

No. 762,315.

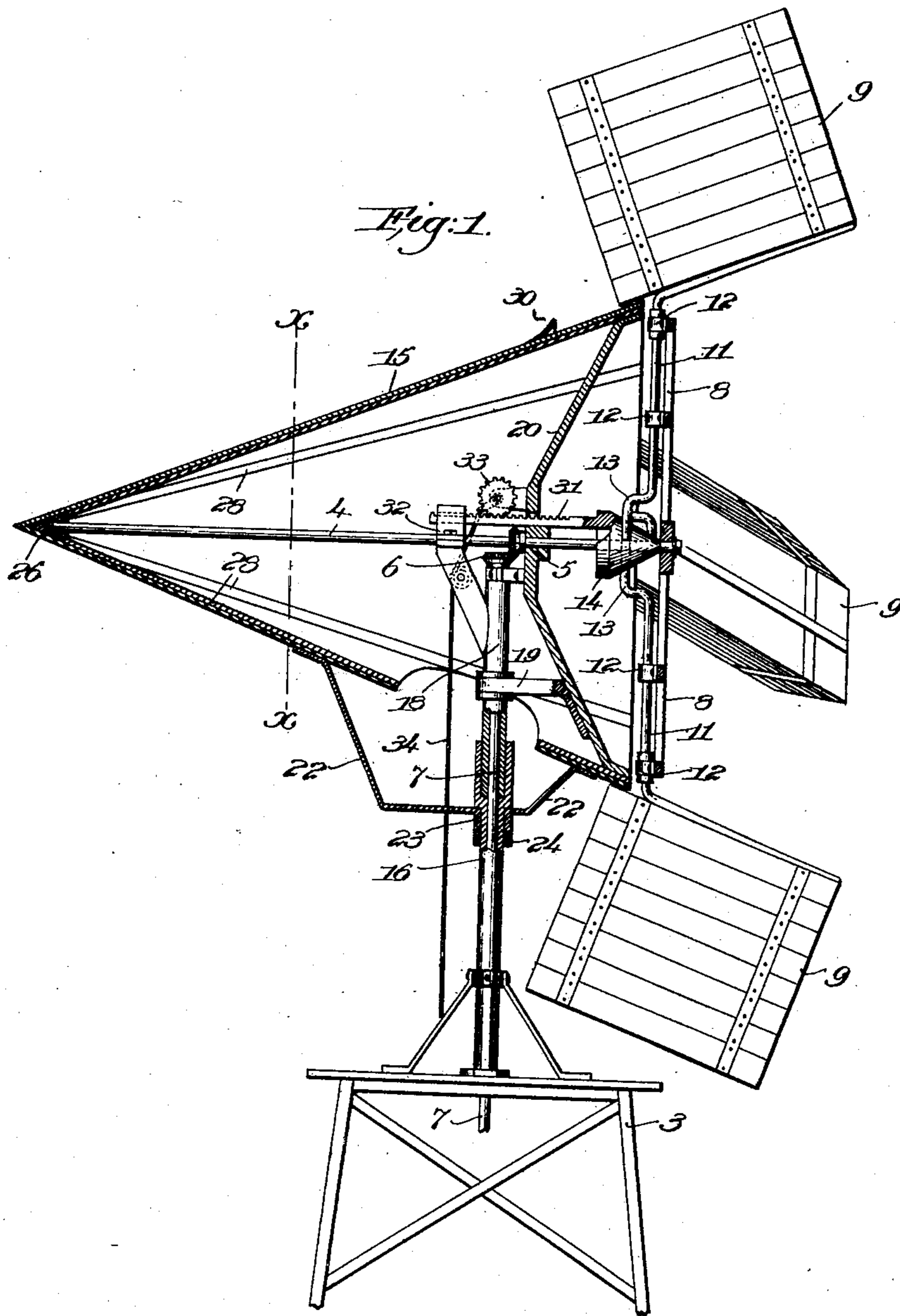
PATENTED JUNE 14, 1904.

J. L. JOYCE.
WINDMILL.

APPLICATION FILED MAR. 10, 1902.

NO MODEL.

3 SHEETS—SHEET 1.



Witnesses,
Edward G. Allen.
Herman J. Sartoris

Inwitness:
Joseph L. Joyce,
by Wesley Gregory,
attys.

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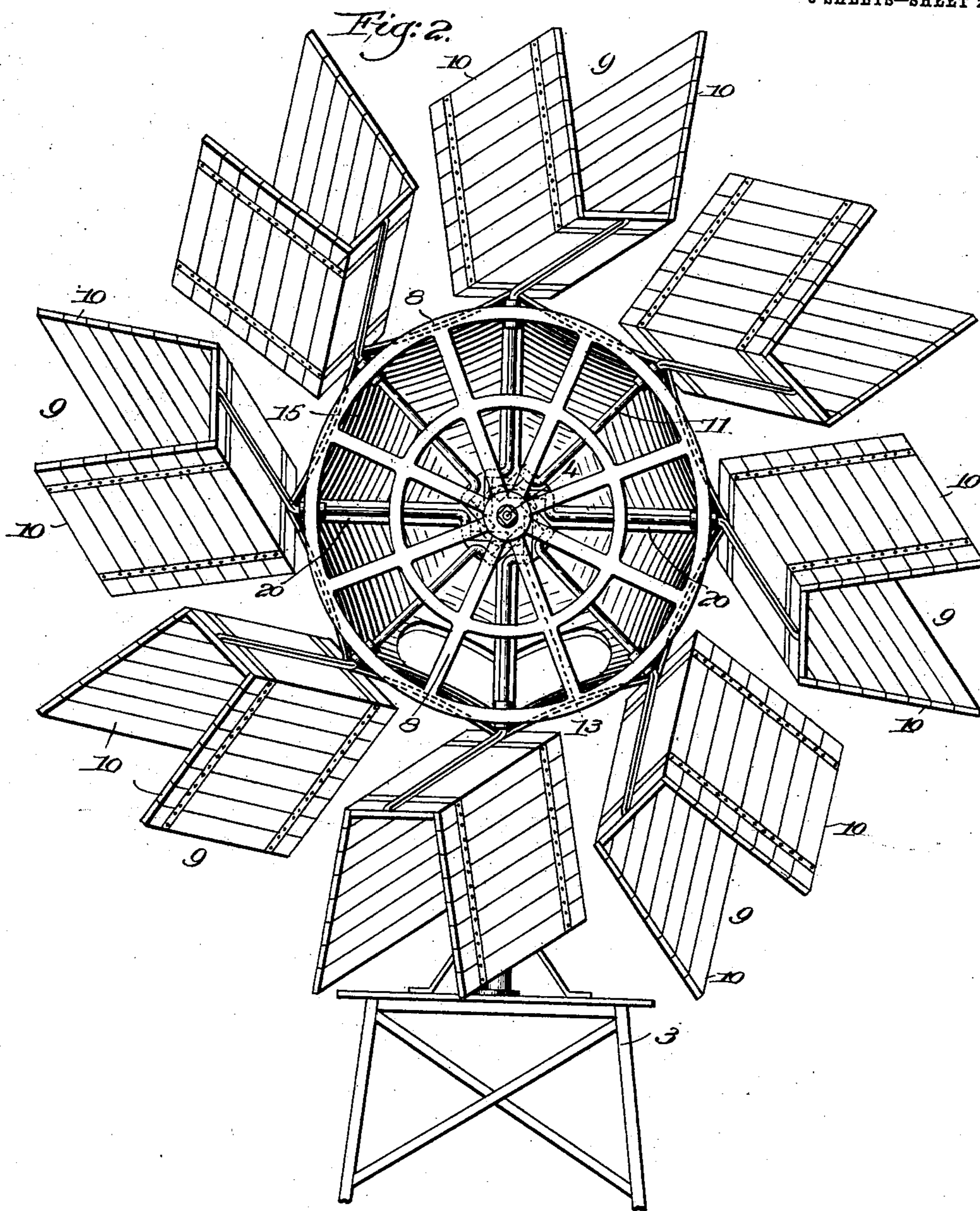
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3 SHEETS—SHEET 2.



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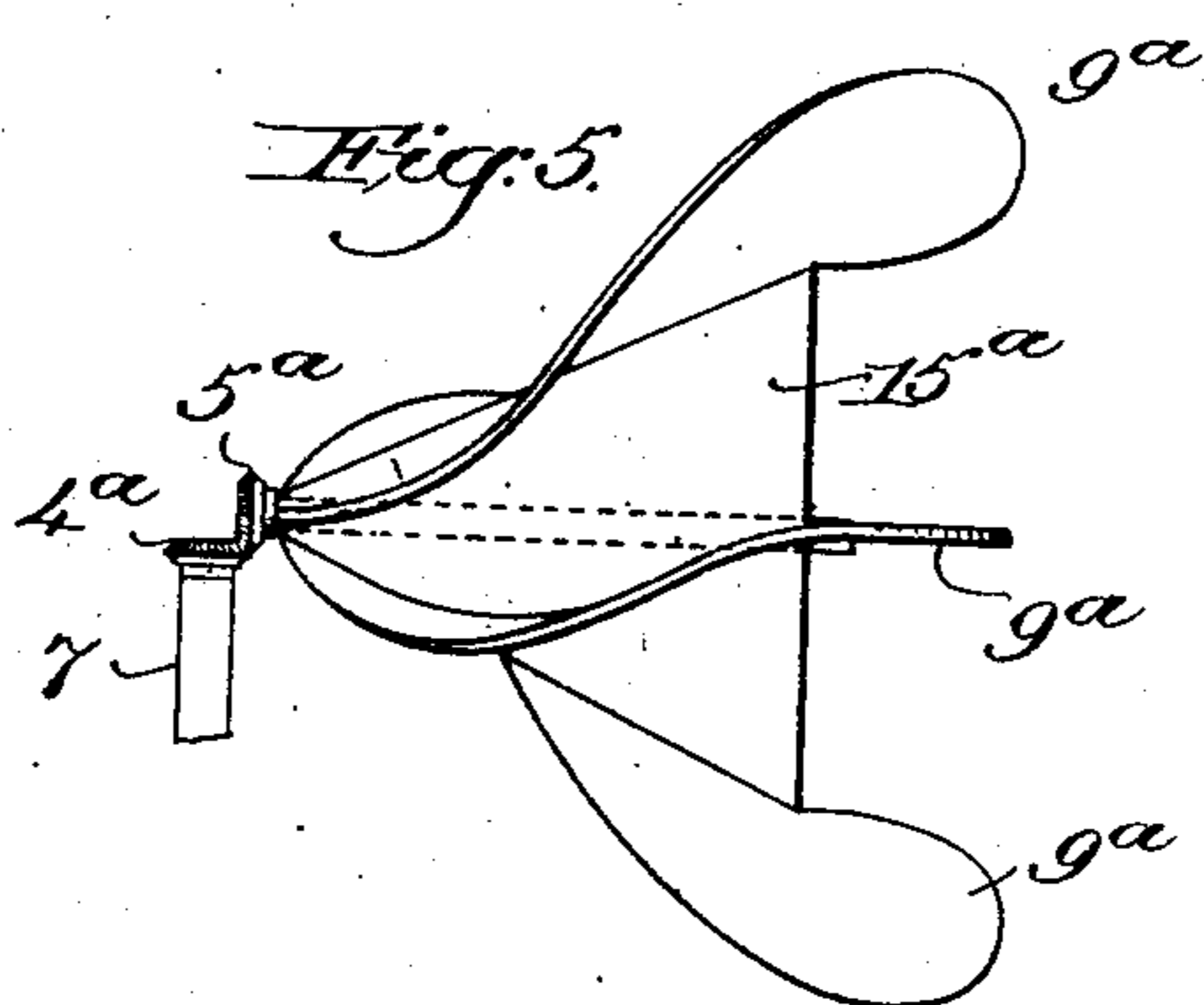
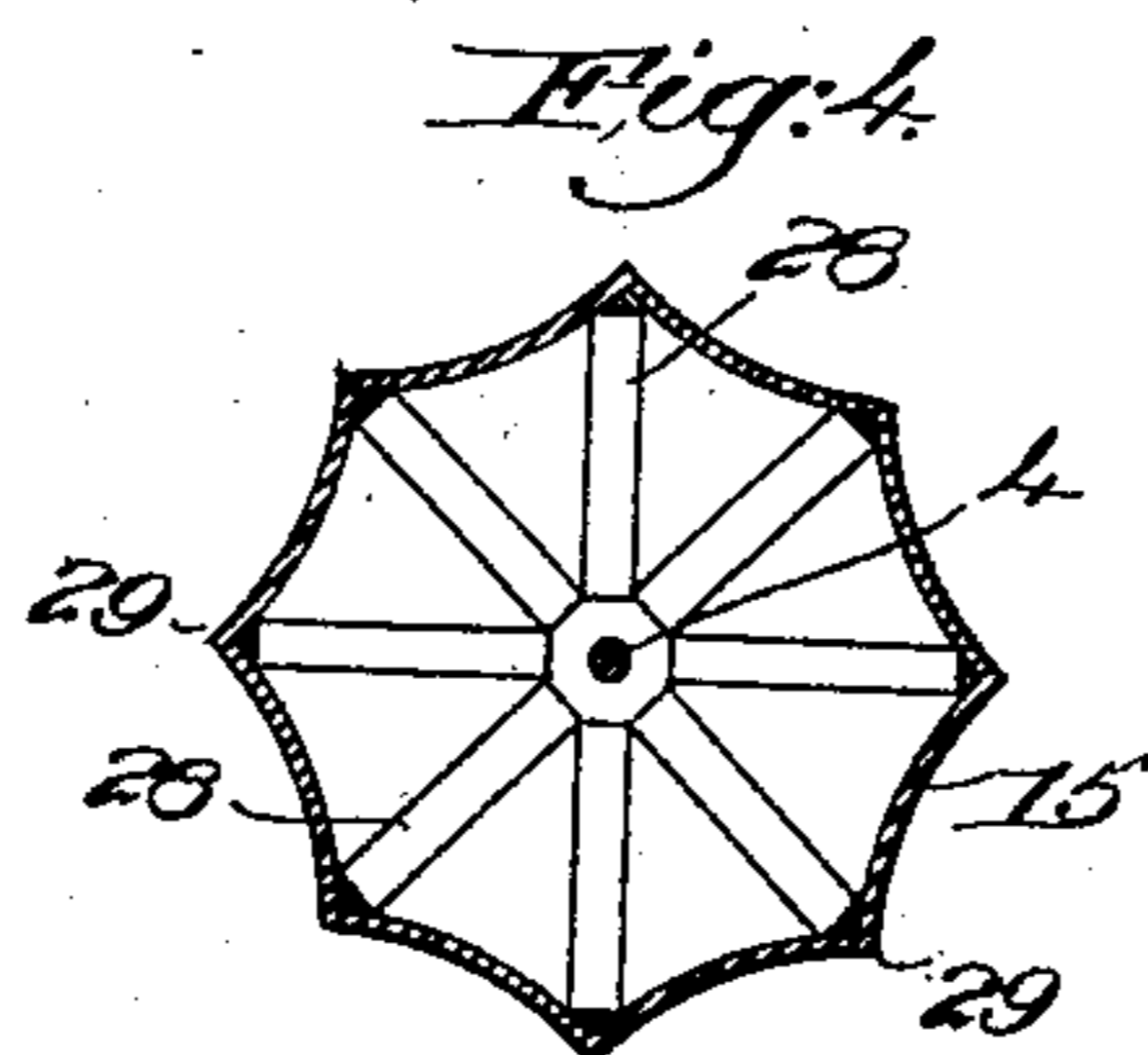
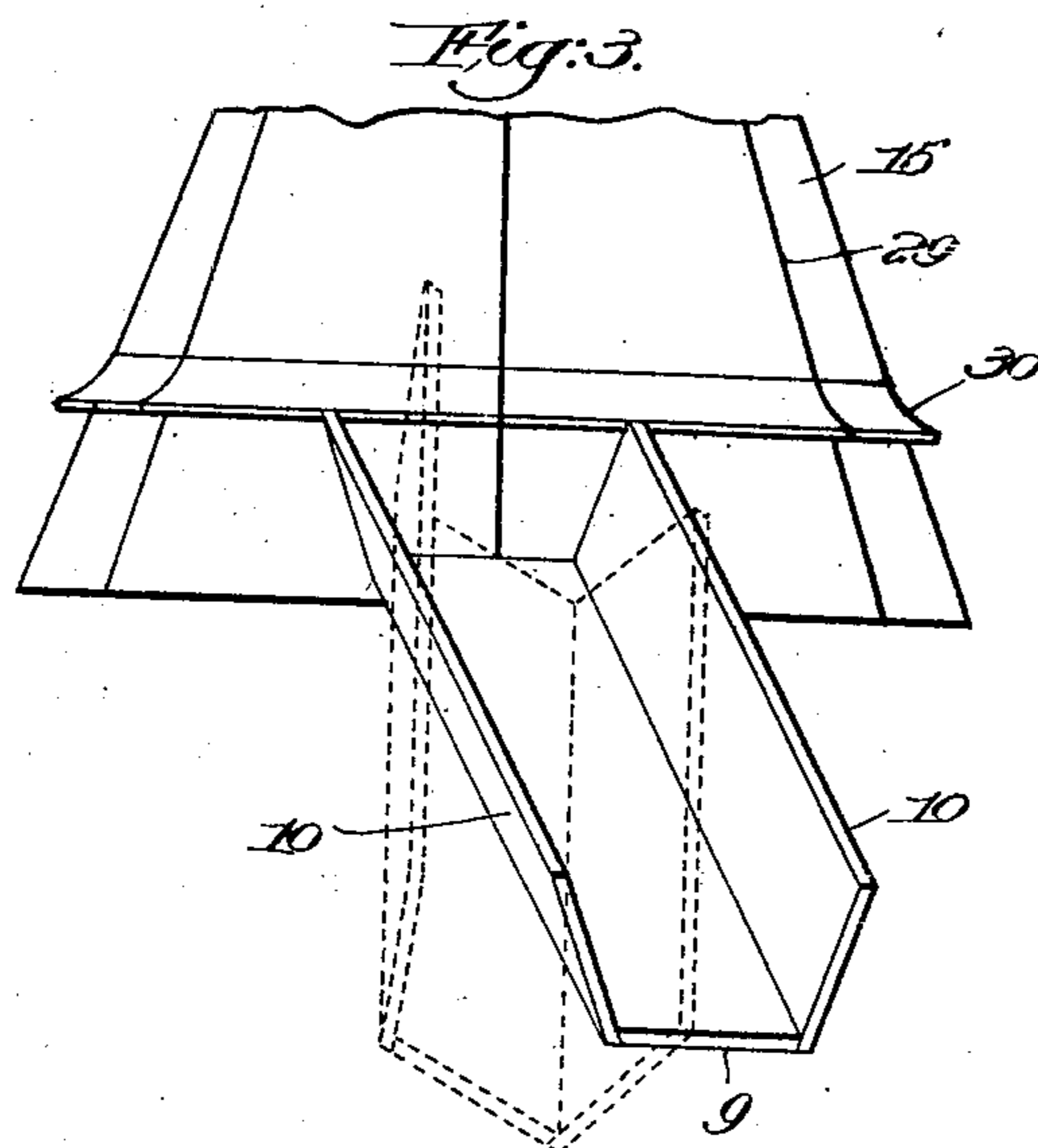
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3 SHEETS—SHEET 3.



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UNITED STATES PATENT OFFICE.

JOSEPH L. JOYCE, OF EGREMONT, MASSACHUSETTS, ASSIGNOR OF ONE-HALF TO ALLEN McLANE HAMILTON, OF NEW YORK, N. Y.

WINDMILL.

SPECIFICATION forming part of Letters Patent No. 762,315, dated June 14, 1904.

Application filed March 10, 1902. Serial No. 97,443. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH L. JOYCE, a citizen of the United States, residing at Egremont, in the county of Berkshire and State of Massachusetts, have invented an Improvement in Windmills, of which the following description, in connection with the accompanying drawings, is a specification, like numerals on the drawings representing like parts.

This invention relates to windmills, and has for its object the production of a windmill of novel form wherein the wind passing through the wheel is used to the best advantage and wherein no directing vane or tail is necessary to hold the wheel to the wind.

In accordance with my invention I provide a suitable directing member having a body which tapers from its base to its point to form a substantially conical or pyramidal shape, which body is mounted for turning movement about a vertical axis. The wind-wheel is preferably supported by the said directing member and is mounted to rotate about a horizontal axis as usual, said wheel being situated at the base of the conical-shaped directing member and having its sails situated outside of the base. The apex of the directing member points toward the wind, and the directing member has two functions—first, to hold the wind-wheel to the wind, and, second, to divert the wind, which would naturally pass through the center of the wind-wheel and which would furnish comparatively little power because of the short lever-arm through which it would work, to the sails which are situated some distance from the axis of the wheel and which therefore work through a comparatively long lever-arm. The directing member is preferably made hollow and incloses within itself the mechanism connecting the wind-wheel with the power-shaft, thus protecting the same.

I have also devised a special form of sail for my windmill which has many advantages.

In the drawings, Figure 1 is a vertical central section of my improved windmill. Fig. 2 is rear elevation thereof. Fig. 3 is a detail showing two positions of one of the sails. Fig. 4 is a section on the line *xx*, Fig. 1; and Fig. 5 is a modified form of my invention.

One of the novel features of the present invention consists in supporting the wind-wheel in bearings carried by a directing member which is mounted upon a tower for movement about a vertical axis and which takes the place of the ordinary tail or vane and serves to hold the wind-wheel to the wind. The directing member which I have herein chosen to show is hollow and comprises a substantially cone-shaped shell 15 and the strengthening or stiffening spider or strut member 20, which is situated at the base of the shell and serves to preserve its shape. The directing member may be mounted on the tower for movement about a vertical axis in any suitable way, and, as herein shown, I have provided a supporting-spider 22, which is attached to the lower end of the shell and which has a hub 23, encircling a stand 16, rigid with the tower 3, the said hub resting and turning upon a collar 24. The above construction, however, is only one out of many ways in which the directing member could be mounted upon the tower for turning movement, and I do not wish to be limited to any particular way of accomplishing this. The wind-wheel is carried upon a suitable shaft 4, which in turn is mounted upon bearings supported by the directing member, the said shaft having a bevel-gear 5 thereon, which meshes with a bevel-gear 6 on the power-shaft 7. The latter shaft is supported in any suitable bearings in the tower and is illustrated as passing through the stand 16. The upper end of the power-shaft is supported in a bearing 18, carried by arms 19, extending from the strut 20, the lower end of the bearing being illustrated as setting in and turning in a socket in the upper end of the stand 16. The bearings for the shaft 4 may be supported by the directing member in any suitable way, and, as herein illustrated, the shaft extends the full length of the directing member and has one end journaled in a bearing or block 26 at the apex of the directing member, while the other end passes through and is journaled in the spider 20 of said directing member.

The wind-wheel comprises a central head 8, preferably having a spider-like construction, though my invention would not be de-

parted from if this head were in the form of a disk. Secured to the head 8 and extending beyond the periphery thereof are the sails 9, which are preferably pivoted to the head and
 5 are substantially U shape in cross-section, each sail thus having two blades 10. Each sail is shown as supported by a suitable shaft 11, which in turn is carried by bearings 12 upon the head 8, said shaft forming an axis about
 10 which the sails may be turned to bring them more or less into the wind. The lower end of each shaft 11 is offset or cranked, as at 13, and the crank portion rests against a suitable controller 14, slidably mounted upon the
 15 shaft 4. The controller is illustrated as having a tapered body and will preferably be substantially cone shape. By moving the controller back and forth upon the shaft the inclination of the sails to the wind may be
 20 varied, as will be obvious. While I have herein shown a conical controller, yet my invention would not be departed from if a controller of any other form were used, it only being necessary that the controller should
 25 have such a shape and such connection with the offset portions of the shaft as to control the position of the sails through the shaft.

From the above description it will be seen that the directing member is supported by
 30 the tower, and the wind-wheel in turn is supported by the directing member. The directing member has a long and comparatively slender body, as will be seen, and by placing the vertical axis thereof in the position shown
 35 and the wind-wheel at the base of said member the directing member serves to hold the wind-wheel to the wind and performs the function of the usual vane or tail. In addition to this function the directing member
 40 serves as a housing for the gearing and shaft and also as a means for diverting the wind, which would naturally pass through the center of the wheel and which would perform no work to the sails where it can be most eco-
 45 nomically used. The body of the directing member may either be conical shape or pyramidal shape, it only being necessary that it have a tapering body. In the drawings I have illustrated the said directing member as
 50 having its surface fluted or scalloped, as shown in Figs. 2 and 4, and as provided with the stiffening members 28, which serve to give proper shape to the shell, which may be of metal or any other suitable material. The
 55 fluted or scalloped surface 15 of the member forms ridges 29, which assist somewhat in holding the said member steadily to the wind. In order that the wind which is diverted or deflected by the directing member may all
 60 pass through the sails instead of between the sails and the surface of the cone member, I will preferably employ a deflecting-flange 30, which encircles the directing member and directs the wind directly to the sails.

55 The controller 14 may be operated in any

suitable way, and I have herein illustrated the same as having connected thereto the rack 31, which passes through the member 20 and is supported by a suitable bearing 32, through
 70 which also the shaft 4 passes, the said rack meshing with a pinion 33, carried by the member 20. The pinion 33 will be operated by means of a cord or other connection 34, which is connected to a crank secured to the
 75 pinion, the said cord or connection being led to any convenient place within reach of the operator. When the said cord is pulled upon, the pinion will be rotated and through the rack will move the controller to the right,
 80 thereby turning the shafts 11 and swinging the sails 9 in an inclined position with reference to the direction of the wind, the extent of the inclination of the sails being under the control of the operator. After the sails have
 85 been properly set the cord 34 will be suitably secured, and the force of the wind against the sails will operate to hold the cranked portions of the shaft 11 hard against the controller 7. When it is desired to throw the
 90 wind-wheel out of operation, the cord 34 is merely released, when the force of the wind against the sails will throw them around into a position parallel with the direction of the wind, as shown in dotted lines, Fig. 3. The
 95 full-line position of the sails in Fig. 3 shows approximately the working position thereof, and it will be seen that the front and rear ends are cut so as to stand parallel with the base when the sails are in this position.

In Fig. 5 I have illustrated a slightly-modi-
 100 fied form of my invention wherein the directing member rotates with the sails. In this embodiment of my invention the directing member is designated by 15^a, and the sails are in the nature of spiral blades 9^a, which are
 105 fast to the surface of the cone. The cone has rigid therewith a bevel-gear 5^a, which meshes with a bevel-gear 4^a upon the power-shaft 7.

The shaft which supports the wind-wheel will be supported in some suitable way. (Not
 110 shown.)

From the above it will be observed that my invention consists, broadly, in providing a cone-shaped directing member which is sup-
 115 ported by a tower in such a way as to have a movement about a vertical axis and which in turn furnishes the sole support for the wind-wheel.

While I have described one specific embodiment of my invention, I do not wish to be
 120 limited to the precise construction herein shown, as various changes may be made in the shape and arrangement of the parts without departing from the spirit of my invention as expressed in the appended claims.

Having described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a windmill, a tower, a non-removable directing member mounted on the tower to
 130

turn about a vertical axis, and a wind-wheel supported by said directing member, the latter having a hollow conical body provided with a continuous exterior surface every portion of which is exposed to the wind.

2. In a windmill, a directing member having a hollow tapering body, a wind-wheel supported in bearings rigidly carried by said directing member, and gearing inclosed in the directing member for transmitting the rotating movement of said wheel to the power-shaft, the shell of the said body having a constantly-open manhole to provide access to the gearing.

3. In a windmill, a tower, a directing member supported thereon for movement about a vertical axis, said directing member having a hollow cone-shaped shell and a stiffening member irremovably secured thereto at its base, a horizontal shaft in the interior of said cone-shaped shell and supported in bearings rigid with said member, a wind-wheel on said shaft, a power-shaft, and gearing inclosed in said shell and connecting said shafts.

4. In a windmill, a tower, a hollow cone-shaped directing member mounted for movement about a vertical axis, bearings carried by said directing member on the interior thereof, a horizontal shaft journaled in said bearings, a wind-wheel on the said shaft at the base of the cone, the sails of the wind-wheel being outside of the conical surface, a power-shaft extending into the cone, and gears inclosed therein and connecting said shafts.

5. In a windmill, a directing member mounted for turning movement about a vertical axis, said member having a hollow tapering body and a stiffening-spider at its base to which it is rigidly and irremovably connected, and a wind-wheel supported by said directing member.

6. A wind-wheel having sails pivoted to its periphery, said sails being substantially U shape in cross-section, and arranged with the side portion thereof extending in a substantially radial direction.

7. A wind-wheel having a central head portion and a plurality of sails pivoted to the periphery thereof, each sail presenting a plurality of radially-arranged blades extending in the general direction of the axis of rotation of the wheel, the pivotal point of each of said

sails being to the windward of their central position.

8. A wind-wheel having a central head portion, a plurality of sails each presenting two parallel substantially radially-arranged blades extending in the general direction of the axis of rotation of the wheel, and means to pivot the sails to the head portion, the pivotal point of each sail being situated to the windward of its central position.

9. In a windmill, a cone-shaped directing member mounted for movement about a vertical axis, a wind-wheel supported by said directing member, said wheel comprising a central head portion of substantially the same size as the base of the directing member and situated at said base, and a plurality of sails pivoted to said head portion, each of said sails presenting a radially-arranged blade having its pivotal point to the windward of its central position.

10. In a windmill, a hollow cone-shaped directing member mounted for movement about a vertical axis, a spider in the base of the directing member, a shaft journaled in said spider, and a wind-wheel mounted on said shaft, said wheel comprising a central head portion situated at the base of the directing member, and having sails pivoted to its periphery.

11. In a windmill, a horizontally-arranged substantially cone-shaped directing member mounted to turn about a vertical axis, a wind-wheel supported by said directing member at the base thereof, said wind-wheel having sails situated outside of the conical surface, and a deflecting-flange on said directing member, said flange operating to prevent the wind from passing between the sails and the directing member.

12. In a windmill, a substantially cone-shaped directing member, having its surface fluted or scalloped, and a wind-wheel supported thereby.

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

JOSEPH L. JOYCE.

Witnesses:

GEO. W. GREGORY,
EDITH M. STODDARD.