2 Sheets--Sheet 1.

M. J. ALTHOUSE & G. RAYMOND.

Wind-Mills.

No. 147,355. Patented Feb. 10, 1874.

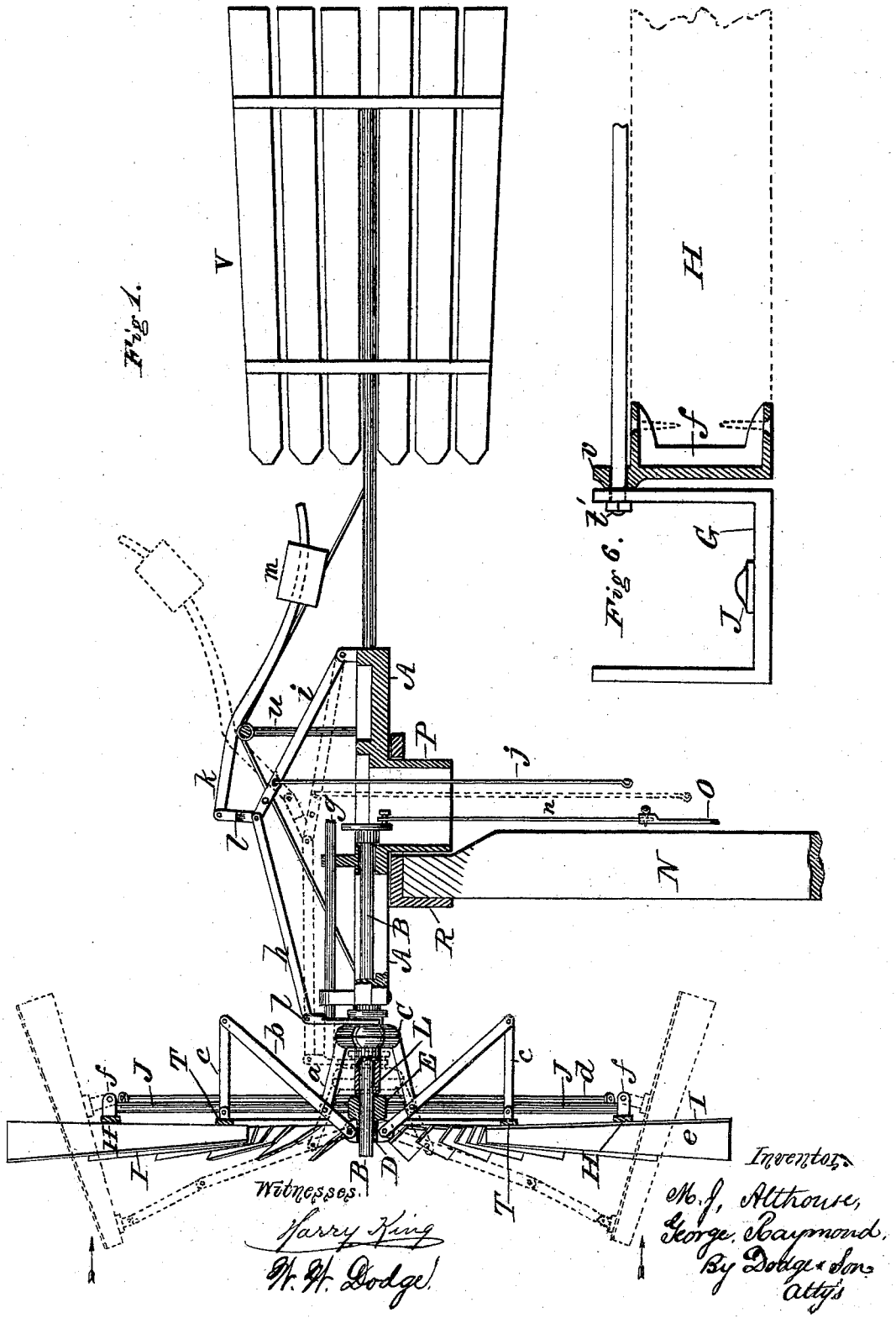

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Fig. 5.

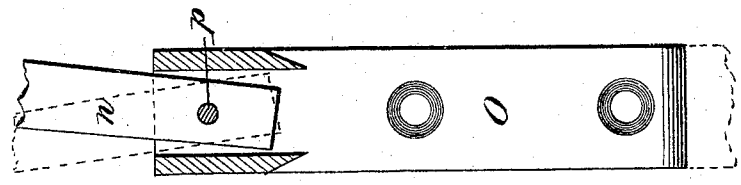


Fig. 4.

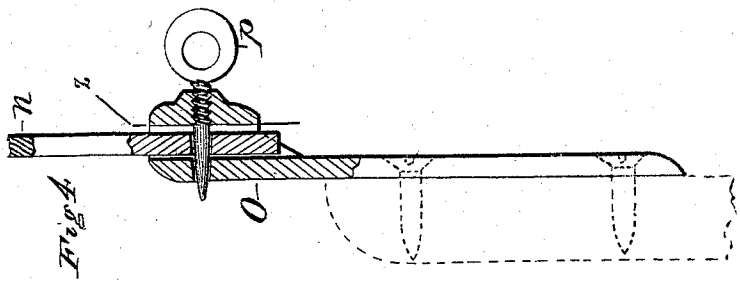


Fig. 2.

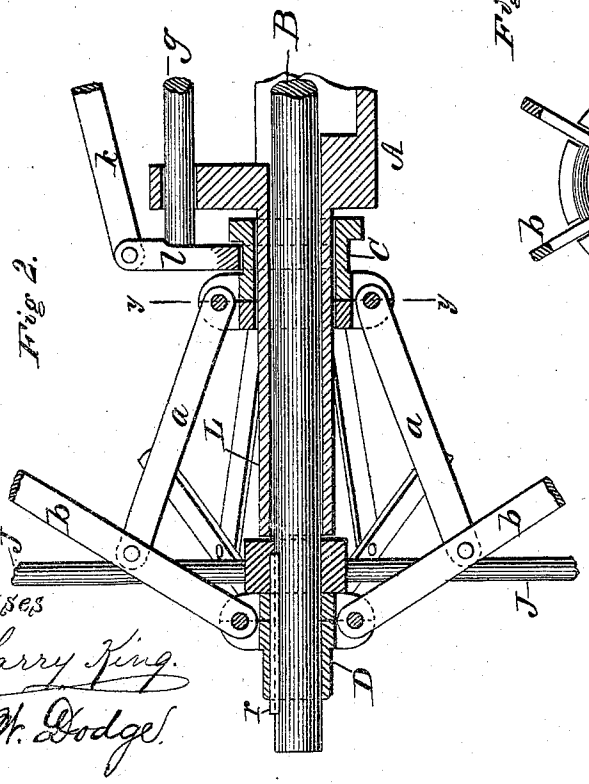
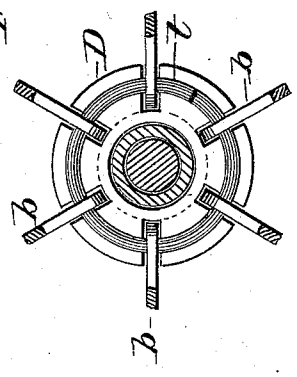


Fig. 3.



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UNITED STATES PATENT OFFICE.

MILO J. ALTHOUSE AND GEORGE RAYMOND, OF WAUPUN, WISCONSIN.

IMPROVEMENT IN WINDMILLS.

Specification forming part of Letters Patent No. **147,355**, dated February 10, 1874; application filed December 5, 1873.

To all whom it may concern:

Be it known that we, MILO J. ALTHOUSE and GEO. 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 invention consists in certain details of construction whereby the wheel is made to automatically regulate itself, and in other respects is rendered more perfect, as hereinafter more fully explained.

Figure 1 is a side elevation of our improved wheel, with portions shown in section to more fully illustrate its construction. Figs. 2, 3, 4, 5, and 6 are views of portions shown enlarged and more in detail.

In constructing our improved wheel, we make the central portion A of the frame of metal, with a central tubular hub, P, which fits in a metallic cap, R, secured upon the post or upright frame N, as shown in Fig. 1. To the rear end of the post A we attach a vane, V, rigidly, and at the front provide it with a rigid tubular sleeve, L. (See Figs. 1 and 2.) Through this sleeve L the shaft B of the wheel extends and has its bearing, there being also another bearing for the rear end of the shaft on the part A, as shown in Fig. 1, though, if preferred, the tubular bearing L may extend the entire distance. The wheel consists of a hub, E, secured rigidly to the shaft B, as shown in Figs. 1 and 2, and having projecting radially therefrom a series of arms, J. To each of these arms, at their outer ends, we secure rigidly a metallic piece, G, made in the form of a double bracket or elbow, as shown in Fig. 6, these pieces being secured to the arms J so as to project from them at right angles, as shown in Fig. 1. The wings of the wheel consist of a series of slats, *e*, secured rigidly and at an inclination to a bar, H, as represented in Fig. 6, the bar being of sufficient length to reach from the extremity of one arm, J, to the next adjoining one, or nearly so, the slats *e* being wider at their outer ends, and being arranged at right angles to the bar H, so that each bar H, with its complement of slats *e*, shall form a wing, I, that will extend from one arm, J, to another, the wings or slats *e* of which it is composed being of such a length as, when hung, to leave an open space at the center of the wheel, as indicated in Fig. 1. The bars H are secured at their ends to a metal bracket, *f*, as shown in Fig. 6, the bracket being cast with a recess, into which the end of the bar fits, and is secured by screws or bolts. These brackets *f* are provided with a projection or ear, *r*, which has a hole through it in line with the bar H, and through which a rod, *d*, passes, said rod, at each end, also passing through an arm of the double bracket G, as shown in Fig. 6, and being secured by a nut, *t*. By this arrangement, it will be seen that the rods *d* serve to hold the wings I in position, and at the same time serve as tie-rods to unite the outer ends of the arms J, and also as pivots on which the wings I turn, as shown by the dotted lines in Fig. 1. Near the inner ends of the slats *e* of each wing we secure another bar, T, Fig. 1, and to each of these we secure a rod, *c*, and to the opposite end of this is pivoted another rod, *b*, which has its opposite end pivoted to a hub, D, keyed upon the front end of the shaft B in front of the wheel-hub E, as shown in Figs. 1 and 6, this hub D being so secured to the shaft that it can be adjusted thereon back or forward, in order to vary the position of the rods *b c* as may be necessary, to tip the wings I more or less. To the rods *b* are pivoted another set of rods, *a*, which latter have their rear ends pivoted to a hub, C, that both turns and slides freely upon the sleeve L, as shown in Figs. 1 and 2. A clutch, *l*, engages in a circumferential groove in the exterior of the hub C, this clutch *l* being secured rigidly to the end of a guide-rod, *g*, which slides freely in bearings on the part A. The clutch is connected, by jointed rods *h* and *i*, to the rear end of the part A, and to these rods, by a link, *l*, is connected a lever, *k*, which is pivoted upon a frame or support, *u*, and has arranged upon its rear end an adjustable weight, *m*, as shown in Fig. 1, there being also a hand-rod, *j*, connected to the rod *i*, and extending down to within reach of a person standing below, by which the wings can be tipped, when desired, by hand. The joint-rods *h* and *i*, as shown in Fig. 1, are set at an angle, so that when the wings first begin to tip they will exert more power to raise the weight *m* than they will after the wings have tipped some distance, this result being due to the fact that the force is exerted upon the front end of the lever *k* more nearly in a direct line when the joint-rods *h i* are elevated than when depressed, the power required to operate the lever *k* and elevate the weight increasing in proportion as the rods *h i* approach a horizontal position or right line. By this arrangement of parts, the wings are made to tip very easily

at the start, and thus the wheel is rendered very sensitive to any change in the force of the wind, and made more perfectly automatic. The hubs C and D we construct of two metal plates, each forming one-half of the hub, divided transversely through its enlarged part, as shown in Fig. 2, each part being cast with radial notches or recesses to receive the ends of the rods *a* or *b*, and each having in their adjoining faces a circular or annular groove to receive and hold a small rod, *t*, which, passing through the ends of all the rods *a* or *b*, serves as a pivot for them, as shown in Fig. 3, which is a face view of one part of the hub D, with the arms *b* attached, as described. By this method of constructing these hubs, the two parts can be cast complete, when it is only necessary to insert the rods *a* or *b* and their pivot-rod *t*, and then bolt the two halves together, thus greatly cheapening and expediting their manufacture.

If desired, the hub E of the wheel may be made in like manner, it, however, only requiring radial grooves to receive and clasp the ends of the arms J.

The ordinary method of connecting the pitman to the pump-rod is to use a bolt, with a nut or key to keep it in place; but these soon wear, rendering the joint loose, and then there is a constant play of the parts at each movement of the pump-rod, creating a jerking movement, accompanied by a clatter and constantly-increasing wear and looseness. To remedy this, we provide a metal strap, O, which has a mortise or socket in its upper end of proper size to admit the lower end of the pitman *n*, and permit it to oscillate slightly therein, as shown in Figs. 4 and 5. We then provide a tapering pin, P, with a screw-thread on it near its head, as shown. This pin is inserted through a hole in the piece O and the pitman *n*, as shown, it being screwed in until it fills the holes in each; and whenever it becomes loose by the wear of the parts it can be screwed farther in, and its tapering or increased size will again fill the enlarged holes, thus compensating for the wear, the screw-thread serving not only to adjust the pin, but also to hold it in place.

It will be observed that while the shaft of the wheel turns in the sleeve or tube L, the hub C turns and slides upon the outside of said tube or sleeve, and this turning and sliding of the hub upon the sleeve tends to keep it free from ice, which would otherwise form thereon, and prevent the wings from adjusting themselves readily; and in case ice should be formed upon the sleeve while the wheel stands still, the hub C will be loosened the moment the wheel starts, and will very soon remove any ice that may be on the sleeve, thus leaving the wheel free to automatically adjust itself or its wings according to the force of the wind. By this mode of construction we obviate the difficulty which exists in all machines which use a sliding hub or collar mounted directly upon the shaft, and in which the wings are prevented from adjusting themselves whenever the hub or collar is prevented from sliding, as it is necessarily, by the formation of ice on the parts, thus seriously impairing the utility of the wheel, and causing it to soon become deranged or broken.

It will also be observed that by pivoting the wings I, as represented, so that they project from the front face of the arms J, the centrifugal force generated by the rotation of the wheel will at once tend to throw the wings outward from the center, thereby causing them to turn endwise to the wind, as shown by the dotted lines in Fig. 1, and thus cause them to adjust themselves at a greater or less angle, according to the velocity of the wind, and that, as the wings are thus inclined, the hub C is drawn forward, thereby elevating the weight *m*, which serves to draw the wings back to their position as soon as the wind lessens its force.

By these several improvements we are enabled to construct a wheel that is very perfect in its operation, and not liable to get out of order.

Having thus described our invention, what we claim is—

1. The shaft B of the wind-wheel, in combination with the tube or sleeve L and the sliding and rotary hub or collar C, the shaft working within the sleeve, and the collar moving upon the outside of the sleeve, substantially as and for the purpose set forth.

2. The hubs or collars C D, composed of two pieces, having a groove formed in their adjoining faces to receive and hold the pivot-rod *t*, with recesses in their edges for receiving the ends of the pivoted rods, substantially as described.

3. In combination with the pivoted wings I and their brace-rods *b c*, the hub D, secured upon the shaft B in such a manner as to permit its longitudinal adjustment thereon, for the purpose of setting the wings at any desired angle, as set forth.

4. In combination with the sliding collar C, the joint-rods *h i* and the weighted lever *k*, the said parts being arranged to operate substantially as described, for rendering the wings I self-adjusting, and causing them to operate more easily at the commencement of the adjusting movement, as set forth.

5. The socket-piece or bracket *f*, provided with a recess to receive the end of the bar H, and with an ear or projection, *e*, for pivoting it upon the rod *d*, as set forth.

6. The tapering pin P, provided with a screw-thread next to its head, in combination with metal piece O, all constructed as described, for the purpose of compensating for the wear of the parts, and keeping the joint tight, as set forth.

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GEORGE RAYMOND.

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