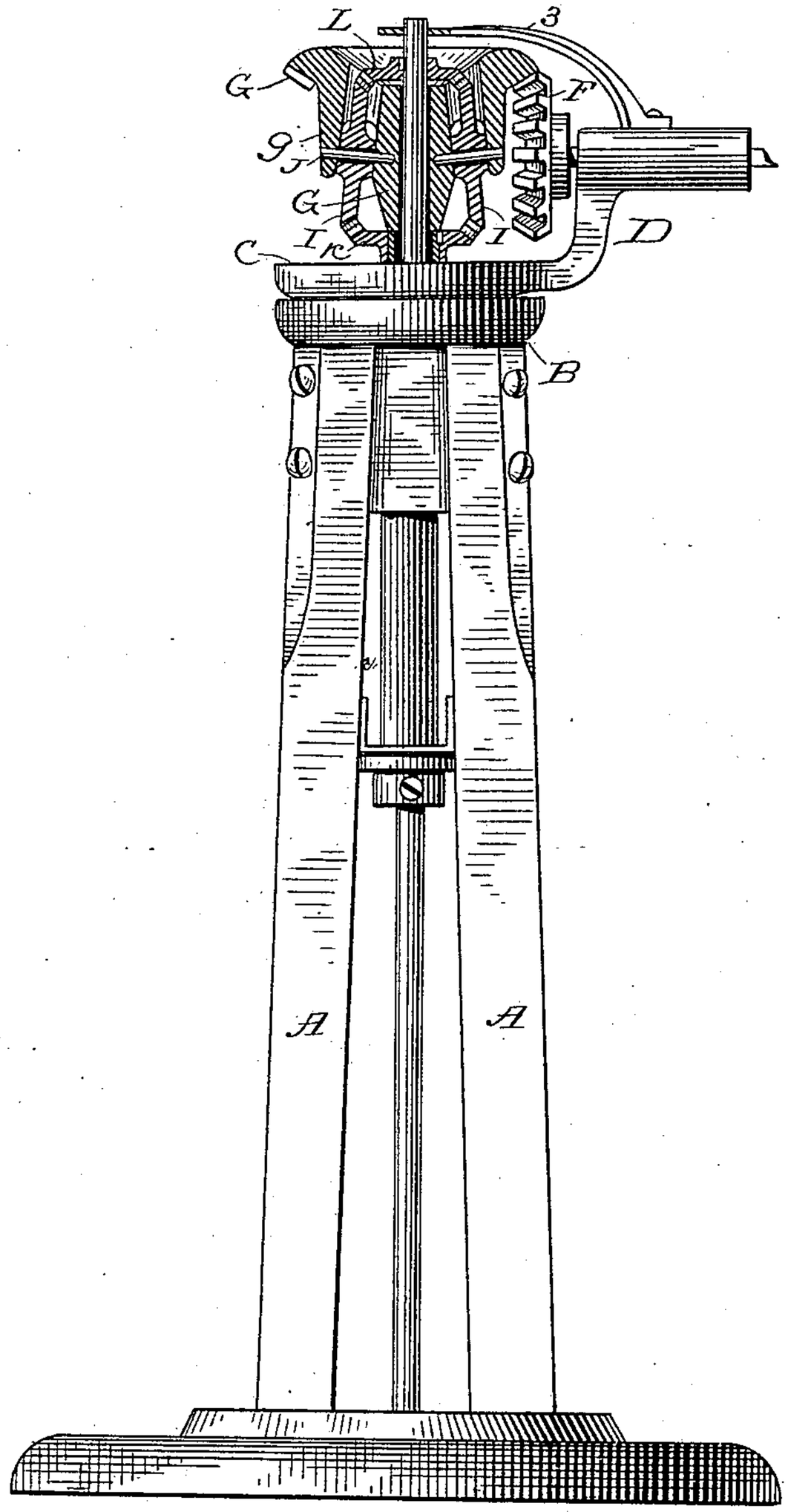
(Model.) 3 Sheets—Sheet 1.

M. R. MARTIN.

GEARING FOR WINDMILLS.

No. 267,440. Patented Nov. 14, 1882.

Fig. 1.



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(Model.) 3 Sheets—Sheet 2.

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Fig 2.

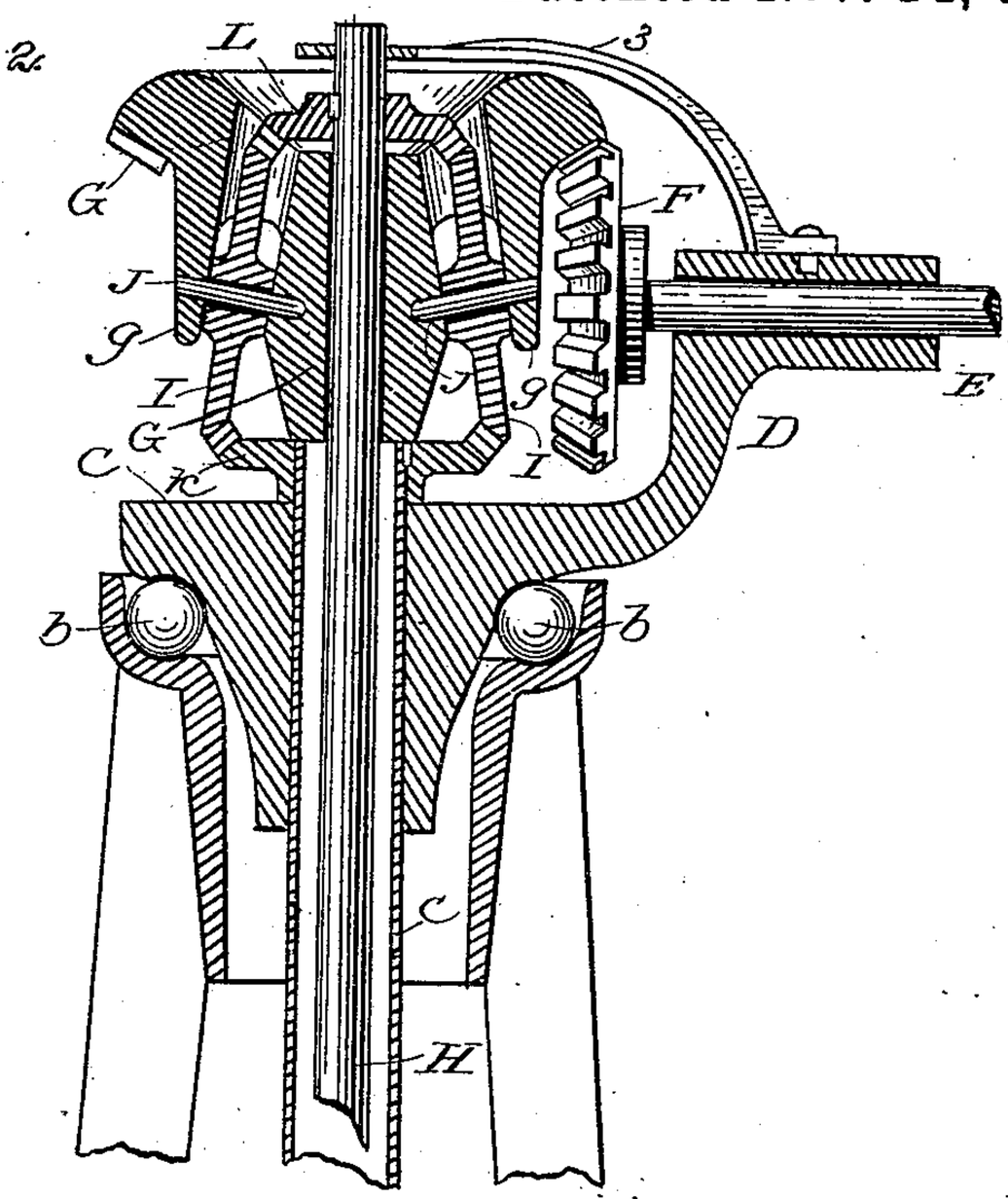
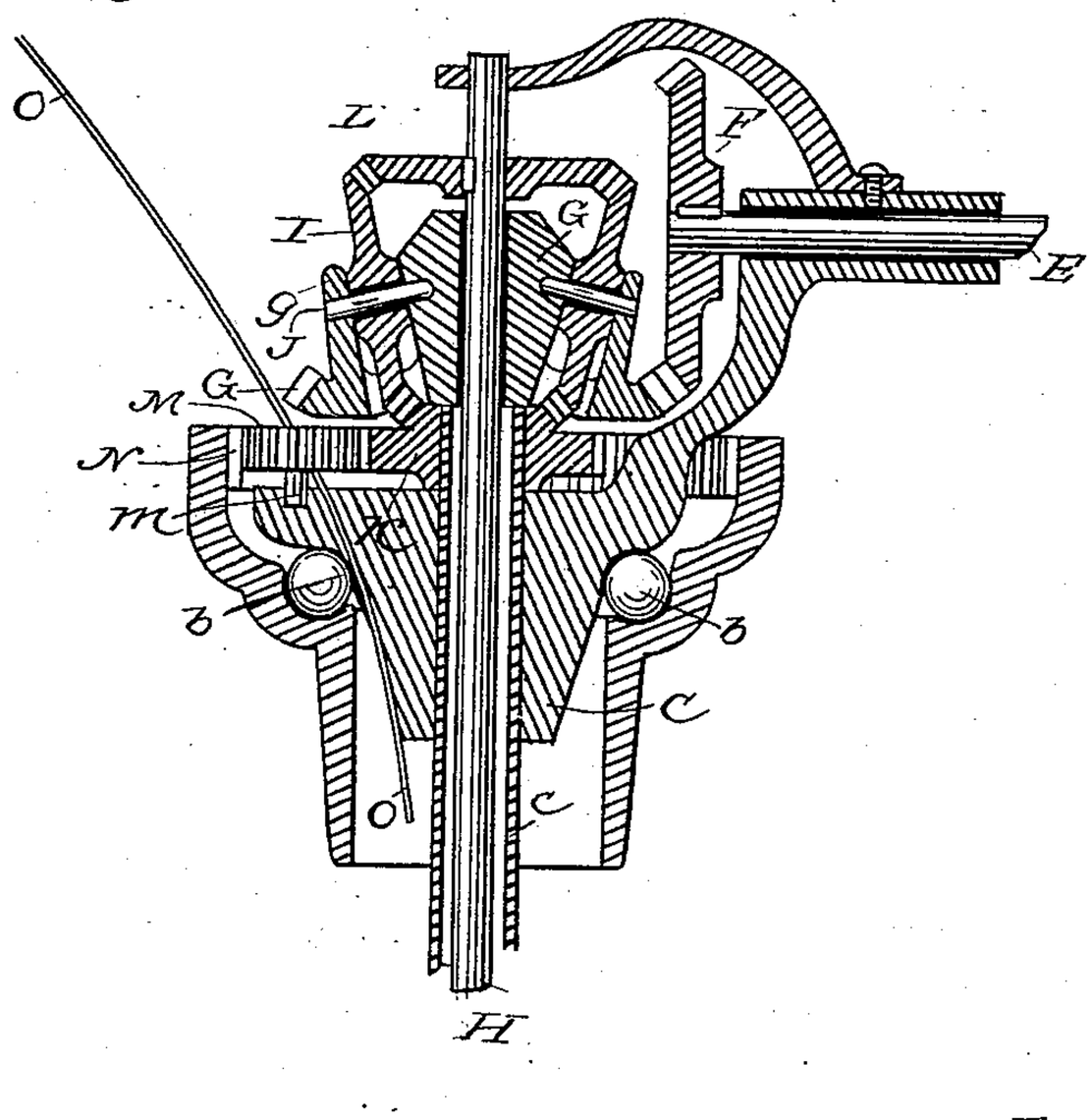


Fig 3.



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(Model.) 3 Sheets—Sheet 3.

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GEARING FOR WINDMILLS.

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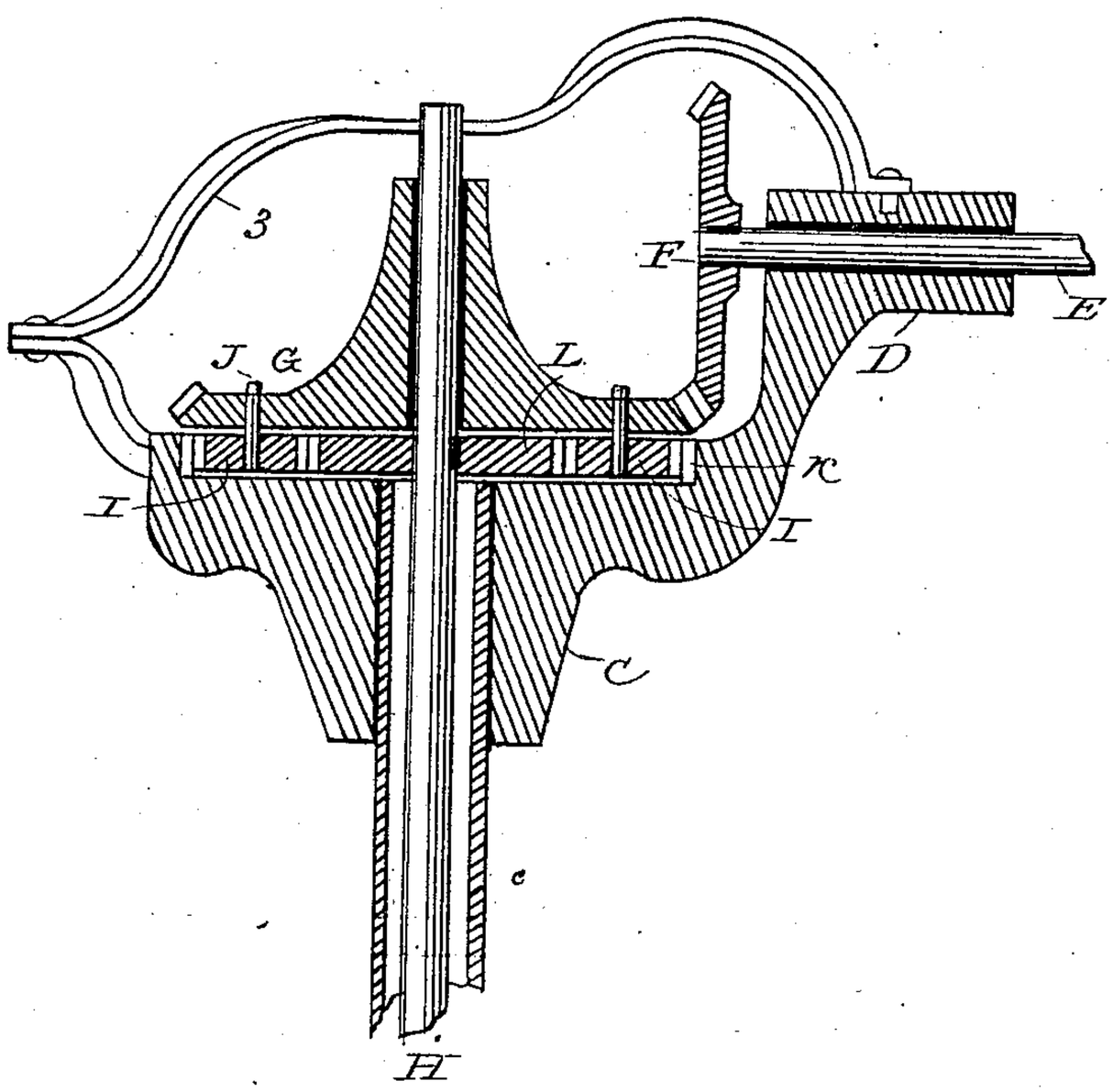
Fig. 4.



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UNITED STATES PATENT OFFICE.

MYRON R. MARTIN, OF BROOKLYN, WISCONSIN.

GEARING FOR WINDMILLS.

SPECIFICATION forming part of Letters Patent No. 267,440, dated November 14, 1882.

Application filed March 8, 1882. (Model.)

To all whom it may concern:

Be it known that I, MYRON R. MARTIN, of Brooklyn, in the county of Green and State of Wisconsin, have invented a new and useful Improvement in Gearing for Windmills, &c.; and I do hereby declare that the following is a full, clear, and exact description of the same.

My invention relates to windmills, more particularly to that part of the mechanism thereof which transmits the motion from the shaft of the wind-wheel to the vertical shaft, which communicates the motion to the machinery or apparatus in which the power is used.

The object of the invention is to effectually overcome the difficulty heretofore experienced in transmitting the motion of the wind-wheel shaft arising out of the side draft on the turn-table, which tends to shift the wind-wheel out of the wind, and causes a consequent loss of power or the machinery to stop altogether. This side draft is unavoidable in windmills using two ordinary beveled gears. The difficulty has been overcome heretofore by inconvenient and complicated mechanisms, in which there was necessarily undue friction and wear.

My invention consists in a compensating or balanced gearing for windmills for the purpose of connecting the wheel-shaft to the vertical power-shaft, whereby not only is the side draft destroyed and the wheel kept in the wind, but the smooth and easy running of the driven machinery is secured and the speed of the power-shaft is maintained at a constant rate proportioned to that of the wheel-shaft, the power-shaft reacting on geared surfaces, by which the tendency to vary in speed is entirely overcome.

The invention further consists in details of construction in connection with a balanced gearing, as fully hereinafter described.

This invention is an improved form designed to take the place of that shown in Letters Patent No. 261,739, granted me July 25, 1882.

In the accompanying drawings, Figure 1 is a side elevation, partly in section, of the invention as embodied in a windmill. Fig. 2 shows the gearing on an enlarged scale. Fig. 3 shows a construction of the parts adapted to drive the vertical shaft at a slower rate of speed. Fig. 4 is a modification.

In these drawings, A A indicate ordinary tower-posts, supporting at their upper ends the tower-casting B, and having also a lower bearing for the pivoted sleeve of the turn-table. The tower-casting is formed with an annular concave track adapted to receive the spherical rollers *b*, on which the turn-table revolves. This turn-table is shown at C. An outer annular flange bears upon the rollers, and a tapering part extends downward into the tower-casting. An axial hole in the turn-table receives a sleeve, *c*, which is fixed therein and extends downward through the lower bearing in the tower-fork. A collar underneath the bearing, held to the sleeve by a set-screw or otherwise, prevents displacement of the turn-table upwardly.

A horizontal arm, D, forms the bearing for the shaft of the wind-wheel, on which shaft, (marked E,) at the inner end thereof, is a beveled gear, F, which engages with and turns a horizontally-arranged beveled gear, G, which is loose upon the vertical shaft H. The beveled gear G is of peculiar construction, and is shown more clearly in Fig. 2. It has downward projections or ears *g g*, which form recesses adapted to receive beveled gears I I, turning on pins J J, which pass through the projections *g* and the beveled gears into the central hub of the beveled gear G. These gears I I mesh into a gear, L, which is keyed to the vertical shaft H. They also mesh into a beveled gear, K, secured to the sleeve or tube *c* of the turn-table C. Now, supposing the turn-table to be at rest, it is manifest that the rotation of the wheel-shaft E and its beveled gear F will turn the gear G, carrying around it the gears I I; but as these travel upon the fixed gear K they are turned in their revolution and impart rotary motion to the gear L, and through it to the shaft H. The vertical shaft H has a bearing at its upper end in an arm, 3, attached to the turn-table in any suitable way. The shaft passes down through the center of the gear G, through the sleeve *c*, extending to the point where it connects with the machinery to be driven. The gear G is recessed to give room for the wheel L, as shown in Figs. 1 and 2. The action of the gears I I, being in opposite directions, counterbalances the side draft, and when in the proportion shown in Figs. 1 and 2 increases the speed transmitted to the shaft H.

In order to run the shaft H at a diminished

speed, I increase the size of the driven wheel L and diminish the size of the fixed wheel K, and cause the wheel K to turn loosely upon the tube or sleeve *c*, and gear it back on the turn-table C in any convenient manner, in order to obtain pressure enough to counteract the side draft. This modification is shown in Fig. 3, in which the gear K is shown as having one set of teeth on a bevel, meshing into the gears I I, and another set at right angles to the plane of the gear, meshing into a loose gear, *m*, which also meshes into an internal gear, N, upon the rim of the tower-casting. The pinion M is pivoted upon the turn-table, as shown at *m*. With this arrangement the side draft of the turn-table C, caused by the driving-gear F meshing into the gear G, is balanced by the action of the pinion M upon the pin *m*, the pressure arising from the resistance of the work to be done by the mill acting through the said pinion M and pin *m* in exact opposition and measure to the side pressure of the driving-gear F. When the turn-table moves around on the tower the gear-wheel M rolls in its connection with the internal gear, N, and, being in engagement with the straight teeth of the wheel K, causes it to roll faster and in the same direction as the turn-table moves, and turns the gear-wheels I I on the driven wheel L without moving it. The shipper-wire O passes through the turn-table C within the tower-casting B. The shift of the turn-table carries the shipper-wire with the wheel M, thereby not obstructing its passage through the tower by the gearing.

The gearing in the construction described is compactly located in connection with the central vertical shaft, and does not require a large turn-table. It is adapted to any kind of mill and allows the turn-table to shift around the tower without carrying with it the vertical shaft. It has but few operative gears, and these rotate around in the same direction as the vertical shaft, whereby the friction and wear on the gearing are diminished.

In Fig. 4 is shown a modification, which may be made without departing from the principle of my invention, as heretofore explained. In this modification the gear-wheel G is driven by the beveled gear F in the same manner as heretofore explained. It is also loose upon the shaft H, and carries pinions I I, turning loosely upon pins J J, set vertically in the horizontal part of the gear G, the pinions I I turning freely underneath and traveling around in a circle with the revolution of G. They engage on one side with the internal gear, N′, upon the rim of the turn-table, which, when the turn-table is stationary, causes them to turn the gear-wheel L, with which they engage, and which is keyed to the shaft H. By this construction the side draft is counterbalanced in the same manner by the opposite action of the pinions I I.

Other similar modifications may be made without departing from the spirit of my invention.

Having thus described my invention, what I claim is—

1. A gearing for windmills, consisting of a gear-wheel fixed to the wind-wheel shaft, a gear-wheel fixed to the vertical shaft, a loose gear central with the vertical shaft, imparting motion to said shaft through an intermediate gearing adapted to react on the turn-table.

2. A gearing for wind-wheels, consisting of a gear-wheel fixed to the wind-wheel shaft, a loose gear concentric with the vertical or driven shaft, said loose gear carrying pinions or gear-wheels meshing with opposite sides of a gear-wheel fixed to the driven shaft, and with other suitable cogged surfaces, whereby motion is communicated to said shaft and the side draft counteracted, as set forth.

3. A gearing for windmills, consisting of a pair of gears driven by the main driver on the wind-wheel shaft through an intermediate gear adapted to revolve around the driven shaft and to turn said pair on their axis, said pair of gears meshing into a fixed rack or gear on one side and into opposite sides of the pinion or gear on the driven shaft, whereby the said shaft is driven and the side draft obviated, substantially as described.

4. The combination, in a windmill, of the gear F, the gear G, carrying the oppositely-arranged gears I I, and the gears K and L, the whole operating on the shaft H, as set forth.

5. The combination, in a windmill, of the gear F, the gear G, carrying the gears I I, the gears K and L, and the pinion M, meshing with the internal rack, N, the whole operating on the shaft H, as set forth.

6. The combination of the tower-casting B, turn-table C, with gears, as described, for communication and balancing-power of the gear F, and with the sleeve *c*, bearing, and collar at lower end thereof, as set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

MYRON R. MARTIN.

Witnesses:
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F. R. MELVIN.