(No Model.) 3 Sheets—Sheet 1.

E. C. BEEBE & R. STONER.

WINDMILL.

No. 400,995. Patented Apr. 9, 1889.

Fig. 1.

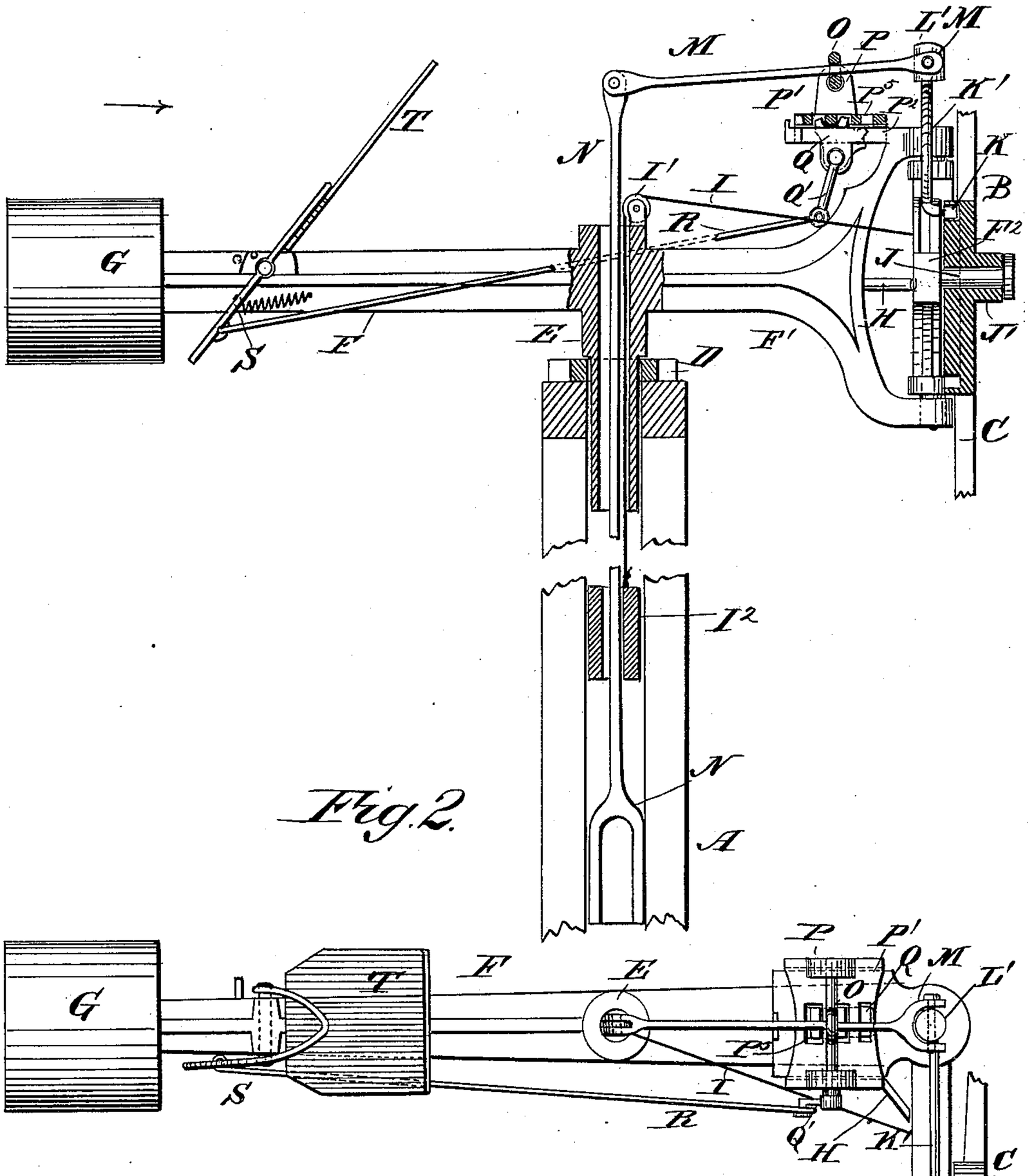

Fig. 2.

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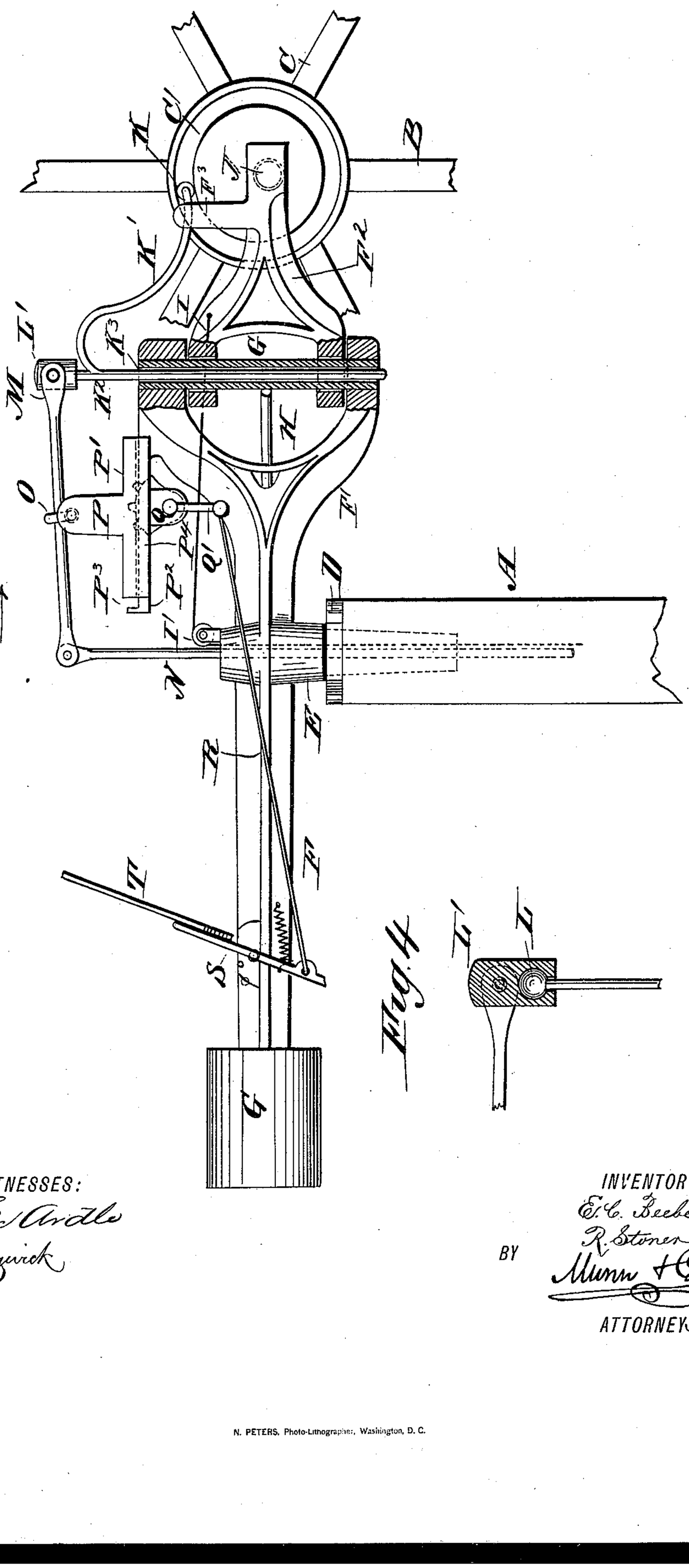

Fig. 3.

Fig. 4.

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E. C. BEEBE & R. STONER.

WINDMILL.

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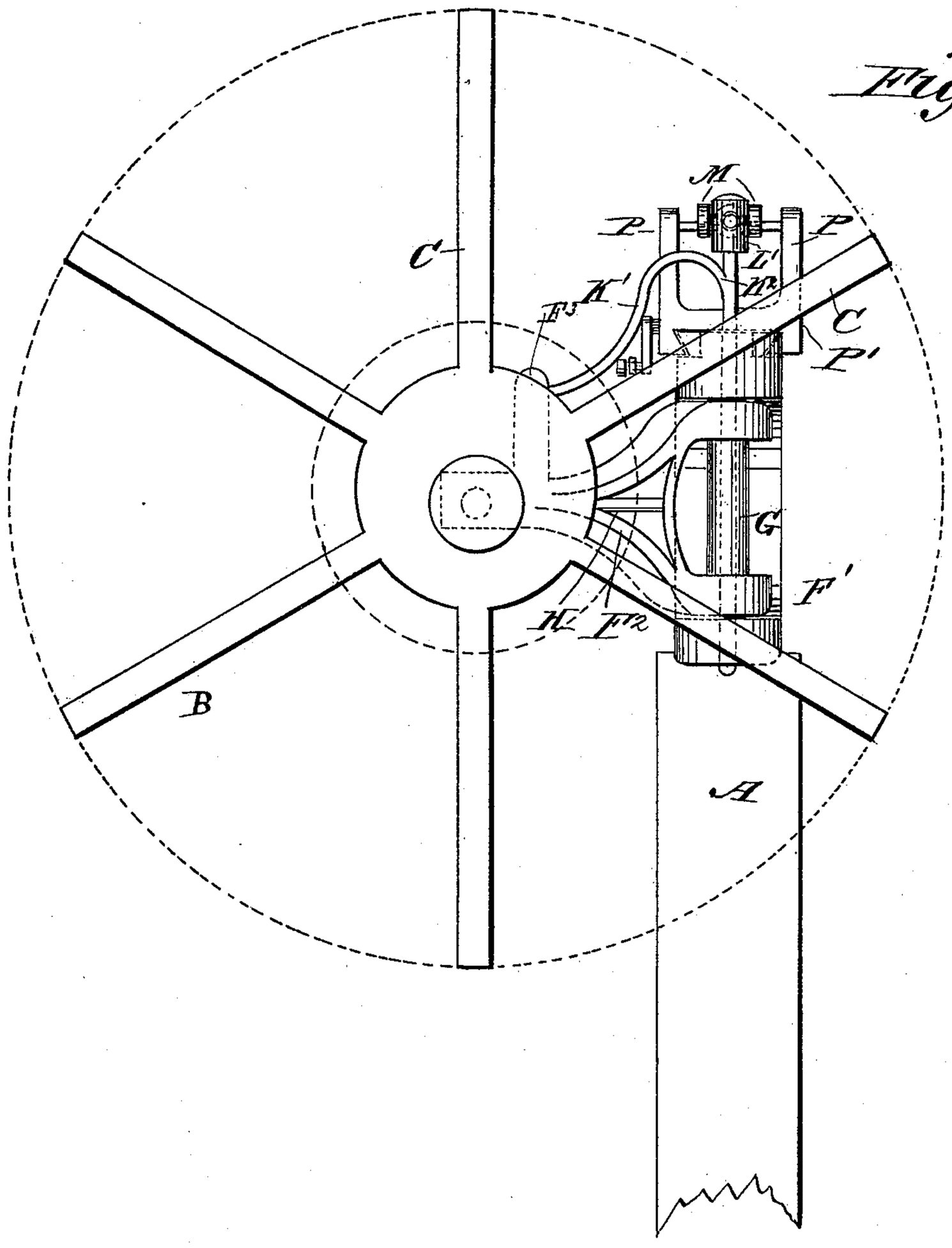
Fig. 5.



WITNESSES:
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UNITED STATES PATENT OFFICE.

EDGAR C. BEEBE AND RILEY STONER, OF GLEN ELDER, KANSAS.

WINDMILL.

SPECIFICATION forming part of Letters Patent No. 400,995, dated April 9, 1889.

Application filed April 10, 1888. Serial No. 270,180. (No model.)

To all whom it may concern:

Be it known that we, EDGAR C. BEEBE and RILEY STONER, of Glen Elder, in the county of Mitchell and State of Kansas, have invented a new and useful Improvement in Windmills, of which the following is a full, clear, and exact description.

This invention is in the nature of an improvement in windmills, having for its object to provide by simple and efficient means for the automatic adjustment of the wind-wheel properly in accordance with the force and direction of the wind without the use of a vane, and for the automatic government of the work performed by the mill according to the wind's power, so that the speed of the wind-wheel will remain approximately constant.

The invention consists of certain novel features of construction and combination of parts, substantially as hereinafter fully described, and pointed out in the claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 is a side sectional elevation of a windmill embodying our improvement, showing the most effective position of the wind-wheel. Fig. 2 is a plan view of the same. Fig. 3 is a side partly sectional elevation of the mill with the wind-wheel in its inactive position. Fig. 4 is a detail sectional view of an arrangement hereinafter referred to. Fig. 5 is a front elevation of the mill.

In carrying our invention into effect in the manner illustrated in the drawings, a hollow standard, A, is erected on a convenient base to form a support for the wind-wheel B and the appurtenances thereof, the spider-like body C of the said wheel only being here shown, to which body any appropriate description of inclined wings may be applied to make a wheel which will be most effective when squarely facing the wind and inert when lying edgewise thereto.

On the upper end of the standard A is arranged a bearing, D, to receive and support with the standard A a vertical tubular journal, E, said journal being fixed to or formed on a cross-beam, F, which supports the wind-wheel B on one end and a counterbalancing-weight, G, on the other, so that the said beam F can revolve easily in the horizontal plane, and will always be in the direction of the wind, the wheel B acting similarly to a vane to keep the weighted end of the beam F pointed into the wind.

To the rear arm, F′, of the beam F is connected by a swing-joint a bracket, F^2, through a vertical tubular pivot, G, the jointing end of the arm F′ being bifurcated and holding rigidly in its branches the respective ends of the pivot G, and that of the bracket F^2 being likewise bifurcated, but embraced between the branches of the arm F′, and its branches receiving the respective parts of the pivot G loosely, so that the bracket F^2 can swing freely in the horizontal plane independently of the beam F, but will be firmly supported therefrom.

A stop, H, is attached to the beam-arm F′ in a position to strike and limit the jointed bracket F^2 when the latter is swung to a position approximately at right angles to the body of the beam, and with the bracket F^2 is also connected the end of a weighted line, I, which in this instance is arranged to run over a pulley, I′, mounted on the middle of the beam F and downward through the tubular journal E and hollow standard A, a weight, I^2, being attached to its end within the standard in such a manner that the weight will tend to hold the bracket F^2 normally in its right-angular position with respect to the body of the beam F, and thus to the direction of the wind.

To the outer part of the bracket F^2 is fixed a laterally-projecting headed stud, J, on which as a bearing is mounted to turn the hub J′ of the wheel-body C, so that the wind-wheel will be forced by the weighted line I constantly toward its most effective position, (facing the wind,) but as the power of the wind increases will be swung thereby against the tension of the weighted line I more and more toward its inert position, (edgewise to the wind,) and the speed of rotation of the wheel thus remain comparatively unaffected by variations in the wind's force.

The wheel-body C is provided on its inner

face with an eccentric groove, C′, in which is arranged to travel a bearing, preferably a friction-roller, K, as shown, mounted on the end of an arm, K′, which works between guides F^3 and is rigidly attached to or formed on a vertically-reciprocating yoke, K^2, said yoke having fixed thereto a shank, K^3, which is mounted to slide vertically in the tubular bore of the pivot G, so as to guide the yoke in its movement. The yoke K^2 is provided also with a ball, L, which is fitted to work within the socket of an inverted cup, L′, as best shown in Fig 4, and said cup L′ is pivoted to and within the bifurcated end of a lever, M, the other end of which projects directly over the top of the standard A and is connected pivotally thereat to a vertically-reciprocating pitman, N, said pitman N being arranged to work within the tubular journal E of the wheel-beam F and the hollow standard A, and adapted for connection with the plunger of a pump or other apparatus or device to be operated by the mill.

The lever M is fulcrumed medially to and is adapted to slide lengthwise in a bearing, O, which is pivoted, so as to rock with the lever, to and between a pair of uprights, P, supported on a carriage, P′, said carriage being arranged to slide in the direction of the length of the lever M on a guide, P^2, which is fixed to the beam-arm F′. The arrangement is such that the pitman N will be operated from the wind-wheel B through the action of the eccentric groove C′ on the yoke-arm K′ and that of the vertically-reciprocating yoke K^2 on the lever M from its universal connection thereto whatever be the angular position of the wind-wheel with respect to the beam F, and that when the carriage P′ is moved along its guide P^2 the bearing O will be slid along the lever M, and the relative proportion of the arms of the lever M and the length of stroke of the pitman N thus changed.

The carriage-guide P^2 is provided with a stop, P^3, to limit the travel of the carriage P′, and the latter with flanges P^4 projecting on opposite sides of the guide P^2, so as to prevent lateral movement of the carriage with respect thereto. The carriage P′ is also provided in this instance with a longitudinal rack, P^5, which is adapted to be engaged and moved lengthwise by a segmental gear, Q, the said gear being pivoted to and between bearings depending from the guide P^2, and provided with a crank-arm, Q′, for rocking it. The crank-arm Q′ is pivotally connected to a rod, R, which is put also in pivotal connection with a lever, S, sustaining a governor-vane, T, which is arranged transversely to the length of the swing-beam F, so as to always face the wind, and the lever S is pivoted to the beam F—in this instance just back of the weight G—so that the governor-vane T can swing to and from the wind as the force of the same varies, a weight or spring being employed to hold it in its vertical position, and thus through the rod R and segmental gear Q automatically adjust the position of the bearing-carriage P′. The arrangement is such that an increase in the force of the wind will shift the loose bearing O toward the outer end of the lever M, and thus lengthen the stroke of the pitman N and increase the work to be performed by the wind-wheel, and, on the other hand, a decrease in the wind's force will shift the bearing O inward, shorten the stroke of the pitman N, and lessen the work, so that the speed of the wind-wheel is governed automatically.

The tension of the weighted line I is so adjusted that it will hold the wind-wheel face to the wind until the force of the same becomes so great as to give the main pitman N the longest possible stroke, and will then yield, as the wind further increases, to permit the wheel to swing more and toward its inert position.

With an opposite variation in the wind the operation of the two governing devices will be exactly reversed.

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

1. The combination, in a windmill, of a beam mounted to swing in the horizontal plane, a bracket, a tubular pivot connecting the beam and bracket, a wind-wheel mounted on the bracket, a reciprocating yoke having a shank guided in the bore of the said pivot, operating mechanism, substantially as described, connecting the yoke and wind-wheel, a pitman, and connections between the same and the yoke, substantially as described.

2. The combination, in a windmill, of a hollow standard, a beam journaled on the standard, a bracket connected by a swing-joint to the beam, a wind-wheel mounted to turn on the bracket, an eccentric groove on the body of the wind-wheel, a reciprocating yoke carrying an arm provided with an anti-friction bearing adapted to travel in the eccentric groove, a lever fulcrumed on the beam, a universal joint connecting the yoke and lever, and a main pitman working in the hollow standard and beam-journal and in operative connection with the said lever, substantially as described.

3. The combination, in a windmill, of a standard, a horizontally-turning beam, a wind-wheel mounted to turn thereon, a pitman, a rocking lever in operative connection with the same, operating-connections, substantially as described, between the wind-wheel and rocking lever, a sliding carriage having a rocking bearing mounted upon it and through which bearing said rocking lever freely passes, a governor-vane, and connections, substantially as described, between said vane and the carriage, substantially as set forth.

4. In a windmill, the combination, with a beam adapted to swing in the horizontal plane, a wind-wheel mounted on the beam, a

pitman, and a rocking lever in operative connection both with the wind-wheel and pitman, of a fulcrum for the rocking lever supported on an adjustable carriage provided with gear-teeth, a carriage-guide on the wind-beam, a rocking gear in engagement with the teeth of the carriage, a movable wind-pressed wing on the beam, and connections, substantially as set forth, between the said wing and the rocking gear, substantially as described.

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Witnesses:
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