

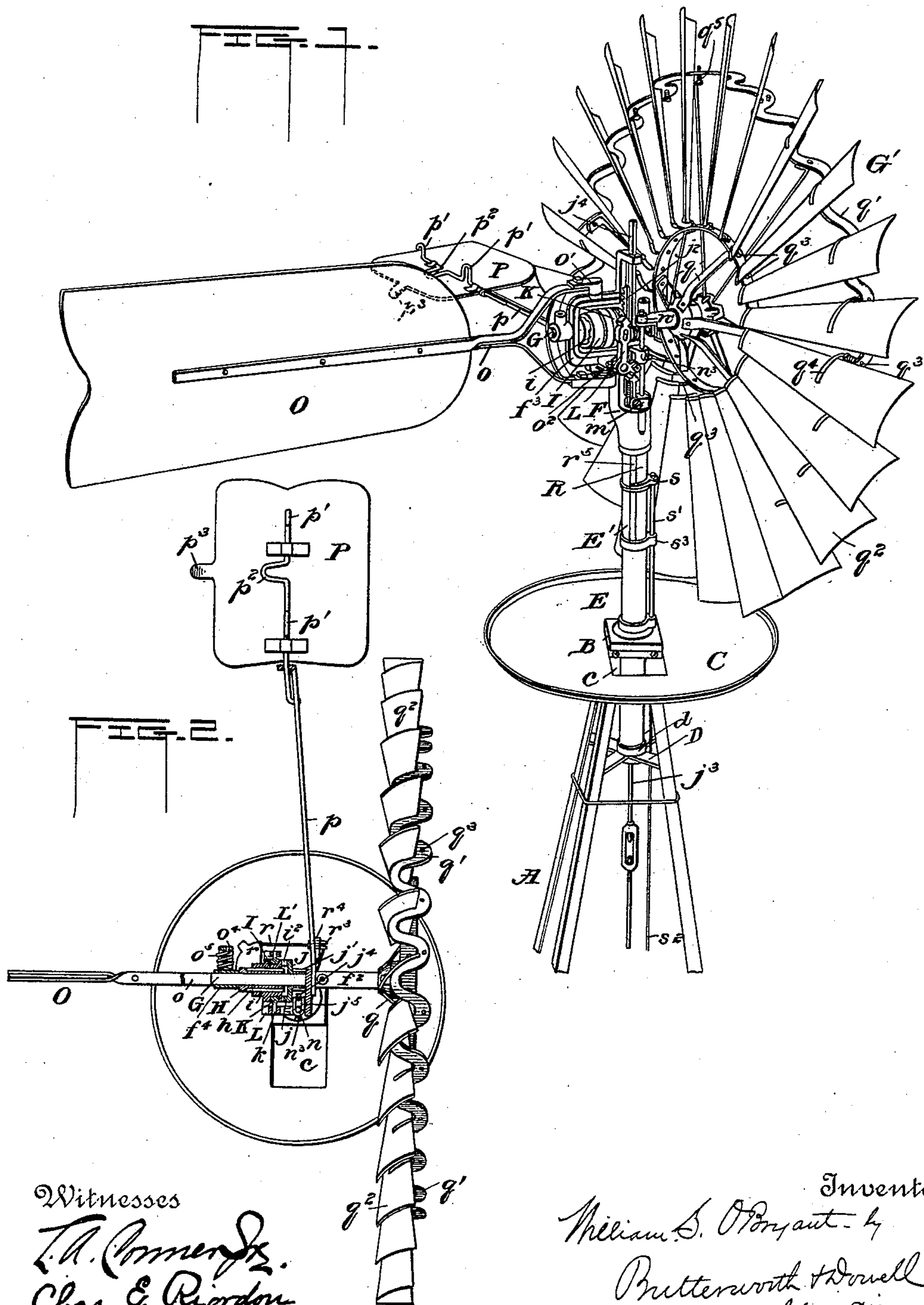
(No Model.)

2 Sheets—Sheet 1.

W. S. O'BRYANT.
WINDMILL.

No. 538,594.

Patented Apr. 30, 1895.



Witnesses

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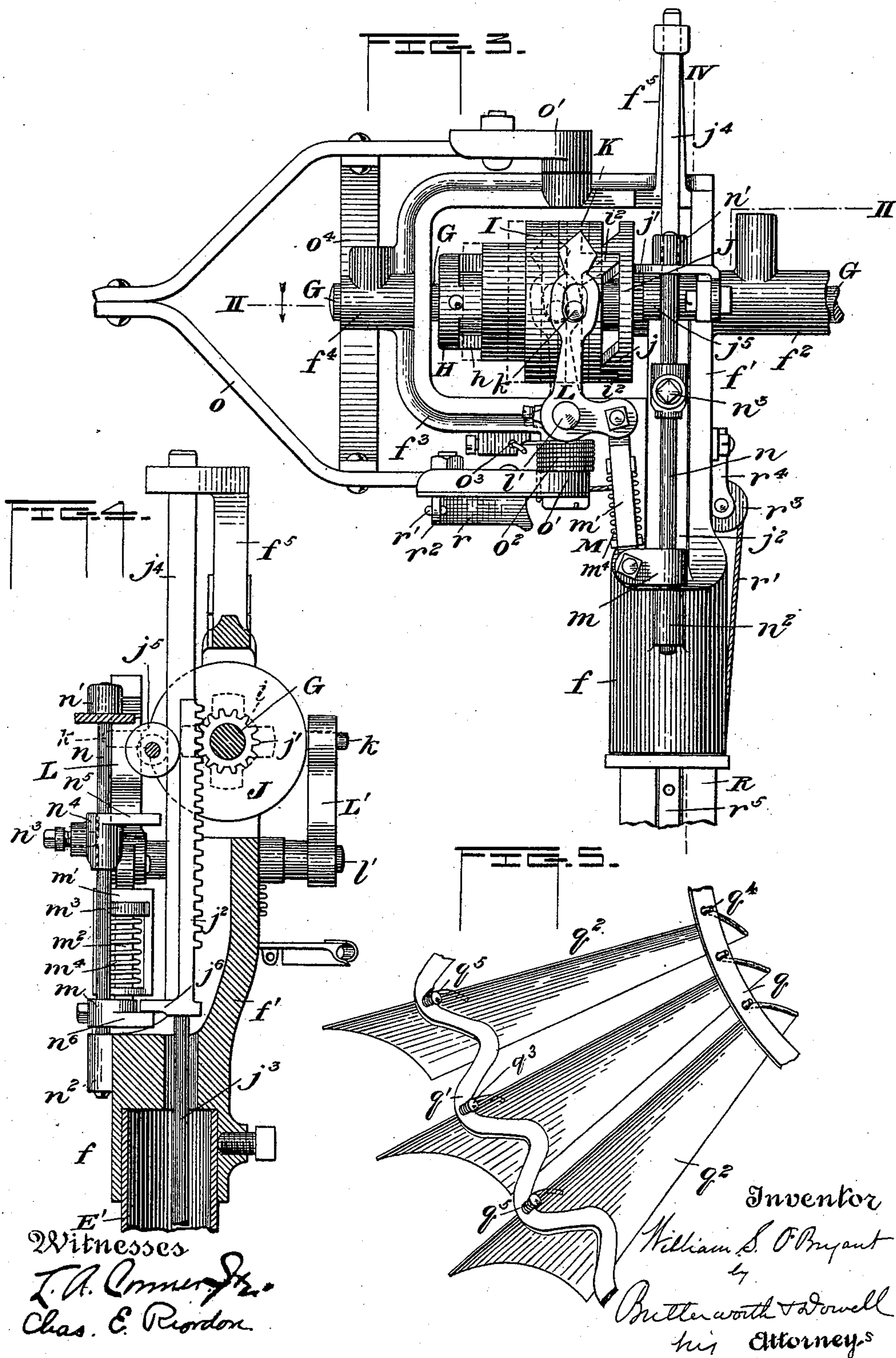
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UNITED STATES PATENT OFFICE.

WILLIAM S. O'BRYANT, OF PARKVILLE, ASSIGNOR OF ONE-HALF TO
GEORGE W. SUTTON, OF VILLA GROVE, ILLINOIS.

WINDMILL.

SPECIFICATION forming part of Letters Patent No. 538,594, dated April 30, 1895.

Application filed December 12, 1894. Serial No. 531,548. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM S. O'BRYANT, a citizen of the United States, residing at Parkville, in the county of Champaign and State of Illinois, have invented certain new and useful Improvements in Windmills; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to wind-mills, but more particularly to those employed for operating the plunger rod of a pump.

Primarily the object of the invention is to provide means whereby the stroke of the plunger rod may be varied to increase or diminish the length or number of strokes of the plunger, or other body which is intended to be moved; to increase the power of the wind-wheel by providing a substantially direct connection with the driving shaft and the plunger rod; to provide means for properly governing the wind-wheel so as to present it in different positions to the wind according as the same varies in strength, or it is desired to prevent the wind-wheel from driving the operating mechanism; and to provide feathering blades in the wind-wheel, whereby the proper resistance may be offered to the wind for revolving said wheel at the proper speed.

A further object is to provide a wind-mill which is simple and durable in construction, and effective and powerful in operation.

With these and other objects in view the invention consists in the construction and combination of the several parts, as will be hereinafter more fully described and then particularly pointed out in the claims at the end of the description.

Referring to the accompanying drawings, forming a part of this specification, Figure 1 is a perspective view of the entire upper portion of the windmill in position for use. Fig. 2 is a sectional plan view on the line II II of Fig. 3, illustrating the wind-wheel in elevation. Fig. 3 is a fragmentary side elevation, on an enlarged scale, of the main frame and plunger-operating mechanism. Fig. 4 is a vertical sectional view on the line IV IV of Fig. 3, and Fig. 5 is a plan perspective of a

portion of the wind-wheel looking downward from the center.

In the drawings A may designate a framework of any suitable or approved form having a cap-piece or bracket B secured to the top thereof and around which is arranged a platform C rigidly secured to said cap-piece and provided with an opening *c* for the passage of a person desiring access to the upper portion of the machine. Below the cap-piece and at a suitable distance therefrom is located a bracket D comprising a central boss *d* and radially-extending arms which are rigidly secured to the frame-work A.

Secured to and passing through the bracket D and the cap-piece B is a hollow standard E in which a tubular post E' is arranged to rotate.

F is the main frame or support for the operating mechanism and comprises preferably a boss *f* which is rigidly secured to the upper portion of the hollow post E'; an upright *f'* which has a bearing *f*² at one side thereof; and a U-shaped bracket *f*³ which is secured to or formed integrally with said upright and boss, and is provided with a bearing or enlarged portion *f*⁴ and a guide *f*⁵ extending upwardly from the bracket. This frame is arranged to rotate or move with the post E', and has journaled in the bearings *f*² and *f*⁴ a main or driving shaft G to one end of which is secured the wind-wheel G' for rotating said shaft. To the driving shaft and between the bearing *f*⁴ and the upright *f'* is secured a collar H having grooves *h*, preferably four in number, which are engaged by projections *i* of the sliding clutch-sleeve I, by which the said clutch-sleeve is slidingly held upon the collar H so as to rotate in unison with the same. The clutch-sleeve is provided with teeth *i*² which engage similar teeth *j* on the opposed face of the disk J, the said disk being loosely mounted upon the driving shaft and provided with a spur-gear or pinion *j'* to one side thereof, the teeth of which engage a toothed rack *j*². This rack is secured to the upper end of the plunger rod *j*³ which passes through and is properly guided in the boss of the frame and the hollow post E'. The rack *j*² has its upper end passed through an aperture in the guide *f*⁵ of the main frame, while the rear

thereof is provided with a track j^4 which engages the grooved roller j^5 arranged upon the upright f' of the frame, and by which the rack is guided and retained in mesh with the spur-gear or pinion j' of the disk; the said rack having also an outwardly projecting lug j^6 , the purpose of which will presently appear.

For throwing the clutch-sleeve and clutch-disk out of engagement with each other as shown in dotted lines in Fig. 3, whereby the said disk may rotate in unison with or independently of the drive-shaft, I provide a ring K fitting loosely in a groove in the clutch-sleeve I which may slide with said sleeve, but does not rotate with the same. This ring has outwardly projecting studs k arranged on opposite sides of the ring which engage elongated slots l in bell-crank levers L, L', the latter being secured to the opposite ends of a shaft l' which passes transversely through and is journaled in the U-shaped bracket f^3 of the frame F. The lever L has its lower outer end pivotally connected to a boss or collar m by a yielding connection M, comprising an open box-like guide lever m' and a rod m^2 , the latter passing through the lower portion of the lever m' and provided with a cross-head m^3 at the upper end thereof, below which and surrounding the rod is a spring m^4 which normally presses the rod m^2 upwardly.

The boss m is secured to a vertical rod or stem n which is slidingly held in guides n' and n^2 located respectively on the upright f' and the boss f of the main frame. Adjustably held to the rod n by a set-screw n^3 is a second boss n^4 which is provided with an inwardly extending toe n^5 arranged in the path of travel of the lug j^6 of the rack, so that as the same travels upward it will engage said toe and lift the rod n , thereby tilting the bell-crank levers and disengaging the clutches, allowing the rack bar to drop of its own weight or by the recoil of a spring (not shown) if so desired. As the rack drops the lug j^6 engages a toe or stop n^6 (Fig. 4) which limits the downward throw of the plunger; the yielding connection between the bell-crank lever L and the boss m serving to take the jar that would otherwise occur if the connection was rigid.

O is a vane or rudder secured to a bar o which has a bifurcated end pivotally secured at o' , o' , to the U shaped bracket f^3 , the said vane serving to present the wind-wheel G' in proper position for the wind to rotate the same. This vane is normally retained in a line approximately the same as the shaft G by a spring o^2 having one of its ends secured, at o^3 , to a lug on the bracket, and having its other end secured to the end of the bar o . Extending upwardly between the bifurcated ends of the bar o is a curved plate o^4 having centrally arranged thereon a spring o^5 (Fig. 2) adapted to abut against the bearing f^4 of the frame to serve as a stop for the vane, and receive the jar as the same swings around to the position to present the wheel to the wind.

To automatically govern the position of the

wind-wheel I provide a side-vane or governor P which is pivotally secured to an arm p extending outwardly from the frame F, the said arm being preferably provided with stops p' , p' , p^2 , the former tending to hold the same in a slightly inclined position, while the stop p^2 prevents the same from tilting beyond a vertical plane. The vane in its normal or operative position is slightly inclined from a horizontal plane, so that, should the wind be too powerful to properly operate the parts, the wind will force the vane to a vertical plane to present a surface of sufficient size to throw the edge of the wheel to the wind, whereby the said wheel will rotate with less rapidity than would be the case if the wheel faced the wind. To materially aid in preventing the wind from acting with too great a force upon the wind-wheel G', I preferably construct the same with a suitable hub or spider q and a serpentine ring q' which are secured together by suitable cross-braces. Pivotally secured to the ring q' and the hub q are the blades or fan-like sections q^2 . These blades are slightly curved and provided with studs q^3 , q^4 , projecting from one edge of the blade and engaging apertures in the ring and the hub, the said studs q^3 having a spring q^5 which engages the ring and the blades and tends to normally throw the blades against the successive curves of the serpentine ring, as best illustrated in Fig. 1, but will allow the blades to yield to the wind when the same has a greater force than is desired.

For the purpose of throwing the machine out of gear, that is, always with the edge of the wheel to the wind; or so that the upper portion may rotate, the same may be accomplished in the manner illustrated. To the bifurcated end of the bar o is secured a grooved quadrant r around which is passed a rope or chain r' to which it is secured at r^2 . This rope passes over a pulley r^3 journaled in a bracket r^4 depending from the arm p of the side-vane or governor P and has its other end secured to the sleeve R, the latter being slidingly held upon the post E. The sleeve R is provided with upper and lower flanges and with a groove extending its length which is engaged by a flat spring r^5 , secured at its upper end to the post E' and has its lower end normally pressing outward; the said spring being adapted to serve as a feather and to aid, by its binding action on the sleeve R, in retaining said sleeve in its proper position. This sleeve may be moved from the ground by means of a finger s carried by a rod s' the lower end of which is secured to a rope or wire s^2 extending a sufficient distance to be within the reach of a person on the ground. The rod s' is guided in the collar s^3 and the cap-piece B, the former serving to limit the distance which the sleeve R may be made to slide. By pulling on the rope s^2 , the rod s' and finger s will cause the sleeve R to slide downward. This movement of the slide carries the rope r' , the end of which is secured

to quadrant r located on the bifurcated end of the bar o of the vane O , thereby moving said vane on its pivot until it strikes the curved portion p^3 of the side-vane P causing the latter to assume a vertical position to permit the vane O to be placed in a line approximately parallel with the face of the wheel G . In this position the wind will cause the upper portion of the machine to rotate in the standard E' , or will present the edge of the wheel to the wind. While releasing the wire s^2 the vane O will, by means of the wind and the action of the spring o' , assume the position illustrated in the drawings.

The operation of the machine will be readily understood from the foregoing description.

It will be seen that as the wind-wheel rotates, the shaft G , collar H , and sleeve-clutch I will rotate with the same. In the position shown in the drawings, the disk J , which is loose upon the driving shaft, will also be rotated, thereby raising the rack j^2 and the plunger rod. This movement will continue till the projection j^6 of the rack strikes the toe n^5 of the boss or collar n^4 , which will raise the stem n , the yielding connection M and one end of the bell-crank lever L , causing the latter to tilt on its pivot and throw the clutch-sleeve I to the position shown in dotted lines in Fig. 3, to disconnect the same from the clutch-disk J . At this time the clutch-disk J is free to revolve on the drive shaft G , thereby allowing the rack j^2 to suddenly fall of its own weight together with the weight of the plunger rod and connections. The distance that the rack will fall is limited by the toe n^6 of the boss m , the latter through the yielding connection M , serving to take the sudden shock due to the fall of the rack, and to prevent unnecessary straining of the operating mechanism, but at the same time the fall of the rack will throw the clutches into engagement causing the rack and plunger rod to rise till they again strike the toe n^5 , the operation continuing as long as the driving shaft is rotated. The position of the wind-wheel G for rotating the drive-shaft at the proper speed, or not at all, is accomplished in the manner heretofore explained.

It is obvious that the mechanism may be employed in connection with other machines than wind-mills, or for operating other devices than the plungers of pumps.

A spring may be employed for aiding the return of the rack when raised, and other changes may be made, if so desired, without departing from the spirit of my invention.

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

1. In a wind-mill, the combination with a driving shaft, a support therefor and a wind-wheel secured to said shaft for rotating the same, of a pinion loosely mounted on the drive-shaft, a rack in mesh with said pinion for operating a plunger rod, together with mechanism for automatically causing the pin-

ion to rotate in unison with the drive-shaft in one direction or independently thereof in the reverse direction, substantially as described.

2. In a wind-mill, the combination with a driving shaft, a support therefor, and a wind-wheel secured to said shaft for rotating the same, of a pinion loosely mounted on the drive-shaft, a rack in mesh with the pinion, pinion-engaging mechanism arranged on the drive-shaft for causing the pinion to raise the rack, together with means for automatically disengaging the pinion-engaging mechanism so that the rack may recede, substantially as described.

3. The combination with a driving shaft, a support therefor and means for rotating said shaft, of a clutch-sleeve slidingly held to rotate with the driving shaft, a clutch-disk loosely mounted on said shaft, a pinion carried by the clutch-disk, a rack in mesh with the pinion, together with means for engaging or disengaging the clutch-sleeve and clutch-disk, substantially as described.

4. The combination with a driving shaft, a support therefor and means for rotating said shaft, of a clutch-sleeve slidingly held to rotate on the driving shaft, a clutch-disk mounted on said shaft, a plunger rod, together with means operated by said clutch-disk for raising the plunger rod, substantially as described.

5. In a wind-mill, the combination with a driving shaft, and means for rotating said shaft, of a clutch-sleeve slidingly held to rotate on the driving shaft, a clutch-disk mounted on said shaft, a pinion carried by the disk, a rack in mesh with the pinion, together with means operated by the movement of the rack for engaging or disengaging the clutches, substantially as described.

6. The combination with a driving shaft and means for operating said shaft, of a vertically movable rod, clutch mechanism arranged on the driving shaft for raising said rod, together with means operated by the movement of the rod to automatically disengage the clutch mechanism so that the rod may lower, substantially as described.

7. In a wind-mill, the combination with a driving-shaft and means for operating said shaft, of a clutch-sleeve slidingly held to rotate on the driving-shaft, a clutch-disk loosely mounted on said shaft, a pinion carried by the clutch-disk, a rack in mesh with the pinion, a rod or stem arranged in the path of movement of the rack, toes arranged on the rod, a bell-crank lever adapted to move the clutch-sleeve, together with a connection between the stem and said lever, substantially as described.

8. In a wind-mill, the combination with a driving-shaft and means for operating said shaft, of a clutch-sleeve slidingly held to rotate on the driving shaft, a clutch-disk loosely mounted on said shaft, a pinion carried by the clutch-disk, a rack in mesh with the pinion, a rod or stem arranged in the path of

movement of the rack, toes arranged on the stem one or both of which are adjustable, a bell-crank lever adapted to move the clutch-sleeve, together with a yielding connection
5 between the stem and said bell-crank lever, substantially as described.

9. In a wind-mill, the combination with a hollow standard, of a hollow post journaled therein, a main frame secured to the post, a
10 driving shaft journaled in the frame, a wind-wheel secured to said shaft, a vane or rudder pivotally connected to the frame, a side vane or governor secured to the frame, together with means for throwing the rudder against
15 the side vane, substantially as described.

10. In a wind-mill, the combination with a hollow standard, of a hollow post journaled in said standard, a main frame secured to the post, a driving shaft journaled in the frame,
20 a wind-wheel secured to said shaft, a side vane pivotally secured to an arm extending

outwardly from the frame, the said arm having stops to hold the vane either in a slightly inclined or vertical position, a rudder pivotally connected to the frame, together with
25 means for throwing the rudder against the vane, substantially as described.

11. In a wind-mill, a wheel having a hub, an outer serpentine ring concentric with said hub, curved blades provided with studs at one
30 edge thereof adapted to engage apertures in the hub and ring for pivotally connecting said blades thereto, and springs surrounding the studs for normally retaining the blades against the successive curves in the ring, sub-
35 stantially as described.

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

WILLIAM S. O'BRYANT.

Witnesses:

DAVID STANFORD,

CHESTER B. KENNINGTON.