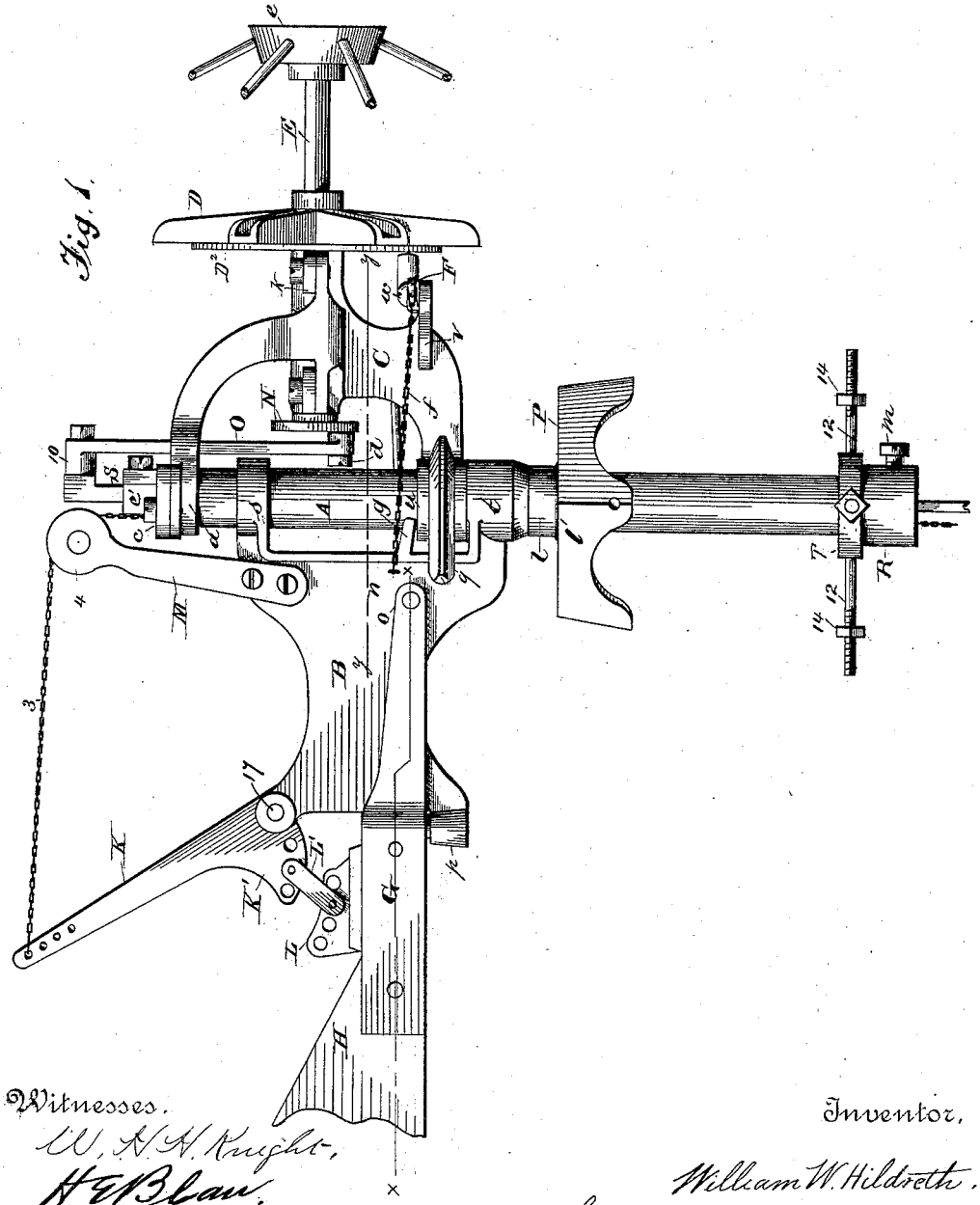
(No Model.) 3 Sheets—Sheet 1.

W. W. HILDRETH.

WINDMILL.

No. 382,981. Patented May 15, 1888.

Fig. 1.



Witnesses.
W. N. N. Knight,
H. G. Blair.

Inventor.
William W. Hildreth.
By his Attorney
A. Bell.

(No Model.) 3 Sheets—Sheet 2.

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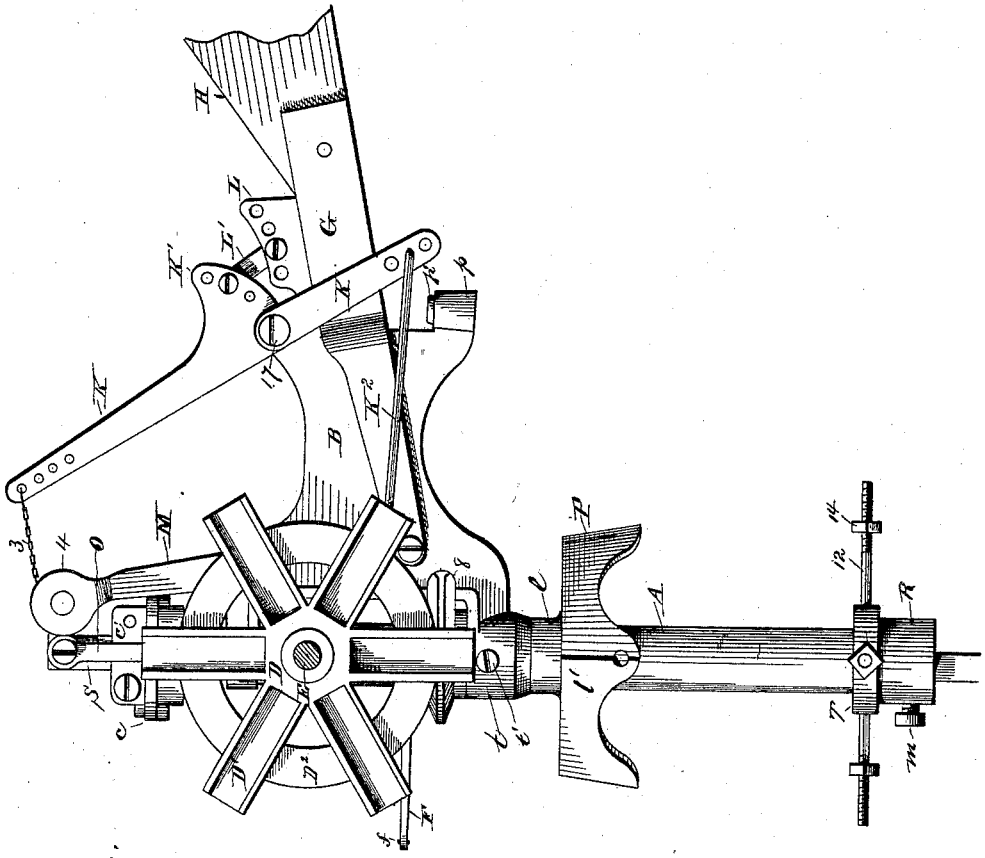

Fig. 2.

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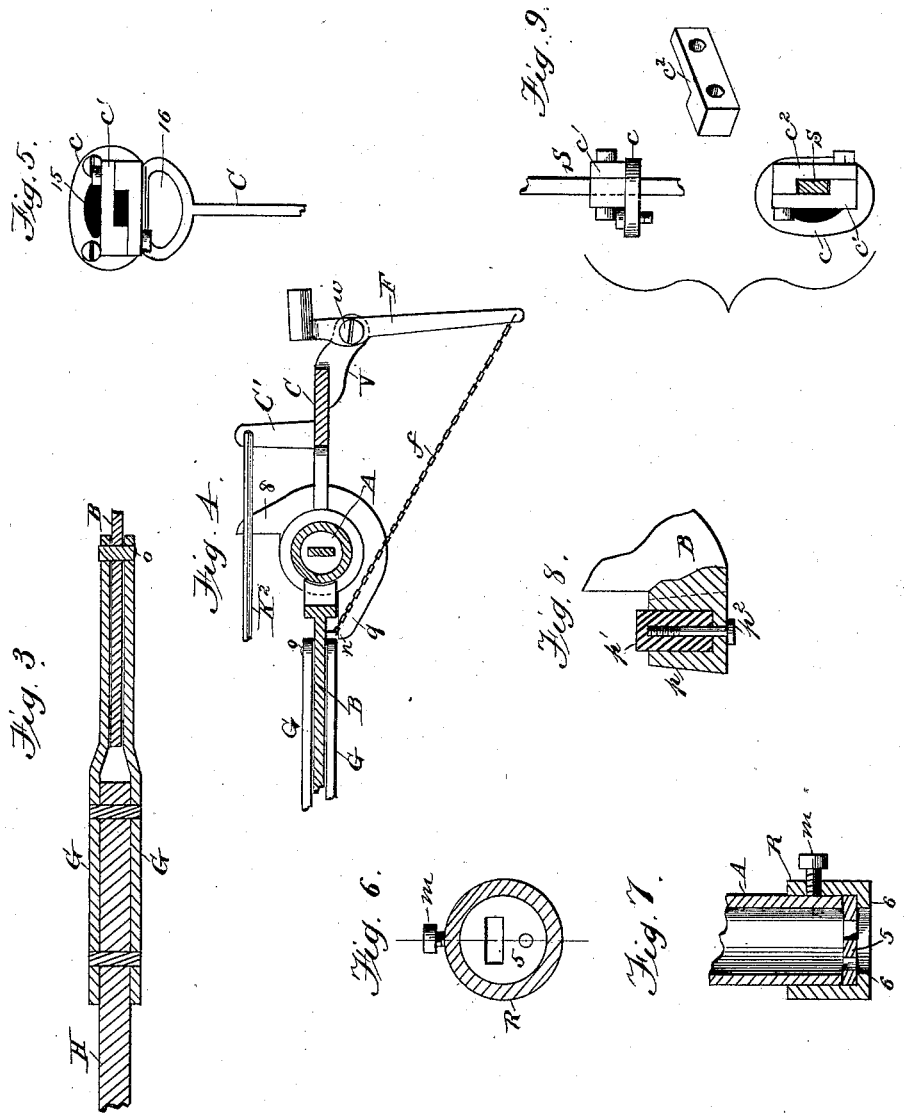

Witnesses,
W. H. H. Knight.
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UNITED STATES PATENT OFFICE.

WILLIAM W. HILDRETH, OF DECATUR, INDIANA.

WINDMILL.

SPECIFICATION forming part of Letters Patent No. 382,981, dated May 15, 1888.

Application filed December 10, 1887. Serial No. 257,516. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM W. HILDRETH, a citizen of the United States, residing at Decatur, in the county of Adams and State of Indiana, have invented certain new and useful Improvements in Windmills; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specification.

My invention relates to improvements in windmills, and has special reference to the means employed to regulate and control their movements.

The invention consists in a vertical tubular shaft capable of a rotary horizontal movement in suitable bearings, a vane and a wheel-bracket mounted on said shaft, the vane-bracket stationary on the tubular shaft and turning therewith and the wheel-bracket having a limited horizontal movement on said shaft, a vane pivoted to the vane-bracket, a shifting lever pivoted to the bracket for lifting the vane and for throwing the wheel out of the wind, and in the means employed for limiting the movement of the vane and the wheel and for operating the shifting lever, as will be hereinafter more fully set forth and described.

In the accompanying drawings, Figure 1 is a side elevation of my improved windmill, showing the wind-wheel in the wind. Fig. 2 is a similar view showing the wind-wheel thrown out of the wind. Fig. 3 is a longitudinal section of the bracket and the vane pivoted thereto, drawn on line *x x* of Fig. 1. Fig. 4 is a longitudinal section of the vane and wheel-brackets and connecting parts, drawn on line *y y* of Fig. 1. Fig. 5 is a plan view of the cap piece or box at the head of the vertical tubular shaft and a portion of the bracket-arm to which it is secured. Fig. 6 is a cross-section of the thimble at the base of the tubular shaft, showing the circular horizontal plate which fits loosely therein, and through which the pump-rod and lever-rope have a movement. Fig. 7 is a vertical sectional view of the parts referred to in Fig. 6, and a portion of the tubular shaft on which the thimble is secured. Fig. 8 is a vertical section of the boss on the vane-bracket which supports the vane, showing the rubber buffer held therein. Fig. 9 is a detached detail of the box or cap piece through which the pump-rod works and which acts as a rotary guide thereto.

In the drawings like figures and letters indicate like parts.

A is the vertical tubular shaft upon which the vane and the wheel-brackets are mounted, and through which the pump-rod S has its movement. This shaft is held in position by the derrick-cap P and the spider T, through both of which it passes. The spider is secured between the derrick-posts by means of the radial arms or bolts 12.

R is a thimble secured to the tubular shaft immediately below the spider, and is secured to the shaft by the set-screw *m*. It is provided at its lower end with an inwardly-projecting flange, 6. The purpose of this flange is to retain the circular horizontal plate 5 in its position at the end of the vertical tubular shaft, and to allow of its partial rotation at the base thereof. This circular plate is provided with openings, as shown in Fig. 6, through which the pump-rod S and the lever rope or wire 3 pass.

It will be seen that the circular plate acts as a guide to the pump-rod and rotates with it horizontally when the rod turns in the shaft as the wheel is thrown in and out of the wind.

The cap piece or box *c* at the head of the tubular shaft through which the pump-rod moves is secured to the upper face of the bracket-arm *a* by cap-screws, and is preferably formed in two parts, the cap-plate provided with an elongated slot through which the lever-rope passes into the tubular shaft, and a vertical flange, *c'*, recessed on its side for the passage of the pump-rod, and a side plate, c^2, bolted or screwed horizontally to said vertical flange, forming, when in position, the box through which the pump-rod has a movement. (See Fig. 9.)

The vane-supporting bracket B is mounted on the shaft A through arms *s t*, formed on the bracket. The bracket is prevented from turning on the shaft by means of the set-screw *t'*, passing through the lower arm, *t*, so that when the vane turns by the action of the wind it car-

ries with it the tubular shaft upon which it is mounted.

The vane H is secured between the extension-plate bars G G and pivoted to the bracket B at the inner end of the extension-bars, so as to admit of a vertical movement to the vane when lifted. The bracket has a boss, *p*, at its lower rear end, said boss being preferably hollow, so as to retain a rubber buffer or a coiled spring in position, as shown in Fig. 8, wherein *p'* is the buffer and *p²* the bolt that holds it in place. The object of the boss is to support the vane in its normal position, the projecting rubber being provided to prevent undue shock when the vane is lowered upon the boss.

K is the shifting lever, through which the vane is lifted and the wind-wheel thrown out of wind. It is formed in one piece, slightly hipped at the fulcrum-point, so as to carry its lower end clear of the side plate to which the vane is secured, and is pivoted at 17 on the upper rear end of the vane-bracket, and has a projecting arm or lug, K', which acts as a bell-crank lever when the upper arm of the lever K is thrown forward for the purpose of lifting the vane H and throwing the wheel-bracket and the wind-wheel thereon at right angles to said vane. The projecting arm K' of the lever is connected to the vane by the graduating-plate L and the link L'. The graduating-plate is provided with a series of eyes similar to those in the projecting arm of the lever, so that the link may be shifted and the elevation of the vane regulated thereby. The plate is secured to the vane by bolts or otherwise. The lower end of the shifting lever extends below the pivotal point and is connected by rod K² to arm C', which is formed on the bracket C and projects at right angles therefrom. (See Fig. 4.) The object of this connection is to cause the wheel-bracket to be drawn around when the lever is drawn forward and the vane lifted. The release of the lever causes the wind-wheel to be thrown into the wind by the falling of the vane into its normal position, as shown in Fig. 1.

M is a vertical arm, carrying in its upper end a pulley-sheave at 4. This arm is secured to the vane-bracket, the sheave supporting the rope or wire that leads from the lever K down through the tubular shaft to the ground.

The wheel-bracket C is mounted on the tubular shaft through arms *a u*, and has a limited horizontal movement on the tubular shaft. The lower arm, *t*, of the vane-bracket supports the lower arm of the wheel-bracket, while the lug *g* on the vane-bracket overlaps the arm *u*, and thereby prevents the vertical displacement of the wheel-bracket on the tubular shaft.

The wind-wheel D is mounted on the driving-shaft E, said shaft being journaled on the bracket C, the box-cap *k* being secured in position by screws or bolts. (See Fig. 1.)

N is a crank-wheel, carried on the inner end of the driving-shaft, and actuates the pump-rod S through the pitman O. The wheel-bracket is provided with horizontal lugs, forming stops 8 9, these stops being formed at right angles to each other and intended to limit the horizontal movement of the wheel-bracket on the tubular shaft when the wind-wheel is thrown in and out of the wind.

The wheel D is provided with radial arms D' and brake-ring D², the latter secured to the rear face of the arms and acting as an annular brace thereto. The slats or inclined blades of the wheel are secured to the radial arms by screws or bolts, and are strengthened in their position by brace-rods extending from said slats to the swivel-cap *e* on the end of the forward extension of the driving-shaft E.

The brake F (shown in Figs. 1, 2, and 4) is pivoted to a lug, *v*, at *w* on the wheel-bracket C. It is connected by wire rope *f* to an eye-bolt, *n*, on the vane-bracket. When the wheel is thrown out of wind, the wire which connects the brake-lever with the bracket is drawn against the vertical tubular shaft. This increases the tension of the wire which operates the brake-lever and forces the brake-head against the brake-ring D². In order to prevent the possible shock which might follow the too sudden stoppage of the wind-wheel, a spring or rubber buffer may be secured to the brake-head similar to that provided on the boss *p* of the bracket B. The recoil action of the spring-buffer when the brake is released will cause it to clear the brake-ring when the wheel is thrown into the wind, or the brake may be applied against the action of a spring secured to the wheel-bracket, the result being the same by either method.

The derrick-cap P, hitherto referred to, through which the vertical tubular shaft passes, is provided with a flanged neck, *l*, and is constructed with flanged side pieces, *l'*, the object being to prevent the entrance of water, thus saving the derrick-posts from decay.

The operation of my improved windmill is as follows: When all the parts are in position, the lower arm of the vane-bracket rests upon the neck of the derrick-cap, and with the tubular shaft, to which the bracket is attached, has a horizontal movement thereon. As the thimble R at the base of the shaft abuts against the under side of the spider-frame T, it will be seen that any tendency to lift on the part of the mill is effectually prevented. The turning of the wind-wheel actuates the pump-rod through driving-shaft E, crank-wheel N, and pitman O. When it is desired to throw the wind-wheel out of wind, the shifting lever is drawn forward by the wire rope 3, thereby lifting the vane, and at the same time, through the connecting-rod K², throwing the wheel-bracket and wind-wheel mounted thereon out of the wind. In order to facilitate this movement, the wheel-bracket is mounted on the tubular shaft slightly to one side of its center or to the turning side of a line parallel with the vane-bracket. By releasing the lever from its forward position the weight of the vane, as

it falls back to its normal position, brings the wheel again into the wind.

What I claim as new and of my own invention, and for which I ask Letters Patent of the United States, is—

1. The combination, with a vertical tubular shaft having suitable bearings therefor, of vane-bracket B, mounted on said shaft and having a horizontal movement therewith, vane H, pivoted at its inner end to said bracket, shifting lever K, having projecting arm K′, connected with said vane and pivoted to said bracket, whereby said vane may be lifted, wheel-bracket C, loosely mounted on said tubular shaft, and having a horizontal movement thereon, said bracket provided with stops 8 9 and projecting arm C′, wind-wheel D, journaled on said wheel-bracket, driving-shaft E, actuated by said wheel, crank-wheel N, pitman O, pump-rod S, and rod K^2 for connecting the shifting lever with the wheel-bracket, substantially as set forth and described.

2. The combination, with a vertical tubular shaft and suitable bearings therefor, of a vane-bracket, B, mounted on said shaft and having a horizontal movement therewith, said bracket provided with the boss *p* and lug *g*, a vane, H, secured to extension-plates G G, and pivoted to said bracket through the inner ends of said extension-plates, shifting lever K, having lifting-arm K′, graduating-plate L, connecting link L′, wire rope 3, wheel-bracket C, loosely mounted on said tubular shaft to one side of a line parallel with the vane-bracket thereon, said bracket provided with stops 8 9 and arm C′, wind-wheel D, driving-shaft E, crank-wheel N, pitman O, pump-rod S, and rod K^2, connecting the shifting lever with the arm C′ of the wheel-bracket, substantially as set forth and described.

3. The combination, with a vertical tubular shaft and suitable bearings therefor, of a vane-bracket, B, mounted on said shaft and moving horizontally therewith, vane H, pivoted on said bracket, a shifting lever, K, pivoted to the bracket for lifting said vane, a link for connecting said vane to the shifting lever, wheel-bracket C, loosely mounted on said tubular shaft, and having a horizontal movement thereon, rod K^2 for connecting the shifting lever with said wheel-bracket, a wind-wheel journaled on said bracket and actuating the driving-shaft E, crank-wheel N, pitman O, pump-rod S, cap-box *c*, secured to the upper arm of the wheel-bracket and acting as a rotary guide to the pump-rod, thimble R, having an annular flange inwardly projecting at its lower end, and circular plate 5, through which the pump-rod and shifting-lever rope pass, and which has a rotary movement therewith as the wind-wheel is thrown in and out of the wind, substantially as set forth and described.

In testimony whereof I affix my signature in presence of two witnesses.

WILLIAM W. HILDRETH.

Witnesses:
JOHN T. FRANCE,
W. S. SUTTON.