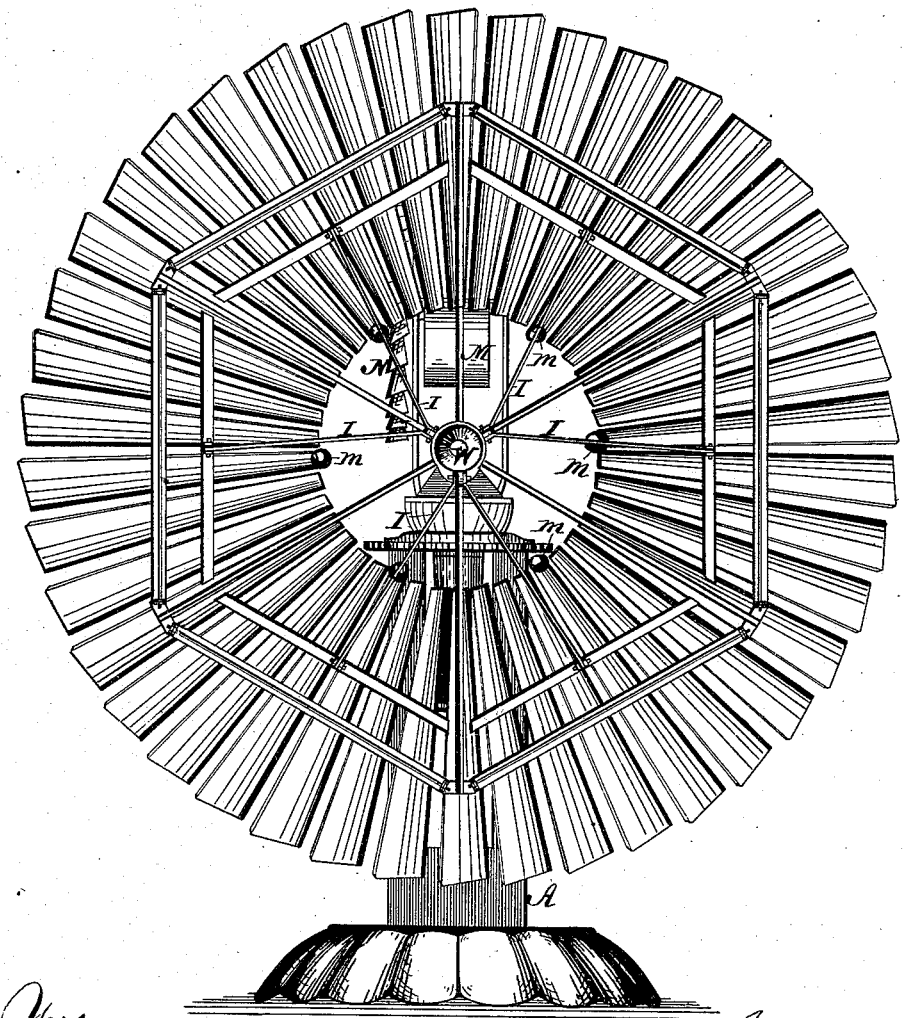
2 Sheets--Sheet 1.

G. & A. RAYMOND.

Wind-Mill.

No. 160,953. Patented March 16, 1875.

Fig. 1.



Witnesses;
Thos. Houghton
Hill & Dodge

Inventor;
George Raymond
Albert Raymond
By their attys.
Dodge & Son

2 Sheets--Sheet 2.

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Fig. 2.

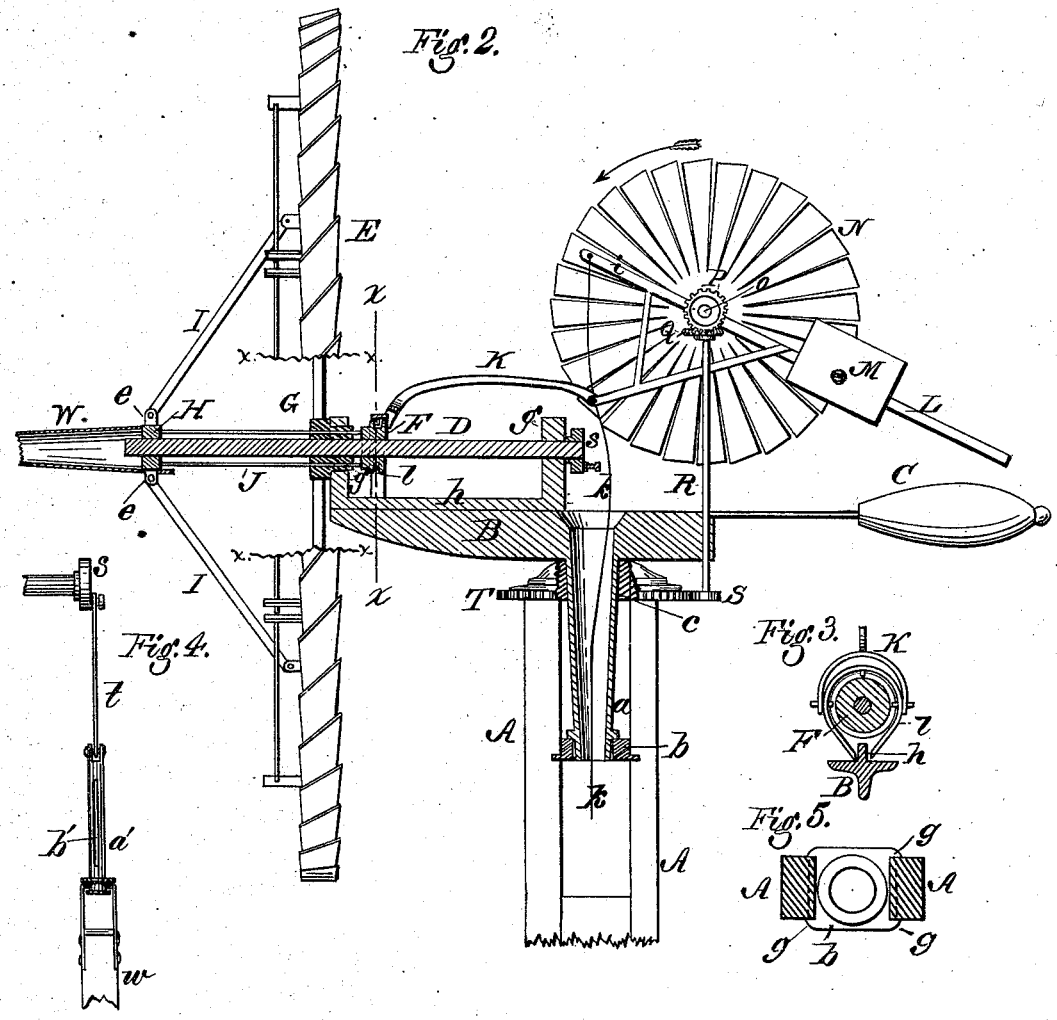

Fig. 4.

Fig. 3.

Fig. 5.

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THE GRAPHIC CO. PHOTO-LITH. 39 & 41 PARK PLACE, N.Y.

UNITED STATES PATENT OFFICE.

ALBERT RAYMOND AND GEORGE RAYMOND, OF WAUPUN, WISCONSIN, ASSIGNORS OF ONE-HALF THEIR RIGHT TO MILO J. ALTHOUSE, OF SAME PLACE.

IMPROVEMENT IN WINDMILLS.

Specification forming part of Letters Patent No. **160,953**, dated March 16, 1875; application filed January 2, 1875.

CASE B.

To all whom it may concern:

Be it known that we, ALBERT RAYMOND and GEORGE RAYMOND, of Waupun, in the county of Fond du Lac and State of Wisconsin, have invented certain Improvements in Wind-Wheels, of which the following is a specification:

Our improvements consist in the combination of the rotating frame or turn table with a weight on its forward end, and the wind-wheel on its rear end facing the pivot; in the combination of the main wheel arranged in rear of and facing the pivot, and a small governing-wheel in front of and at right angles to the main wheel, to assist in keeping the same faced toward the wind; in the manner of connecting the sail-operating arms to a collar on the main shaft; in the arrangement of a cover or shield, to protect the main shaft from snow and ice; and in a peculiar manner of constructing and attaching the lower bearing or step of the turn-table.

Figure 1 represents a rear elevation of our wheel; Fig. 2, a side elevation of the same with portions broken away, and the central parts shown in section; Fig. 3, a cross-section on the line *x x*, showing the forward sliding collar and its connections; Fig. 4, a side view of the pump-rod and pitman; and Fig. 5, a cross-section on the line *y y*, showing the lower step or bearing of the turn-table.

A represents the usual standard or pivot post, on which is mounted a cast-iron rotating frame or turn-table, B, having at its middle a depending tubular journal, *a*, which is supported in two metal bearings, *b c*, secured to the standard A, as shown in Fig. 2, and as hereinafter more particularly described. The rear end of the turn-table is provided with two upright arms, *g*, in which is mounted the horizontal main shaft D, which has the wind-wheel secured on its rear end facing the standard A, as shown in Figs. 1 and 2. As shown in Fig. 2, the turn-table is provided at its forward end with a heavy weight, C, which serves to counterbalance the wheel and keep the parts from binding or sagging, and also to steady the motion of the turn-table and prevent it from vibrating under the motion of the wheel and slight flaws of wind.

It will be seen that as the wheel is mounted behind the journal of the turn-table and faces toward the same, no vane or tail-piece is required, as the pressure of the wind against the wheel will force it around behind the standard and keep it faced constantly to the wind.

The wheel used may be of any desired construction; but in the present instance I have shown an automatic "rosette" wheel similar in construction to those now in common use.

On top of the standard A around the journal of the turn table I mount a spur-wheel, T, and in the turn-table I mount a vertical shaft, R, provided on its lower end with a pinion, S, gearing into the wheel T, and on its upper end with a bevel-pinion, Q, as shown in Fig. 2. In standards on the turn-table I mount a transverse shaft, O, provided with a bevel-pinion on one end gearing into the pinion Q, and provided on the other end with a small wind-wheel, N, the face of which stands at right angles to that of the main wheel E, as shown in Fig. 2.

The wind, when blowing squarely against the face of the main wheel, acts against the edge of the small wheel, which consequently remains at rest; but as the wind changes its course to the right or left, so that it impinges against the face of the main wheel obliquely, it acts upon one face or the other of the small wheel, which being thereby set in motion causes the pinion S, through the intermediate gearing, to travel around the wheel T, and rotate the turn-table until the main wheel faces squarely to the wind again. The parts are so arranged that the wheel follows around with the changing wind, instead of being brought up against the same. When the wind shifts to the left, it turns the small wheel in the direction indicated by the arrow; but when it shifts to the right, it acts upon the opposite side of the wheel and turns the same in the reverse direction, so that whatever di-

rection the wind may take the wheel will be immediately brought around facing it.

By arranging the main wheel behind and facing the pivot of the turn-table, and arranging the single governing-wheel in front of the main wheel, we cause the wind to adjust the parts very quickly and with perfect certainty, and render the general operation of the parts more satisfactory than would otherwise be the case.

We are aware that the use of governing-wheels behind a main wheel is not new, and we make no claim thereto.

Our invention consists in the special combination and arrangement of the parts as shown, with the main wheel behind the pivot of the turn-table, and the governing-wheel in front of the main wheel, exposed at all times to the free and direct action of the wind.

As stated above, the main wheel, mounted in the manner shown, will adapt itself to the course of the wind; but by the use of the governing-wheel the movement of the parts is rendered quicker and more certain, and the continual vibration of the turn-table prevented. The main wheel E consists, as usual in wheels of its class, of a central hub, G, fastened upon the main shaft, and provided with a series of rigid radial arms, which have their outer ends connected by rods, on which are mounted the sails, each consisting of a series of radial slats connected by cross-bars. As usual, the sails are hung in such manner that as the speed of the wheel increases beyond a fixed limit, they will be turned back by the centrifugal force edgewise to the wind; and, as usual, a weight is connected with the sails through a system of rods, &c., in such manner as to bring them back to their normal position when the speed of the wheel decreases. On the main shaft there are mounted loosely two collars, F and H, one on each side of the main wheel, connected by two rods, J, which slide through the hub of the wheel, as shown. The rear collar H is provided with radial ears *e*, to which are pivoted bars I, the opposite ends of which are pivoted to the sails, as shown. Each sail is provided with a single bar, I; but as there are only half as many lugs as bars two bars are pivoted to each lug, as shown in Fig. 2, the bars being placed on opposite sides of the lug, and secured by a single pivot-pin. This arrangement permits the use of a simple and cheap form of hub, and prevents all danger of the lug being broken or the pivot-pin bent and worked loose, as would be liable to occur in the event of a single bar being attached to one side of the lug. The forward collar F is provided with a peripheral groove, and surrounded by a band, *l*, which is provided with lugs entering said groove, and with a notch or recess in its under side to receive a rib, *h*, which is formed lengthwise on the turn-table to keep the band from turning with the collar, as shown in Figs. 2 and 3. A forked bar, K, has its arms pivoted to the sides of the band *g*, and its opposite end connected to a lever, L, which is mounted in standards on the turn-table, and provided with an adjustable weight, M, as shown in Fig. 2.

The weighted lever and the forked bar tend to push backward the collar F, which, through the rods J, pushes back the collar H, causing it to draw upon the bars I and hold the wings or sails flatwise to the wind. In order to prevent snow and ice from accumulating on the rear end of the main shaft and interfering with the movement of the collar H, we secure to the collar a tube or shield, W, which surrounds and incloses the shaft, as shown in Fig. 2. The weighted lever L is constructed with an arm, *i*, to which is connected a rod, *k*, extending down through the hollow journal of the turn-table, so that upon being drawn down by hand it will operate the lever and tip the sails back edgewise to the wind, causing the wheel to remain at rest. Each sail is provided at its inner end with a weight, *m*, the centrifugal force of which aids in tipping the sails back when the wheel is running at a high speed. The inner end of the main shaft is provided as usual with a crank-wheel, *s*, and a pitman, *t*, the lower end of which latter is connected with the pump-rod *w*. The pump-rod is not swiveled as usual directly to the lower end of the pitman, but to the lower end of a tube, *a*, which has its upper end pivoted to the pitman and its side provided with a slot, *b'*, as shown in Fig. 4. The rod *k* is passed through the slot and down inside of the tube, so that the pitman may be arranged in the center of the hollow journal *a* instead of being thrown to one side, as usual, in order to make room for the rod *k*.

The standard A to which the bearings *b c* are secured consists of two upright parallel bars having a space between them, as shown. The upper ends of the two bars are held in position by means of the wheel T, which is bolted firmly on their upper ends, and which is provided at its center with a hole forming the upper bearing *c* for the journal *a*, as shown in Fig. 2. The lower bearing *b* consists of a plate placed between the two bars forming the standard with its edges supported in notches cut in their inner faces, as shown in Figs. 2 and 5. The plate is provided at its corners with lips *g'*, which engage over the sides of the bars to hold the plate from moving edgewise, as shown in Fig. 5. The edges of the plate are inserted in the notches or grooves before the bars are adjusted, so that when the wheel T is bolted in place it holds the bars and keeps the plate *c* in position.

Having described our invention, what we claim is—

1. In combination with a pivoted frame or turn-table, B, a wind-wheel, E, mounted on its rear end and facing the pivot, and a counter-weight, C, mounted on its forward end, as shown.

2. In combination with the turn-table B,

having the wheel E mounted on its rear end, as shown, the governing-wheel N mounted in front of the main wheel upon the turn-table, and connected with gearing for rotating the same, substantially as shown and described.

3. In combination with the collar H, provided with single lugs *e*, the bars I, arranged in pairs, and connected to opposite sides of each lug, as shown, and for the purposes described.

4. In combination with the rotating grooved collar F, mounted on the main shaft, and the turn-table, provided with the rib *h*, the band *l*, encircling the collar and engaging with the rib, as shown.

5. In combination with the shaft D and sliding collar H, the shield or cover W, attached to the collar, as shown.

6. In combination with the grooved standards or uprights, the bearing-plate *b*, provided with the lips *g'* at its corners, as and for the purpose described.

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GEORGE RAYMOND.

Witnesses:
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A. NUDD.