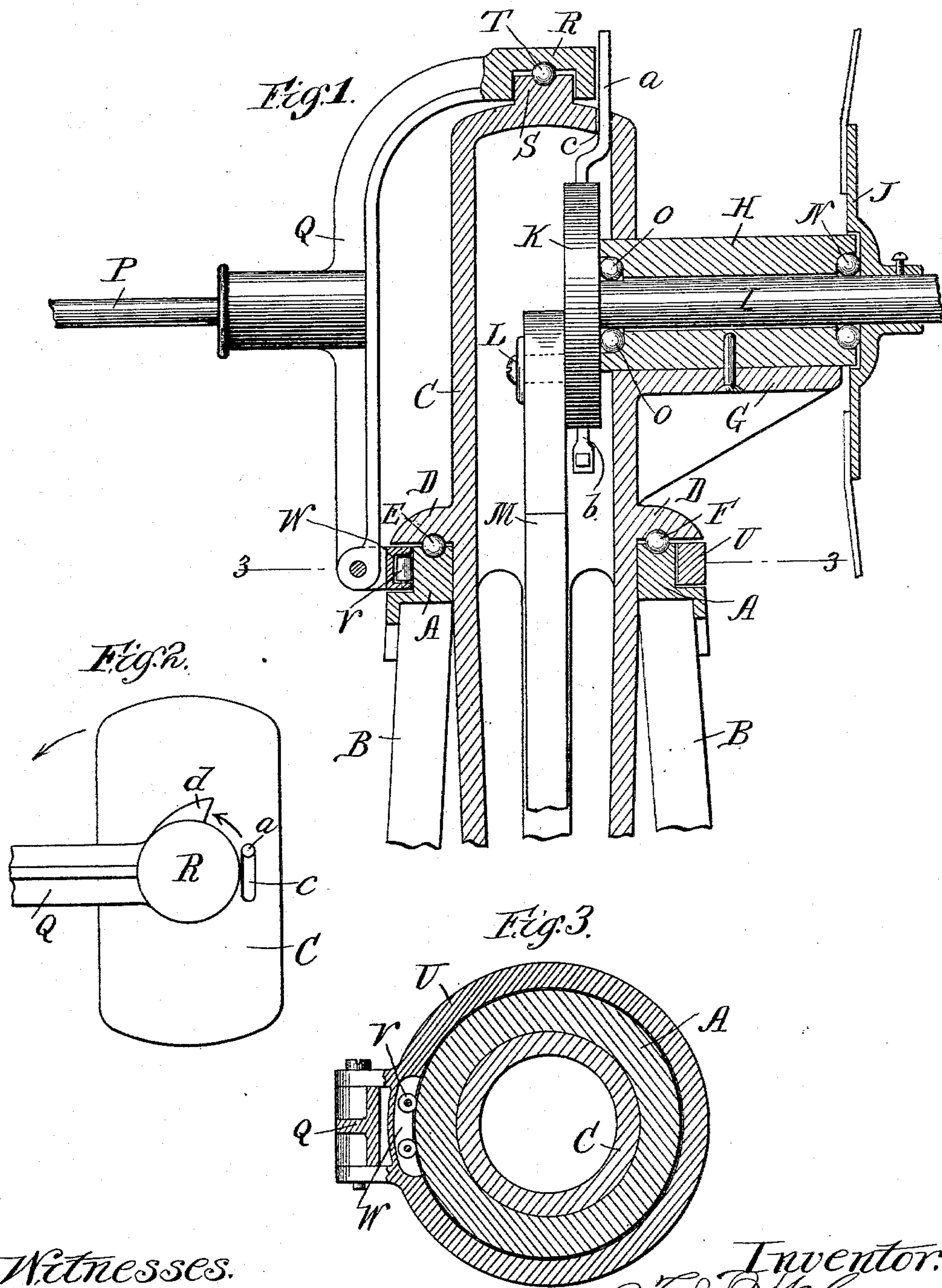


(No Model.)

F. J. McCORMICK.
WINDMILL.

No. 546,425.

Patented Sept. 17, 1895.



Witnesses.
Wm. M. Rheem
Wm. F. Humm

Inventor:
F. J. McCormick
by
Raymond W. Quohndro
Attys

UNITED STATES PATENT OFFICE.

FRANCIS J. McCORMICK, OF CHICAGO, ILLINOIS, ASSIGNOR TO ELLSWORTH
M. BOARD, OF SAME PLACE.

WINDMILL.

SPECIFICATION forming part of Letters Patent No. 546,425, dated September 17, 1895.

Application filed May 4, 1894. Serial No. 510,038. (No model.)

To all whom it may concern:

Be it known that I, FRANCIS J. McCORMICK, a citizen of the United States, residing in Chicago, county of Cook, and State of Illinois, have invented certain new and useful Improvements in Windmills, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

10 This invention relates to improvements in windmills, and has for its primary object to cheapen and simplify the construction of windmills and at the same time promote the efficiency thereof.

15 A further object is to so balance the weight of the wheel and vane upon the swivel-mast as to avoid the strains and binding to which such masts are usually subjected and at the same time maintain the promptness of action
20 desirable in both the wheel and vane.

A further object is to provide antifriction-bearings for the various parts of the devices, so as to not only reduce the friction between the parts, but also to render the parts more
25 sensitive and prompt in their action under all conditions.

A still further object is to have an automatic brake for the wheel which shall be applied whenever the wheel is thrown to an in-
30 operative position, so as to arrest the operation thereof, thereby avoiding the necessity for feathering the blades or leaves of the wheel when the latter is thrown out of a working position.

35 These objects are attained by the devices illustrated in the accompanying drawings, in which—

Figure 1 represents a detail central vertical section through the mast-head and its immediately contiguous parts of a windmill embodying my invention. Fig. 2 represents a detail plan view thereof, and Fig. 3 represents a horizontal section on the line 3 3 of Fig. 1.

45 Similar letters of reference indicate the same parts in the several figures of the drawings.

Referring by letter to the accompanying drawings, A indicates an annular or ring-like
50 cap uniting the upper ends of the standards B of a windmill-tower of any usual or desired

construction. Through this ring or cap works the hollow swivel-mast C, provided immediately above the cap A with the horizontal annular flange D, provided on its under side 55 with an annular groove, in which works a series of balls E, resting in a corresponding annular groove formed in the upper surface of the cap A, so as to constitute an antifriction connection and support between the mast 60 and cap. These balls carry the entire weight of the mast and wheel and a portion of the weight of the vane, and, acting antifrictionally, serve to sensitize the action of the mill, and through the vane permit the mill to be 65 brought into motion in the lightest of changeable winds.

At one side the mast is provided with a bracket G, cast with or otherwise rigidly secured thereto, in which rests and to which is 70 securely fastened a bearing H for the shaft I, upon the outer end of which shaft is mounted the wheel, the inner portion or hub J of which only is shown in the drawings. Upon the inner end of this shaft is mounted a disk or 75 wheel K, having a crank-pin L on the inner face thereof, to which is pivotally connected the pitman or power-transmitting rod M, which delivers the power of the mill to a pump, gearing, or any suitable mechanism by 80 which the power of the mill is to be utilized.

In each end of the bearing H, immediately surrounding the shaft I, is formed an annular semicircular groove, in which works a series 85 of balls N and O, the former being interposed between the said bearing and the hub J and the latter also resting upon the shaft I, being interposed between the opposite end of said bearing and the disk or wheel K. The purpose of these balls is to afford antifrictional 90 support for the mill-wheel and the driven disk K against the thrust of the shaft I resulting from the impact of the wind upon the mill-wheel whether in a working or idle position, this impact in a strong wind being so great as 95 to materially reduce the power of the mill and to cause great and unnecessary wear and strain upon the parts in the absence of such antifrictional devices. The vane-arm P is rigidly secured to the vane casting or yoke 100 Q, which latter is necessarily pivotally connected with the mast, so that the wheel may

swing into and out of working position, while the vane remains practically stationary under the influence of wind-pressure. To this end I have provided the upper end of the yoke Q with a cap R, fitting over a reduced boss S upon the upper end of the mast C, fitting loosely over the same, and interposed between said cap and boss a ball T, resting in suitable recesses or depressions in the opposing faces of said members, so as to afford an antifrictional connection between these parts. To the lower end of the yoke is rigidly or pivotally secured, as desired, a ring U, which encircles the cap A just below the flange D upon the mast, and at the side of the ring next the point of connection of the yoke therewith, as more clearly illustrated in Fig. 3, I provide the ring with two or more antifrictional rollers V, located in a suitable recess W in the inner face of the ring, which rollers bear against the cap A and serve, in conjunction with the connection between the top of the mast and the yoke, to support the weight of the vane. Obviously antifrictional rollers might be placed at intervals around the ring; but such arrangement is not necessary, because in practice the ring U will have practically no bearing against the cap. In conjunction with these devices I propose to provide an automatic brake to arrest the rotation of the wheel whenever it is thrown to an idle position, which brake consists in a spring friction-bar *a*, which I will denominate the "brake-bar," rigidly secured at its lower end *b* to the interior of the mast C, with its upper free end working through a slot or opening *c* in the upper portion of the mast. The cap R of the vane-yoke Q is provided at one side with a shoulder or lug *d*, constituting a stop for the brake-bar *a*, the upper free end of which is adapted and arranged to strike said stop when the wheel and mast turn in the direction indicated in Fig. 2, thus operating to force the brake-bar against the edge of the disk or wheel K, which the bar is curved to fit, and thereby arrest the rotation of the wheel.

A mill constructed in accordance with my

invention is very simple and economical, yet strong, durable, and efficient in construction, and avoids many objections to prior forms of mills of this character.

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

1. In a wind mill, the combination with a stationary mast having a recessed upper surface and laterally projecting flange below said surface, of a swivel mast mounted thereon having an annular flange and anti-friction balls arranged between the flange and upper surface of the stationary mast, a movable ring resting upon said laterally projecting flange of the stationary mast and below the annular flange on the swivel mast, said ring being provided with a recess in the inner face thereof, the vane-yoke pivotally connected at its lower end to said ring and terminating at its upper end with a recessed cap adapted to fit over a boss upon the top of the swivel mast, and the anti-friction rollers carried by the recess in the movable ring and adapted to bear only upon the top portion of the stationary mast, substantially as shown and described.

2. In a wind mill, the combination with the stationary and swivel masts, said swivel mast having a boss on its top and a slot near said boss, of the movable ring arranged between said masts, the vane casting pivotally connected at its lower end to said ring and journaled at its upper end upon the boss on the swivel mast, the upper end of said casting carrying a lug, the wheel shaft journaled in the swivel mast, and carrying a crank disk and a spring friction bar attached to the interior of the swivel mast, its free end projecting through the slot in the top of the said mast and in the path of the lug carried by the vane casting, substantially as shown and described.

FRANCIS J. McCORMICK.

Witnesses:

M. E. SHIELDS,
O. R. BARNETT.