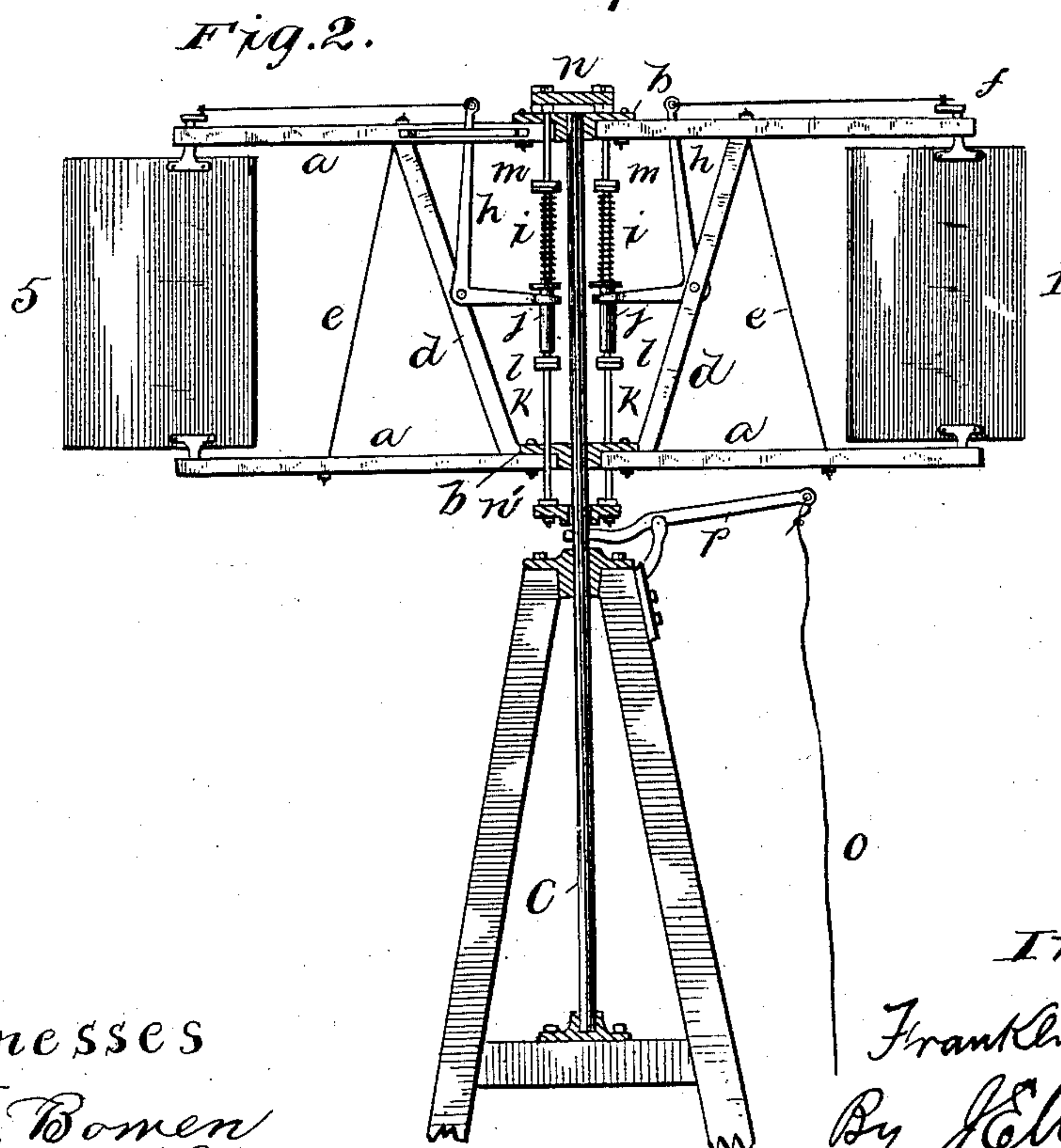
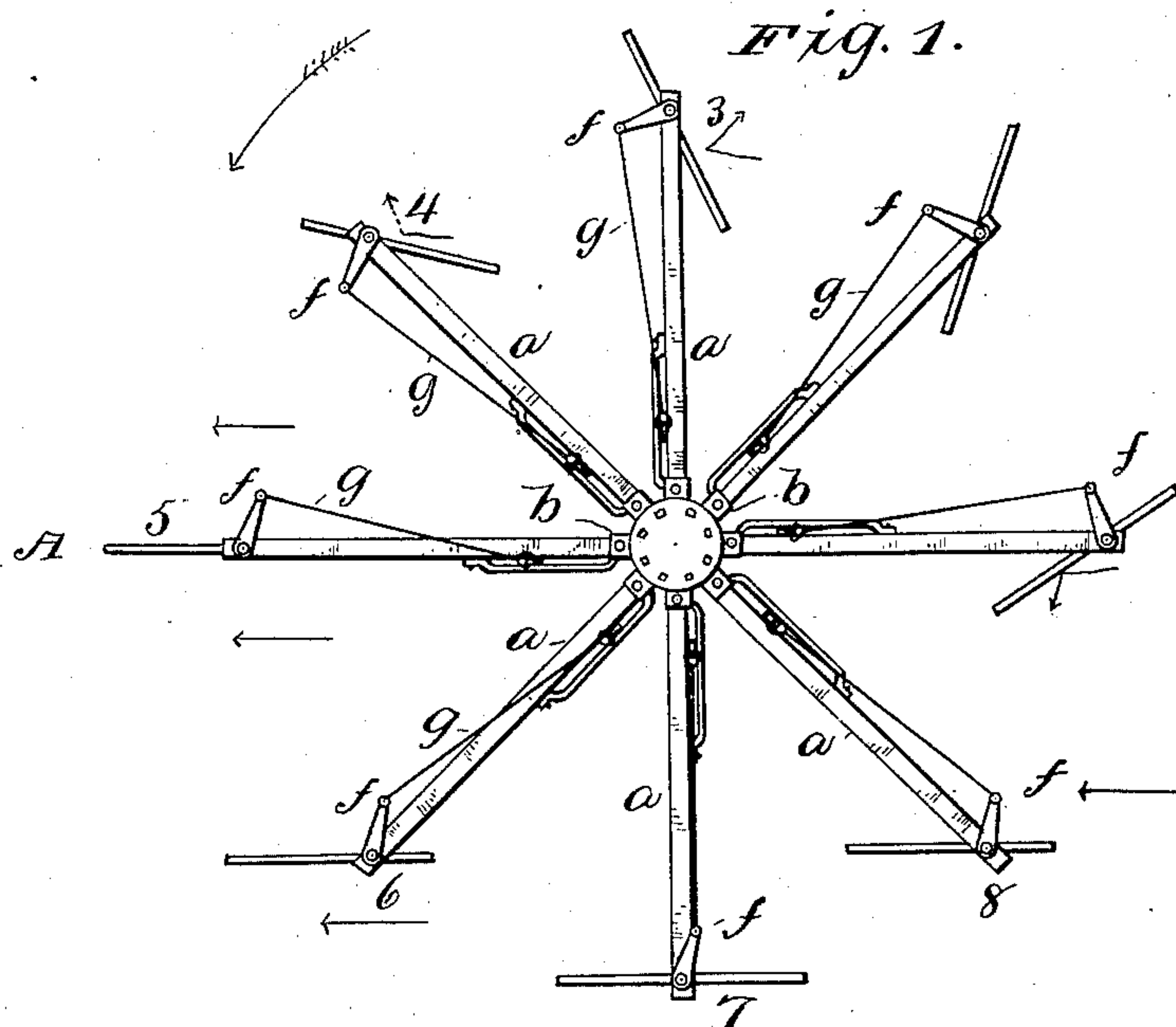


(No Model.)

F. FANNING.
WINDMILL.

No. 318,175.

Patented May 19, 1885.



Witnesses

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UNITED STATES PATENT OFFICE.

FRANKLIN FANNING, OF ST. JOSEPH, MISSOURI.

WINDMILL.

SPECIFICATION forming part of Letters Patent No. 318,175, dated May 19, 1885.

Application filed March 11, 1884. (No model.)

To all whom it may concern:

Be it known that I, FRANKLIN FANNING, a citizen of the United States of America, residing at St. Joseph, in the county of Buchanan and State of Missouri, have invented certain new and useful Improvements in Windmills, of which the following specification is a full, clear, and exact description.

Referring to the accompanying drawings, which form a part of this description, and in which like letters indicate like elements, Figure 1 represents a top plan view of a windmill embodying my invention; and Fig. 2, a vertical section on the line A B, Fig. 1.

My invention relates to that type of windmills known as "horizontal mills," in that they revolve horizontally on a vertical shaft.

The object of my invention is to produce a horizontal mill without special complications of structure, and one that shall utilize a large percentage of the effective power of the wind and at the same time automatically adjust itself to the varying velocity of the wind. A further object is to furnish reliable and easily-manipulated means whereby the mill may be thrown in and out of operation.

I aim to accomplish these objects by the construction set forth in this description and illustrated in the drawings annexed.

The features of novelty embraced in my invention, and for which I seek protection, are pointed out in the claims at the end of this specification.

The small arrows in Fig. 1 show the direction of the wind, while the larger curved arrow indicates the direction in which the mill is revolving.

C is an upright shaft—the main shaft of the mill. It is suitably secured in bearings in a frame-work or tower of ordinary construction.

The letter *a* represents arms—in this instance two sets of eight each—which are attached, one set above the other, to the cast spiders *b b*, secured to the upright main shaft C, as shown.

The arms *a* are stiffened vertically by the braces *d d* and the suspension-rods *e e*, these braces and suspension-rods forming a truss for supporting the weight of the sails, which is rested upon pivots at the ends of the lower arms, as clearly shown in the drawings. The sails are indicated by Figs. 1 to 8, both in-

clusive. They are pivoted at one side of their centers and swing between the two sets of arms above mentioned. They are provided with cranks *f*, attached to their upper pivot-shafts above the upper arms. When the mill is in gear for working, the sails are held in position for propelling the wheel by the rods *g*, one for each sail, one end of each rod being attached to a crank, *f*, and the opposite ends to the bent levers *h*, one for each rod, the short arm of the levers being resisted from an upward movement by the spiral springs *i*. If the wind blows too hard, these spiral springs are compressed by the upward movement of the short arms of the levers *h*, which allows the sails to give way before the wind and adjust themselves to the pressure, the action and stiffness of the springs *i* acting as a governor or balance to equalize the power of the wheel while being operated upon by the varying wind-pressure. The lower ends of the springs *i* rest upon the enlarged heads of the sleeves *j*, which slide upon the rods *k*, their height being adjusted by the nuts *l* on the screw-threaded portions of the rods *k*. The stiffness of these springs is adjusted and the consequent working power of the mill increased or diminished according to the work required to be done by the movement of the nuts *m* upward and downward on screw-threaded portions of the rods *k*. The rods *k* pass through holes in the upper and lower spiders, *b b*, and are attached at their upper and lower ends to weights *n n'*, which weights are made sufficiently heavy, in addition to the weight of the rods, springs, nuts, and sleeve attachments, to resist the lifting force of the bent levers *h* in compressing the springs *i*.

The operation of the parts which have just been described is clearly illustrated in Fig. 1 of the drawings. The sails 1, 2, 3, and 4 are receiving the force of the wind to propel the wheel in the direction of the large curved arrow. The sail 5 has just reversed its position before the wind, as is seen by comparing the positions of the cranks of 4 and 5. The sails 6, 7, and 8 are flying loose in the wind, the short arms of the levers (*h*) operating with them, being, as a consequence, below the heads of the sleeves *j*, and having a free movement up and down to that height.

To throw the mill out of gear and stop its working, the cord or wire *o*, which extends below the top of the tower, within reach of the attendant, and is attached to the lever *p*, suitably fulcrumed on the tower, is pulled down. This has the effect of raising the weights *n n'*, together with the rods *k*, springs *i*, sleeves *j*, and nuts *l m*, thereby removing the resistance and leaving an unobstructed course for the play of the short arms of the levers *h* up and down. This permits all the sails to swing free and shift about in the wind at will.

I have shown in the embodiment of my invention presented eight sails and their attachments; but it is plain that any number more or less than eight can be used, each sail being supplied with its complement of attachments, as herein explained.

The precise function of every part of my invention is so fully illustrated in the accompanying drawings that no further description of their operation is deemed requisite in this specification.

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

1. In a horizontal windmill provided with a series of arms, such as *a*, a set of sails, as described, in combination with cranks *f*, rods *g*, bent levers *h*, rods *k*, and means, substantially as shown, for governing and regulating the sails.

2. The set of sails provided with cranks *f*, in combination with rods *g*, bent levers *h*, and rods *k*, provided with springs *i*, whereby the

pressure from the levers *h* is counteracted or resisted, substantially as herein set forth.

3. The rod *k*, in combination with the spring *i*, nut *l*, and nut *m*, whereby the position of the spring on the rod is regulated and the requisite degree of stiffness thereof maintained, substantially as herein set forth.

4. The bent lever *h*, in combination with the screw-threaded rod *k* and sliding sleeve *j*, whereby the lever is permitted to move up and down upon the rod without liability of injury thereto, substantially as herein set forth.

5. The bent lever *h* and rod *k*, in combination with the headed sleeve *j*, spring *i*, nut *l*, and nut *m*, substantially as herein set forth.

6. The bent levers *h*, and the rods *k*, carrying the springs, sleeves, and nuts, as described, in combination with the weights *n n'*, whereby the lifting force of the levers in compressing the said springs is resisted, substantially as and for the purpose set forth.

7. The rod *k*, provided with the sleeves, springs, and nuts, as described, in combination with the weights *n n'* and spiders *b b*, substantially as herein set forth.

8. The rods *k*, provided with means for resisting the force of the sail-levers, as described, in combination with the weights *n n'*, and the lever *p*, fulcrumed on the tower, whereby the mill may be easily thrown in and out of gear, substantially as herein set forth.

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