

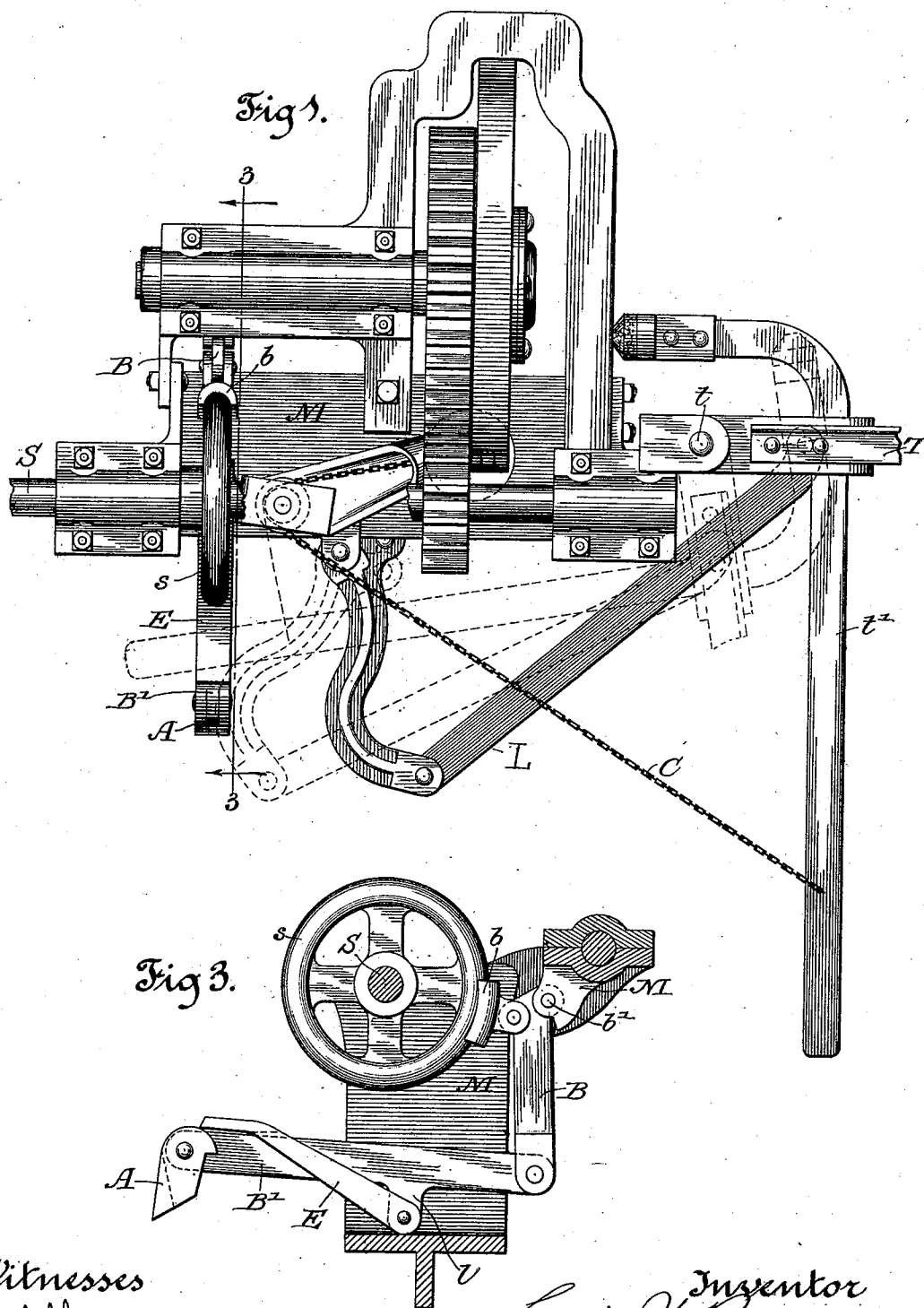
(No Model.)

3 Sheets—Sheet 1.

L. W. BEARD.
WINDMILL.

No. 510,497.

Patented Dec. 12, 1893.



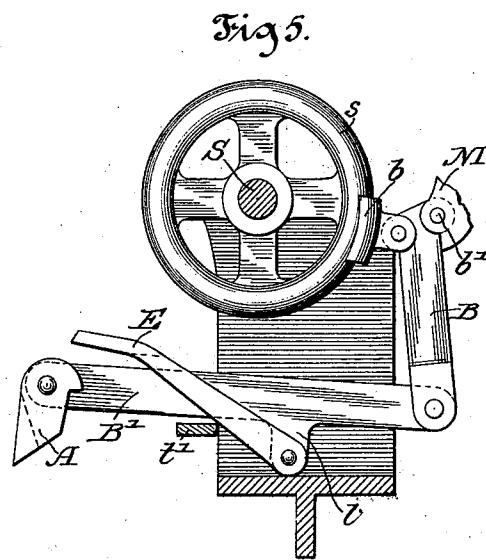
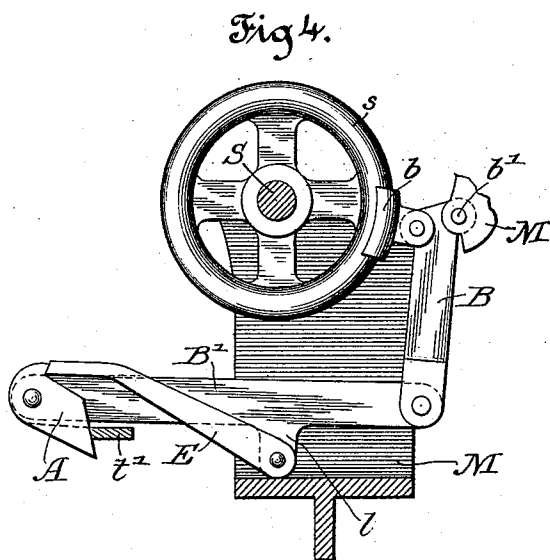
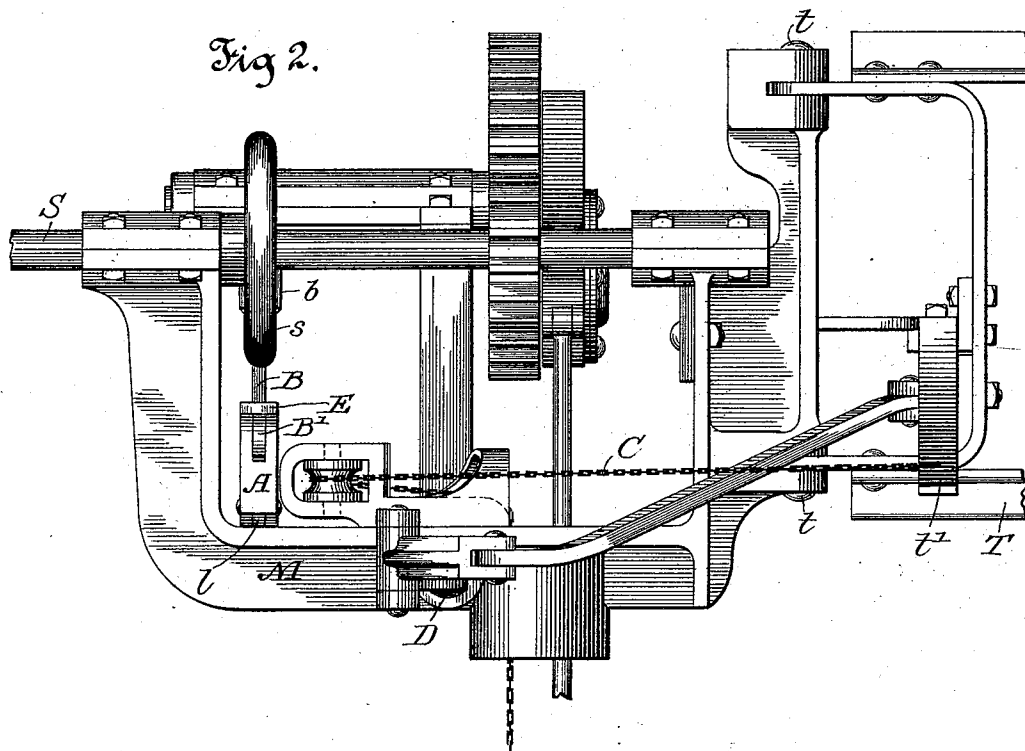
Witnesses
Wm. J. Heming.
Wm. M. Rheem.

Inventor
Lewis W. Beard
by L. A. Hill
his attorney.

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Witnesses
Wm. J. Fleming
Wm. M. Rheem.

Inventor
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(No Model.)

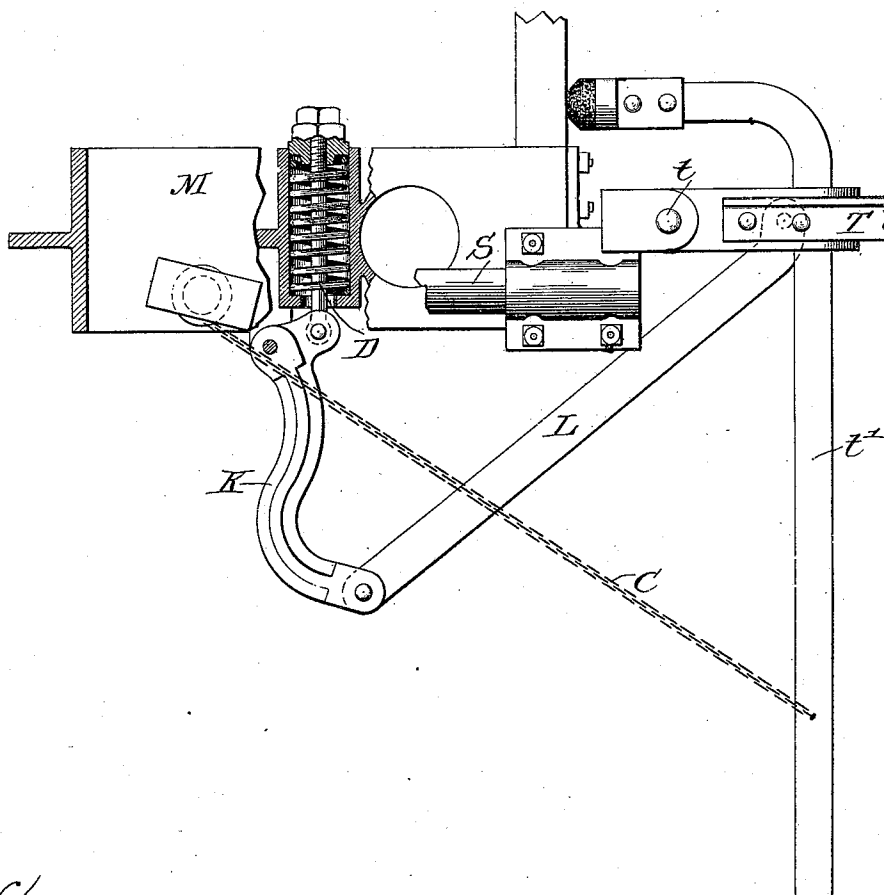
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Fig 6.



Witnesses:
Wm. J. Hamming
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Inventor
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UNITED STATES PATENT OFFICE.

LEWIS W. BEARD, OF DECORAH, IOWA.

WINDMILL.

SPECIFICATION forming part of Letters Patent No. 510,497, dated December 12, 1893.

Application filed March 2, 1892. Serial No. 423,529. (No model.)

To all whom it may concern:

Be it known that I, LEWIS W. BEARD, a citizen of the United States of America, residing at Decorah, in the county of Winneshiek and State of Iowa, have invented certain new and useful Improvements in Windmills, of which the following is a specification.

Referring to the accompanying drawings, wherein like reference-letters indicate like parts, Figure 1. is a top-plan; Fig. 2. a front elevation; Fig. 3. a vertical section in line 3—3 of Fig. 1; and Figs. 4. and 5. are detail views of the brake mechanism.

Windmills are thrown out of action by bringing the working-surfaces of the wind-wheel—that is to say, the surfaces against which the wind acts—substantially into line with the direction of the wind. To accomplish this result, the attendant, at the bottom of the tower, pulls upon a cord (chain, wire, or other equivalent) connected to said surfaces and acting against the resistance of the regulating-spring or weight of the windmill. When he releases the cord, the regulating-weight or spring tends to restore the wind-wheel to its normal working condition or position—hence, in order to hold the wheel permanently out of action, it is necessary for him to pull the cord down and fasten it. So fastened, it must be provided with a swiveling-device to prevent its twisting and breaking as the mill-head turns on its vertical axis; and, in any case, it is under constant strain and wear.

The primary object of my main invention is to do away with the labor and inconvenience of fastening and unfastening the cord, and the necessity of a swiveling-device to prevent it from twisting.

To this end, my main invention consists in combining with a windmill a device supported by the mill-head, and adapted to be operated (by pulling the cord) so as to lock the acting-surfaces of the wind-wheel out of the wind.

Further improvements consist, respectively, in combining a brake with such locking device; in adapting the locking-device to be both locked and unlocked by pulling down the cord; and in the various combinations specifically set forth in the claims hereto appended.

My main inventions are applicable to any ordinary form of windmill; but I have preferred to illustrate them as applied to that class known in the art as “solid-wheel windmills,” in which the tail-vane is pivoted to the mill-head or vertical axis, and the mill is thrown out of action by swinging the wind-wheel bodily around on the vertical axis of the mill until the acting surface of said wheel comes substantially in line with the direction of the wind.

In practice I have applied my invention to a windmill constructed in accordance with description of the mill in the patent to West-away and Beard, granted March 22, 1892, No. 471,406.

In the drawings illustrating such form of mill, M. indicates the mill-head; S. the wind-wheel shaft; T. the tail-vane, pivoted to the mill-head or vertical axis at *t*, and pivoted with a rigid lateral arm *t'*; D. the regulating-spring or weight of the mill; and C. the cord attached to the arm *t'*, and thence extending to the mill-head, and down to the lower part of the tower, by pulling upon which the wind-wheel is swung around out of the wind. All these parts are well-known in the art, and therefore need no further description.

In this form of embodiment, I key upon the shaft S. a small wheel *s*. to receive the action of the brake-shoe *b*., which is applied to the wheel by means of a brake-lever B., pivoted to the mill-head at *b'*. A bar B'. is articulated to the lower end of the brake-lever, and held in a substantially horizontal position by any suitable means, for example: by a lug *l*. projecting downward from the bar and resting upon the flat surface of the mill-head. Upon the free end of the bar B'. I pivot a double-acting detent-block or plate A., having one end extending above, and the other and heavier end below, the pivot, and swinging freely thereon. To the downwardly-projecting lug *l*. I pivot a bar E., which extends upward in an inclined direction to the upper end of the detent A., and, by the action of gravity (or a spring, if preferred), tends to so lock the detent as to allow the lower end of the latter to swing toward, but not from, the lug *l*. Any suitable means may be employed to prevent the free end of the stop-bar E. from dropping down below the proper position for engagement against

the upper end of block A.—for example: a pin extending from the upper side of bar E., and normally resting upon the upper edge of bar B'. Thus constructed the parts B. B', E., A., are all connected together, so as to maintain their relative working positions, and, being supported by the mill-head, they always occupy the same relative position to the pivoted tail-vane when the mill is in full operation; but they can all swing horizontally together upon the pivot b', as an independent center of motion. I arrange the lateral arm t', of the tail-vane, so that it extends horizontally in a plane which intersects both the block A. and bar E., at or slightly below the lower edge of the bar B', so that, in the act of bringing the wheel-shaft to a right angle to the tail-vane, the outer end of arm t' will trip and pass under the block A., and the latter will then drop back to its normal position, thus confining the end of arm t' between the lower end of block A. and the lower end of bar E. In this position, the arm t' cannot return, because, locked by the block A., the lower end of which is prevented from swinging outward, by the engagement of the upper end against the stop-bar E.; but, by swinging the arm t' a little farther inward, it will strike and lift the bar E., disengaging the block A., and the arm t' can then be restored to its original position. The position of the tail-vane is, of course, controlled by the arm t', rigidly attached thereto; so that, when said arm is locked by the block A., as above described, the vane is held substantially at right-angles to the wheel-shaft, and the wheel thus held edge to the wind. In this position, the regulating-weight or spring D., of the mill, tends to restore the vane and wind-wheel to their normal working relations, and thus causes the arm t' to press constantly outward with considerable force against the locking-device A.; and this swings the block A., bars E. B' and lever B. outward upon their common pivot b', and thereby applies the brake b. to the wheel s., so as to arrest or retard the rotation of the latter, and consequently bring the wind-wheel to rest. The cord or chain C. is preferably attached to the arm t', and so arranged that when pulled downward it swings said arm into locking engagement with block A., and, if pulled still further, brings the arm into contact with bar E. and releases the lock.

The practical operation is as follows: Whenever the attendant desires to stop the mill, and hold it out of action, he pulls downward upon the cord C. till the arm t' becomes locked behind block A. The cord now being released from his grasp, the mill is held out of action by the locking-device, with no strain upon the cord, which hangs free. The pressure of the regulating-spring or weight, as soon as the cord is released from the hand, forces the locking-device outward, applying the brake in the manner above described, and automatically bringing the wind-wheel to rest.

Whenever it is desired to set the mill at

work, the attendant gives a somewhat stronger pull upon the cord, which carries the arm t' back against the under side of bar E., thereby pushing the connected parts B. B'. E. A. back so as to release the brake, and at the same time lifting the bar E. so as to disengage the lock; and then, dropping the lower end of the cord from his grasp, the wind-wheel is swung by the regulating-weight or spring into its working position, face to the wind.

The chief advantages of the invention lie in the extreme ease, quickness and convenience of its practical manipulation; the relief of the cord from strain and wear; the greater durability and strength of the locking-device, as compared with the light cord or wire usually employed to hold the mill out of operation; and the brake, automatically applied by the action of the mill itself whenever the latter is locked out of working position.

The mechanical details may be varied indefinitely, without departing from the principle of the invention. In wind-mills not having a pivoted tail-vane, the device, whatever its form, which is operated by the cord or its equivalent to throw the working surfaces of the wheel out of the wind, will be arranged to engage with the locking-device, instead of employing for that purpose an arm attached to the tail-vane.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a wind-mill in which the wind-wheel and tail-vane tend to normally assume a position at right-angles to one another, a locking device, supported by the mill head, and so arranged and adapted that when the wind-wheel and tail-vane assume a position substantially parallel to one another, they will be automatically locked, and be held in such position; substantially as set forth.

2. In combination, a wind-mill, in which the wind-wheel and tail-vane tend to normally assume a position at right-angles to one another, with a locking device supported by the mill-head, and operated by a cord or chain extending to the lower part of the tower, whereby, upon pulling the cord, the wind-wheel and tail-vane will assume a position substantially parallel to one another, and be locked in such position; substantially as set forth.

3. In a wind-mill in which the wind-wheel and tail-vane tend to normally assume a position at right angles to one another, the combination of the following elements: first, a part of the working mechanism of the wind-mill, adapted to be acted upon by a brake; second, a brake device adapted to act upon the part just mentioned; third, a locking device adapted, when the wind-wheel and tail-vane assume a position substantially parallel to one another, to lock them in such position, said locking device being so connected to the brake device that the force tending to cause the mill to assume its normal position, and

exerted upon the locking device, shall operate the brake; substantially as and for the purposes set forth.

4. In a wind-mill of the kind described, the combination of the following elements: first, a part of the working mechanism, of the wind-mill, adapted to be acted upon by a brake; second, a brake device, supported by the mill-head, adapted to act upon said part and control the operation of the wind-wheel; third, a locking device adapted, when the wind-wheel and tail-vane assume a position substantially parallel to one another, to automatically lock them in such position; said locking device being so connected to the brake device as to control the action of the same; and, fourth, a cord or chain extending from the mill-head to a point near the ground, whereby, upon pulling the cord or chain, the wind-wheel and tail-vane will be caused to assume a position substantially parallel to one another, and the locking device and brake mechanism be operated, and by pulling the cord still further the locking device may be unlocked, the brake mechanism released and the wheel and vane assume their normal positions; substantially as described.

5. In a wind-mill of the kind described, the combination of the following elements: first, a brake-wheel mounted upon the wind-wheel shaft and revolving therewith; second, a brake device, supported by the mill-head, adapted to act upon said brake-wheel; third, a locking device connected to the brake-lever and adapted to operate the brake; fourth, a part upon the tail-vane adapted to engage with the locking device when the wind-wheel and tail-vane are substantially parallel to one another; and, fifth, a cord or chain extending to the lower part of the tower, whereby, upon pulling the cord, the wind-wheel and tail-vane will assume a position parallel to one another, the part upon the tail-vane engage with the locking device, and the force tending to throw the mill into its normal position be exerted upon the brake lever thereby operating the

brake, and, upon pulling the cord still further the parts will be unlocked, the brake released, and the mill allowed to assume its normal position; substantially as described.

6. A wind-mill of the kind described, in combination with the following elements: first, a wheel mounted upon the wind-wheel shaft; second, a brake-shoe adapted to act upon said wheel; third, a brake lever upon which said shoe is mounted; fourth, a locking device connected to said brake lever; fifth, a part upon the tail-vane adapted to engage with the locking device; and, sixth, a cord or chain extending from the working parts of the mill to a point near the ground, whereby, upon pulling the cord, the wind-wheel may be swung out of the wind, and locked in such position and the brake thereby be applied, and upon pulling the cord still further the parts may be unlocked and the brake released, when the wind-wheel may automatically swing into its normal working position; substantially as described.

7. In a wind-mill of the kind described, the wind-wheel shaft *S*, the brake-wheel *S* mounted thereon, the brake lever *B*, the brake-shoe *b*, the bar *B'* connected to the brake-lever, the double detent *A* pivotally connected to said bar, and the latch bar *E* adapted to control the detent *A*, in combination with the rigid laterally extending arm *t* attached to the tail-vane of the mill, adapted to engage with the detent *A*, and the cord or chain *C* extending to a point near the ground, whereby, upon pulling the cord the arm *t* may be caused to engage the detent *A*, and the parts thereby be locked together and the brake applied, and upon pulling the cord further the latch-bar *E* will be raised, the detent and brake released, and the mill may then automatically assume its normal working position; substantially as described.

LEWIS W. BEARD.

In presence of—

JOHN W. HILL,
LYSANDER HILL.