No. 819,943. PATENTED MAY 8, 1906.

G. B. SNOW.

WINDMILL.

APPLICATION FILED JULY 22, 1905.

2 SHEETS—SHEET 1.

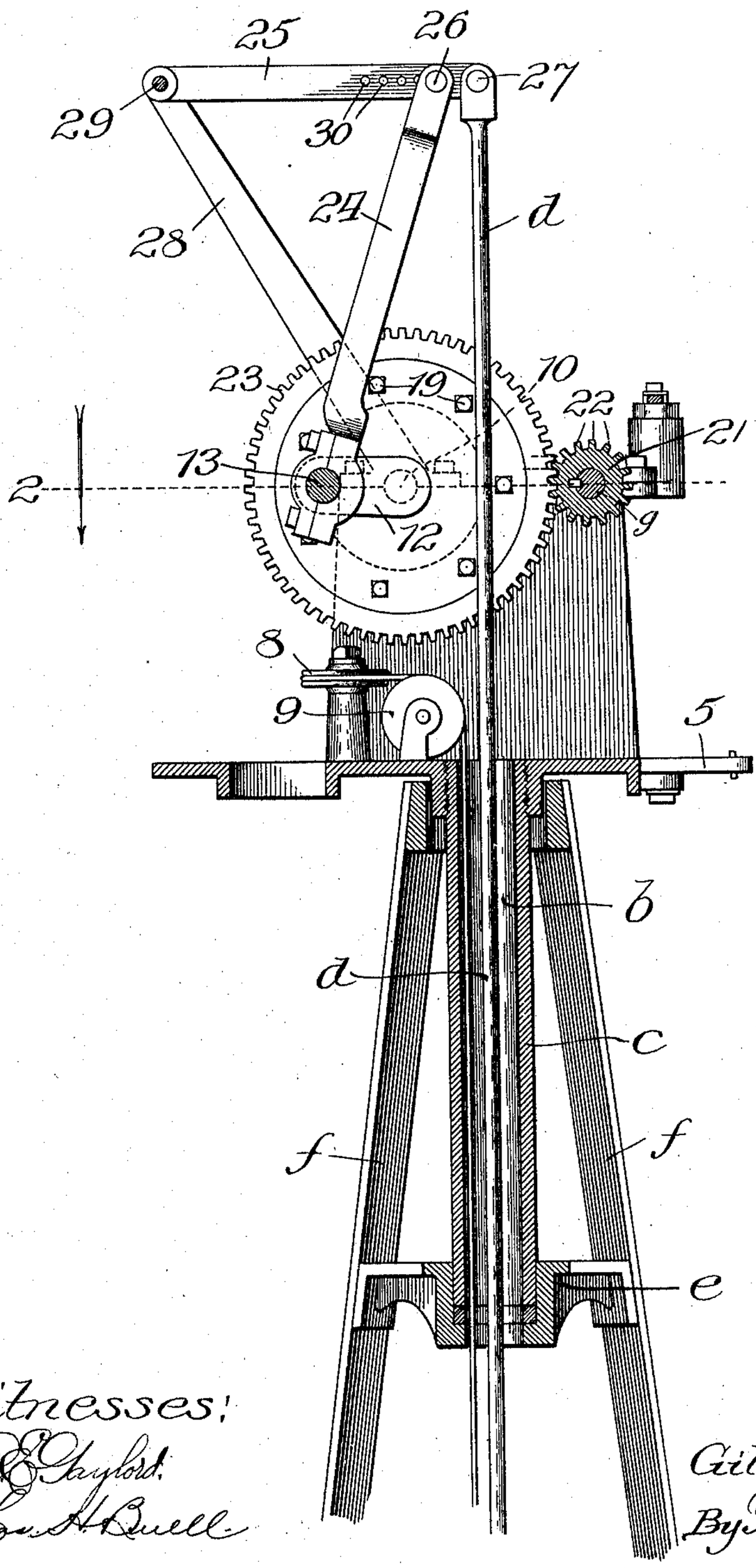

Fig. 1.

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2 SHEETS—SHEET 2.

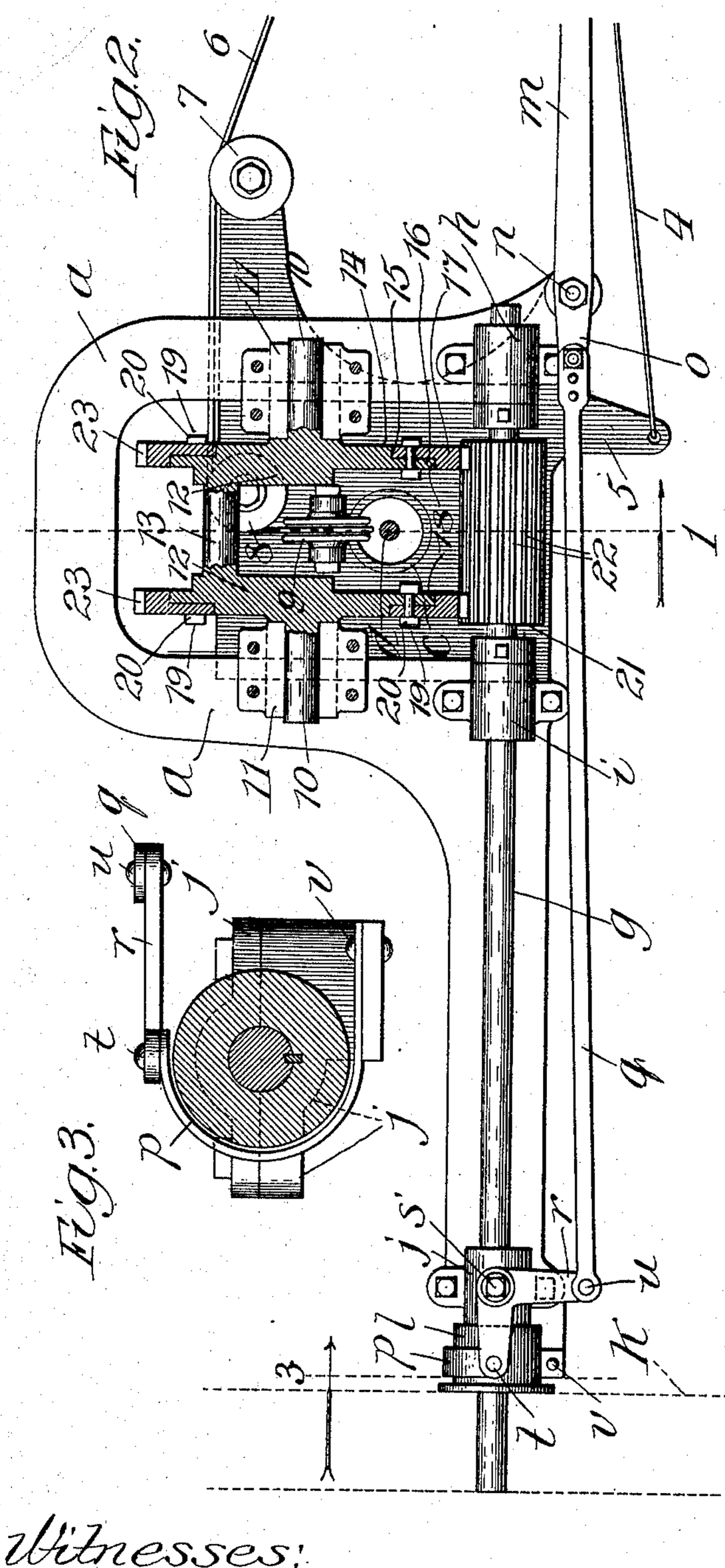

Fig. 3.

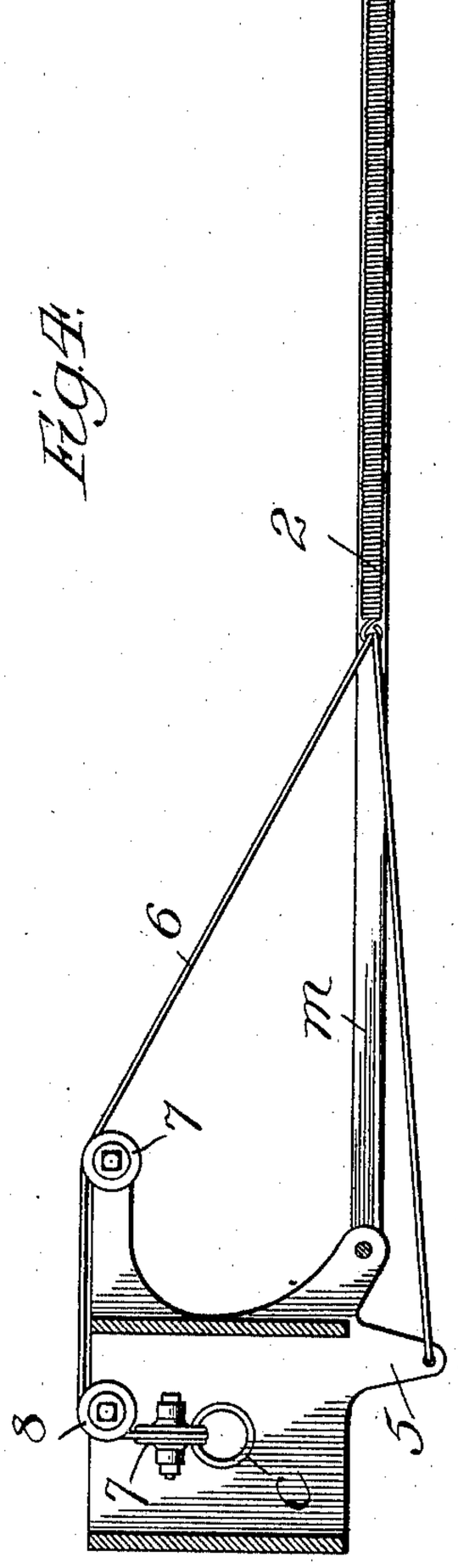

Fig. 4.

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UNITED STATES PATENT OFFICE.

GILBERT B. SNOW, OF ELGIN, ILLINOIS.

WINDMILL.

No. 819,943. Specification of Letters Patent. Patented May 8, 1906.

Application filed July 22, 1905. Serial No. 270,761.

To all whom it may concern:

Be it known that I, GILBERT B. SNOW, a citizen of the United States, residing at Elgin, in the county of Kane and State of Illinois, have invented certain new and useful Improvements in Windmills, of which the following is a specification.

My invention relates to that class of windmills having a plurality of gear-wheels mounted on the same crank-shaft and pinion mechanism mounted upon a driving-shaft in toothed engagement with such gear-wheels for operating the crank-shaft, and thereby the pump-rod, and the pitman and lever mechanisms operatively connecting the crank-shaft with the pump-rod.

The principal object of my invention is to provide a simple, economical, and efficient windmill.

A further object of the invention is to provide a simple, economical, and durable mechanism for operatively connecting the main driving or wind-wheel shaft with the pump-rod.

A further object is to provide suitable means for enabling gear-wheels mounted upon opposite sides of the crank portion of the same crank-shaft to be readily centered and secured to such crank-shaft and to connect such gear-wheels by means of an integral portion of the shaft.

A further object is to provide means for operatively connecting both of the integral crank-arms of the same crank-shaft with the main driving-shaft.

A further object is to provide means for enabling the windmill to be yieldingly held in operative position and thrown out of operative position, or, in other words, out of the wind, and locked, if desired, by means of suitable spring mechanism.

Other and further objects of the invention will appear from an examination of the drawings and the following description and claims.

The invention consists in the features, combinations, and details of construction hereinafter described and claimed.

In the accompanying drawings, Figure 1 is a central sectional elevation taken on line 1 of Fig. 2, showing a windmill constructed in accordance with my improvements; Fig. 2, a sectional plan view taken on line 2 of Fig. 1; Fig. 3, a detail sectional elevation taken on line 3 of Fig. 2, showing the brake mechanism; and Fig. 4, a detail showing the spring and cord mechanism for throwing the vane into and out of operative position.

In constructing a windmill in accordance with my improvements I provide a framework *a*, which may be of any ordinary and well-known type, having a central opening *b* and a depending pipe portion *c*, through which the pump-rod *d* extends, the lower end of such pipe portion being mounted upon or in a bracket *e*, which is secured to the upright members *f* of the tower. A main driving-shaft *g* is rotatably mounted by means of brackets *h*, *i*, and *j* upon the framework or tower-top, such brackets forming suitable bearings for the shaft. A wind-wheel *k* is mounted upon this main shaft and may be of any ordinary or known construction, such wind-wheel being provided with a friction brake-wheel or hub portion *l*. A vane *m* is pivotally mounted upon the framework by means of a vertical pivot *n*, and an inwardly-projecting end portion *o* of the vane extends beyond such pivot-pin in the direction opposite the guiding or body portion of the vane. This projecting end portion forms an operating-lever, which is operatively connected with a flexible brake-band *p* by means of a rod *q* and a bell-crank lever *r*, such bell-crank lever being pivotally mounted upon a bolt or pivot-pin *s* and having one of its arms connected with the free end of the brake or friction strap by means of a pin *t* and its other arm connected with a rod *q* by means of a pivot *u*. The brake-strap partly encircles the brake-wheel or hub of the wind-wheel and has one end secured to the framework or tower-top by means of a bolt or rivet *v* or in any ordinary and well-known manner.

A spiral spring 2 is connected at its outer end by means of an I-bolt 3 with the outer portion of the vane, and its inner end is provided with a metallic cord or similar flexible or articulate member 4, secured to an arm portion 5 of the framework at one side of the axial center of the vane when it is in operative position or parallel with the axis of the wind-wheel. A second flexible element or cord 6, which may also be of metal, is connected directly or indirectly with the spring and extends into the annular grooves of idler-pulleys 7 and 8 and over an idler-pulley 9 and thence downward to a point where it may be readily operated by the operator, who may be stationed at the bottom of the structure. By pulling this cord 6 it will be readily seen that

the vane, and thereby the mill, may be thrown into operative position. In other words, the vane is thrown into the position shown in Fig. 4, parallel with the axis of the wind-wheel. When in this position, the cords 4 and 6, extending outward at an angle, as they do, to opposite sides of the axial center of the vane, serve with the spring to hold the vane yieldingly in operative position. When the cord 6 is released, it will be readily seen that the spring 2, connected, as it is, by means of cord 4 with the framework at a point at one side of the axial center of the vane, will throw the vane around out of the wind or into a position at an angle to the axis of the wind-wheel. The movement of the vane to this position by means of the spring sets the brake, and the movement of the vane back to operative position releases it.

In order to provide simple, economical, and durable mechanism for operatively connecting the main driving-shaft with the pump-rod, a crank-shaft 10 is provided formed of one integral piece comprising crank-arm portions 12, an integral wrist or crank pin portion 13, disk portions 14, and journal or end portions, all formed of one integral casting, and altogether forming a crank-shaft of great rigidity and strength. The opposite ends of this crank-shaft are, as already suggested, mounted in suitable bearings and the disk portions 14, which are cast with and form an integral part of the crank-shaft, are provided with annular recesses in their outer faces forming annular shoulders 15, which are concentric with the crank-shaft. Annular flange, or disk portions 16 extend outward beyond these annular shoulders, forming a face which is uniform and adapted to properly position the gear-wheels to be mounted upon such disk portions of the crank-shaft.

Gear-wheels 17 are mounted upon the disk portions 14 of the crank-shaft on opposite sides of its crank portion, each of such gear-wheels being intermediate the crank and journal portions of the crank-shaft, as shown in Fig. 2, so that the crank portion of the shaft being between the gear-wheels is adapted to support the pitman mechanism, hereinafter described, between such gear-wheels. These gear-wheels have large axial perforations, the annular walls of which encircle and rest snugly upon the annular shoulders 15 of the disks and are held in place upon such shouldered portions of the disks by means of bolts 19 and nuts 20. The gear-wheels are thus practically self-centering and may be readily removed and replaced as circumstances require. A pinion 21 is mounted upon and in fixed relation to the shaft *g*, such pinion having teeth 22, which mesh with the teeth 23 of both of the gear-wheels 17, above described.

The crank-shaft is operatively connected with the pump-rod by means of a pitman 24, one end of which is pivotally mounted upon the wrist or crank pin portion of the crank-shaft and the other end of which is pivotally connected to a lever 25 by means of a pivot-pin 26, such lever being in turn connected at one end by means of a pivot 27 with the pump-rod and having its opposite end pivotally mounted upon supporting-arm portions 28 of the framework by means of a pivot or bolt 29. This lever is provided with a plurality of perforations 30, adapted to receive the connecting pin or bolt 26, and thus permit the adjustment of the pitman longitudinally of the lever, so as to govern the length of stroke of the pump-rod.

I claim—

1. In a windmill, the combination of a crank-shaft comprising a crank portion and journals both integral with the crank-shaft, and gear-wheels mounted upon the crank-shaft on opposite sides of its crank portion and connected to a portion of such crank-shaft and held in rigid relation to each other thereby.

2. In a windmill, the combination of a crank-shaft having integral crank and journal portions, gear mechanism mounted upon such crank-shaft between such crank portion and the adjacent integral journal portion, a pump-rod operatively connected with the crank portion of such shaft, and a wind-wheel shaft provided with pinion mechanism in engagement with such gear mechanism of the crank-shaft.

3. In a windmill, the combination of a crank-shaft comprising a crank portion and journal portions integral with the crank-shaft, the journal portions being arranged on opposite sides of the crank portion, a pair of gear-wheels mounted on the shaft on opposite sides of its crank portion and secured to the crank-shaft, a main driving-shaft, and pinion mechanism mounted upon the main driving-shaft in toothed engagement with both of the gear-wheels.

4. In a windmill, the combination of a crank-shaft comprising a crank portion and journal portions on opposite sides of the crank portion the crank portion and journal portions being integral with the shaft, gear-wheels secured to the shaft on opposite sides of its crank portion, a main driving-shaft, pinion mechanism mounted upon the main driving-shaft in toothed engagement with both of such gear-wheels, a pitman mounted upon the crank portion of the shaft, a pump-rod, and means for connecting the pitman with the pump-rod.

5. In a windmill, the combination of a crank-shaft comprising a crank portion and journal portions on opposite sides of the crank portion the crank portion and journal portions being integral with the shaft, gear-wheels secured to the shaft on opposite sides of the crank portion and between the journal

portions, a main driving-shaft, pinion mechanism mounted upon the main driving-shaft in toothed engagement with both of the gear-wheels, a pitman connected with the crank portion, a pump-rod extending between the gear-wheels and between the pinion mechanism and the crank portion, and lever mechanism connecting the pitman and pump-rod.

6. In a windmill, the combination of a crank-shaft having a crank portion and journal portions on opposite sides of such crank portion integral therewith such shaft being provided with integral disk portions each having an annular shoulder for engaging a gear-wheel, a gear-wheel mounted in engagement with each of such annular shoulder portions on opposite sides of the crank portion of such crank-shaft, and means for securing such gear-wheels in position upon such integral shoulder portions of the crank-shaft.

7. In a windmill, the combination of a framework, a crank-shaft having a crank portion and journal portions on opposite sides of such crank portion integral therewith and rotatably supported upon the framework such shaft being provided with integral disk portions which are also integral with the crank portion of the shaft each having an annular shoulder for engaging a gear-wheel, a gear-wheel mounted in engagement with each of such shouldered disk portions, means for securing such gear-wheels in position, a main driving-shaft, and a pinion mounted upon such main driving-shaft in toothed engagement with such gear-wheels.

8. In a windmill, the combination of a framework, a crank-shaft having a crank portion and journal portions on opposite sides of such crank portion integral therewith and rotatably supported upon the framework the crank portion of such shaft being provided with integral disk portions each having an annular shoulder for engaging a gear-wheel, a gear-wheel mounted in engagement with such annular shoulder portions on opposite sides of the crank portion of such crank-shaft and between the journal portions thereof, means for securing such gear-wheels in position, a main driving-shaft, pinion mechanism mounted upon such main driving-shaft in toothed engagement with such gear-wheels, a reciprocating rod extending between such gear-wheels, a pitman mounted upon the crank portion of such crank-shaft, and a walking-beam pivotally mounted in the framework and connected with such reciprocating rod and pitman.

9. In a windmill, the combination of a main driving-shaft, a wind-wheel mounted thereon, a framework in which such driving-shaft is rotatably mounted, a vane pivotally mounted in the framework, a spring secured to the outer swinging portion of the vane and connected with the framework at a point out of alinement with the axial center of the vane for swinging the vane out of operative position, and a cord operatively connected with the framework on the opposite side of the axial center of the vane and with the vane for moving it to operative position and holding it in such position.

10. In a windmill, the combination of a main driving-shaft, a wind-wheel mounted thereon, a framework in which such driving-shaft is rotatably mounted, a vane pivotally mounted in the framework, a spring secured to the outer swinging portion of the vane and connected with the framework at a point out of alinement with the axial center of the vane for swinging the vane out of operative position, and a cord in engagement with the framework at a point on the opposite side of the axial center of the vane when such vane is in operative position and connected with the spring and thereby with the vane for holding the vane yieldingly in operative position.

11. In a windmill, the combination of a main driving-shaft, a wind-wheel mounted thereon provided with a hub forming a friction brake member, a framework in which such driving-shaft is rotatably mounted, a vane pivotally mounted in the framework, a spring secured to the outer swinging portion of the vane and connected with the framework at a point out of alinement with the axial center of the vane for swinging the vane out of operative position, a cord operatively connected with the framework on the opposite side of the axial center of the vane and with the vane for moving the vane to operative position and holding it in such position, a friction-strap in engagement with the friction brake member of the wind-wheel, and rod and lever mechanism connecting such strap with the vane whereby the brake is set when the vane is held out of operative position by the spring mechanism and released when the vane is in operative position.

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