

(No Model.)

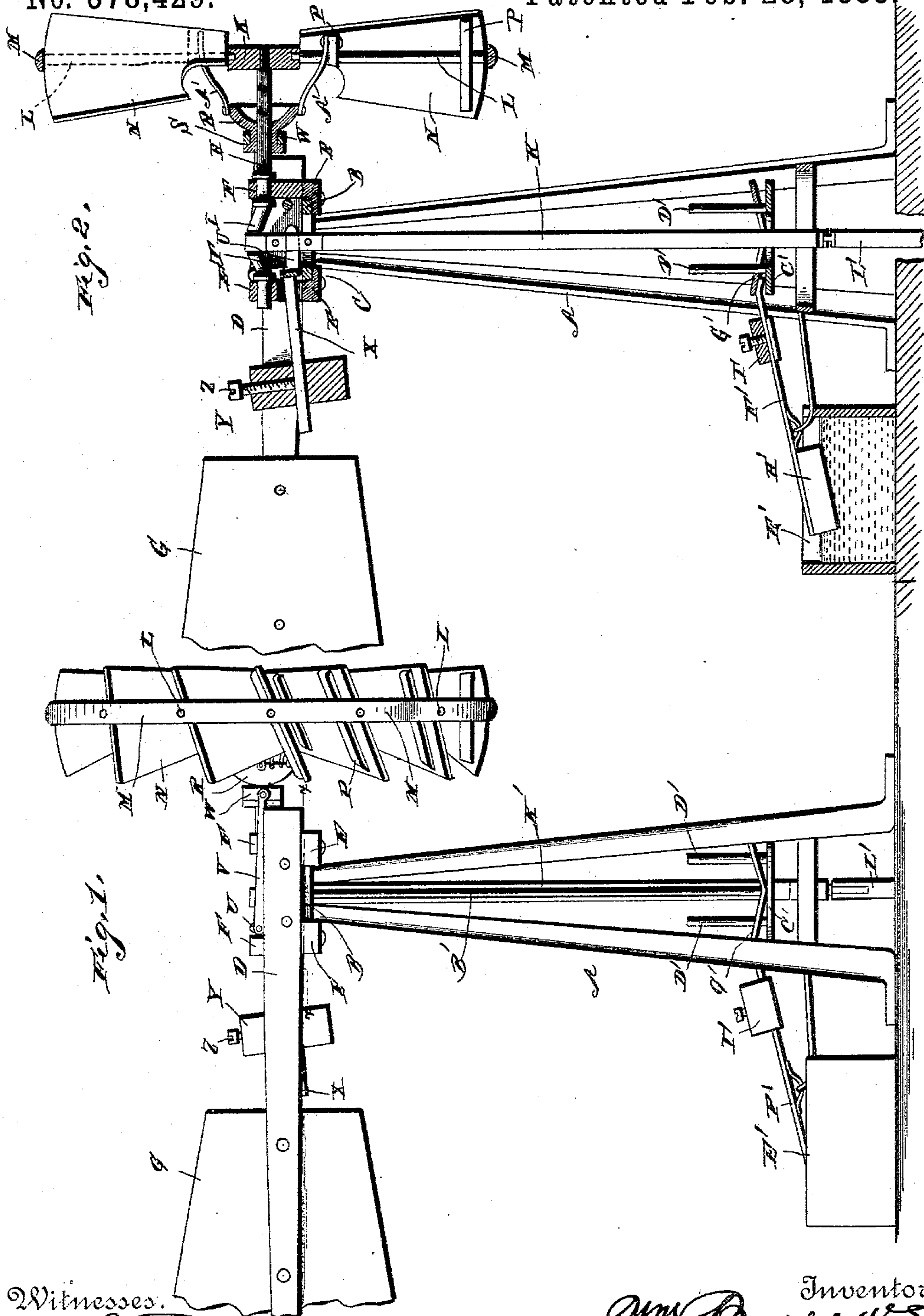
2 Sheets—Sheet 1.

W. BURROWS.

WINDMILL.

No. 378,429.

Patented Feb. 28, 1888.



Witnesses.

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J. W. Gama

Inventor,

Wm. Burrows

By his Attorneys,

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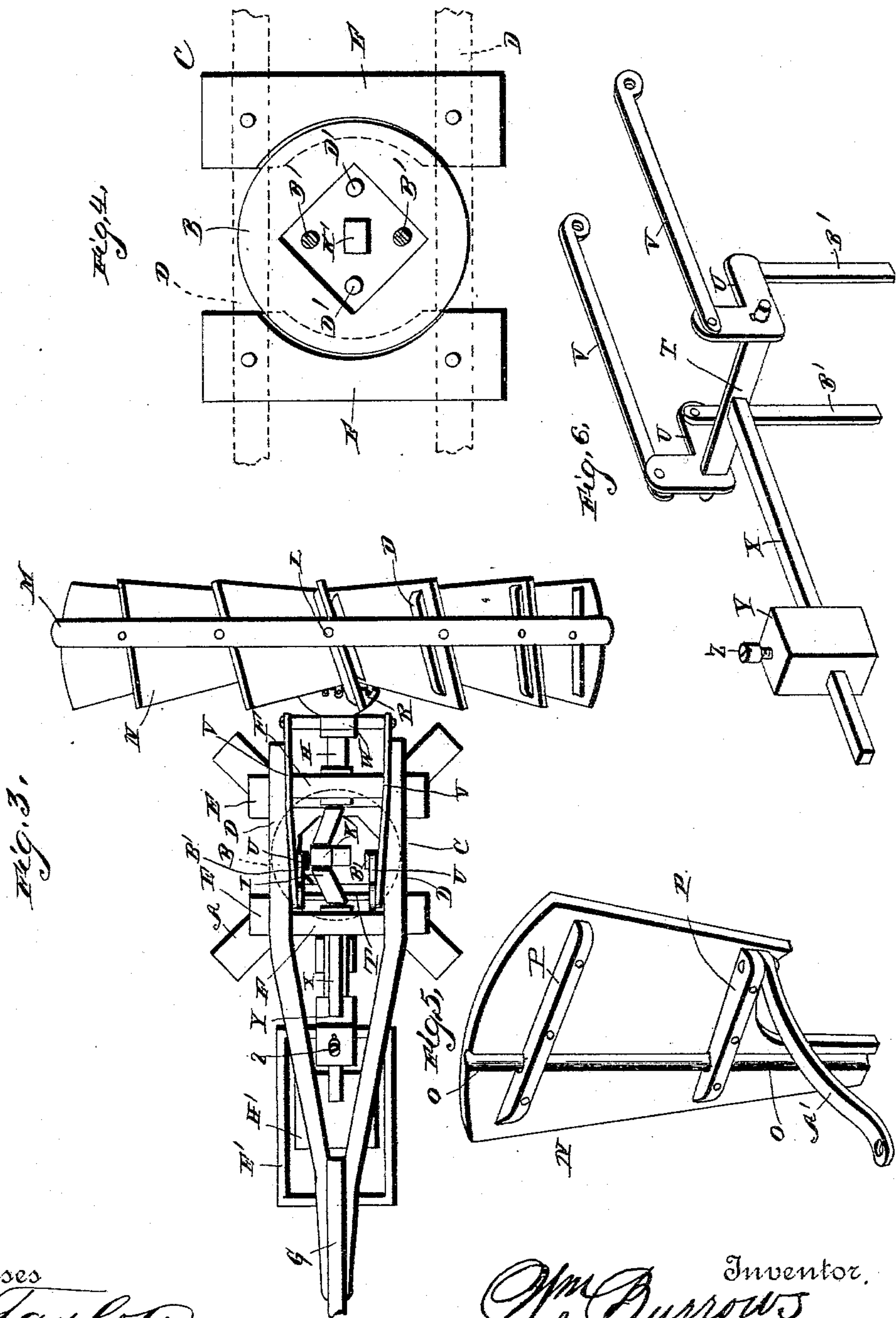
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Inventor,
Wm. Burrows.
By *his* Attorneys
C. A. Snowdon

UNITED STATES PATENT OFFICE.

WILLIAM BURROWS, OF LITTLETON, ILLINOIS.

WINDMILL.

SPECIFICATION forming part of Letters Patent No. 378,429, dated February 28, 1888.

Application filed July 2, 1887. Serial No. 243,235. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM BURROWS, a citizen of the United States, residing at Littleton, in the county of Schuyler and State of Illinois, have invented a new and useful Improvement in Windmills, of which the following is a specification.

My invention relates to an improvement in windmills; and it consists in the peculiar construction and combination of devices, that will be more fully set forth hereinafter, and particularly pointed out in the claims.

In the drawings, Figure 1 is a side elevation of a windmill embodying my improvements. Fig. 2 is a vertical section of the same. Fig. 3 is a top plan view showing the wind-wheel partly in section. Fig. 4 is a horizontal section taken on the line *x x* of Fig. 1. Fig. 5 is a detail view of one of the blades of the wheel, and Fig. 6 is a detached view of the bell-crank levers.

A represents a tower, which is of any suitable height, and is provided at its upper end with a circular cap, B, which has a large central opening.

C represents the turn-table, which comprises a pair of longitudinal bars, D, connected near their outer ends by a pair of transverse bars, E, which are secured to the lower edges of the bars D by means of bolts, as shown.

F represents a pair of bearing-blocks, which are arranged on the upper sides of the bars E, and have their ends bearing between the opposing sides of the bars D. In the opposing sides of the bars E, near their upper edges, are made curved recesses, which receive opposite sides of the cap B, and thereby swivel the turn-table to the said cap, so that the said turn-table is adapted to rotate freely thereon. The bars D are extended from one end of the turn-table, and have their outer ends bolted to opposite sides of the vane G. These bars D are arranged at such a distance apart as to be within the radius of the cap B, and they bear upon the upper side of the said cap, and thereby support the turn-table thereon.

H represents a shaft, which is journaled in the bearing-blocks F and extends forward from the turn-table. In the rear portion of the said shaft is formed a crank, I. The portion of the shaft which projects forward from the turn-table is square or angular in cross-section.

To the front end of the shaft H is secured a hub, K, and in the said hub are secured the inner ends of a series of radial rods, L, the outer ends of which are secured to a circular metallic ring or tire, M. On each of the rods L is journaled a blade or fan, N, the said fans or blades being provided on their rear sides, at a suitable distance from one edge, with semi-cylindrical grooves O, adapted to fit on the rods, and cleats P are bolted on the rear sides of the said fans or blades, near the ends thereof, and retain the said fans or blades on the radial rods.

R represents a sliding hub, which is arranged on the shaft on the inner side of the hub K, and the said sliding shaft is provided on its rear side with a peripheral grooved collar, S.

Journaled in between the bars D, at a point slightly in advance of the rear bearing-block, F, is the rock-shaft T, near the ends of which are secured a pair of bell-crank levers, U. To the upper ends of the said bell-crank levers are pivoted the rear ends of a pair of pitmen, V, and the front ends of the said pitmen are pivoted to the ends of the transverse yoke or cross-head W, that engages the groove in the collar S. Rigidly connected to the rock-shaft T and extending rearwardly therefrom is a lever-arm, X, which passes through a transverse opening in the rear bearing-block, F, and on the said lever-arm is arranged a weight, Y, which is adapted to slide in and out upon the said arm and is provided with a set-screw, Z, by means of which it may be secured to the arms at any desired adjustment.

From the foregoing description it will be readily understood that the weighted lever-arm Y normally turns the rock-shaft so as to turn the bell-crank levers to such a position as will cause the pitmen and the yoke to draw the hub R rearward on the shaft from the hub K.

A' represents a series of curved connecting-rods which have their front ends pivoted to the inner sides of the inner cleats, P, near the front end thereof, and the rear ends of the said connecting-rods are pivoted to the periphery of the hub R, and thereby when the said hub R is moved rearward on the shaft the feathering blades or fans are turned on their radial rods and maintained obliquely to the wind, so that the wind-wheel will be caused to rotate.

B' represents a pair of vertical rods which have their upper ends pivoted to the horizontal arms of the bell-crank levers and depend therefrom. To the lower ends of the rods B' is secured a circular disk, C', which has a large central opening.

D' represents a pair of short vertical rods which extend from the upper sides of the said disks, and are arranged at points midway between the rods B'. On one side of the base of the tower is arranged a water tank or trough, E', on the front side of which at its upper edge is fulcrumed a lever, F'. The front end of the said lever is provided with a circular collar or disk, G', which bears upon the upper side of the disk C' and has a central opening through which the rods B' and D' extend. At the rear end of the said lever is secured a float, H', which is arranged in the tank.

I' represents an adjustable weight which is secured on the front portion of the lever F', and is provided with a set-screw adapted to secure it to the lever F' at any desired adjustment.

K' represents a connecting-rod, which has its upper end connected to the crank. To the lower end of the said connecting-rod is attached a pump-rod, L'. The pump (which is not here shown, as it may be of any suitable construction and forms no part of my invention) has its discharge-pipe connected to the trough E', so as to discharge water into the same.

The operation of my invention is as follows: When the wind blows, the wheel rotates, and thereby causes the pump-rod to reciprocate. The vane keeps the wind-wheel directed to the wind. The reciprocation of the pump-rod causes the pump to operate, and thereby force water into the trough or tank, and when the latter becomes filled to the desired level the float H' rises on the surface of the water, thereby depressing the front end of the lever F' and causing the same to bear downwardly on the disk C', with the result that the rods B' are caused to turn the rock-shaft T sufficiently to raise the weighted lever X and to move the sliding hub R forward on the shaft, and thereby cause the connecting-rods to turn the feathering-blades to a position at right angles to the rim of the wind-wheel and in line with the wind, and thereby cause the wind-wheel to cease rotating. When the wind-wheel is in

operation in a high wind, the force of the wind causes the feathering blades or fans to turn on the radial rods, and thereby present a small area of surface to the wind, and thereby regulate the speed of the wind-wheel. When the wind blows sufficiently hard to cause the said fans to turn directly in line therewith, the wheel ceases to operate. The function of the weighted lever X is to restore the feathering-blades to their normal position obliquely to the wind after each blast or gust has passed.

By providing the bell-crank levers in the turn-table and the depending rods B', connected to the said bell-crank levers and having the disk C', on which the front ends of the lever F' bears, connection is maintained between the said lever and the operating parts of the wind-mill, no matter in which direction the wind is blowing.

Having thus described my invention, I claim—

1. The combination, in a windmill, of the vertically-reciprocating disk C', provided with the vertical guide-rods D', and the float-lever having the collar G' at its inner end, bearing on the disk, and having the circular opening through which the rods D' extend, substantially as described.

2. In a windmill, the combination of the turn-table, the crank-shaft journaled thereon, the wind-wheel attached to said shaft and having the feathering-blades, the reciprocating pump-rod attached to and depending from the crank-shaft, the rock-shaft T, journaled in the turn-table and having the weighted lever X, the bell-crank levers attached to said shaft, connections between the said bell-crank levers and the feathering-blades, the rods B', connected to and depending from the bell-crank levers, the disk C', connecting the lower ends of said rods and having the vertical guide-rods D', and the float-lever having its inner end provided with the collar G', bearing on the disk C', and through which the guide-rods extend, substantially as described.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in presence of two witnesses.

WILLIAM ^{his} X BURROWS.
mark.

Witnesses:

JOHN S. BAGBY,
FRED A. BAGBY.