

G. RISCHMULLER.
Windmill.

No. 226,421.

Patented April 13, 1880.

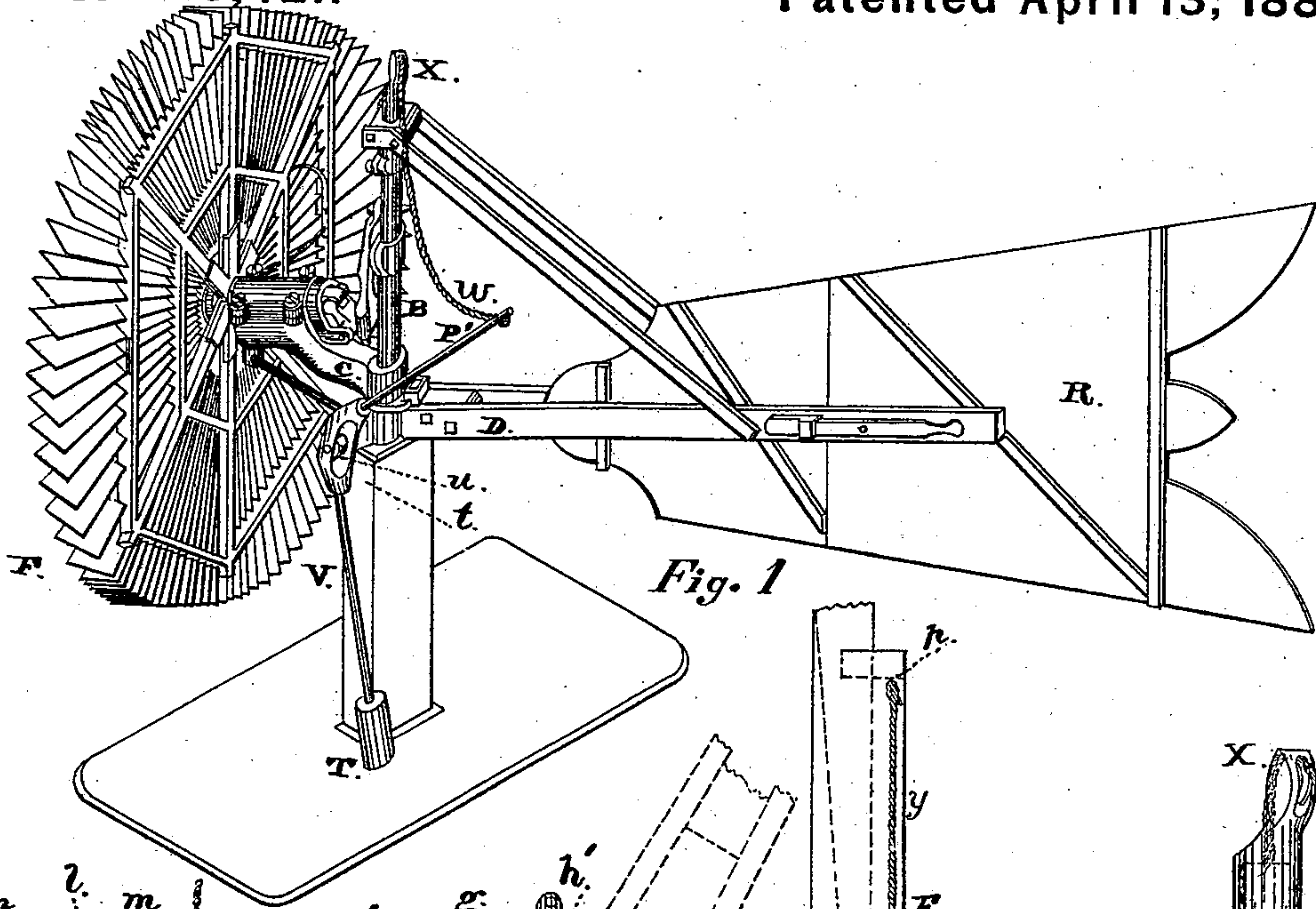


Fig. 1

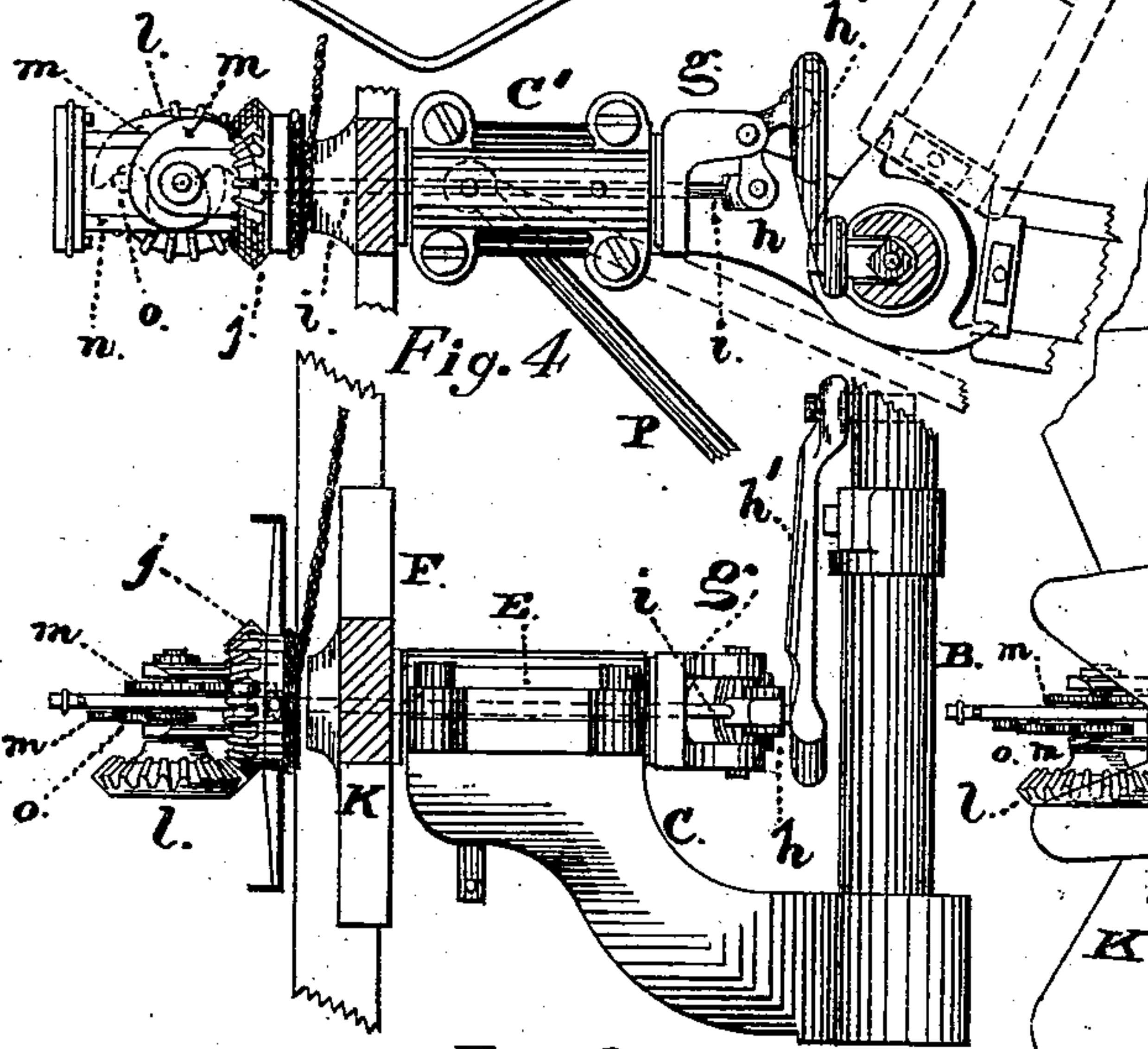


Fig. 3

Fig. 3

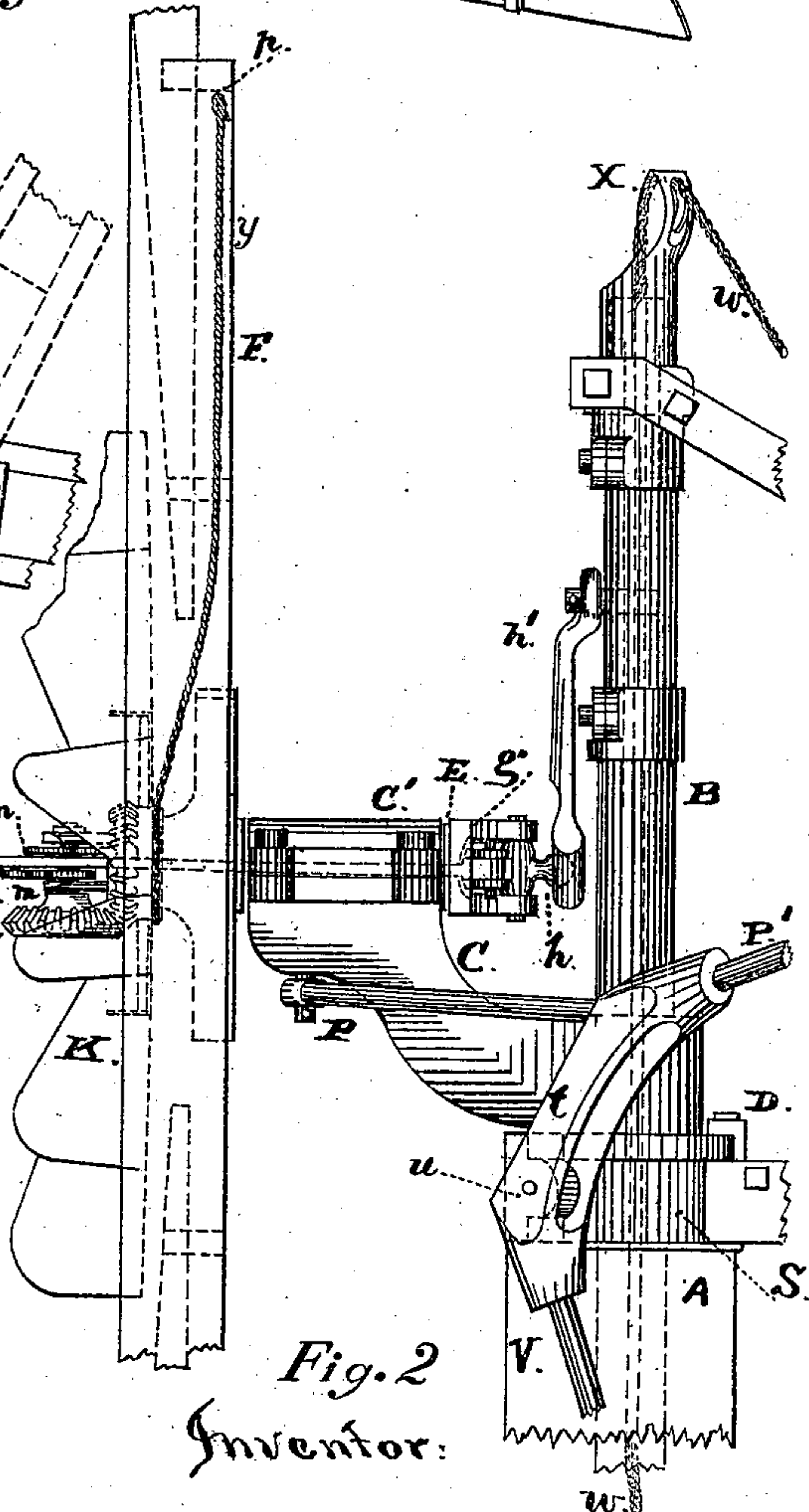


Fig. 2

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Jno. L. Boone

Inventor:

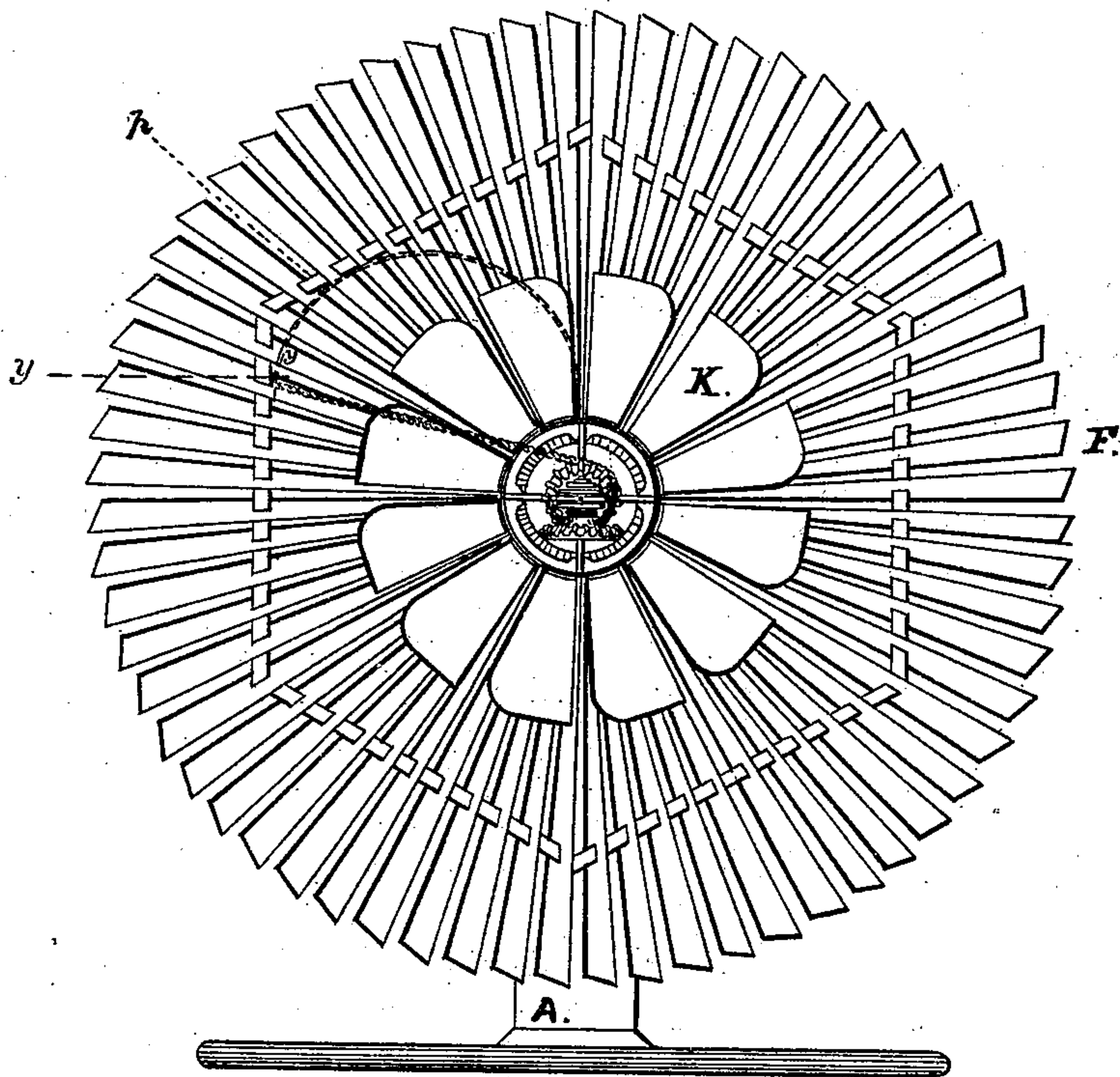
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Fig. 5



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UNITED STATES PATENT OFFICE.

GEORGE RISCHMULLER, OF OAKLAND, CALIFORNIA.

WINDMILL.

SPECIFICATION forming part of Letters Patent No. 226,421, dated April 13, 1880.

Application filed September 19, 1879.

To all whom it may concern:

Be it known that I, GEORGE RISCHMULLER, of Oakland, Alameda county, State of California, have invented certain new and useful
5 Improvements in Windmills; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings.

My invention relates chiefly to an automatic
10 governor or regulator for windmills; and it consists of an arrangement by which the stroke of the pump-rod is lengthened or shortened according to the increased or diminished force of the wind, thus producing a differential ac-
15 tion between the wind-wheel and the pump-rod.

To accomplish this I provide an extension-
crank, to which the pitman that operates the pump-rod is attached. This crank is connected
20 by a sliding stem or spindle with a small supplemental wind-wheel the vanes of which stand at an angle opposite to the angle of the vanes of the main wheel, so that the force of the wind will cause the small wheel to rotate
25 in a direction opposite to that in which the main wheel rotates. This supplemental wind-wheel is connected by bevel-gears with two cams, which move the spindle back or forth according to the direction in which the wheel
30 turns, and the longitudinal motion of the spindle lengthens or shortens the crank. Besides this differential regulator, I employ the usual hinged tail or rudder, so that both wheels can be permanently thrown out of the wind when
35 desired; and in connection with this last-named arrangement I employ a novel weight-and-lever arrangement for adjusting the position of the wheel and tail with reference to each other.

Referring to the accompanying drawings,
40 Figure 1 is a view, in perspective, of my improved windmill. Fig. 2 is an enlarged elevation of the upper part of the standard and the center portion of the wind-wheel. Fig. 3
45 is a similar view, but with the wind-wheel broken away to show the small regulating-wheel and its gearing. Fig. 4 is a top view of Fig. 3. Fig. 5 is a front view of Fig. 1, showing the mill in elevation.

50 Let A represent the post upon which the

mill is mounted. B is an upright tubular shaft, the lower end of which enters the upper end of the post A, while its upper end extends to some distance above the post.

The bracket C, in which the wheel-shaft is
55 mounted, is secured to the shaft B above the post A, and rests upon the rear end of the rudder-beam D, through which it also passes, while the rear end of the rudder-beam rests upon the top of the post A, thus forming a
60 support for the tubular shaft and allowing both the shaft and the rudder-beam to turn horizontally independent of each other.

The main wheel-shaft E is tubular, and it is supported in a box on the bracket C.

65 The main wind-wheel F is secured upon the shaft E near its outer end, leaving a short portion extending outside of it, while a two-armed crank, *g*, is formed on the inner end of the shaft, as shown.

70 A bell-crank, *h*, (shown at Figs. 2, 3, and 4,) is journaled between the two arms of the crank *g*, one arm of which is attached to the lower end of the pitman *h'*, while the opposite arm is attached to the end of a sliding plate or bar,
75 *i*, that passes through the tubular shaft E and projects to a short distance at its outer end.

A bevel-gear wheel, *j*, is mounted loosely upon the projecting end of the shaft E outside of the main wind-wheel, and this bevel-wheel
80 forms the center of a small supplemental wind-wheel, K, the blades of which stand at an angle opposite to the angle of the blades of the main wheel. This supplemental wheel is much smaller than the main wheel, but its blades are
85 wider.

The bevel-wheel *j* gears with another bevel-gear wheel, *l*, which is mounted in the extreme outer end of the shaft E. Upon the shaft of the bevel-gear wheel *l* two cams, *m m*, are se-
90 cured at a short distance apart, so that they operate in opposite directions.

The sliding plate *i*, as before stated, passes through the tubular shaft E and projects be-
95 yond its outer end. This plate is slotted at *n*, and the shaft of the bevel-gear wheel *l* passes through the slot, and one of the cams *m* is secured to the shaft on each side of the plate.

A pin or stud, *o*, is secured to the plate *i*
100 on each side, in front of each of the cams, and

as the cams operate in alternate directions, when the supplemental wind-wheel rotates in one direction one of the cams will move the plate outward, and when it rotates in the other direction the other cam will move the plate back again in an opposite direction.

The pump-rod passes up through the tubular upright shaft B. This shaft is slotted at a short distance above the crank *g*, and the upper end of the pitman is connected with the pump-rod through the slot. By this arrangement, when the supplemental wind-wheel K is rotated in a direction opposite to that in which the main wheel rotates, the sliding plate *i* is moved inward and the arm of the bell-crank, to which its inner end is connected, is thrown toward the upright tubular shaft B. This throws the other arm of the crank, to which the pitman is connected, outward, so as to enlarge the throw of the crank and increase the length of the stroke of the pump-rod, while the opposite or return movement of the wheel allows the crank to resume its original position, thus reducing the stroke of the crank and shortening the stroke of the pump-rod.

In an ordinary wind this arrangement for regulating the length of the stroke of the pump-rod is not needed. I therefore secure a spring, *p*, to one of the radial bars of the main wheel and connect it by a cord, *y*, with the hub of the bevel-gear wheel *j*, which forms the center of the supplemental wheel, so that the force of the wind must be sufficient to overcome the tension of the spring before the supplemental wheel can come into action. Ordinarily, therefore, the shaft E will be rotated by the main wind-wheel, and will carry both wind-wheels with it in its rotation; but when the force of the wind increases above the tension of the spring *p* the supplemental wheel will be moved around in an opposite direction to that in which the main wheel rotates, and the stroke of the pump will be lengthened proportionally, so that the quantity of water raised by the pump is uniform, regardless of the speed of the main wheel. As the force of the wind decreases the tension of the spring *p* restores the supplemental wheel to its original position, and the stroke of the pump-rod is shortened.

Besides this regulating device, which will answer every purpose in any ordinary storm, I also use the hinged tail or rudder R, so that in case the wind should become so strong as to take up the entire motion of the supplemental wheel the main wheel can be thrown out of the wind to any desired degree or stopped entirely by means of the tail.

For accomplishing this I have devised a novel arrangement of a weight and levers, as follows: To the hinged end of the rudder-beam I secure an arm, *s*, to which a bent casting, *t*,

is secured by means of a universal coupling, *u*. A rod, *v*, extends downward from the lower end of this casting and has a weight, T, secured to its lower end. A pitman, P, connects the upper end of the casting with the bracket C of the wind-wheel, while an arm or lever, P', projects upward from the upper end of the casting. A cord, *w*, has one end attached to the upper end of this lever, and passes over a pulley, *x*, on the top of the upright tubular shaft E, thence passes down through the tubular shaft to the ground, where it can be belayed. By drawing on this cord the weighted arm is raised and the pitman P forces the wind-wheel and rudder to the desired oblique positions, and when the cord is released the weight T restores them to their original positions. I thus lengthen or shorten the stroke of the pump-rod according to the speed of the main wheel, thus providing a simple and effective governor or regulator for the mill.

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

1. The improvement in regulating windmills, consisting in lengthening or shortening the stroke of the pump-rod by means of a supplemental wind-wheel, K, bevel-gear wheels *j l*, cams *m m*, sliding plate *i*, bell-crank *h*, and fixed crank *g*, all combined and arranged to operate substantially as above specified.

2. The main wind-wheel F, secured upon the tubular shaft E, said tubular shaft being connected with the pump-rod by means of the two-armed crank *g*, journaled bell-crank *h*, and pitman *h'*, in combination with the loose supplemental wind-wheel K, the blades of which stand in an opposite direction to the blades of the main wheel, bevel-gear wheels *j l*, cams *m m*, pins *o*, sliding plate *i*, spring *p*, and winding cord *y*, all combined and arranged to operate substantially as and for the purpose specified.

3. The bent casting *t*, connected with the arm *s* of the rudder-beam D by a universal coupling, *u*, and having the weighted arm *v* and lever-arm P', and connected with the bracket C by a pitman, P, in combination with the cord *w*, combined and arranged to operate substantially as and for the purpose described.

4. The extensible crank consisting of the bell-crank *h*, journaled in the fixed crank *g*, and operated by a supplemental speed-regulator, K, for governing the machine by lengthening and shortening the stroke according to the speed of the machine, substantially as specified.

In witness whereof I have hereunto set my hand and seal.

GEORGE RISCHMULLER. [L. S.]

Witnesses:

W. F. CLARK,

EDWD. E. OSBORNE.