2 Sheets--Sheet 1.

G. & A. RAYMOND.

Wind-Wheel.

No. 130,071. Patented July 30, 1872.

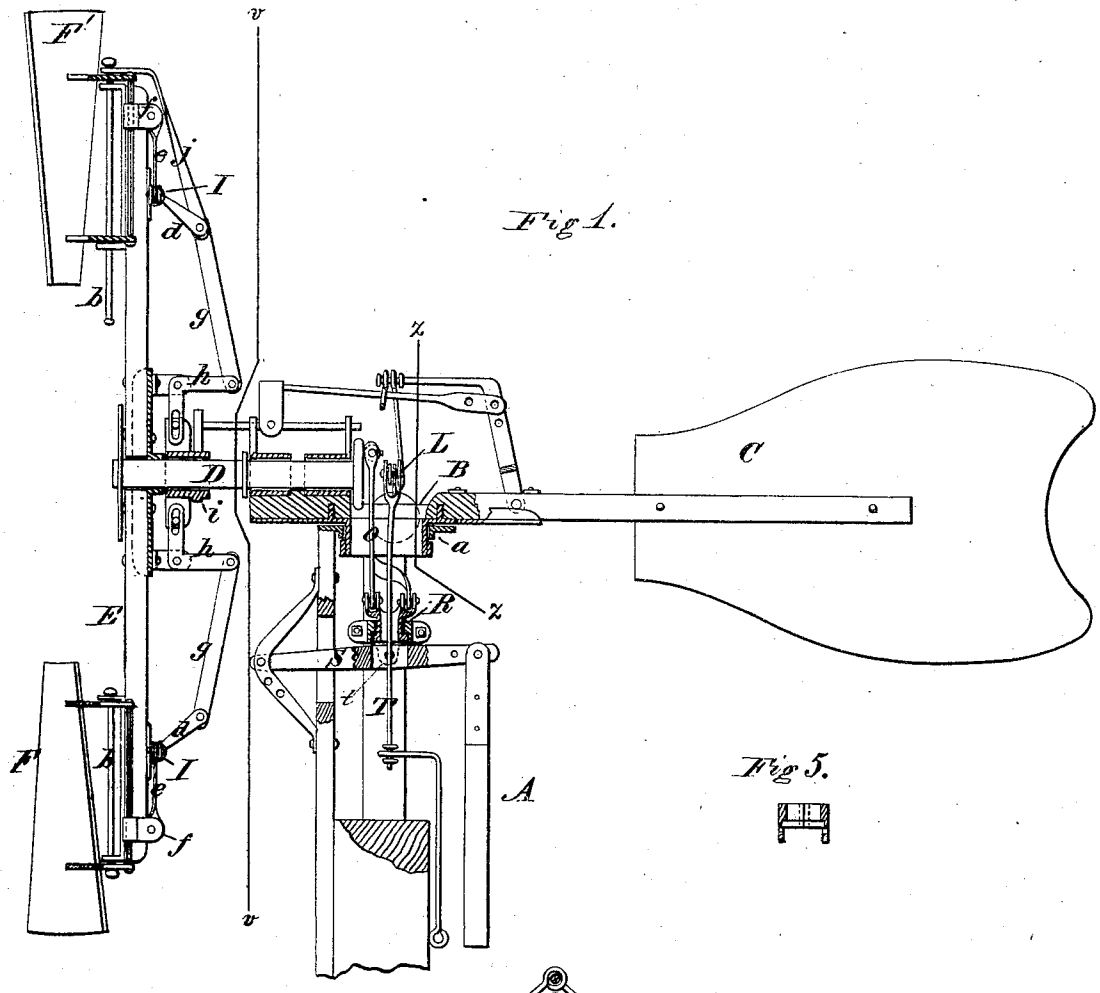

Fig 1.

Fig 5.

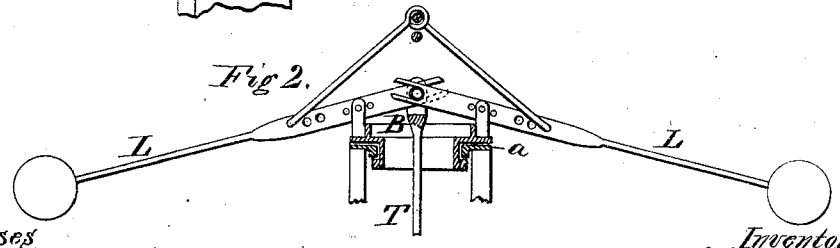

Fig 2.

Witnesses

Harry King

Phil T. Dodge

Inventors

George Raymond

Albert Raymond

by Dodge & Munn

their attys.

2 Sheets--Sheet 2.

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Fig 3.

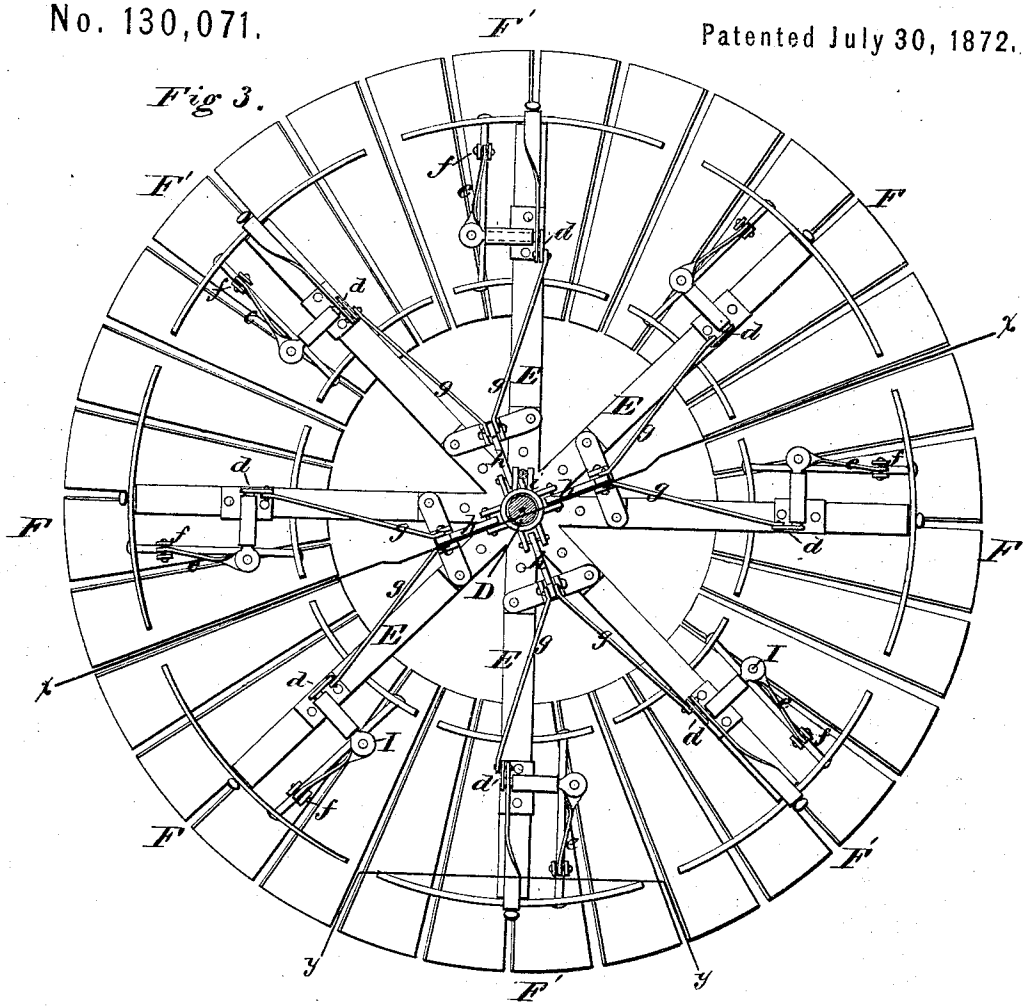
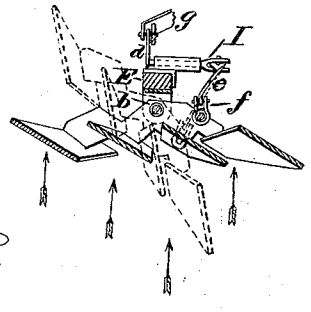


Fig 4.



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George Raymond

Albert Raymond

by Dodge & Munn

their Attys.

UNITED STATES PATENT OFFICE.

GEORGE RAYMOND AND ALBERT RAYMOND, OF WAUPUN, WISCONSIN.

IMPROVEMENT IN WIND-WHEELS.

Specification forming part of Letters Patent No. **130,071**, dated July 30, 1872.

SPECIFICATION.

To all whom it may concern:

Be it known that we, GEORGE RAYMOND and ALBERT RAYMOND, of Waupun, in the county of Fond du Lac and State of Wisconsin, have invented certain Improvements in Self-Regulating Wind-Wheel, of which the following is a specification, reference being had to the accompanying drawing.

Our invention relates to that class of wind-wheels having radials, blades, or arms so pivoted that they can be turned at a greater or less inclination to the breeze, to govern the speed of the wheel; and it consists in so arranging a portion or all of the blades that they can slide toward and from the center, and connecting them with a system of levers in such manner that when the wheel revolves at above a certain speed the centrifugal force will slide the blades outward so as to operate the levers, and cause them to turn the blades so as to offer less resistance to the breeze, the blades being brought back again by counter-weights as the breeze decreases; and the invention further consists in various details, as hereinafter described.

Figure 1 is a longitudinal vertical section through the center of my wheel and its frame; Fig. 2, a vertical cross-section on the line *x x* of Fig. 1, looking forward toward the wheel proper; Fig. 3, a rear face view of the wheel; Fig. 4, a cross-section through one of the pivoted blades or sails on the line *y y* of Fig. 3, looking toward the center; and Fig. 5, a section of the tubular swivel at the lower end of the pitman.

In the drawing, A represents an upright frame, provided on its upper end with a tubular collar, *a*, on which there is mounted a revolving head-block, B, provided with bearings to receive and support the shaft D of the wheel, and with a vane, C, to keep the wheel faced to the wind, as usual. The wheel consists of a series of radial arms, E, attached rigidly to the front end of the shaft D, and provided at their outer ends with blades or sails F, which, in the present instance, are each composed of a number of small blades secured together by cross-pieces, although a single large blade may be used instead, if preferred. The blades or sails are pivoted to the arms E by rods *b* on their rear sides, which are mounted in ears *c* on the arms, as shown in Fig. 1, so that each one can be turned so as to present its face at any required inclination to the wind and to the plane of rotation. In addition to this motion on their pivots certain of the blades, marked F′, are arranged so that they can slide in and out to and from the center of the wheel, their pivot-rods *b* being lengthened and arranged, as shown in Fig. 1, to admit of such movement. Across the back of each arm E there is mounted a rock-shaft, I, provided at one end with a crank, *d*, and at the other end with an arm, *e*, which has its end connected to a sliding eye, *f*, mounted on one side of the adjacent blade or sail, so that when the shaft is turned by means of the crank the arm *e* is caused to turn the blade or sail, and change its inclination to the wind.

In order that all the blades or sails may be turned together, and to the same extent, the cranks *d* are connected by rods *g* with bell-cranks *h*, which are mounted on the arms E, and which have their other ends connected to a collar, *i*, on the main shaft D, as shown in Figs. 1 and 3, the collar serving to connect the bell-cranks, so that they must move equally. The blades or sails F′, which are arranged, as described, to slide in and out, have the outer ends of their pivot-rods *b* connected by rods *j* with the cranks *d* of the adjacent rock-shafts I, as shown in Figs. 1 and 4, so that when the blades slide outward they move the rods *j*, which operate the rock-shafts and their connections, so as to turn the blades so as to offer less resistance to the wind, the blades which do not slide being turned as well as the others. Thus it will be seen that by the outwardly-sliding movement of the blades F′, caused by the centrifugal force when the wheel is in motion, all the blades are turned on their pivots so as to offer less resistance to the wind.

For the purpose of resisting any movement of the blades, and of bringing them back to their normal position after they have been moved, two weighted arms, L, are pivoted to the head-piece B, and connected by a lever and rods with the collar *i*, as shown in Figs. 1 and 2, so as to push it forward and hold the system of levers from moving. The weights are so proportioned in relation to the other parts that, as long as the wheel runs at a proper

speed, they hold the blades in position so as to receive the full force of the wind, but that as soon as the wind increases, so as to drive the wheel too fast, the centrifugal force will overcome the resistance of the levers, and slide the blades F′ outward, so as to turn all the blades, so as to offer less resistance, and allow the wheel to fall back to its proper speed. As the wind decreases the weights bring the blades back to their original positions so as to offer more resistance and prevent the speed of the wheel from decreasing. By changing the fulcrum-points of the weighted levers, which are provided with a series of holes for the purpose, their resistance to the movement of the blades may be increased or diminished at will, so as to hold the blades until the wheel attains any given speed.

It will be seen that the wheel, constructed and arranged as described, may be adjusted to run at any speed required, and that being thus adjusted it is entirely self-regulating, as, whenever it commences to run too fast, the blades are automatically turned off from the wind.

The head-piece B and the collar *a*, upon which it turns, are both provided with a central opening down through them to admit the passage of a pitman, O, which is connected to the rear end of the main shaft D. The lower end of the pitman is forked, and connected by a tubular swivel, R, to the middle of a transverse lever, S, which has one end pivoted to the frame A, and the other end left free, so that the pump-rod or other device to be operated may be connected to it. The pitman, being thus passed down through the center, and connected with the swivel, also at the center, allows the wheel to turn and face in any direction without affecting its operation. Through the swivel and the lever S there is passed a rod, T, which is connected to the inner ends of the weighted arms L inside of their fulcrums, as shown in Fig. 2, so that by drawing down on the rod the arms may be raised so as to turn the blades and stop the wheel. The rod, being passed down through the center, is not interfered with by the turning of the wheel about.

It is obvious that a different arrangement of weights and levers may be used in connection with the sliding blades, if desired, and that, if preferred, all of the blades may be arranged to slide instead of a portion only of their number.

Having thus described our invention, what we desire to claim is—

1. A wind-wheel provided with pivoted radially-sliding blades so arranged that their outward movement serves to turn them on their pivots, substantially as and for the purpose set forth.

2. In combination with the pivoted blades F and the pivoted sliding blades F′, the rock-shaft I, provided with their arms *e* and cranks *d*, the rods *g*, bell-cranks *h*, collar *i*, and weighted levers L, when arranged to operate as described.

3. In combination with the pivoted sliding blade F′, the rock-shaft I, provided with the arm *e* and crank *d*, and the link *f*, when arranged as shown and described, whereby the blades, as they slide inward and outward, are turned on their pivots, as set forth.

4. The hollow swivel R, in combination with the lever S, having the central opening *t*, when arranged as and for the purpose set forth.

GEORGE RAYMOND.
ALBERT RAYMOND.

Witnesses:
W. H. TAYLOR,
CLINTON W. PAGE.