *s*, and in the frame E, which supports said shaft, there is a lever, K, one end of which has a spring, *t*, bearing against it, said spring having a tendency to keep the opposite end of the lever free from the disk *s*. This lever K serves as a brake to stop the wind-wheel, and it has a wire, *u*, attached to it, which extends down within the building for the purpose of operating it. When the wire *u* is pulled and the lever brought in contact with the disk *s*,

the speed of the wheel is suddenly checked, and the balls *i i* are instantly thrown out, owing to their inertia, and the wings or sails are presented edgewise to the wind and the wheel stopped.

The above-described parts comprise all pertaining to the wind-wheel. I will now proceed to describe the other mechanism which is connected with it and is within the building B.

L is a framing constructed in any proper manner, and having a shaft, *v*, on its upper part, from which two blades, *w w*, project at opposite points to form a fly or regulator. On one end of this shaft *v* there is a cone of pulleys, M, and on the opposite end there is keyed a wheel, *a'*.

N is a bar, which is secured to the framing L just below the wheel *a'* by a pivot, *b'*, and when shoved upward presses or bears against the wheel *a'*, to form a brake to stop the revolution of the shaft *v*. This shaft *v* is driven by a cord, *c'*, from a large cone of pulleys, *d'*, on a shaft, *e'*, in the lower part of the framing L, said shaft having a pinion, *f'*, upon it which gears into a wheel, *g'*, on a shaft, *h'*, the latter also having a pinion, *i'*, upon it, into which a wheel, *j'*, gears, the latter being keyed on a shaft, *k'*, on which a drum, O, is placed loosely, said drum having a rope, P, upon it, which extends over pulleys *i'* in the upper part of the building and under a pulley, *m'*, which has a weight, Q, attached to it, the end of rope P being secured to the upper part of the building. (See Fig. 1). On the shaft *k'* there is also placed loosely a ratchet-wheel, R, having a bevel-wheel, *n'*, and a small ratchet, $n^{\times}$, at one side of it, and a pinion, *o'*, at the opposite side, and there are secured or keyed on the shaft *k'* a pinion, *p'*, and a disk, *g'*, the latter having a pawl, *r'*, attached to it which engages with the ratchet $n^{\times}$. The pawl J of the lever H has a cord, *s'*, attached to it, which passes through an eye, *t'*, at the upper part of the building, and is connected to a lever, R, which has a spring, *u'*, bearing against it, said spring having a tendency to keep the upper end of lever R forced outward and the pawl J raised free from the ratchet R.

S is a bar, which is secured in the building B by a pivot, *v'*. This bar S has nearly a horizontal position, and it extends over the top of the lever R, and is provided with a notch, *w'*, to receive the top of said lever when brought in line with said notch. (See Fig. 1.) The lower end of the lever R is provided with a curved rod, *x'*, which projects within the path of the movement of weight Q. To one side of the drum O there are attached, at two opposite points, two pinions, $a^{\times}$ $a^{\times}$, having attached to them wheels, $b^{\times}$ $b^{\times}$, the latter gearing into the pinion *o'* of the ratchet R and the former gearing into the pinion *p'*. (See Fig. 4.)

The operation is as follows: As the wind-wheel A rotates, the lever H is operated through the medium of the wire or rod *m*, bell-cranks *n p*, and wire or rod *q*, and spring I, and the pawl J, which is pivoted to lever H, actuates the ratchet R. If the shaft *v* be stopped or prevented from rotating, by adjusting the bar or brake N to the wheel *a'* the shaft *k'* will be prevented from rotating, owing to the friction of the rope *c'*, and the drum O will be rotated through the medium of the gearing *o'* $b^{\times}$, the rope P wound upon the drum O, and the weight Q raised. The weight Q will be elevated until it strikes the bar S, the latter being raised thereby and the lever R released so that the spring *u'* will throw back its upper end and cause the pawl J to be raised free from the ratchet R, and the connection between the wind-wheel and the weight mechanism thereby cut off. Power may be taken from the weight by releasing the shaft *v* from the bar or brake N. The power is taken from the cone-pulley *d'* by means of a proper rope. The weight Q as it descends comes in contact with the curved rod *x'* at the lower end of lever R and throws the upper end of said lever in the notch *w'* of bar S, so as to allow the pawl J to engage with ratchet R and admit of the wind-wheel again raising the weight when necessary. The shaft *v* may be driven direct by the wind-wheel. In the latter case the shaft *k'* is rotated through the medium of the pawl J, ratchet R, and gearing *o'* $b^{\times}$ $a^{\times}$ *p'*. When the shaft *v* is rotated from the weight, the drum O rotates shaft *k'* through the medium of the gearing $a^{\times}$ $a^{\times}$ $p^{\times}$, which form a positive connection between O and *k'* without rotating, the pawls *r'*, which gear into the ratchet $n^{\times}$, preventing a backward movement of the shaft *k'*.

I claim as new and desire to secure by Letters Patent—

1. The combination of a wind-wheel and power-retaining mechanism provided with a weight, and all arranged substantially as herein shown and described, so that the wind-wheel, when unemployed, will raise the weight and accumulate power, which may be employed during the absence of wind or when the wind-wheel is inoperative.

2. The arrangement of the gearing $a^{\times}$ $a^{\times}$ $b^{\times}$ $b^{\times}$ *p' o'*, drum O, and the ratchets R $n^{\times}$, with the pawls *r' r'* and J, for the purpose of operating the weight or power retaining mechanism from the wind-wheel, as set forth.

3. The lever R, in connection with the notched bar S, arranged in connection with the weight Q and cord *s'*, for automatically cutting off the connection between the wind-wheel and the weight mechanism, as set forth.

4. The wind-wheel governor composed of the racks *h h*, springs *j*, and balls *i i*, and connected with the wings or sails *a* through the medium of the gearing *g f*, and segments *e*, all arranged substantially as herein shown and described.

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Witnesses:
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