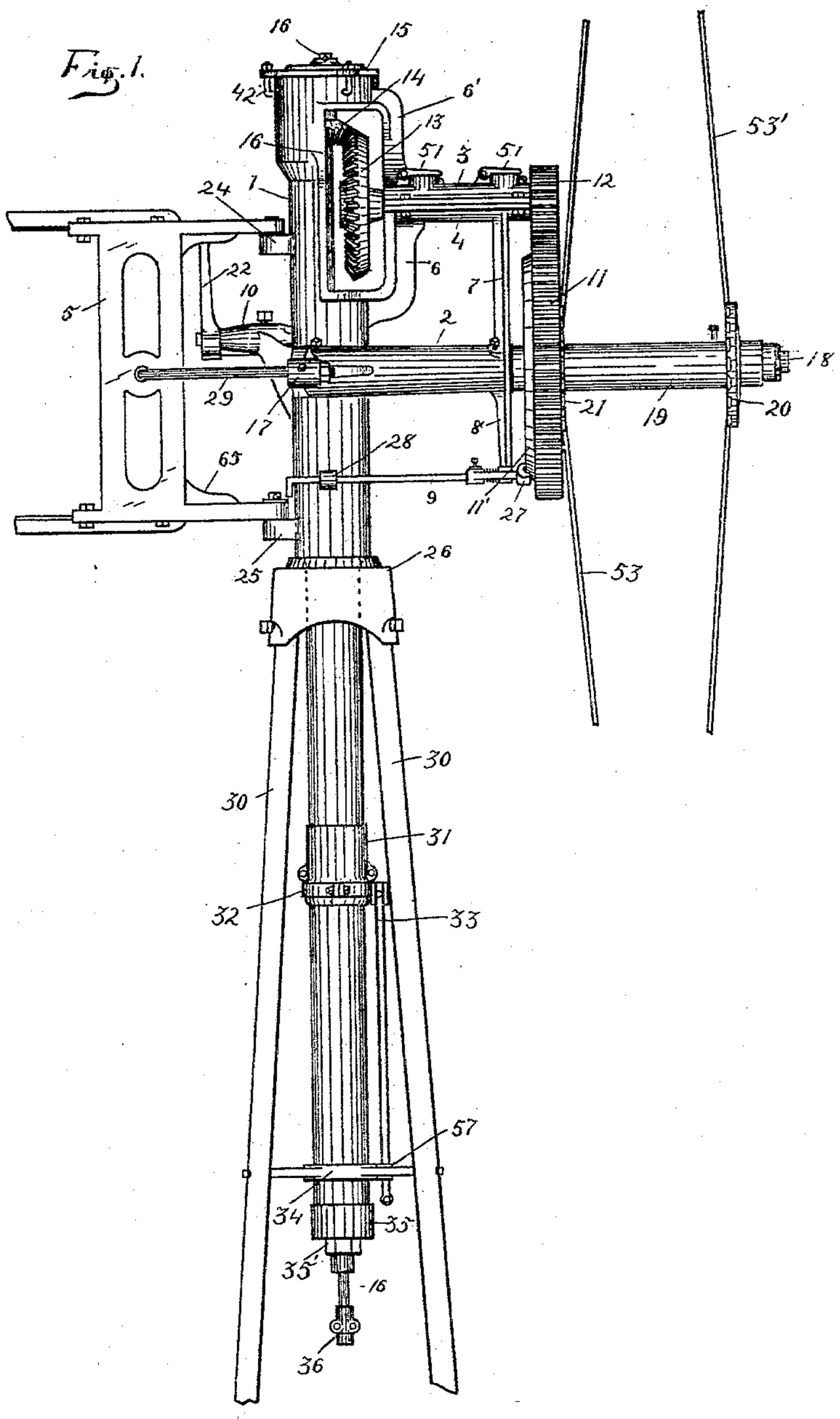
(No Model.) 3 Sheets—Sheet 1.

D. C. WALLING.

WIND ENGINE.

No. 565,191. Patented Aug. 4, 1896.

Fig. 1.



WITNESSES:

Walter G. Burns

John C. McCarthy

David C. Walling INVENTOR

BY Chapin & Denny

his ATTORNEYS.

(No Model.)

8 Sheets—Sheet 2.

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Fig. 3.

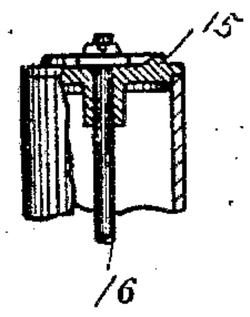

Fig. 2.

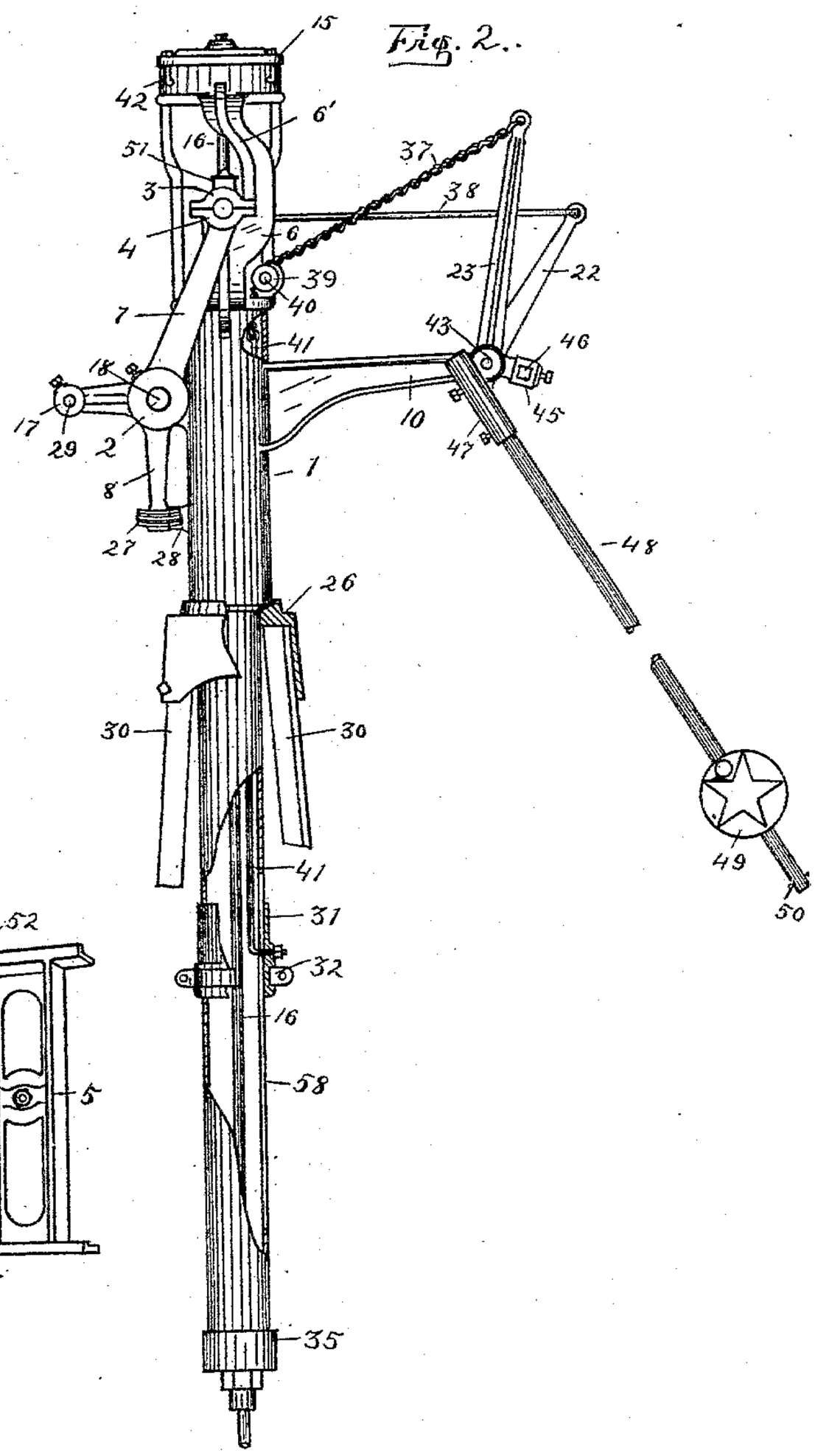

Fig. 4.

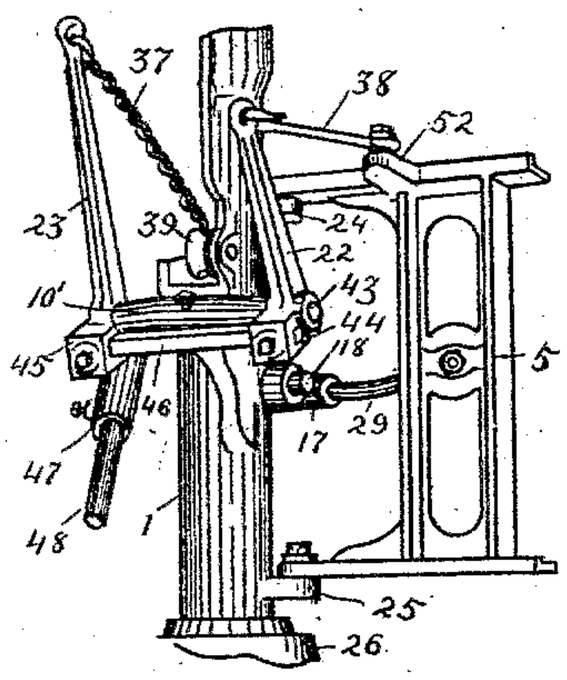

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Fig. 5.

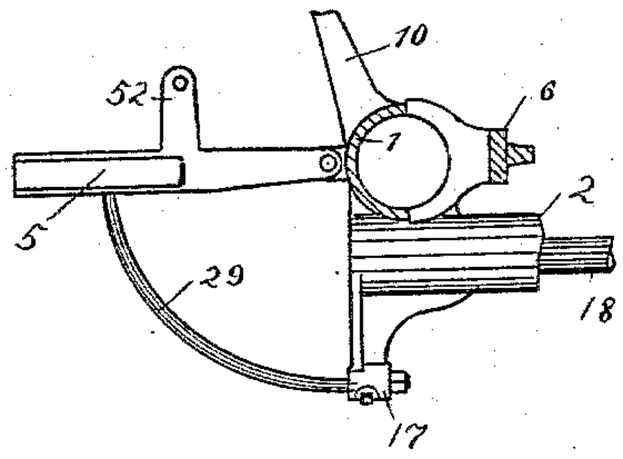


Fig. 6.

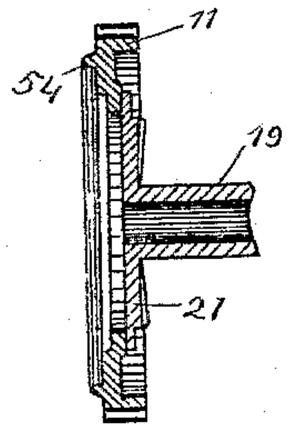


Fig. 7.

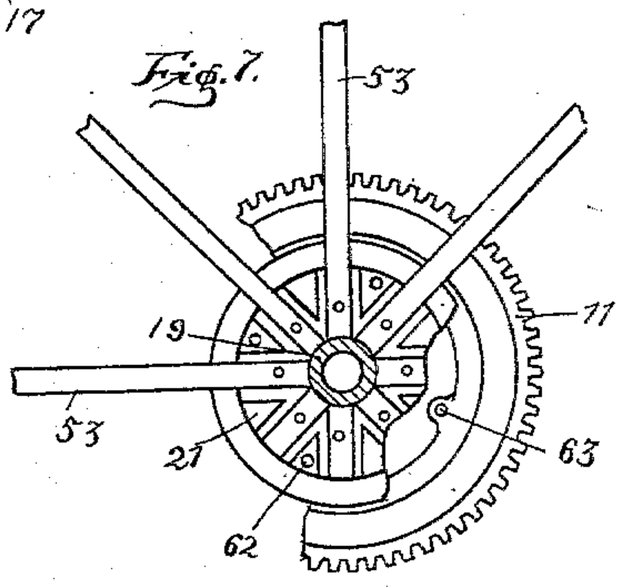
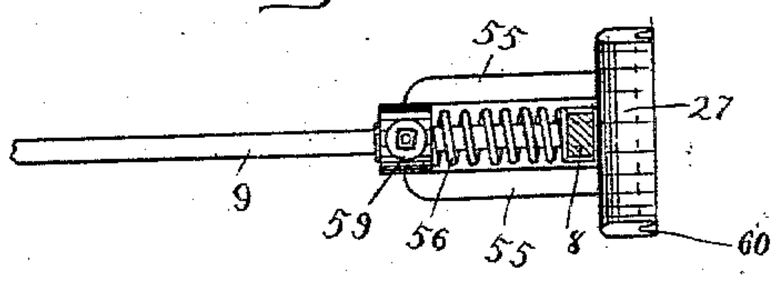


Fig. 8.



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John C. McCarthy

David C. Walling INVENTOR

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UNITED STATES PATENT OFFICE.

DAVID C. WALLING, OF KENDALLVILLE, INDIANA.

WIND-ENGINE.

SPECIFICATION forming part of Letters Patent No. 565,191, dated August 4, 1896.

Application filed October 29, 1894. Serial No. 527,225. (No model.)

To all whom it may concern:

Be it known that I, DAVID C. WALLING, a citizen of the United States, residing at Kendallville, in the county of Noble, in the State of Indiana, have invented certain new and useful Improvements in Wind-Engines; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, which form part of this specification.

My invention relates to improvements in wind-engines for geared power-mills.

The objects of my invention are, first, to provide a geared power-windmill of simple and economical construction in which both the wind-wheel and the actuating gear-wheel are rotatably mounted on the same rigid shaft in such a manner that neither of the said wheels overhangs its bearing; second, to provide in a geared windmill a novel arrangement of operative parts whereby the tendency of the mill "to creep," under the heavy side shaft, caused by the resistance of the machinery which it drives, will be exerted in a direction opposite to that toward which the windmill-wheel folds, thereby avoiding the loss of power experienced when the torsion of the vertical shaft, under the resistance of the work, tends to twist the wind-wheel out of the wind; third, to provide an improved means for throwing the wind-engine out of the wind; fourth, to provide an improved and also an improved general arrangement friction-brake for the actuating gear-wheel, of the operating parts.

The novel feature of my invention is the relative arrangement of the wind-wheel and the geared mechanism for operating the power-shaft.

Similar figures refer to similar parts throughout the several views.

Figure 1 is a side elevation of my invention, showing the manner of mounting the wind-wheel, the rudder, and the operating gear-wheels, and the relative arrangement of the various parts of the mill. Fig. 2 is a front elevation of the same with the wind-wheel, rudder, and gears removed to show the form and arrangement of the governing device, the lower part being partially broken away to show the operating-rod to which the pull-chain is secured. Fig. 3 is a detail of the engine head-cap, showing the manner of securing the upper end of the vertical power-shaft therein. Fig. 4 is a detail of the rudder-casting, showing its connection with the governing device. Fig. 5 is a detail of the segment-guide which limits the lateral movement of the rudder. Fig. 6 is a cross-section of the actuating gear-wheel, showing the annular brake-flange and also the manner of mounting said wheel on its supporting-hub. Fig. 7 is a front side view of a section of the large gear-wheel, showing the manner of securing the same to the hub-flange, and also showing the wind-wheel braces in position on said flange. Fig. 8 is a plan of the brake, showing the slotted brake-shoe.

The engine-head 1 is a hollow casting of proper length, adapted to be vertically and rotatably mounted in the derrick-cap 26 of well-known construction, rigidly fixed upon the end of the metallic frame 30. The said engine-head is further secured in its vertical position by the spider 34 loosely encircling the same and having its radial arms rigidly fixed in the derrick-frame.

That portion of the engine-head within the derrick is of a less diameter than its upper portion, forming at its point of contraction an annular bearing-surface adapted to rest upon a corresponding bearing surface or seat on the said derrick-cap 26, as shown in Fig. 2.

The hollow lateral arm 2, integral with the head 1, is arranged off center or at one side of the vertical axis of the mill, as seen in Fig. 1, has upon its inner end a perforated lug 17 and upon its outer end the integral radial arms 7 and 8. In the arm 2 is rigidly fixed a steel shaft 18 of proper strength, upon the outer end of which is rotatably mounted the wind-wheel hub 19, having at or near its extremities the annular flanges 20 and 21, respectively, having their inner and opposite faces radially grooved for the reception of the inner ends of the wind-wheel arms or braces 53 and 53′, which are then bolted thereto, as seen in Fig. 7. Upon the opposite or outer face of the said flange 21 is rigidly fixed in

any proper manner the actuating gear-wheel 11, the preferable construction of which is that shown in Fig. 7, and consists of a ring having upon its inner edge the perforated lugs 63, adapted to register with the perforations 62 in the said flange 21, and is then rigidly secured by proper bolts. The wind-wheel and the actuating gear-wheel are thus rigidly fixed on the same revoluble hub or sleeve 19 and are arranged directly over their bearing on the said shaft 18.

The curved vertical bracket 6 supports the horizontal boxing 4, having a cap 3, provided with the oilers 51. The upper portion 6′ of the said bracket is united to the top of the head 1, thereby strengthening the same.

In the boxing 4 is rotatably mounted a counter-shaft having upon its outer end a rigid pinion 12, adapted to mesh with the wheel 11, and having upon its inner end the rigid bevel gear-wheel 13, arranged in the open space between the bracket 6 and the head 1 and adapted to engage the bevel gear-pinion 14, rigidly fixed on the vertical power-shaft 16 at or near the upper end thereof. The said power-shaft is loosely suspended in the hollow head 1, as seen in Fig 2, its upper end being rotatably secured in the perforated cap 15, as shown in Fig. 3, by the fixed nut 16, and its lower end is centrally secured in said head by the threaded perforated cap 35 on the lower end of the head 1, the said cap 15 being secured by the bolts 42, Fig. 1.

The integral arm 8 is provided at its free end with a rectangular slot, in which is loosely mounted the outer end of the horizontal brake-rod 9, the other end of which is loosely mounted in a perforated lug 28 on the head 1. On the outer end of the said brake-rod 9 is adjustably secured by a proper set-screw a brake 55, having an integral longitudinal slotted shoe 27, adapted to engage the annular flange 11′ on the face of the gear-wheel 11.

Between the lug 59 of the shoe 55 and the slotted end of the arm 8 is properly mounted on the brake-rod 9 the retracting coil-spring 56, Fig. 8, adapted to keep the shoe 27 normally out of engagement with the flange 11′.

On the radial lugs 24 and 25 of the head 1 is properly hinged the swinging rudder 5. In the lateral perforated lug 17 is rigidly mounted the curved rod or guide 29, Figs. 1 and 5, which passes through a perforation in the rudder, and has upon its free end a proper nut, Fig. 4, which limits the lateral movement of the rudder, the curvature of the rod 29 being parallel with the arc described by the swinging vane.

The integral horizontal arm 10 of the head 1 has upon its free end the integral cross-arm 10′, in which is rigidly fixed the shaft 43, on the projecting end of which are loosely mounted the lever-arms 22 and 23, respectively.

The lever-arms 22 and 23 are provided at their base with the rectangularly-perforated shoulders 44 and 45, respectively, in which perforations is fixed the cross-bar 46, which thereby rigidly secures the said lever-arms at all times in their relative position. The said lever-arm 23 is provided at its base with the integral oblique sleeve 47, in which is secured the upper end of the governor-arm 48, secured therein by proper set-screws, having at its free end the stop-pin 50, and carrying the adjustably-mounted weight 49.

To the upper and free end of the said lever-arm 23 is secured one end of the pull chain or cable 37, which passes over a pulley 39, loosely mounted on the pin 40, fixed in a proper lug on the engine-head 1. The lower end of said chain 37 is secured to the upper end of the vertical operating-rod 41, Fig. 1, the lower end of which is bent outwardly, so as to project through the longitudinal slot 58 in the lower portion of the head 1 and through a lateral perforation in the collar 31, which is vertically slidable on the lower portion of the head 1.

In an annular recess on the collar 31 is rotatably mounted the collar 32, preferably constructed in two parts bolted together by means of perforated lugs, Fig. 2, and provided with a lateral lug, Fig. 1, to which the upper end of the vertical operating-rod 33 is secured. The lower end of the rod 33 is loosely mounted on the perforated lug 57 on the fixed spider 34. By this arrangement it is obvious that the collar 31 slides freely up and down on the head 1 when actuated by the rod 41 and rotates freely within the collar 32, which is relatively fixed by the rod 33. but that the collar 31 has no rotatable movement relative to the engine-head. A cord or cable extending to it within reach of the operator is secured to the lower end of the rod 33.

The wind-wheel may be of any proper form, preferably of steel, with a well-understood arrangement of wind-buckets thereon. A proper connection is made between the machinery to be driven and the shaft-coupling 36 on the power-shaft 16.

The operation of my improvement thus described is, briefly stated, as follows: When the wind-wheel is full in the wind, the rudder will be at its limit on the guide-rod 29 and will stand parallel with the axis of the wind-wheel, while the weighted lever-arm will stand approximately at right angles thereto, and the slidable collar 31 will be at or near the top of the slot 58. As the actuating gear-wheel is fixed on the same hub as the wind-wheel it rotates therewith, meshes with the pinion 12, and thereby rotates the bevel gear-wheel 13, rigid on the same counter-shaft 4. The bevel gear-wheel 13 engages at its upper edge the bevel-pinion 14, rigid on the shaft 16, which arrangement, in the construction shown, gives to the power-shaft 16 nine revolutions to every revolution of the wind-wheel. When it is desired to stop the mill, the operator lowers the collars 31 and 32 on the head 1 to the lower end of the slot 58 by

means of the rod 33 and a proper cord or cable depending therefrom. Lowering the collar 31 also lowers the rod 41, as it is fixed therein, and at the same time elevates the lever-arm 48 to a horizontal position by means of the pull-chain 37. As the lever-arm 22 is fixed relative to the lever-arm 23 they will be simultaneously operated by the chain 37, thereby forcing the rudder by means of the connecting-rod 38 to a position at right angles to the wind-wheel shaft and substantially parallel with the wind-wheel, when the engine will automatically adjust itself in the derrick to a position out of the wind. When in this position, the flange 65 or the rudder will firmly bear against the free end of the brake-rod 9, thereby stopping the mill by the friction of the brake-shoe 27 against the flange 11′ of the gear-wheel 11.

It is obvious that by the described arrangement of the said collars 31 and 32 the rotation of the engine-head can in no emergency interfere with the position and arrangement of the pull-chain 37 and the rod 41 relative to the adjacent power-rod.

Having thus described my invention and the manner in which the same is operated, what I desire to secure by Letters Patent is—

The engine-head, the hollow horizontal arm 10′, secured thereto, a rod projecting through the arm, the levers 22, and 23 placed upon the ends of the rod, and the rod 46, secured to the hubs of the levers, so as to lock and cause them to move together; combined with the weighted lever 48, the connecting-rod 38 secured to the upper end of the lever 22, and the pivoted swinging frame to which the vane is secured, substantially as set forth.

Signed by me at Kendallville, Noble county, Indiana, this 25th day of October, 1894.

DAVID C. WALLING.

Witnesses:
NATHAN B. MCPHERSON,
LEE BARRON.