

No. 609,378.

Patented Aug. 16, 1898.

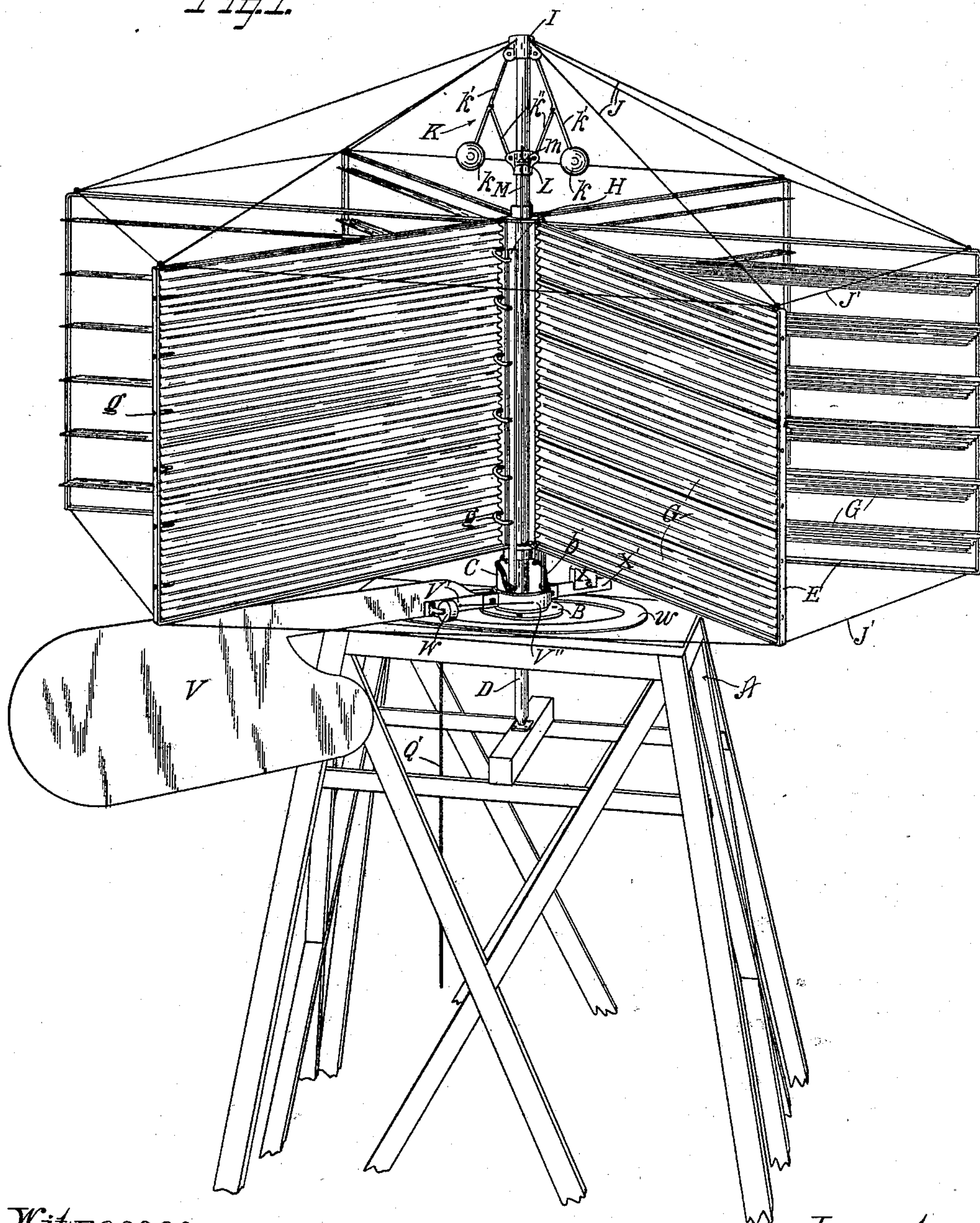
J. A. WEITZEL.
HORIZONTAL WINDMILL.

(Application filed Feb. 26, 1897.)

(No Model.)

2 Sheets—Sheet 1.

Fig. 1.



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2 Sheets—Sheet 2.

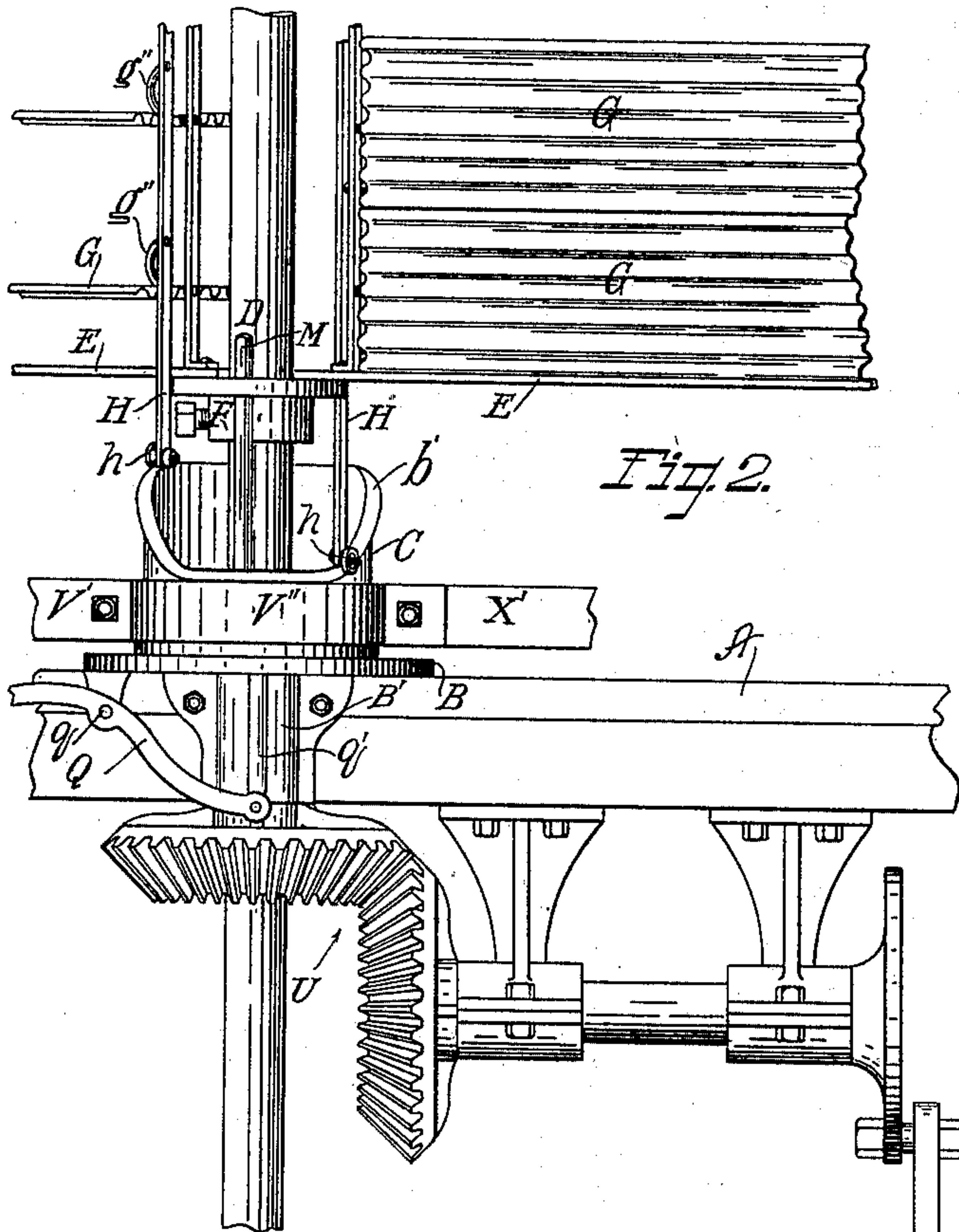


Fig. 4.

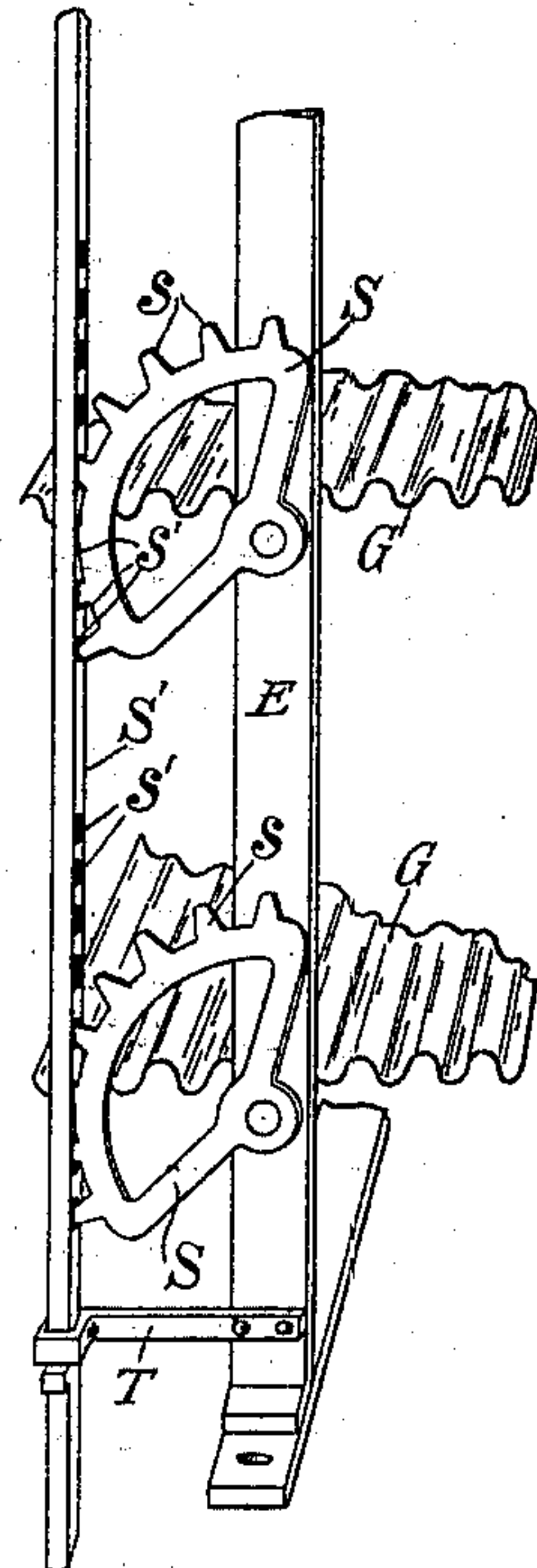


Fig. 5.

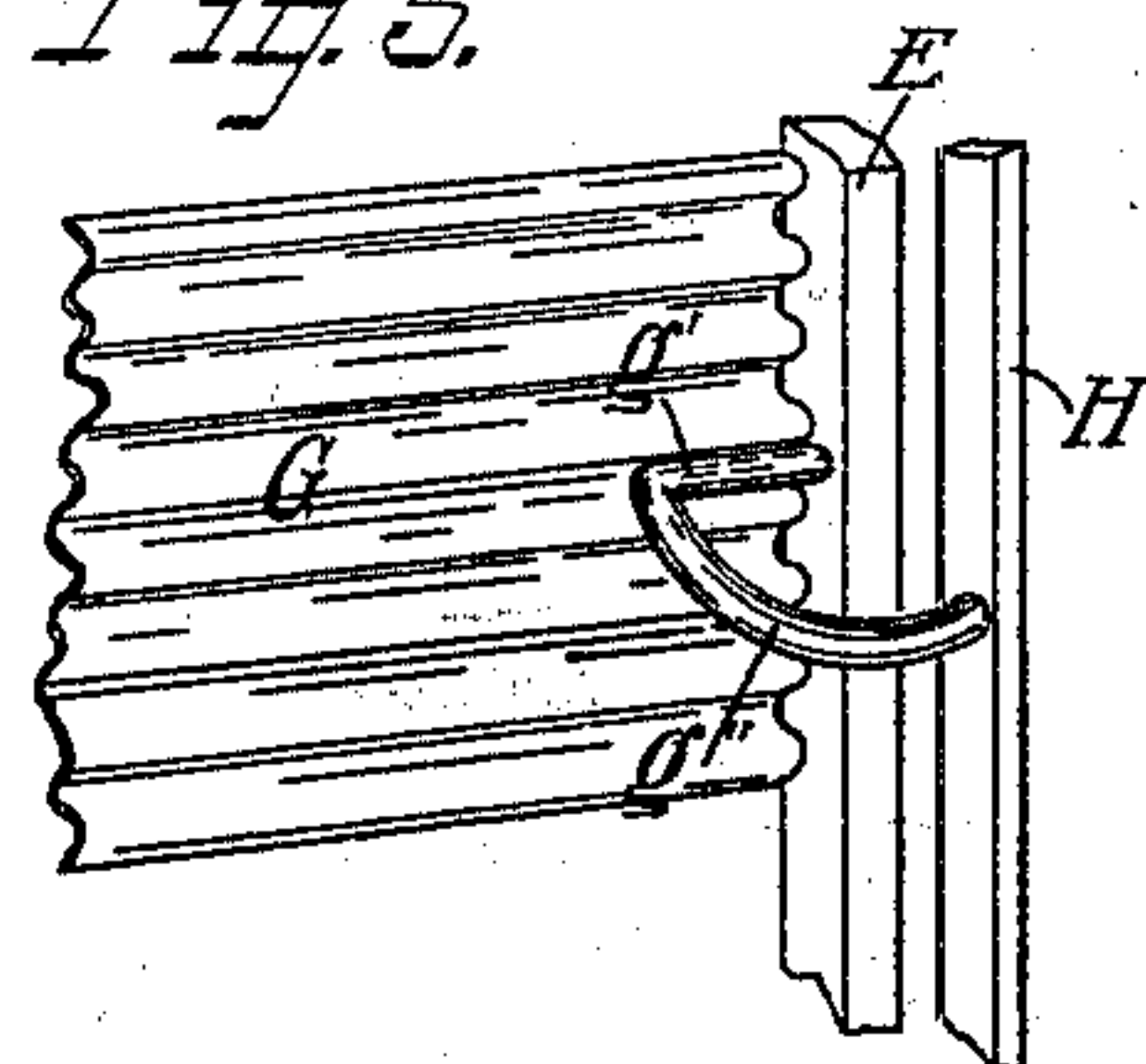
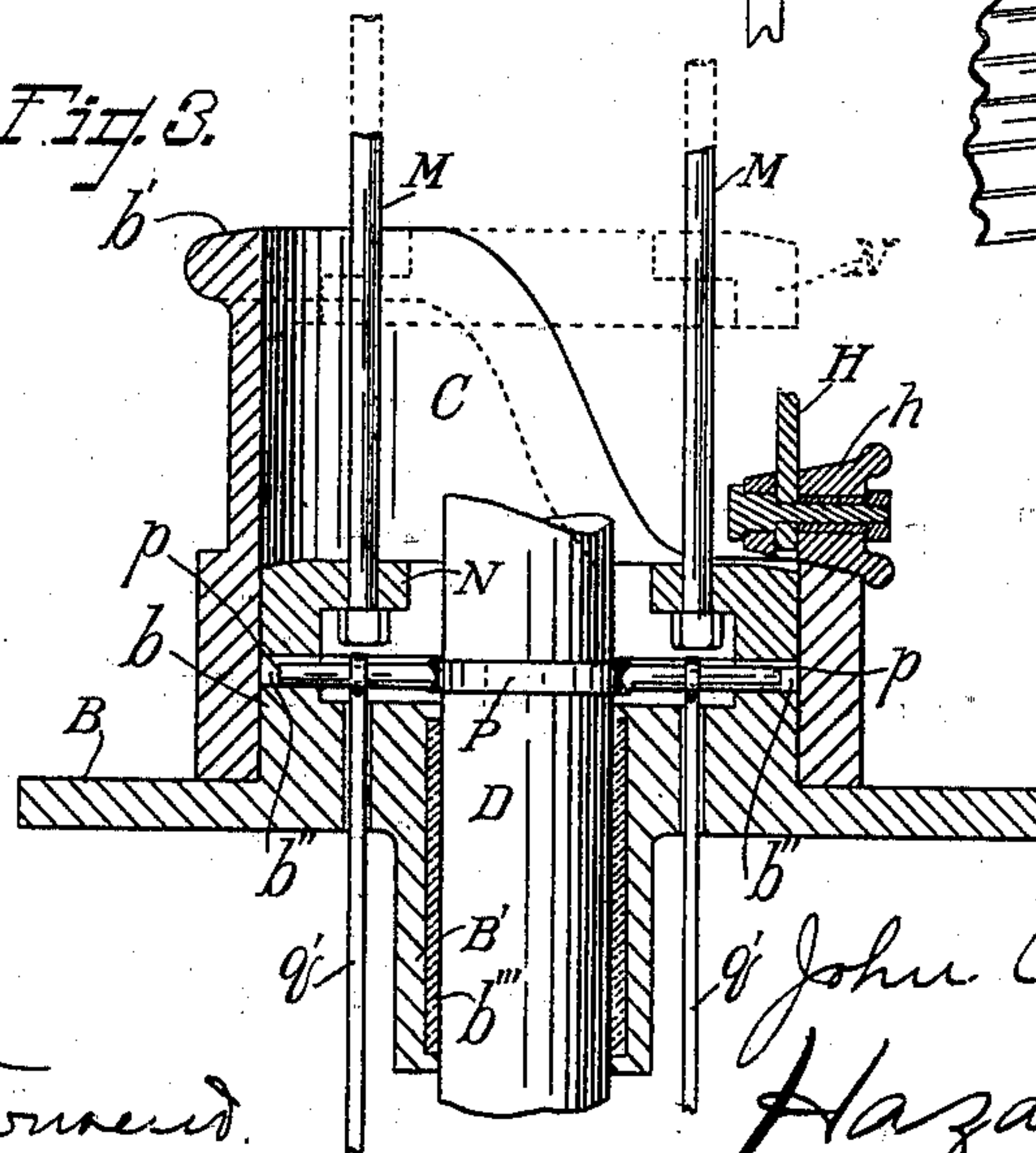


Fig. 3.



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UNITED STATES PATENT OFFICE.

JOHN A. WEITZEL, OF REDLANDS, CALIFORNIA.

HORIZONTAL WINDMILL.

SPECIFICATION forming part of Letters Patent No. 609,378, dated August 16, 1898.

Application filed February 26, 1897. Serial No. 625,203. (No model.)

To all whom it may concern:

Be it known that I, JOHN A. WEITZEL, a citizen of the United States, residing at Redlands, in the county of San Bernardino and State of California, have invented new and useful Improvements in Horizontal Windmills, of which the following is a specification.

My invention relates to those windmills having horizontally-arranged shutters adapted to open and close and to present upon one side of the vertical axis of the mill broad flat surfaces to receive the force of the wind and upon the other side of the axis of the mill to present practically no resistance to the wind passing through the wings as they travel into the eye of the wind.

My invention comprises the various features of construction and combinations of parts hereinafter set forth, whereby I increase the efficiency and decrease the number of parts of the mill and provide a mill which is simple, durable, and cheap.

The accompanying drawings illustrate my invention.

Figure 1 is a perspective side elevation of a mill embodying my invention. In this view the mill is shown in action. Fig. 2 is a fragmental side elevation of a portion of my improved mill. Fig. 3 is a fragmental sectional view illustrating the arrangement of parts. Fig. 4 is a fragmental side elevation showing one form of shutter-operating mechanism. Fig. 5 is a fragmental detail illustrating the gudgeon and crank-arm.

In the drawings, A represents a frame upon which the mill is mounted.

B is a base-block or bed-plate which is secured upon the frame and is provided with an upwardly-projecting annular boss b.

C is a cam-collar which is journaled upon the boss and is adapted to turn freely thereupon. This collar is provided upon its upper face with a cam-track b', the face of which is beveled at an angle with the axis of the vertical shaft D, upon which is mounted the wing-frames E. The wing-frames are preferably made of angle-iron and are rigidly secured to the shaft D by means of flanged collars F. Each wing-frame is provided with series of shutters G, which are preferably formed of corrugated sheet metal in order to secure lightness, together with rigidity, and

also to give a greater frictional surface for the impact of the wind. These shutters are each pivoted to its respective wing-frame by means of gudgeons g g'. These gudgeons are of a diameter sufficiently large to fit closely within one of the corrugations, so that the axes of the gudgeons are in the mid-plane of the shutters, and each gudgeon is rigidly secured to the shutter by brazing or soldering. By seating the gudgeon in the corrugation the contacting surface between the gudgeon and the wing is very large, and a rigid union may be thus secured. The corrugations stiffen the wings to such an extent as to avoid the necessity of extending the shaft from one end of the wing to the other, thus cheapening the cost and lessening the weight of the wing.

Each wing-frame, with its corrugated sheet-metal shutters, constitutes a vertical wing, and each of the shutters is hung to turn on a horizontal axis and is corrugated throughout with corrugations which extend parallel to the axis of the shutter, so as to give a superior frictional face to impede vertical deflection of the wind. The whole wing is thus provided with a closely-corrugated face, the corrugations of which run horizontal to prevent any ready upward or downward escape of the wind from the face of the wing. By this means I am enabled to provide wings of very slight cost and which are very light and afford a high degree of efficiency, coupled with great strength and rigidity.

The gudgeon g' is a combined crank-arm and gudgeon, an arm g'' projecting from the inner end of the gudgeon and extending outward from the wing to form a crank, the outer end of which is pivoted to the pitman-rod H.

All of the shutters of each individual wing are operated by one of the pitman-rods H, and each pitman-rod is provided at its lower end with a cone-shaped bearing or caster wheel h, which is adapted to travel upon the beveled face of the cam-track. By beveling the track at an angle with the shaft D and providing a cone-wheel to travel upon the track the cone-wheel is arranged to travel upon the track without that slipping and grinding which is present where the track and the bearing-face of the wheel are at right angles with the axis of the shaft.

Upon the upper end of the shaft D, I secure a cast-metal cap I, to which is secured the ends of the stay-rods J, the other ends of which are attached to the outer ends of the wing-frames E and are adapted to support such frames. The frames E are connected with each other by tie-rods J' to insure rigidity.

K is the governor, which is composed of two balls *k*, secured to arms *k'*, which are pivoted to the cast-metal cap I. A sleeve L is arranged to slide upon the shaft D, and connecting-rods *k''* connect the sleeve with the arms *k* in the ordinary manner, so that when the governor-balls swing outward the sleeve will slide upward along the shaft. The sleeve is provided with two eyes for the reception of the rods M, the upper ends of which are arranged to slide freely upward through the eyes, and the lower ends of which are rigidly secured in a ring N, which is arranged within the cam-collar C and upon the top of the boss *b* and is adapted to turn freely within the collar and to slide up and down therein. The top face of this ring is beveled to correspond to the bevel of the bearing or caster wheels *h*.

I provide means independent of the governor whereby to operate the ring to throw the mill out of action. These means consist of the yoke P, which is adapted to encircle the shaft D and is provided with outwardly-extending arms *p*, which are adapted to seat within recesses *b''*, provided in the boss *b*. This construction is illustrated in detail in Fig. 3.

Q is a bifurcated lever which is pivoted to the under side of the base-block by means of a pivot *q*, and the ends of which lever are connected with the yoke by means of connecting-rods *q'*. A cord Q' is arranged to operate the lever to push the ring up into the position shown in dotted lines in Fig. 3. The ring will revolve freely upon the arm of the yoke without engaging therewith, the rods M being rigidly secured to the ring, so that when the ring is pushed upward the rods will slide freely upward through the eyes in the sleeve L. Thus when the mill is thrown out of the wind by means of the lever Q the governor will not tend to force the ring downward or to thrust the lower ends of the rods downward through the ring, which would cause them to catch upon the arms of the yoke P.

In Fig. 4 of the drawings I have shown improved means for operating the shutters of the wings. In these views I have shown an arc S secured to the outer end of the pivots or gudgeons and provided with teeth *s*. A reciprocating pitman S' is arranged in suitable guideways T, which are secured to the wing-frame, and is provided with sockets *s'*, which receive the teeth of the arcs, so that as the pitman is moved back and forth the shutters will thereby be opened and closed. This construction retains the bearing or cone wheels *h* upon the ends of the pitmen always at the same distance from the shaft D. This

is not possible where a crank connection is employed for operating the shutters, and therefore when the crank-arm is employed the cone-wheel *h* must be made of greater length in order to provide for this variation.

The shaft D is journaled in the journal-box B', which is provided in the base-block or bed-plate and is babbitted, as indicated by *b'''*. The lower end of the shaft is provided with a steel pivot stepped into a steel bearing in the ordinary manner.

Beveled gears U are arranged to transmit the power from the rotating shaft.

V is the tail of the mill. This tail is of sheet-iron secured to an L-shaped frame-bar V', which is bent to fit around the collar C and is bolted thereto by means of a clamp V''. A bearing-wheel W may be provided to run upon a track *w* to support the tail, or a counterbalance-weight X may be arranged upon an arm X', projecting from the other side of the collar, to balance the tail.

In practice the various parts being assembled to form the mill, as shown in Fig. 1, the wind striking on the tail of the mill swings the tail away from the wind. The tail is secured to the cam-collar in such a manner that the elevated portion of the cam-track is upon one side of the extended axis of the tail, while the lower portion thereof is upon the other side of such axis. Thus when the wind swings the tail into line with the breeze those wings having the wheels of their pitmen upon the lower portion of the cam-track will be closed and will receive the full impact of the breeze. This causes them to travel toward the rear, successively bringing other wings forward. The bearing-wheels of the pitmen which operate the shutters successively travel down the incline of the cam-track to the lower portion thereof, thus closing the shutters and presenting a broad corrugated surface against which the wind impinges. The corrugations give a frictional surface which holds the wind better than a smooth surface, thus securing more power from a breeze of given velocity. The wings which travel toward the rear force their respective bearing-wheels up the rear incline of the cam-track to the elevated portion thereof, and the shutters of such wings are thereby opened and turned edgewise toward the wind as the wings travel into the eye of the wind.

The nuts *m* upon the rods M are so adjusted that when the mill is running at the rate of speed desired the governor will not operate to raise the ring N sufficiently to engage with the bearing-wheels *h*; but as soon as the speed becomes excessive the rods operate to raise the ring, and the bearing-wheels, which project inside the track, engage with the ring, and the shutters are prevented from fully closing, thus allowing a portion of the wind to escape through the wings and to thereby slacken the speed of rotation.

When it is desired to throw the mill out of

the wind, the operator pulls upon the rope or cord Q', thus operating the bifurcated lever to raise the yoke and push the ring up, thus raising the bearing-wheels which are upon the lower portion of the track and thereby opening their respective shutters and bringing the mill to a standstill.

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

1. In a windmill, the combination set forth of a base; a collar mounted to rotate on the base-block and provided with a cam-track; a ring arranged within the collar; a vertical shaft journaled in the base; wing-frames secured to the shaft; shutters pivoted in the wing-frames; pitmen, each provided at its lower end with a wheel to travel upon the cam-track, and arranged to operate the shutters of one wing; a governor secured upon the upper end of the shaft; rods connecting the governor with the ring and adapted to elevate the ring as the speed of the governor increases.

2. In a windmill, the combination set forth of a cam-track; pitman-rods, each provided with a wheel adapted to travel upon the track and to project inside the track and arranged to operate the shutters of the mill; a ring arranged within the track beneath the project-

ing portion of the wheels; a vertical shaft; a governor secured to the upper end of the shaft; rods rigidly secured at one end to the ring and having their upper ends arranged to slide through eyes provided in the governor; and means independent of the governor, arranged to elevate the ring.

3. In a windmill, the combination set forth of a base; a collar journaled upon the base and provided with a cam-track; a ring adapted to fit within the collar; a vertical shaft journaled in the base; recesses provided in the base below the ring; a yoke encircling the shaft and provided with arms seated in the recesses; a bifurcated lever pivoted below the base; pitman-rods connecting the ends of the lever with the yoke; means for operating the lever; wings secured to the shaft and each composed of shutters adapted to open and close; pitman-rods arranged to operate the shutters and each provided with a wheel to travel upon the cam-track and the ring; a governor; and means connecting the governor with the ring and adapted to operate to raise the ring when the speed becomes excessive.

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