

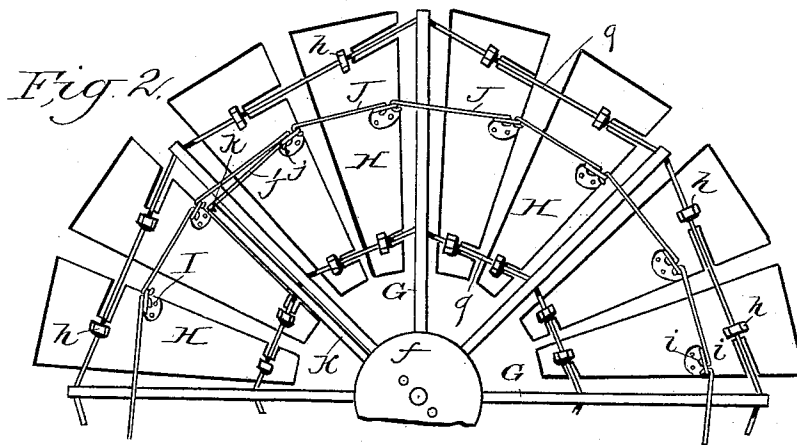
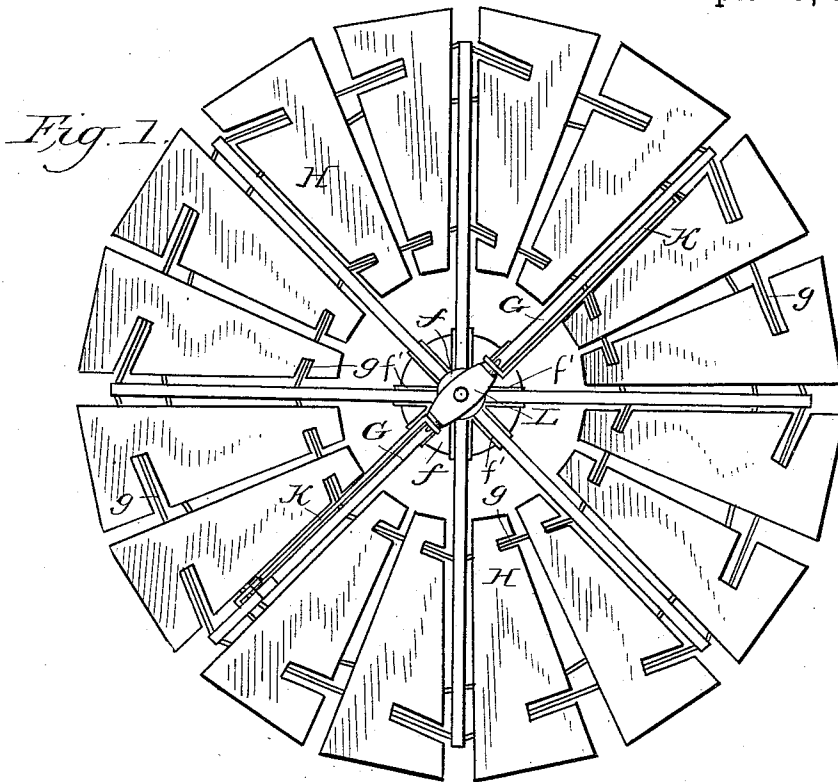
(No Model.)

2 Sheets—Sheet 1.

J. F. REUL.
WINDMILL.

No. 496,098.

Patented Apr. 25, 1893.



Witnesses

M. J. Mc Mahon
W. A. Mitchell

Inventor

John F. Reul
By his Attorney *J. R. Little*

(No Model.)

2 Sheets—Sheet 2.

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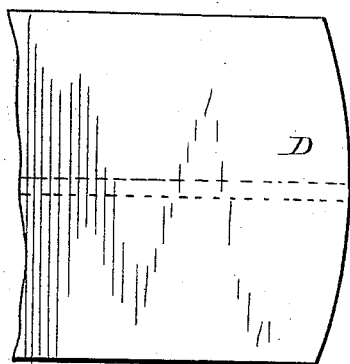


Fig. 3.

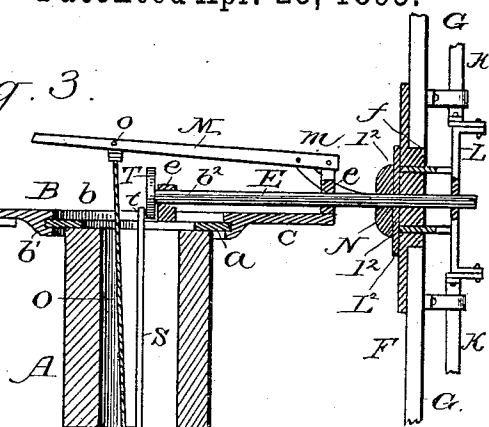


Fig. 5.

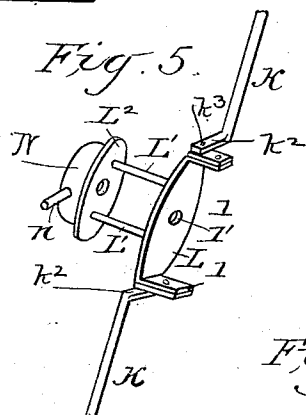


Fig. 4.

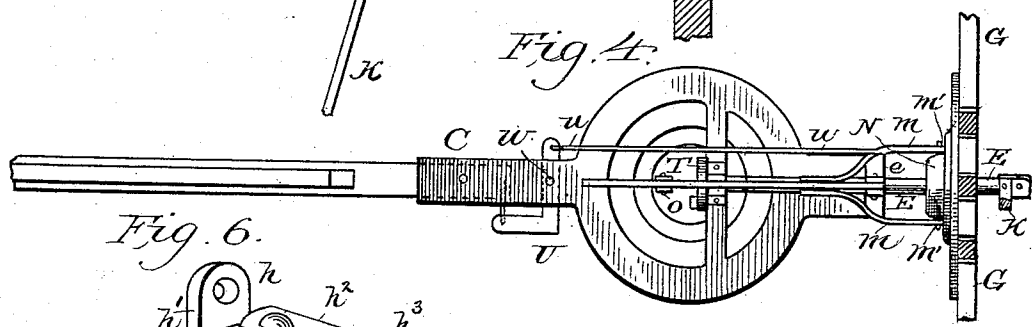


Fig. 6.

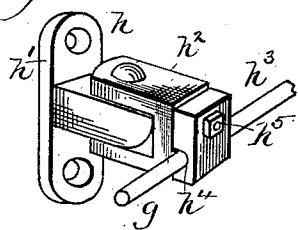
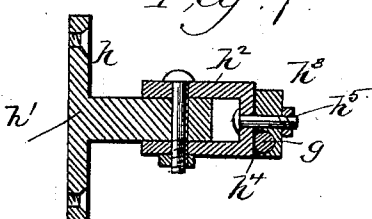


Fig. 7.



Witnesses
W. J. McMahon
W. A. Mitchell

Inventor
John F. Reul
By his Attorney
J. R. Little

UNITED STATES PATENT OFFICE.

JOHN F. REUL, OF JUNEAU, WISCONSIN.

WINDMILL.

SPECIFICATION forming part of Letters Patent No. 496,098, dated April 25, 1893.

Application filed May 17, 1892. Serial No. 433,376. (No model.)

To all whom it may concern:

Be it known that I, JOHN F. REUL, a citizen of the United States, residing at Juneau, in the county of Dodge and State of Wisconsin, have
5 invented certain new and useful Improvements in Windmills; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it apper-
10 tains to make and use the same.

This invention relates to windmills of that class embodying feathering blades, and it has for its object to provide simple and improved means for operating the blades.

15 A further object of the invention is to provide a windmill possessing advantages in point of inexpensiveness and durability in construction, ease of operation and general efficiency.

20 To this end, the invention consists, substantially, in the construction, combination and arrangement of parts as will be hereinafter more fully described and particularly pointed out in the claims.

25 In the drawings—Figure 1 is a front elevation of a wind-mill embodying my invention. Fig. 2 is a rear elevation of the wheel, detached. Fig. 3 is a vertical longitudinal sectional view. Fig. 4 is a top or plan view. Fig.
30 5 is a detail perspective view of the devices for operating the blades. Fig. 6 is a similar view of one of the hinges. Fig. 7 is a sectional view of the latter.

Corresponding parts in the figures are denoted by the same letters of reference.

35 Referring to the drawings, A designates the tower, which may be of any suitable or preferred construction, and to the top of which is secured a circular bearing plate, *a*. Working upon the latter is a metallic frame, B,
40 consisting of a circular body portion, *b*, provided with an annular depending flange, *b'*, embracing the edge of the bearing plate. To one side of the center the circular opening in
45 the body *b* is a transverse piece, *b²*.

C C designate two arms projecting outwardly from said body *b* in diametrically-opposite directions, to one of which is pivotally
50 secured a vane, D. Projecting upwardly from the other arm and from the piece *b²*, are bearings, *e e*, within which is journaled a wheel shaft, E.

F designates the wheel, which comprises a hub, *f*, rigidly secured upon the shaft E near its outer end. The hub is preferably formed
55 of cast metal, and provided at its outer face with a series of radially-arranged flanges, *f'*. To the latter and also to the hub proper are bolted or otherwise secured arms, G G. These arms are connected about midway their cen-
60 ters and at their outer ends by rods, *g g*.

H designates the blades, which are preferably constructed of wood or steel and of approximately V-shape. The blades are pivotally attached at their sides to the respective
65 rods *g*, by hinges *h h*, and said blades are also transversely slotted to accommodate the rods, as shown. The hinges *h*, each comprise a standard, *h'*, secured to the blade, and to said
70 standard is pivoted a U-shaped plate, *h²*. A block, *h³*, having a groove, *h⁴*, at its under side, is secured to the center of the said plate by a bolt, *h⁵*. In practice, the respective rods
75 *g* are received by the groove *h⁴*, and by tightening or loosening the bolt *h⁵*, the hinge is adapted to be adjusted upon the rod.

For operating the blades, I provide the mechanism which will now be described. To the inner edge of each blade is secured a bracket, I, which projects beyond said edge
80 and is provided in said extension with two apertures, *i i*, said eyes being in alignment when the wheel is in operative condition. The blades are all coupled together by links, J, which are received by said apertures.
85 Journaled in bearings, *k k*, carried by the adjacent arms G, are two diametrically-opposite rods, K K. These rods are located at the outer face of the wheel and have their distal
90 ends turned rearwardly at right angles to the rods, as shown at *k' k'*. These ends are each connected to one of the adjacent brackets I, but at opposite sides, by a supplementary link J', said brackets being provided with an
95 additional aperture, *j*, for this purpose. The inner opposing ends, *k² k²*, of the rods K are bent in reverse directions, at right angles to both the rods K and the outer, rear-turned ends *k'*, said ends *k²* being each provided with
100 a bearing eye, *k³*.

L designates an approximately U-shaped plate which is provided at its ends with outwardly-projecting pins or studs, *l l*, which are journaled in the bearing eyes *k³*. The plate

L is further provided with a central eye, *l'*, which receives the outer end of the shaft E and with two inwardly-projecting, parallel guide-rods, *L' L'*. The latter play in bores, *l² l²*, provided therefor in the hub *f* of the wheel, the rear ends of said guide-rods being secured to a second plate, *L²*, which slides upon the shaft E.

Fulcrumed upon the outer bearing *e* for the shaft E is a lever, M, which is provided with two diverging arms, *m m*, said arms projecting toward the wheel at an oblique angle to the lever. The free ends of these arms are each provided with a bearing eye, *m' m'*, which receives pins or studs, *n n*, projecting from opposite sides of a collar, N, which slides on the shaft E. To the free end of the lever is attached by means of a swivel device, *o*, an operating cord or chain, O.

Normally, the blades are at right angles to the face of the wheel. To throw the wheel into operation, the cord or chain O is drawn upon, and through the means just described, the plate L is forced outwardly. This plate serves to turn the rods K, which through the links J and J', throw the blades into proper operative position. To throw the wheel out of operation, the cord or chain is released, when the blades are by the force of the wind returned to their normal position.

Motion is imparted from the wheel by the means which will now be described. P designates a pump or other rod, having secured to its upper end a metallic sleeve, Q. The latter is provided with a grooved flange, *g*, engaging which is a collar, R. The collar has a loop, *r*, to which is pivotally secured a pitman, S. The shaft E has a circular plate, T, at its rear end, and to which is secured a crank-pin, *t*, the upper end of the pitman being journaled on the latter. The cord or rope O passes down through the sleeve Q, and out through an aperture, *q'*, near its lower end.

For shifting the vane, I provide a right angular lever, U, mounted upon a lug, *w* carried by the frame B. This lever is connected at one end with the vane in rear of its pivot, the other end of the lever being connected by a cord or chain, *u* with the arms *m* of the lever, M. Thus when the lever is drawn upon to throw the wheel into operative position,

the vane is simultaneously feathered. To limit the movement of the vane, a loop, V, is provided, said loop being secured to the under side of the arm C carrying the vane. The end of the latter plays within the loop, its movement being limited by coming into contact with either end thereof.

I claim as my invention—

1. In a wind mill, the combination, with the wheel comprising pivotally attached blades, the latter being coupled together, of a U-shaped plate, L, and a plate, *L²*, mounted on the wheel shaft, parallel rods, *L'*, rigidly connecting the said plates and working in bores in the wheel hub, crank-rods, K, connecting the blades with the out-turned end of the plate L, and a lever, M, carrying a disk, N, the latter being adapted to bear against the plate *L²*; substantially as set forth.

2. In a windmill, the combination, with a frame, B, provided with arms, C C; a wheel, F, journaled upon one of said arms, and a vane, D, pivoted to the other of said arms; of a lever, M, fulcrumed upon the frame B; arms, *m*, connected with said lever and adapted to be reciprocated thereby to feather the blades of the wheel; an L-shaped lever, U, pivoted to the frame B and having one end connected with the inner ends of the vane; and a rod, *u*, connecting the free end of the lever U with one of the arms *m*; substantially as set forth.

3. In a windmill, the combination, with the wheel-frame comprising radially arranged arms, G, and rods, *g*, connecting the latter; of blades, H, and hinges, *h*, connecting the blades with the rods *g*, said hinges being adjustable upon the latter; substantially as set forth.

4. In a windmill, the combination, with the wheel-frame and the blades, of a hinge for connecting the latter to the former and consisting of a standard, a U-shaped plate pivotally connected therewith, a block having a groove upon its under face, and a bolt for securing said block to said plate; substantially as and for the purpose set forth.

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

JOHN F. REUL.

Witnesses:

M. HARTZHEIM,
F. W. LUECK.