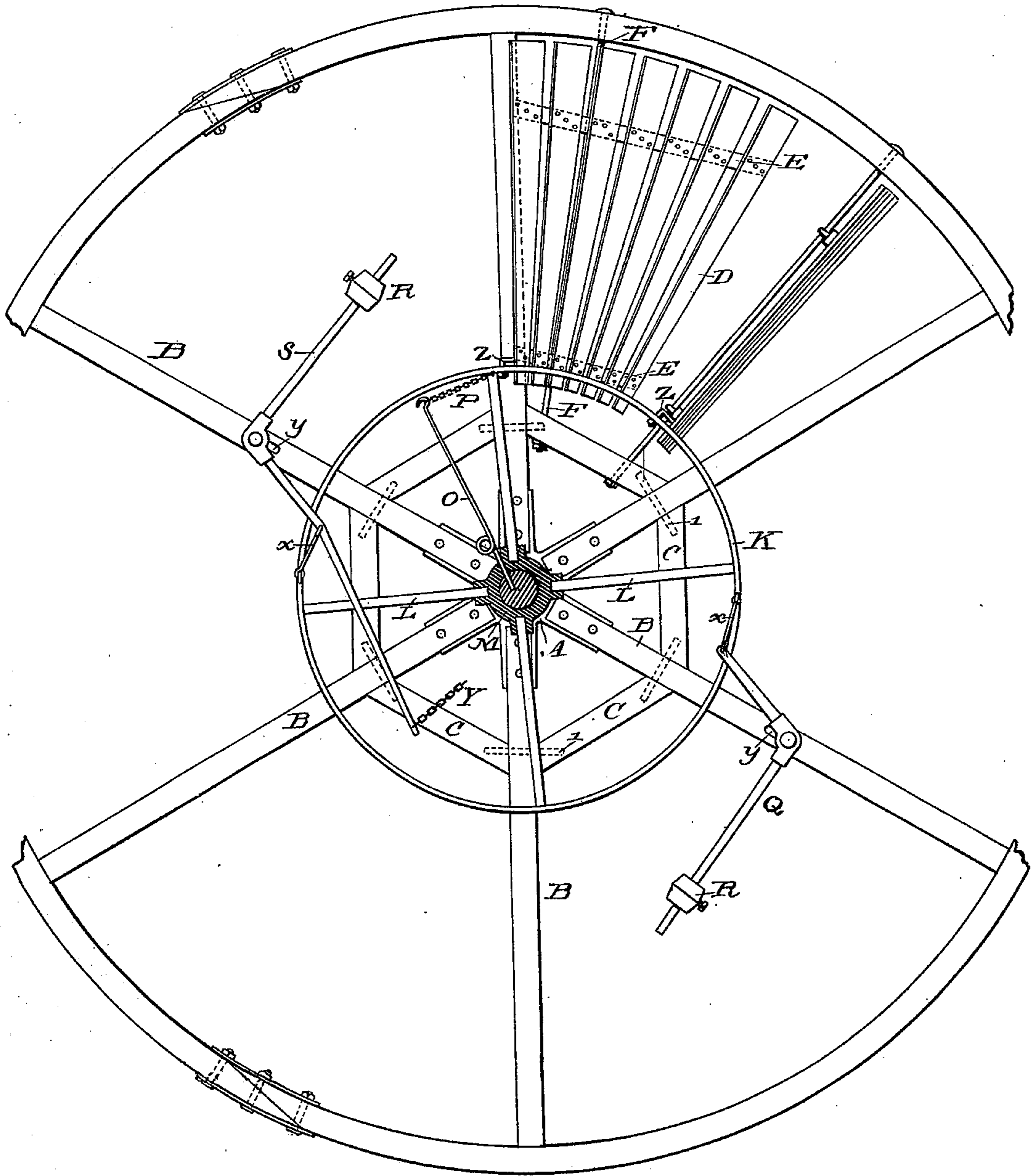


Fig. 1.



Attest:
R. H. Barnes.
S. W. Lusk.

Inventor:
Orville T. Chamberlain
Samuel D. Straw
Alfred J. Signor

(No Model.)

2 Sheets—Sheet 2.

O. T. CHAMBERLAIN, S. D. STRAW & A. J. SIGNOR.
Windmill.

No. 243,508.

Patented June 28, 1881.

Fig. 2.

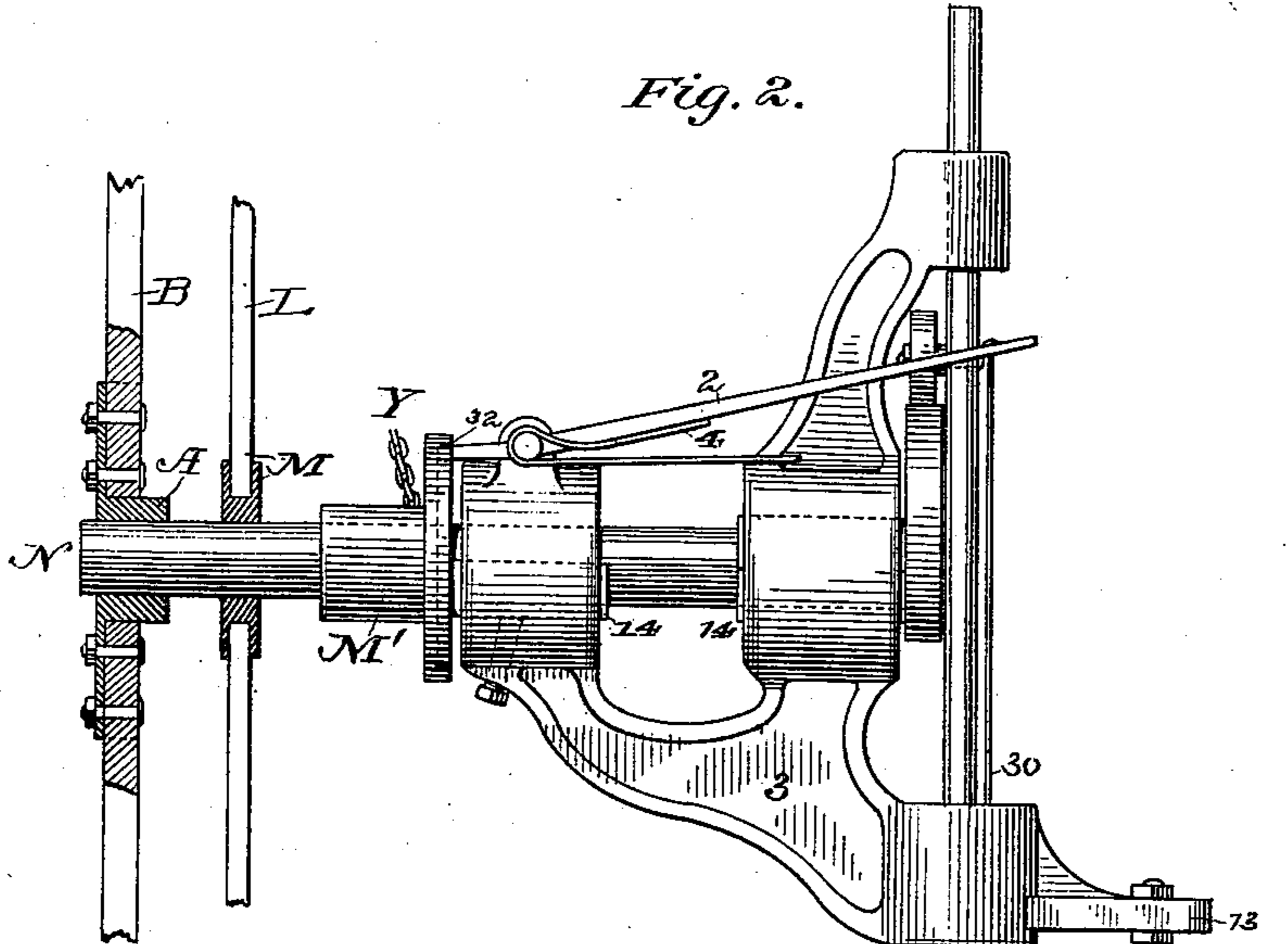
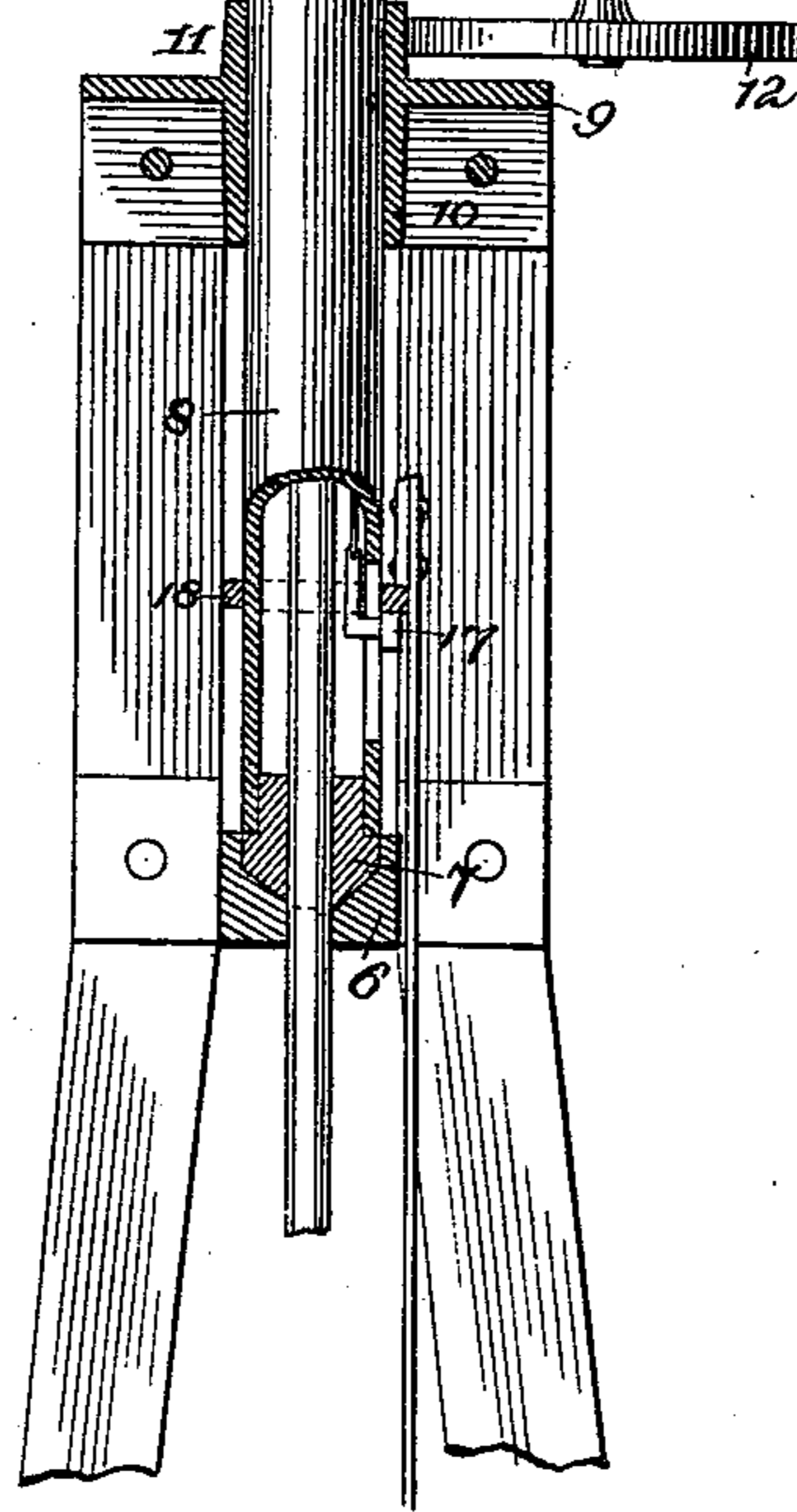
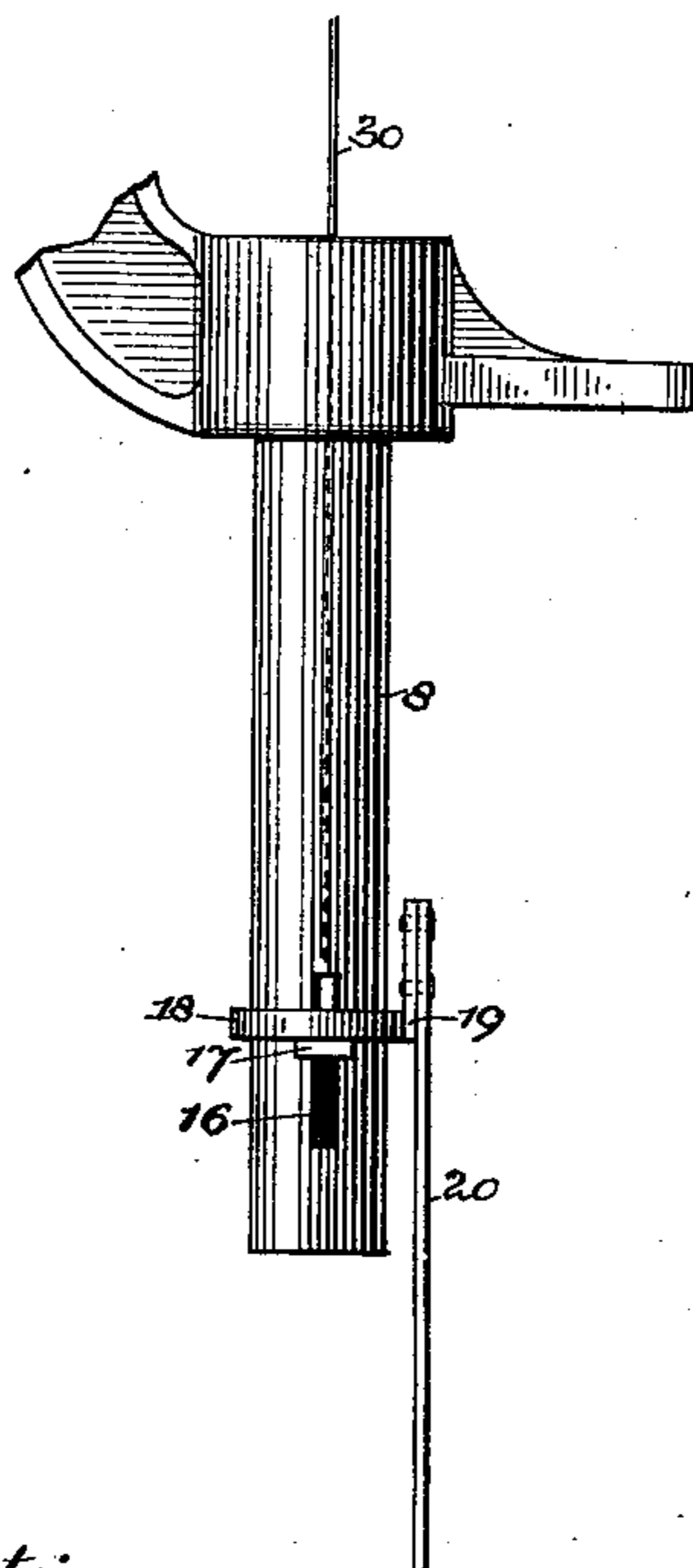


Fig. 3.



Attest:

R. H. Barnes.
D. W. Luby.

Inventor:

Orville T. Chamberlain
Samuel D. Straw
Alfred J. Signor
by Eli Spear
Atty

UNITED STATES PATENT OFFICE.

ORVILLE T. CHAMBERLAIN, SAMUEL D. STRAW, AND ALFRED J. SIGNOR,
OF ELKHART, INDIANA; SAID SIGNOR ASSIGNOR TO SAID CHAMBER-
LAIN AND STRAW.

WINDMILL.

SPECIFICATION forming part of Letters Patent No. 243,508, dated June 28, 1881.

Application filed April 1, 1881. (No model.)

To all whom it may concern:

Be it known that we, ORVILLE T. CHAMBERLAIN, SAMUEL D. STRAW, and ALFRED J. SIGNOR, of Elkhart, in the county of Elkhart and State of Indiana, have invented a new and useful Improvement in Windmills; and we do hereby declare that the following is a full, clear, and exact description of the same.

The object of our invention is an improvement upon the construction of windmills for which Letters Patent of the United States were granted to us February 8, 1881. In that patent was described a wind-wheel composed of pivoted fan-sections adapted to be adjusted automatically by the force of the wind acting upon each of such sections, and also capable of simultaneous adjustment by the partial rotation of a band or circle connected to all of the fan-sections, such circle being operated by a brake mechanism connected with the fan-shaft.

Our present invention consists, first, in an improved construction of the frame of the wind-wheel; second, in the novel construction of an automatic centrifugal governor; further, in the improved means for providing for the independent section; further, in the construction of the turn-table; and, finally, in the improved manner of connecting the brake-wire.

In the accompanying drawings, Figure 1 represents a rear view; Fig. 2, a longitudinal section taken centrally through the wheel-shaft; Fig. 3, a separate view, showing the mechanism for connecting the brake-wire.

The wind-wheel is composed of an outer rim, constructed in the same manner as that shown in our patent referred to, a hub, A, having arms or sockets into which are stepped radial braces B, and a series of intermediate connecting-braces, C. Instead of forming these braces of curved sections mortised into the arms B, as in our former patent, we use straight beams, which are beveled at the ends, so as to bear squarely against the sides of the radial braces B. The connection is made by dowel-pins 1, passing through the braces B and embedded in the adjoining ends of the straight braces C. This construction, while it is equally as strong, is much less expensive than that shown in our

before-mentioned patent. As many braces B may be employed as may be desired, though in practice six will usually be found sufficient to give the required strength to the parts.

The fan-sections are composed of strips D D, bolted to battens E E. Each section is connected by eyes to the pivot-rod F, which is stepped at one end in the outer rim of the wheel and at the other in one of the braces C. Each section is so pivoted that a larger amount of its surface is exposed to the wind on one side of the pivot than upon the other, so that any excessive force of wind will have a tendency to turn the section upon the pivot, and thus cause it to present less surface to the wind.

In practice the fan-sections would, of course, completely fill the space between the inner series of braces C and the outer rim; but on the drawings we have illustrated only one fan exposed to the wind and one thrown out of it.

Upon the main shaft, in the rear of the hub or spider of the wind-wheel, is the hub M of a circle, K, constructed of metal. Spokes L serve to support and brace the circle. The hub is placed loosely upon the shaft and has a free movement thereon. The circle K is connected to each of the fan-sections by a bent arm, Z, stepped in a bearing on such circle, so as to have a crank motion. A rotary movement of the circle will move all the fan-sections simultaneously, either into or out of the wind, and by this movement the hub M will traverse the main shaft a distance equal to the movement of the crank-arm Z. The required position of the circle necessary to keep the fans in the wind is maintained during ordinary wind-pressure by a spring, O, the outer end of which passes through the outer flange of the spider of the main wheel, incidentally serving to keep the wheel in position. The free end of the spring O is connected to the circle K by a chain, P, the tension being changed by shortening and lengthening the connection—an adjustment easily accomplished by means of the chain-links. Ordinarily the tension of the spring is such that the circle will be thrown around to the limit of movement, bringing the fans directly into the wind and holding them

there. An undue increase of wind, however, acting on the fan, will overcome the tension of the spring, allowing the fans to move on their pivots, presenting less surface to the wind and moving the circle accordingly.

For the purpose of governing the wheel automatically and regulating its speed, we have provided peculiar centrifugal governors, (represented at S Q.) These consist of a long angular arm pivoted adjustably in the slot γ , to one or more of the main braces B of the wind-wheel, the pivot being long enough to permit the governor-arms to swing clear of the fans when they are out of the wind. At the outer end of the arms S Q is an adjustable weight, R, the position of which is regulated by a set-screw, or in some other suitable manner. A link, x , connects the other end of the governor Q to the circle K. The governor S has its inner end extended, and to this end is connected the chain Y of the brake mechanism, hereinafter to be described. The operation of the centrifugal governors S Q will be readily understood from the drawings. At an ordinarily rapid movement of the wind-wheel they will exert no counteracting effect; but an excessive increase of wind, causing a more rapid revolution of the wheel than is desirable or safe, will cause the weighted governor-arms to fly around, and through the links x move the circle K, and consequently throw the fans out of the wind, and the weight of speed required to operate the governors is of course dependent upon the position of the adjustable weights R.

Upon the main shaft N of the wind-wheel, and in rear of the hub M, is the drum M', to which is attached the chain Y, its other end being secured to the end of the governor-arm.

The brake mechanism consists of a brake-lever, 2, pivoted to the main casting 3, and connected with the ground by a cord or wire, 30, a spring, 4, holding the brake-lever off the inner surface of the flange 32 of the drum unless the cord or wire is pulled. The operation of the brake mechanism will be readily understood by the application of the brake to the flange of the drum M'. The motion of such drum is caused to cease, and the chain Y will wind up, drawing forcibly upon the end of the governor-arm S, and through the circle K moving all the fans out of the wind, where they will be held until the cord is released.

Another feature of our invention is an improved turn-table adapted to give a minimum of friction and to render the wind-wheel extremely sensitive.

A socket, 6, having a coned bearing, is bolted to the derrick-posts, and forms a support for a casting, 7, correspondingly coned to run easily. The casting 7 has a shoulder, on which rests a length of gas-pipe, 8, the upper end of which is secured to the main casting carrying the wind-wheel shaft. On the top of the derrick-posts is a cap, 9, having a flange, 10, by which it is bolted to the derrick-posts, and a raised

ring, 11, and the parts are so fitted that when the casting 7 bears in the socket no part of the main casting will bear on the ring 11. A roller, 12, is supported upon a bracket, 13, and bears upon the ring 11 during the rotation of the turn-table.

It will be of course understood that the wheel takes wind from the rear, and, being mounted off its bearing-center, needs no tail or rudder vane, but will always adjust itself to the direction of the wind-currents.

It will also be seen that only three bearing-points are necessary—one in the socket, one between the friction-roller and the ring on the derrick-cap, and one formed by the journal of roller 12.

The manner of attaching and connecting the pump-rod is substantially the same as in our former patent. The casting 7 and socket 6 are of course bored out to give passage to the rod. The main shaft turns in adjustable bearings 14, as in our former patent.

We have devised an improved manner of attaching and connecting the cord which operates the brake-lever from the ground. Under ordinary circumstances, in the revolution of the turn-table, this cord or wire would be twisted or broken. The wire or cord, one end being attached to the brake-lever, is passed down through the tubular support alongside of the pump-rod to a point where the gas-pipe is slotted, as at 16. The free end of the wire is provided with a head, 17, of greater diameter than the slot. A ring or band, 18, encircles the pipe, against the lower side of which the head 17 bears. To this ring is secured an arm, 19, and to this arm another cord or wire is attached. Power applied to the cord 20 will pull down the ring and head and the upper cord, while at the same time all the parts are free to revolve without interfering with one another.

Having thus described our invention, what we claim as our invention is—

1. In a windmill, the combination of the wheel, a circle supported on spokes and a hub mounted on the main shaft of the wheel, and a bell-crank lever pivoted on the wheel and provided with a weight upon one arm, the other being approximately radial to the circle and connected thereto by a link, substantially as described.

2. In a windmill, the combination of a series of pivoted fan-sections, a circle connected to all of such sections to move them simultaneously, a spring for holding such sections in the wind, and a centrifugal governor adapted to operate against the pressure of said spring.

3. In combination, the hub or spider of the wind-wheel, the main shaft, and the spring O, connected to the fan-sections by the chain P, whereby the tension of the spring is varied.

4. In a windmill, the combination, with the radial brace B, having slot γ , of the centrifugal governor-arm, pivoted adjustably in such slot and connected to the fan-sections.

5 5. In a wind-wheel, the described turn-table, consisting of a socket secured to the derrick or tower, in combination with a casting; 7, and the tubular support secured to the main casting of the wind-wheel.

10 6. In combination, the bearing 6, supporting the main casting 3 upon the tubular portion 8, the derrick 10, having the ringed flange 11, and the bearing-roller 12, attached to casting 3, adapted to travel on the periphery of the flange 11.

7. In combination with the tubular support

8, having the slot 16, the cord 30, having head 17, the collar 18, and the cord 20.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

ORVILLE T. CHAMBERLAIN.
SAMUEL D. STRAW.
ALFRED J. SIGNOR.

Witnesses:

ABNER P. SIMONTON,
DAVID W. HUNTER.