

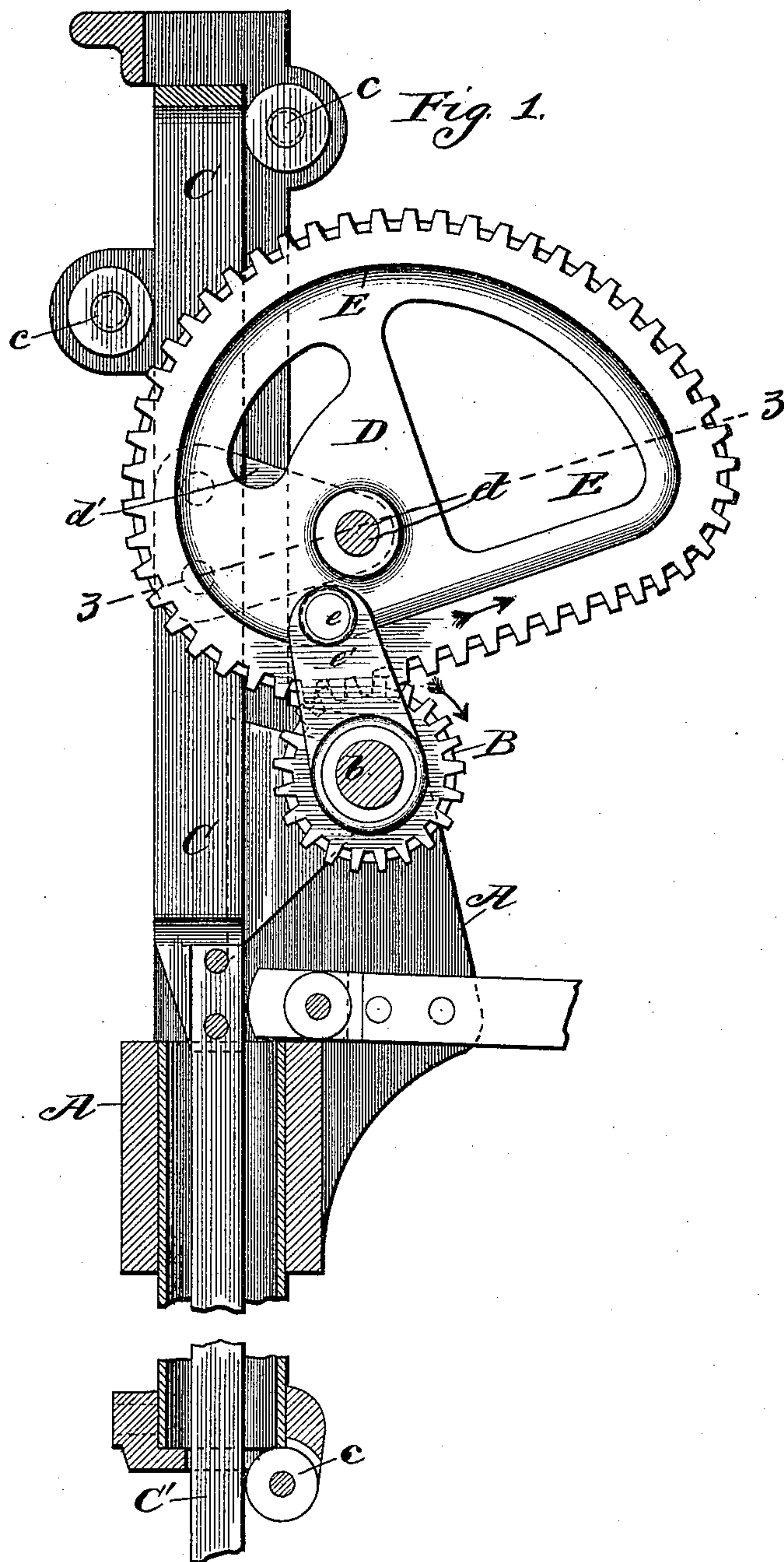
(No Model.)

2 Sheets—Sheet 1.

G. M. ALLEN.
GEARING FOR WINDMILLS.

No. 463,978.

Patented Nov. 24, 1891.



Witnesses
W. C. Corlies
Martin H. Olsen

Inventor
George M. Allen
By Le. Hill His Atty

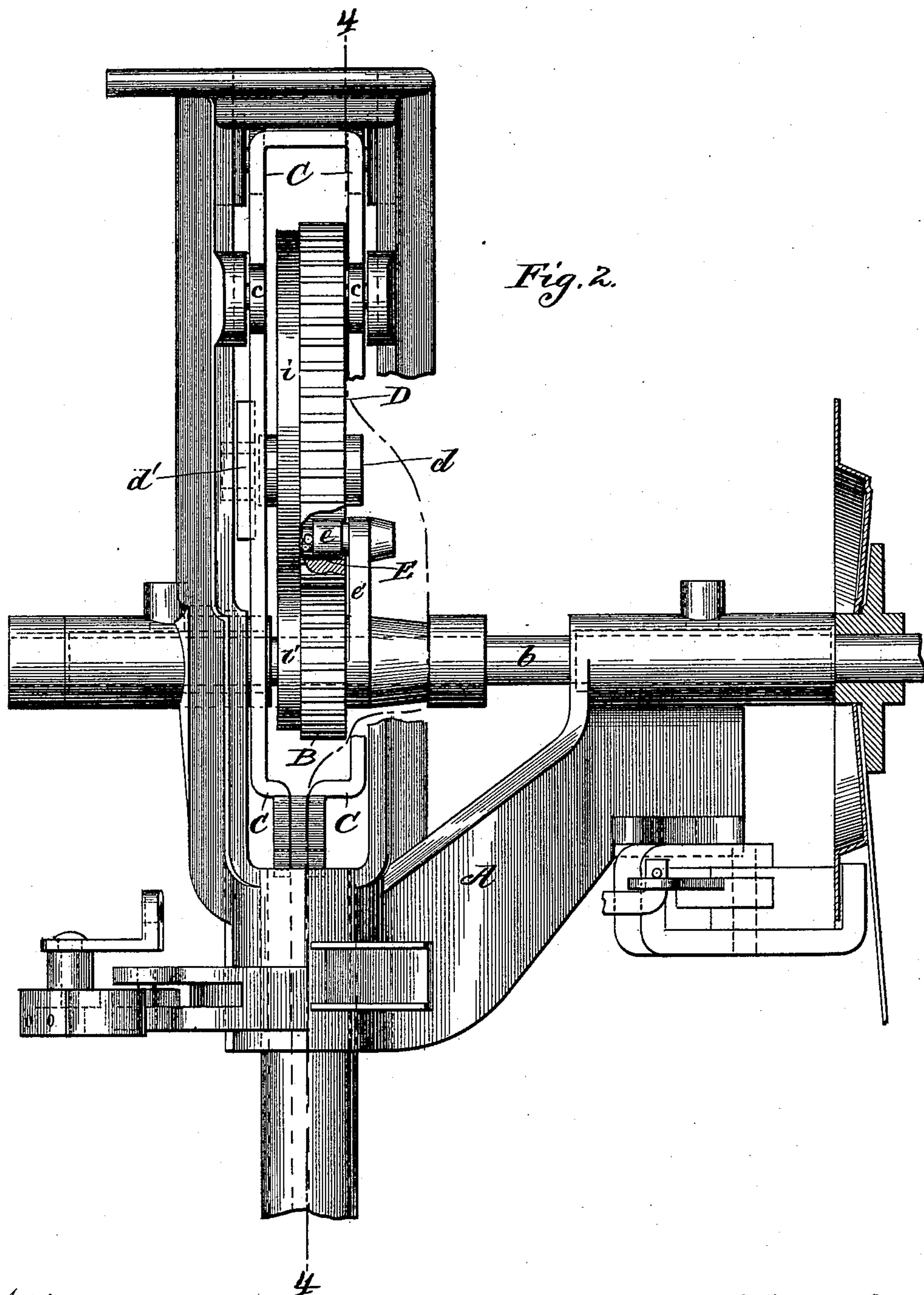
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UNITED STATES PATENT OFFICE.

GEORGE M. ALLEN, OF BELOIT, WISCONSIN.

GEARING FOR WINDMILLS.

SPECIFICATION forming part of Letters Patent No. 463,978, dated November 24, 1891.

Application filed February 19, 1891. Serial No. 382,120. (No model.)

To all whom it may concern:

Be it known that I, GEORGE M. ALLEN, a citizen of the United States of America, residing at Beloit, in the county of Rock and State of Wisconsin, have invented certain new and useful Improvements in Gearing for Windmills, of which the following is a specification.

Referring to the accompanying drawings, wherein like reference-letters indicate like parts, Figure 1 is a vertical section; Fig. 2, a side elevation with parts broken away.

In a pending application filed by me contemporaneously herewith and designated as Serial No. 382,119 I have described and claimed a new mechanical movement, invented by me and applicable generally for the conversion of rotary into reciprocating motion.

My present invention, intended to be described and claimed in the following specification, consists, first, in applying said mechanical movement as a means for actuating a reciprocating vertical pump-rod by the rotary motion of a wind-wheel, with a special construction and arrangement of the coacting elements for the purpose of producing in the actuated pump-rod the particular form of reciprocating movement whose characteristics and advantages are hereinbelow set forth, and, secondly, as an independent improvement in an improved construction and application of brake to stop the rotation of the wind-wheel when turned out of the wind.

In the drawings, A indicates the revolving mill-head or turn-table at the top of the windmill tower or frame; B, a pinion mounted on and revolving with the shaft *b* of the wind-wheel; C, a yoke guided by the friction-rollers *c c c* and connected at its lower end to the pump-rod C'; D, an eccentric non-circular gear-wheel loosely mounted on a stud *d*, projecting from an arm *d'*, attached to and moving with the yoke C; E, a guide-shoulder formed on the eccentric wheel D, and *e* a retaining-roller held against the concave face of the shoulder E by means of a swinging arm *e'*, pivoted upon the shaft *b* as a center, for the purpose of holding the wheels B D in proper relation to each other. The wheel B, rotating with the wind-wheel, rotates the wheel D; but as the axis of wheel B is stationary

and that of wheel D movable and one of said wheels eccentric to its own axis it will readily be seen that the axis of wheel D will be reciprocated, carrying with it the guided yoke C and the pump-rod C'. The special form of the reciprocating movement thus imparted to the pump-rod by the wheel B in any given case will depend, of course, upon the special form of eccentricity adopted for the driven wheel in that particular case.

In the present case my invention as an improvement, not in the mechanical movement itself, but in the application thereof to the purposes of a windmill, consists in combining the pinion B, the wind-wheel shaft *b*, and the guided pump-rod C' with an eccentric non-circular intermediate wheel D, connected to and moving with the pump-rod and having such a form of eccentricity and such a relation to the pinion B in point of size that when the wind-wheel is in action the combination will operate to lift the pump-rod slowly with great power and drop it quickly, utilizing about two revolutions of the wind-wheel to lift the rod and one to drop it for each complete reciprocation of the rod. To this end the eccentric wheel is made of such a relative size that its pitch-line will be about three times the length of the pitch-line of wheel B and of such eccentricity that its pitch-line, starting from the point of nearest approximation to the axis *d* and proceeding contrary to the direction of motion indicated by the arrows, will gradually diverge from said axis through about two-thirds of its own length to the point of greatest divergence and then converge rapidly in nearly or quite a straight line to the starting-point, the diverging line and converging line being connected at their ends, if preferred, by short circular arcs to give an easy transition from the one line to the other. With the parts thus combined an easy action is given to the wind-wheel, the force of gravity is largely utilized in carrying the rod down and is overcome by an increase of the wind-wheel power while the rod is rising, and thus a substantial uniformity is imparted to the action of the driving power by means simpler and more compact than those which have heretofore been resorted to for such purposes.

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

5 In a windmill, the combination of the wind-wheel with the pinion B, the reciprocating pump-rod C', and an eccentric non-circular wheel D, connected to and moving with the pump-rod and taking motion from the pinion B, said wheel D having its pitch-line about
10 three times as long as the pitch-line of the pinion and of such a form as to diverge gradually from the axis of motion for about two-

thirds of its length and converge rapidly toward it during the remaining one-third, with the lines of divergence and convergence so applied that the former acts to raise and the latter to lower the pump-rod, whereby about two revolutions of the driving-wheel will be expended in raising the rod to one in lowering it, substantially as described.

GEORGE M. ALLEN.

Witnesses:

W. M. HILL,

FRANCIS E. DRESSER.