

(No Model.)

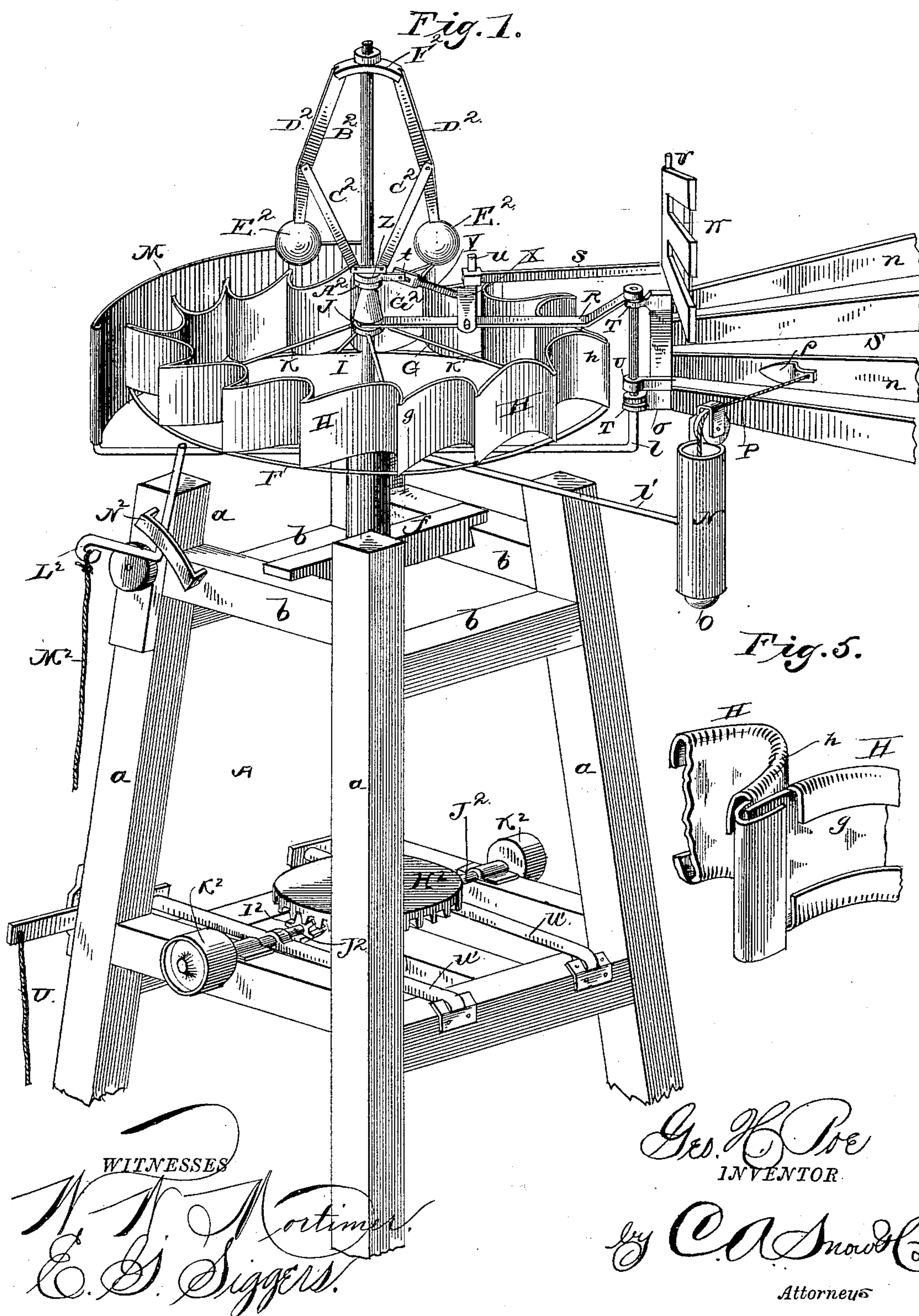
3 Sheets—Sheet 1.

G. H. POE.

WINDMILL.

No. 318,498.

Patented May 26, 1885.



(No Model.)

3 Sheets—Sheet 2.

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Fig. 2.

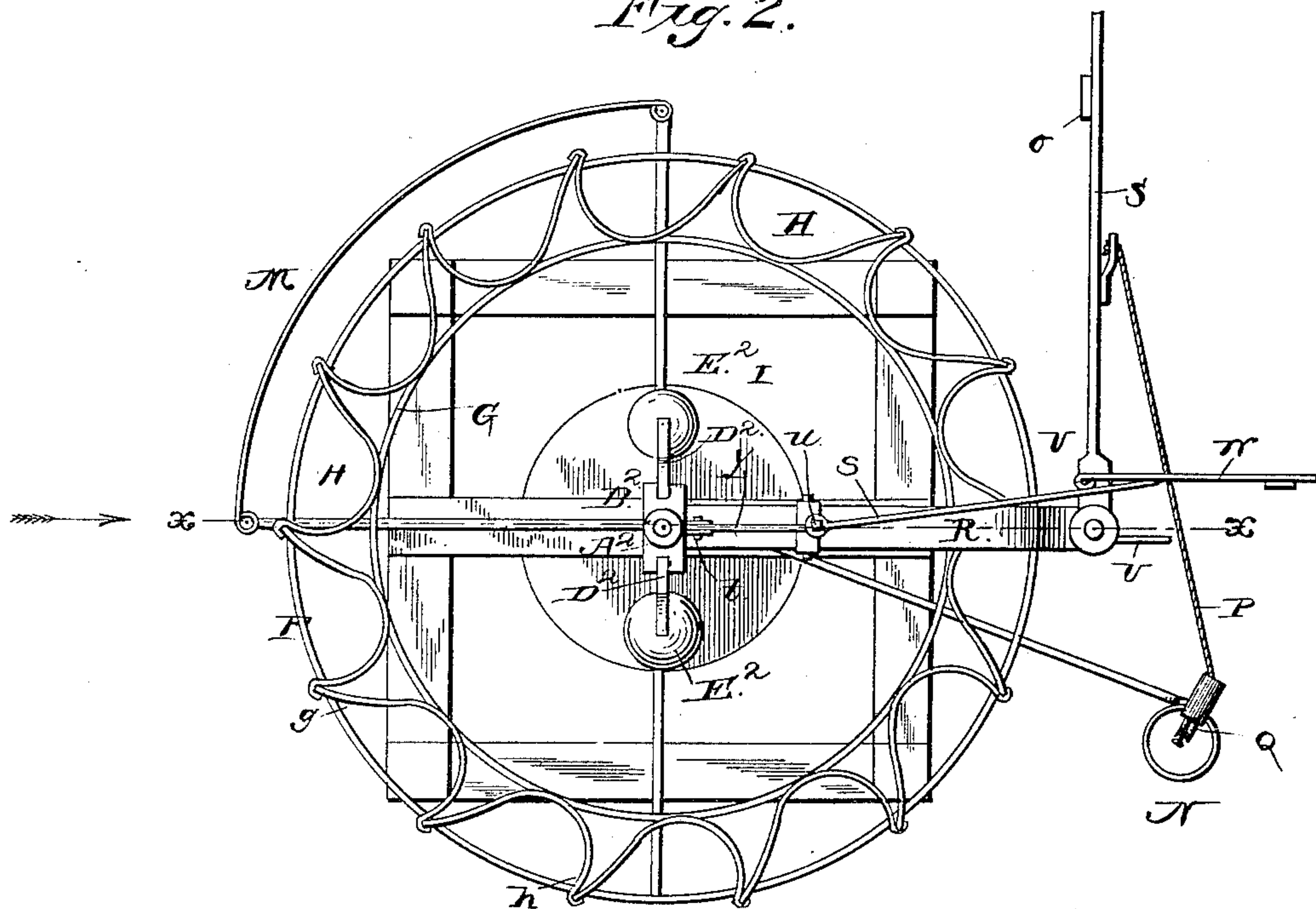
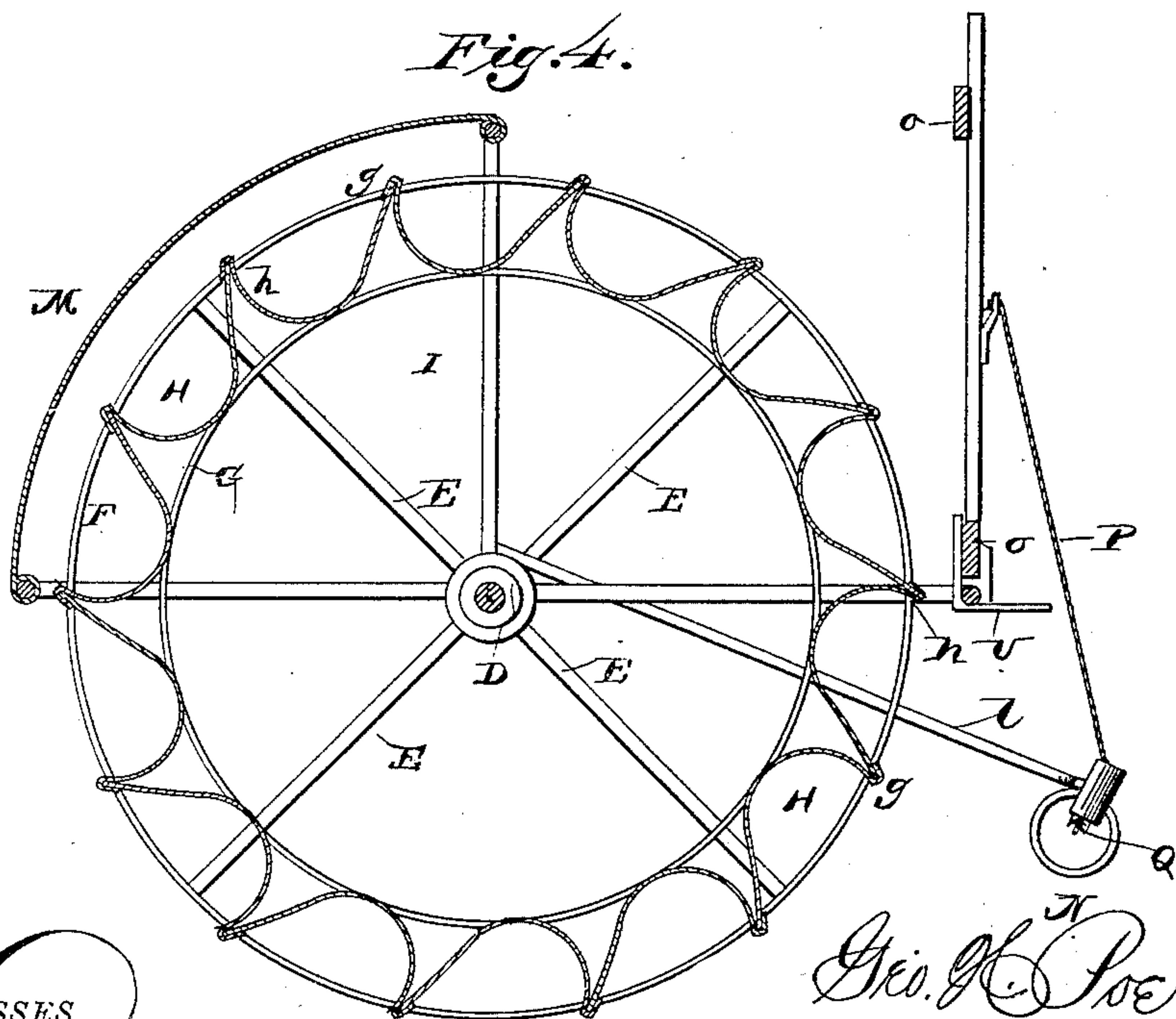


Fig. 4.



WITNESSES

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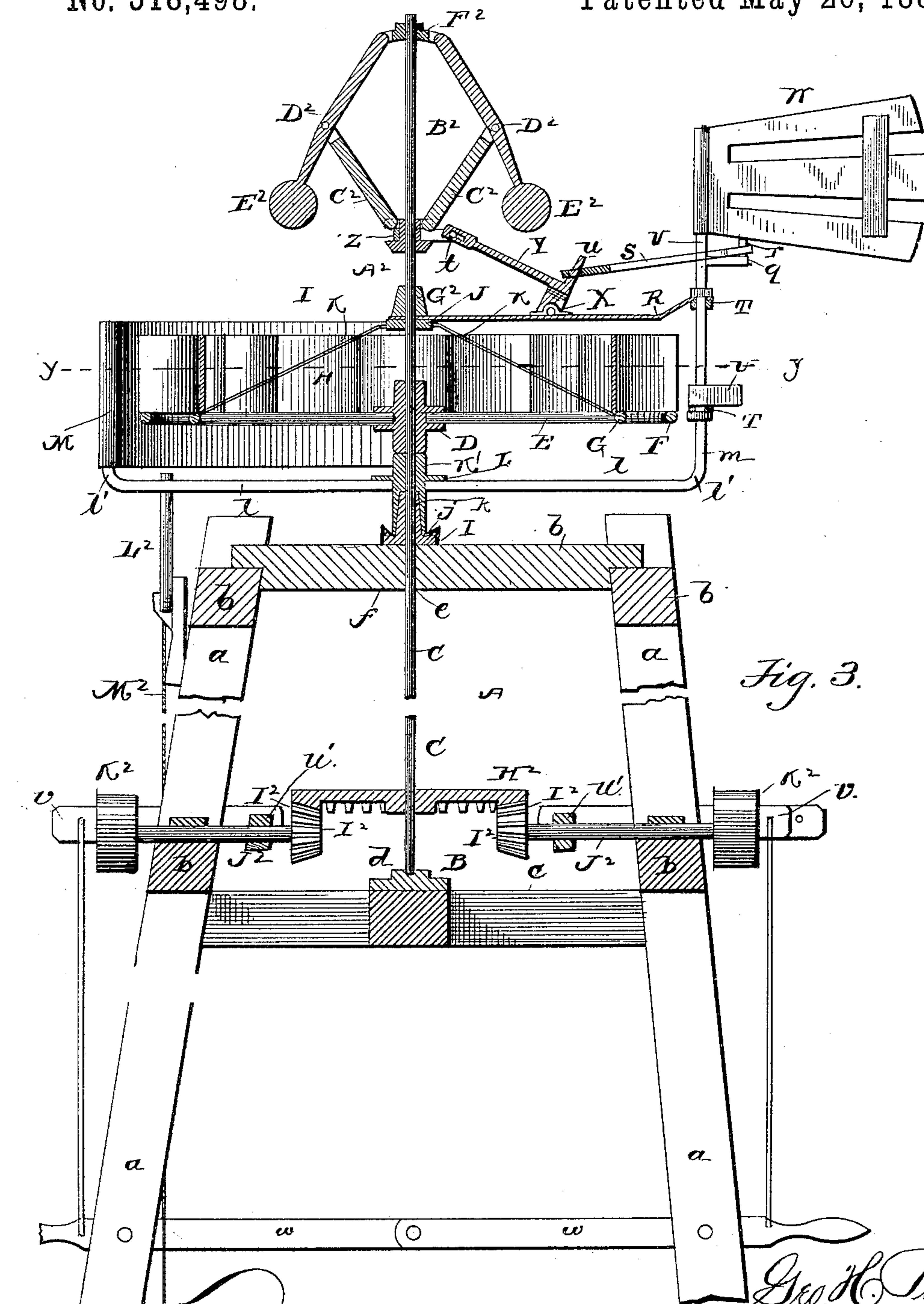


Fig. 3.

WITNESSES

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UNITED STATES PATENT OFFICE.

GEORGE HENRY POE, OF ROUNDHEAD, OHIO.

WINDMILL.

SPECIFICATION forming part of Letters Patent No. 318,498, dated May 26, 1885.

Application filed September 23, 1884. (No model.)

To all whom it may concern:

Be it known that I, GEORGE H. POE, a citizen of the United States, residing at Roundhead, in the county of Hardin and State of Ohio, have invented a new and useful Improvement in Windmills, of which the following is a specification, reference being had to the accompanying drawings.

This invention relates to windmills; and it has for its object to provide an improved means for governing the same, whereby when the speed of the mill increases above the maximum point a set of devices will be automatically thrown into operation to cause the turning of a shield to protect the wheel from the full force of the wind, and thus decrease the speed of the mill, and when this is accomplished to return the shield to its original position.

A further object of the invention is to provide means for either automatically or manually turning the shield around to protect the wheel during a heavy storm.

With these and other objects in view the said invention consists in certain details of construction and combination of parts, as hereinafter set forth, and particularly pointed out in the claims.

In the accompanying drawings, Figure 1 is a perspective view of my invention. Fig. 2 is a plan view of the same, showing the shield thrown around to protect the wheel during a storm. Fig. 3 is a vertical longitudinal section on the line *x x*, Fig. 2. Fig. 4 is a horizontal section on the line *y y*, Fig. 3. Fig. 5 is a detail view.

Like letters are used to indicate corresponding parts in the several figures.

Referring to the drawings, A designates the frame-work or tower of the mill, consisting of four vertical posts, *a*, joined together by horizontal bars *b*, a central cross-bar, *c*, extending across and connecting the horizontal bars.

Secured to the upper face of the central cross-bar, *c*, is a bracket or plate, B, having a recess or depression, *d*, in the center, forming a step-bearing for the lower end of the rotary main shaft C. The latter is arranged in a vertical position, and passes upward through an opening, *e*, in a cross-bar, *f*, which connects the upper horizontal bars, *b*, the upper end of

the main shaft extending above the mill and forming the axis on which the parts turn.

About midway of the length of the main shaft is fitted a hub, D, having a series of horizontal radial arms, E, to the outer ends of which are secured two concentric circular rings, F G, one arranged within the other, the blades or buckets H of the wind-wheel I being fitted to the said rings in any suitable manner. These blades or buckets are independent of each other, and are connected together by the edges of one blade lapping the adjacent edges of the other, as shown in Fig. 5. The form of the blades or buckets is substantially semi-elliptical, one side, *g*, being longer and less rounded than the other side, *h*, so that the wind will be allowed to strike the rounded shorter side, *h*, with its full force.

I do not wish to be limited to any particular manner of attaching the blades to the rings, so I have not thought it necessary to show any particular means, since such may be varied at will without materially affecting the operation of the wheel.

Above the wheel I a band or collar, J, is fitted on the main shaft C, and is provided with a series of radial downwardly-extending braces, K K, which are secured at their lower ends to the arms E of the wheel, and thus serving as an efficient brace for the same.

To the upper face of the cross-bar *f* is attached a plate, I, having a dished flange, *j*, formed in its upper face, a conical collar or projection, *k*, extending up from the flange and provided with a central opening for the passage of the main shaft. A sleeve, K', turns loosely on the projection *k*, and is arranged on the main shaft between the hub D and the cross-bar *f*, the lower edge of the sleeve revolving within the dished flange *j*. Said sleeve K' has an annular band, L, formed therewith, and thus providing a hub for a series of horizontal radial arms, *l*, the latter being four in number and operating beneath the wind-wheel. Two of the arms *l* have their ends extending upward, as at *l'*, to receive the ends of a shield, M, quadrantal in form, which covers one-fourth of the edge of the wheel, the turning of the shield to cover the portion of the wheel being acted upon causing the stoppage of the same. One of the other arms *l* is also extended upward, as at *l'*, to

form a support for a cylindrical chamber or casing, N, which is open at both ends, and provides a receptacle for a weight, O, which is connected with the vane by a cord, P, in the manner presently to be described. Mounted in the extension l' , above the chamber or casing N, is a pulley, Q, over which the cord passes. The remaining arm l has an upward extension, m , at the outer end, to the upper end of which extension is fitted the outer end of a horizontal arm, R, the latter turning at its inner end on the main shaft.

S designates a vane having its wings n attached to vertical bars o and converging inward, the inner ends of the vane having perforated brackets T attached thereto and swinging on the extension m between suitable stop-lugs. To one of the wings n is attached a staple or eye, p , to which the end of the cord or rope P is attached, the turning of the vane causing the cord or rope to work over the pulley Q and raise the weight, the latter serving to automatically return the parts to their normal positions.

An angle-plate, U, is attached to the extension m , and is arranged in such a manner that one of its arms forms a stop for the vane when the latter is forced around by the wind, while the other arm provides a similar stop when the weight holds the vane in its normal position.

A rod, V, extends upward from the vane S and carries a smaller vane, W, the central portion of the rod having a prolongation, q , from which projects an upwardly-extending pin or stud, r . A connecting-rod, s , connects the pin or stud with a vertical post, u , projecting from a V-shaped standard, X, the lower ends of which are pivoted to the horizontal arm R, and a rod, Y, is attached to the standard at one end, and has its other end slotted to receive a pin, t , connecting the outwardly-extending branches of a ring, Z. The latter is fitted in a recessed portion of a sleeve, A^2 , forming the base of the governor B^2 , the upper end of the sleeve having the arms C^2 pivoted thereto and to the arms D^2 , which carry the balls or weights E^2 , the upper ends of the arms D^2 being pivoted to a cross-head, F^2 , which is fixed on the main shaft. The sleeve A^2 works on the said main shaft, and is separated from the arm R by a fixed cap or collar, G^2 .

On the lower end of the main shaft C, between the cross-bars f , is fixed a gear-wheel, H^2 , receiving motion from the main shaft and communicating it to a pair of pinions, $I^2 I^2$, on the inner ends of transverse shafts J^2 , the outer ends of which have band-wheels K^2 . One of the band-wheels may be connected by a band with a rotary churn or corn-shelling machine, and the other may have a wrist-pin to connect with a pitman to operate a pump. This, however, I do not claim and have not shown, since I may make other uses of the power derived from the windmill, as I may deem necessary or desirable. The shafts J^2 of the band-wheels are mounted in one of the horizontal

bars b of the tower, and also in a hinged beam, u' , the front ends of which are connected by rods $v v$ through ropes with hand-levers $w w$, which are pivoted together and to the posts a of the tower. It will be seen that by the operation of any one or both of said hand-levers the hinged beam u' is forced down to withdraw any one or both of the pinions I^2 from engagement with the gear-wheel H^2 , or forced up to bring the pinions into engagement with the latter.

To one of the tower-posts a is pivoted a bell-crank lever, L^2 , one end of which has a rope, M^2 , attached thereto and extending down to the ground, the other end working in a guide-bracket, N^2 , and adapted to engage with one of the arms l of the shield M, to throw the latter around to cover the wheel at the point where the wind strikes.

The operation of my invention will be readily understood from the foregoing description, taken in connection with the annexed drawings.

In its normal position the shield M covers one-fourth of the circumference of the wheel, but does not cover that portion of the wheel which receives the force of the wind. In the operative position the vanes are arranged as seen in Fig. 1. As will be seen, the wind strikes the blades or buckets of the wheel, and by the peculiar shape of the blades or buckets they catch the direct force of the wind and it is revolved in a horizontal path, imparting a rotary motion to the main shaft C. The gear-wheel on the lower portion of the latter transmits this motion to the pinions I^2 to revolve the band-wheels K^2 , for the purpose hereinbefore stated. By this arrangement the windmill may be used to supply power for a variety of purposes. By the revolution of the main shaft C the governor is turned likewise, and as the speed of the shaft increases by the increased revolution of the wheel the balls or weights of the governor are raised by centrifugal force, drawing the sleeve A^2 upward on the main shaft and causing the tilting of the rod Y, which will incline the standard X outward. This movement of the standard, by reason of the connecting-rod s , throws the large vane around a short distance, the weight O being drawn up in the casing N. The large vane swings on the extension m , as seen in the drawings, and since the small vane is attached rigidly to the other, it will be carried around by the movement thereof. This partial movement of the large vane causes the shield M to be carried around to partly cover that portion of the wheel being acted upon by the wind, and thus the rapidity of the motion of the wheel will be decreased to correspondingly decrease the motion of the main shaft, the governor balls or weights dropping down, so as to relieve the pressure on the large vane, the weight O preponderating and returning the latter to its normal position against one of the arms of the angle-plate U. This arrangement provides an automatic

turning of the vane to partly cover the wind-wheel where the direct force of the wind strikes, so as to decrease the speed of the wheel, and when this is accomplished to re-

5 turn the parts to their normal positions.

In the case of a heavy storm the large vane will be struck by the wind and swung around on the extension *m*, so as to draw the weight *O* up in the casing *N*, and when the large vane
10 has reached the limit of its movement the small vane is caused to present its face to the direct action of the wind, as seen in Fig. 2. The wind blowing on the small vane carries the shield around to entirely cover that por-
15 tion of the wind-wheel which receives the direct force of the wind. Thus the wheel will be protected during storms or high winds, and when the force of the storm has been spent the weight *O* will draw on the vanes
20 and restore the latter and the shield to their original positions. In this manner the mill will be protected during a storm, so as not to get out of order.

When it is desirable to shut off the mill, the
25 cord *M*², which reaches down to the ground, may be operated to oscillate the bell-crank lever *L*² to strike one of the arms *l* of the shield and force the latter around to cover that portion of the wheel which receives the
30 action of the wind. The wheel will then cease to move, and by reversing the action the shield will be restored to its normal position.

It will be understood that the position of the vanes is such that they will regulate the
35 position of the shield to accord with the direction of the wind—that is, the vanes will swing the shield around as the wind changes.

It will be seen that by the construction de-
40 scribed I am enabled to provide an improved form of mill, which will be automatically governed in its speed, which may be used to transmit power for a variety of purposes, which will be self-regulating, which will not be in-
45 jured during a heavy wind or storm, which will not get out of order, and which possesses other advantages not necessary to mention here.

Having described my invention, I claim—

1. In a windmill, the combination, with the
50 main shaft mounted in the tower, of the wind-wheel secured in the shaft and comprising a hub, radial arms or spokes, concentric rings or bands attached to the latter, one within the other, and blades or buckets arranged in a
55 horizontal plane between the rings or bands and resting on and secured to the latter, as set forth.

2. In a windmill, the combination, with the
60 main shaft, of the wind-wheel secured on the same and comprising a hub, arms or spokes, and concentric rings or bands, and blades or buckets, semi-elliptical in form, arranged be-
65 tween the rings in a horizontal plane, the blades or buckets being secured at their ends to the outer ring or band, and at or about their centers to the inner ring or band, as set forth.

3. In a windmill, the combination, with the main shaft, of the wind-wheel attached to the latter and having a series of blades or buck-
70 ets which are semi-elliptical in form, said blades being fitted in place independent of each other, the edges of the adjacent blades being lapped over and secured to form a com-
75 plete connection throughout the series, as set forth.

4. In a windmill, the combination, with the main shaft mounted in the tower, of the wind-wheel attached to the main shaft and arranged in a horizontal plane, and consisting of a hub,
80 radial arms or spokes projecting therefrom, concentric rings attached to the arms, blades or buckets semi-elliptical in form and attached to the rings, the adjacent edges of the blades being lapped over and secured, and a band or
85 collar fixed on the main shaft and having bracing-arms for the spokes of the wind-wheel, as set forth.

5. In a windmill, the combination, with the main shaft, of the wind-wheel arranged in a
90 horizontal plane, and a shield quadrantal in form arranged outside of and covering a portion of the circumference of the wheel, said shield turning loosely around the latter, so that as the speed of the wheel increases it will
95 be caused to partly cover that portion of the wheel where the wind strikes, as set forth.

6. In a windmill, the combination, with the tower and main shaft, of the wind-wheel fixed on the shaft, a shield turning on the shaft
100 around the circumference of the wheel, and a governor acting automatically by the revolution of the shaft to cause the shifting of the shield to any point of the circumference, as
105 set forth.

7. In a windmill, the combination, with the tower and main shaft, of the wind-wheel, a shield turning around the circumference of the wheel, a large vane connecting with the
110 shield, and a smaller vane arranged at an angle to the larger vane, whereby when the large vane has been carried around to its limit of movement the small vane will come into action to receive the direct force of the
115 wind, so as to carry the shield around to cover the wheel, as set forth.

8. In a windmill, the combination, with the tower and main shaft, of the wind-wheel, a shield turning around the circumference of the same, a vane connecting with the shield, a
120 governor for operating the vane, and means, substantially as described, for causing the return of the vane to its normal position, as set forth.

9. In a windmill, the combination, with the
125 tower and main shaft, of the wind-wheel, a shield turning around the circumference of the same, a vane connecting with the shield, and a governor for operating the vane, as set
130 forth.

10. In a windmill, the combination, with the tower and main shaft, of the wind-wheel, a shield for the same, a vane connecting with the shield and carrying a smaller vane, means

for returning the vanes to their original positions, and a governor connecting with the aforesaid vanes, as set forth.

11. In a windmill, the combination, with the
5 main shaft, of the wind-wheel, a shield for the same, a vane connecting with the shield and arranged to turn the same around to partly cover that portion of the wheel where the wind strikes, and devices for returning the vane to
10 its original position, as set forth.

12. In a windmill, the combination, with the tower and main shaft, of the wind-wheel, a sleeve or hub working on the shaft and having a series of arms, a shield attached to a pair of
15 the arms, a vane turning on one of the other arms, a casing attached to the remaining arm, and a weight moving in the casing and connecting with the vane, as set forth.

13. In a windmill, the combination, with the
20 tower and main shaft, of the wind-wheel, a sleeve or hub working on the shaft and having a series of arms, a shield attached to a pair of

the arms, and a vane turning on the other and having a weighted rope connecting with the remaining arm, as set forth.

14. In a windmill, the combination, with the tower and main shaft, of the wind-wheel, a shield working around the circumference of the same, a pivoted vane connecting with the shield, a casing or chamber, also connecting
30 with the shield, a weight moving in the casing, and having a rope which is attached to the vane, means for limiting the movement of the vane in either direction, and a governor connecting by intermediate devices with the vane,
35 as set forth.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in presence of two witnesses.

GEORGE HENRY POE.

Witnesses:

JOSEPH WARD,
JOHN HATFIELD.