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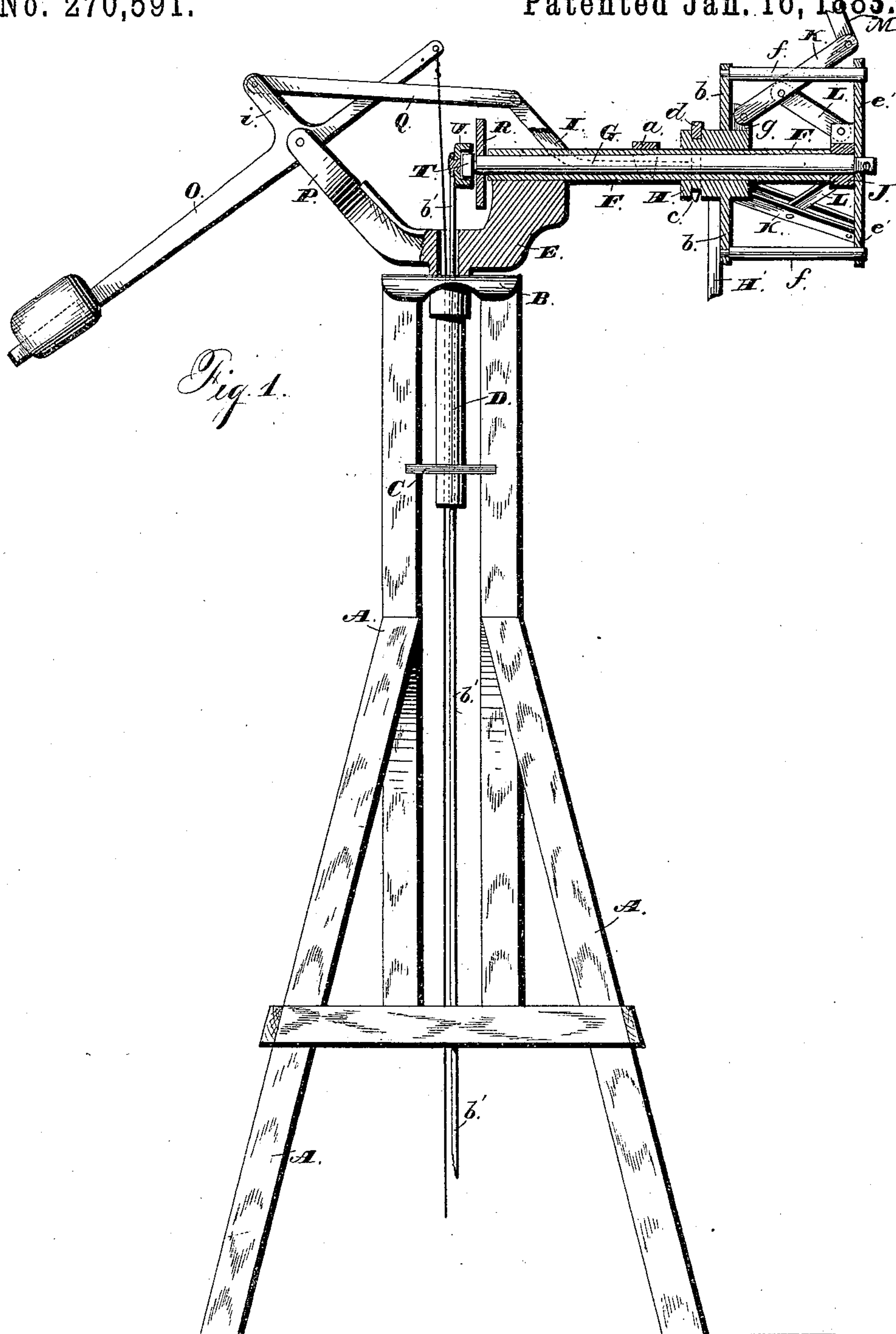
2 Sheets—Sheet 1.

A., A. J. & C. INGLIS.

WIND WHEEL.

No. 270,591.

Patented Jan. 16, 1883.



WITNESSES

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(No Model.)

2 Sheets—Sheet 2.

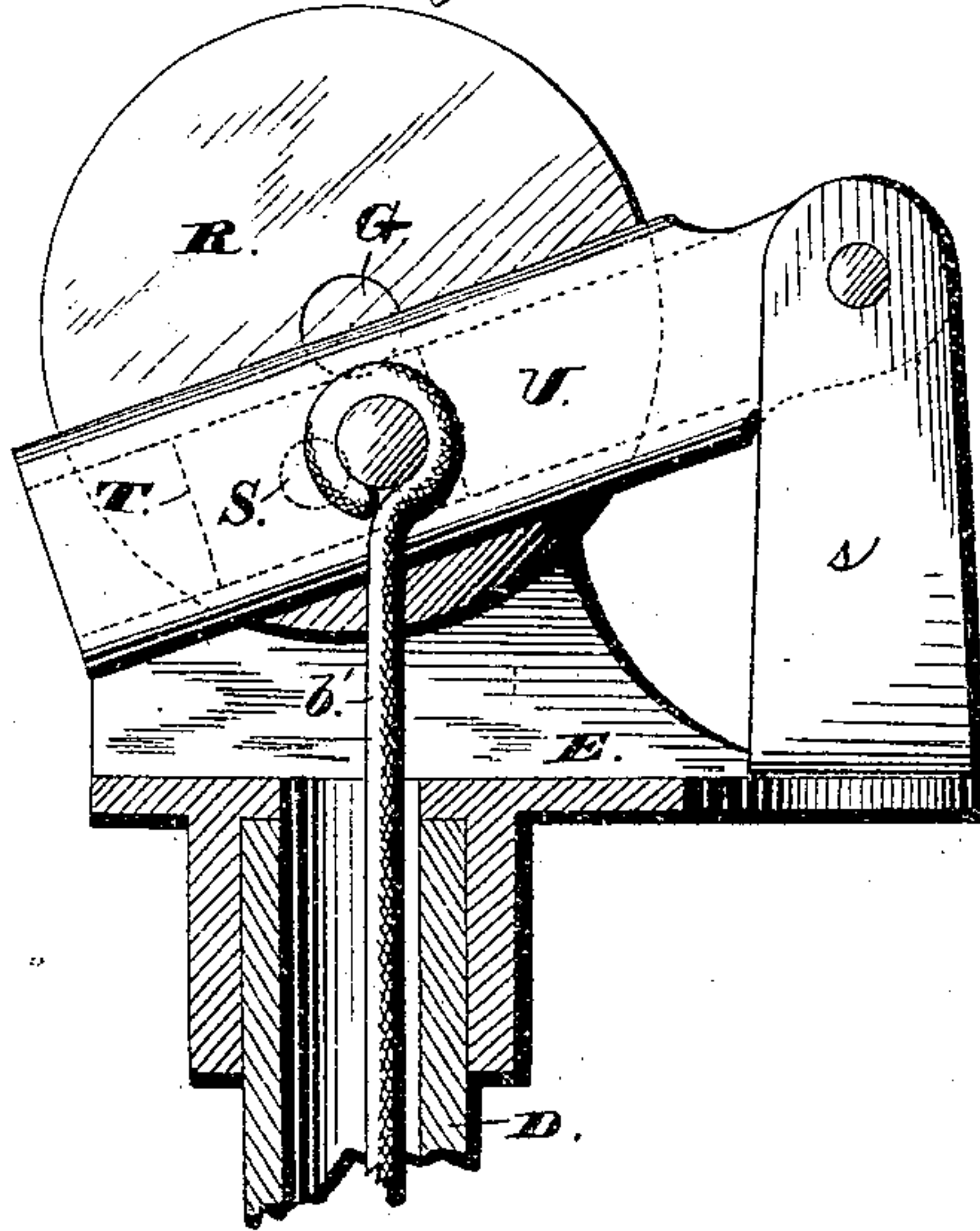
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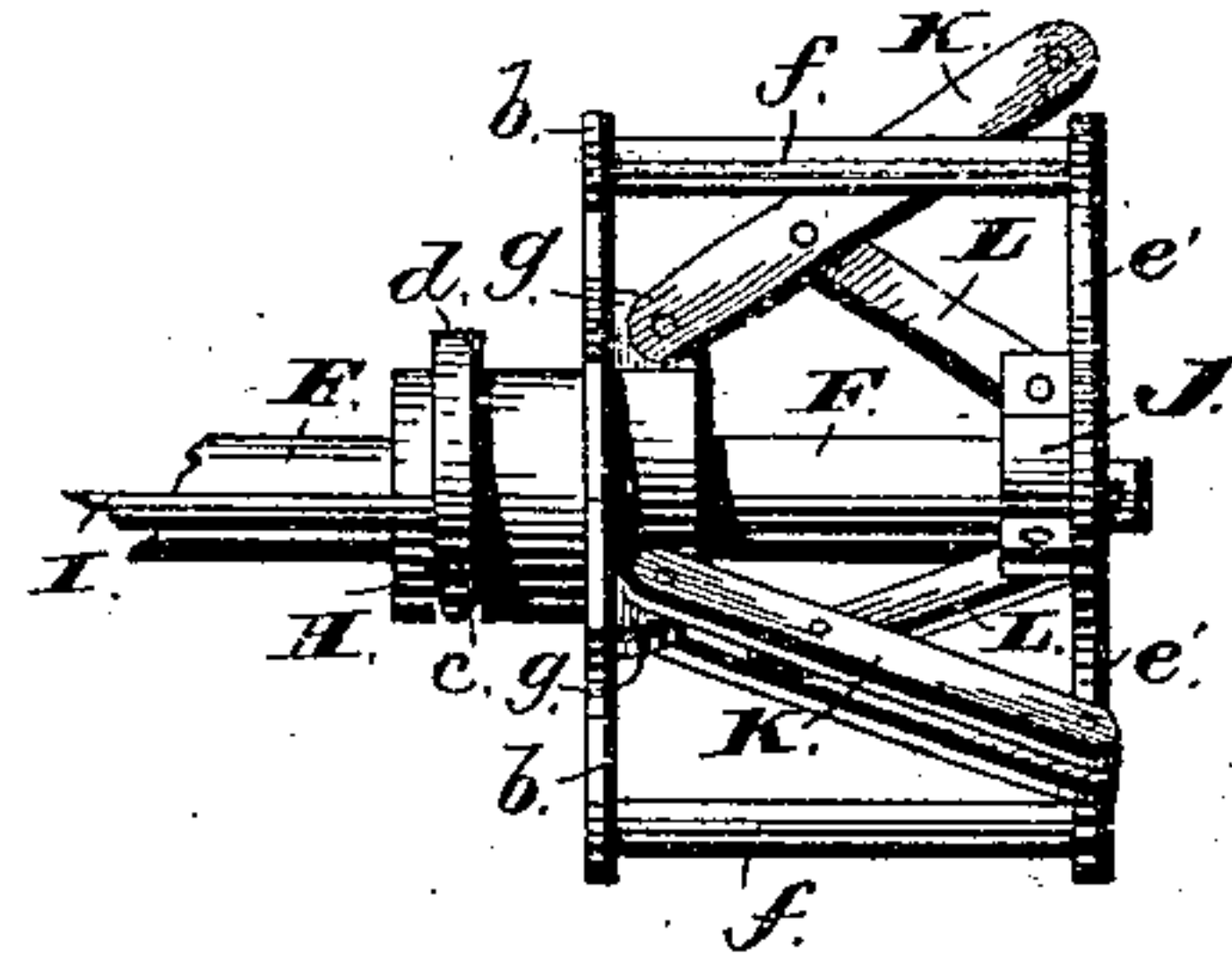
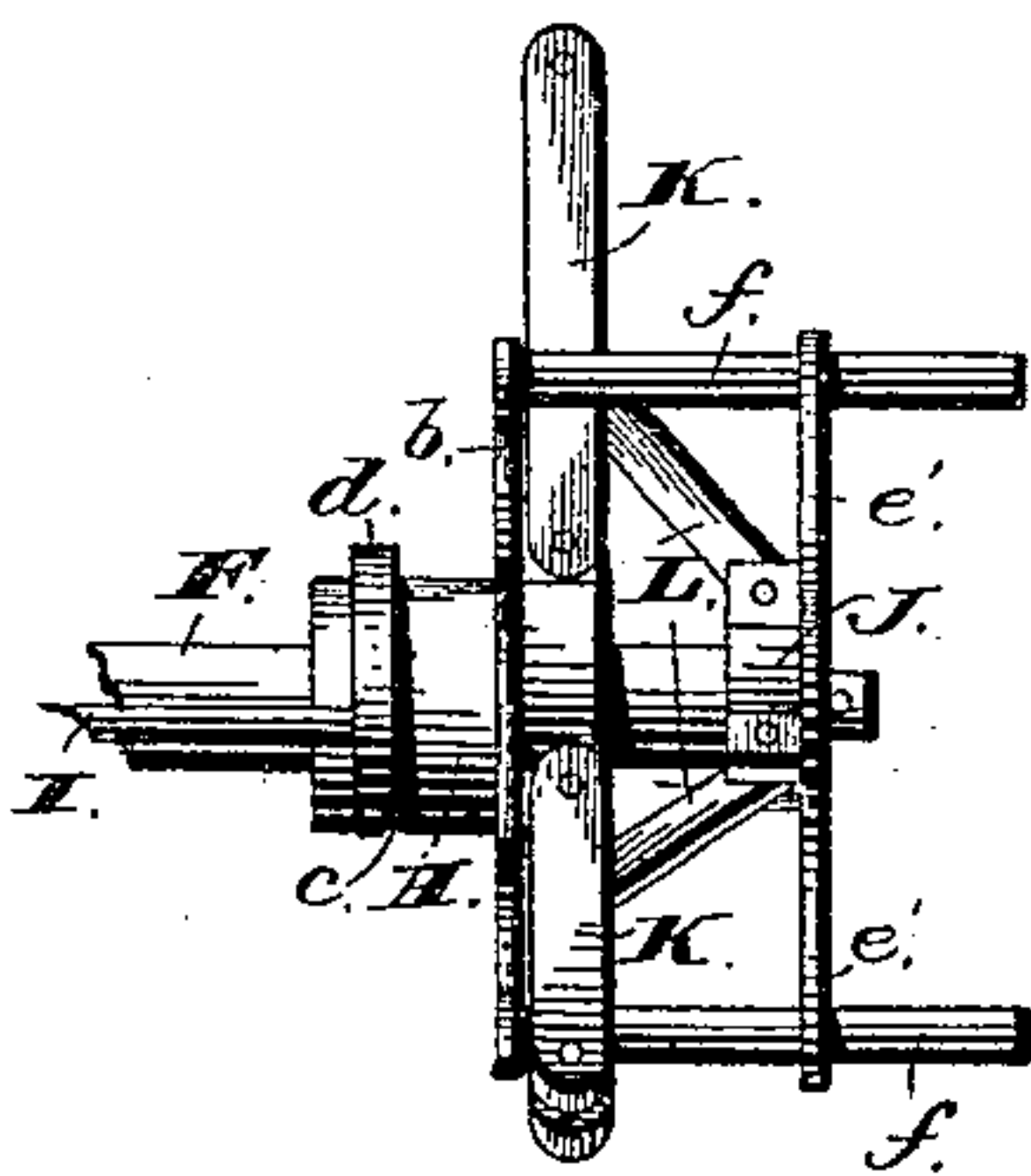
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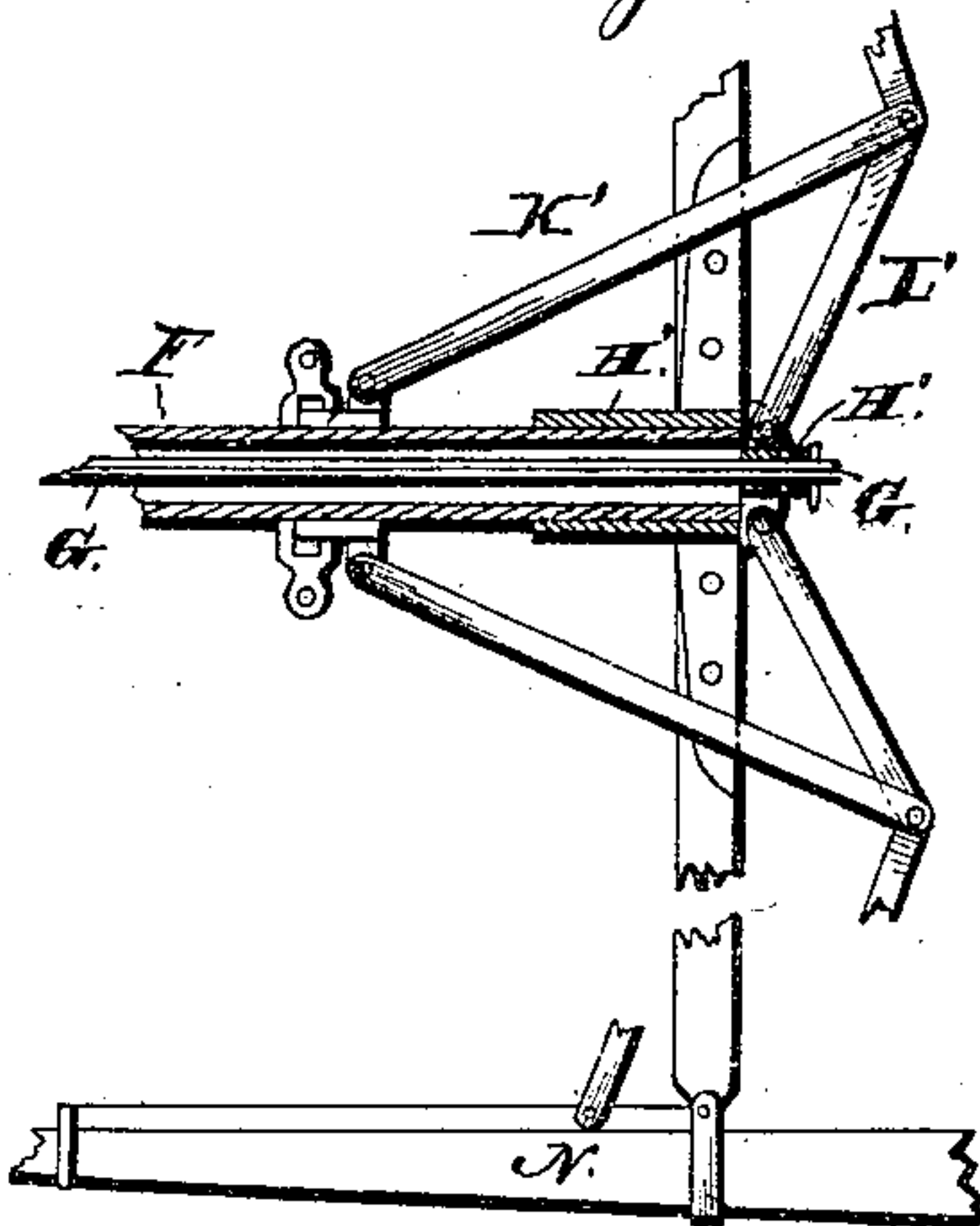
*Fig. 2.*



*Fig. 3.*



*Fig. 4.*



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# UNITED STATES PATENT OFFICE.

ANDREW INGLIS, ANDREW J. INGLIS, AND CHARLES INGLIS, OF HORICON,  
WISCONSIN.

## WIND-WHEEL.

SPECIFICATION forming part of Letters Patent No. 270,591, dated January 16, 1883.

Application filed June 22, 1882. (No model.)

*To all whom it may concern:*

Be it known that we, ANDREW INGLIS, ANDREW J. INGLIS, and CHARLES INGLIS, of Horicon, in the county of Dodge and State of Wisconsin, have invented certain new and useful Improvements in Wind-Wheels; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use the same.

Our invention relates to an improvement in wind-wheels, the object of the same being to provide positive means for regulating or feathering the fans or wings of the wheel.

A further object of our invention is to provide simple and efficient means for transmitting the motion from the revolving main shaft to the operating-rod; and with these ends in view our invention consists in the parts and combination of parts, as will be more fully described, and pointed out in the claims.

In the accompanying drawings, Figure 1 is a vertical sectional view of our improvement. Fig. 2 is a view showing the manner of connecting the main shaft to the operating-rod. Fig. 3 shows the relative positions of the hubs when the fans are in open and closed adjustment, and Fig. 4 is a modification.

A represents any suitable standard or base, provided at the upper end with a metallic bearing-plate, B, and slightly below the latter with the guide-bearing C. This plate B and bearing C are centrally perforated for the passage of the downwardly-projecting tube D, which latter is rigidly secured at its upper end to the turn-table E. This turn-table rests and turns on the bearing-plate B, and is provided with a hollow cylindrical arm, F, arranged at right angles to the tube D and adapted to contain the main shaft G. The hollow arm F is rigidly secured near its inner end to the turn-table, and is provided with the two laterally-extending arms *a*, adapted to hold and guide the regulating-levers I.

To the loose hub H the main stays or arms H' of the wind-wheel are rigidly secured through the intervention of the radial arms *b*, which latter are rigidly connected to the hub or formed integral therewith. This hub H, as before stated, is loosely secured to the hollow arm F, and is free to move longitudinally, but

is prevented from turning thereon independent of the hub J, by means which will hereinafter be more fully described. The rear end of this hub H, or the end nearer the standard A, is provided with a circumferential groove, *c*, in which the collar *d* rests, the latter being provided with two side ears, by means of which the regulating-levers I are secured thereto.

J is a hub rigidly secured to the main shaft G, and provided with the arms *e'*, each latter having an opening at its outer end for the passage of the guide-rods *f*. These guide-rods *f* (two in the present instance) are rigidly secured on opposite sides of the hub H to the arms *b*, which latter are enlarged for that purpose, and extend forward and pass through the apertures in the arms *e'*.

As the hub J is rigidly secured to the shaft G, and the hub H loosely secured on the arm F, it follows that as the wind-wheel revolves the rotary motion of the hub H, to which the wheel is secured, is transmitted to the hub J through the intervention of the guide-rods *f*. This construction relieves the hollow arm F of all torsional strain, and transfers it directly to the shaft G, and equalizes the matter by transferring the weight of the wheel to the arm F.

As the rotary shaft does not sustain the weight of the wheels, as in wind-wheels heretofore constructed, it will be observed that there is comparatively little wear on the bearings of the shaft, and it is not likely to sag at its outer end. A much lighter and less expensive rotary shaft may be used than is required in those windmills where the wheel is carried by the rotary shaft.

Besides the connection between the hubs H and J already referred to, the levers K and L help to strengthen the connection, and at the same time perform another function—viz., to feather the fans or wings when it is desired to throw the wheel from the wind. The long levers K are pivotally connected at one end to the ears *g* of the hub H, and extend outward therefrom, and are secured at their outer ends to the inner end of the levers M. The opposite ends of these levers M are secured to the fans *n* below their pivotal connection with the wheel-stays. The short levers L are pivotally secured to the hub J, and extend inward toward the levers K, and are pivotally connected



to the said levers at or near the center thereof. Thus it will be seen that by moving the hub H toward the end of the arm F, or toward the hub J, the levers L move the levers K backward until they stand in the same or nearly the same plane as the arms *f* of the hub H. As the levers K are forced backward, they also move the levers M outward and open the fans.

The regulating-levers (two in number) are situated on opposite sides of the hollow arm F, and, as before stated, are secured at their outer ends to the clutch or collar engaging the hub H. These levers run parallel for a suitable distance, and at their rear ends converge and bend upward, so as not to obstruct the operation of the crank mechanism situated at the rear end of the shaft G.

O is a weighted lever, pivotally secured to the rearwardly-extending arm P, and provided with an upward extension or arm, *i*, by means of which the said weighted lever is connected to the regulating-levers through the intervention of the link Q. The inner end of this weighted lever O rests over the downwardly-projecting tube D, and is provided with a hole or opening by means of which the regulating rope or chain is secured thereto. The lever O is so constructed and weighted as to keep the fans down to the wind; but when the wind increases in force and acts directly against the face of the wings or sails of the wheel it forces the hub H toward the hub J, which causes the said wings or sails to change their position to the wind, so that its force upon them is diminished. The weighted lever acts as an automatic governor, and causes the wheel to turn regularly, irrespective of the varying velocity of the wind.

When it is desired to open the fans it is simply necessary to pull downward on the regulating cord or rope, which depresses the inner end of the lever O, elevates the rear end, and moves the hub H toward the hub J by means of the levers and links before described. The fans can be held in this open adjustment by simply tying the end of the cord to the standard after the fans have been opened.

The shaft G extends throughout the entire length of the hollow arm F, and is provided at its inner end, just beyond the said arm, with the face-plate R, to which the wrist-pin S is secured. This wrist-pin is provided with the sliding block T, which latter moves in the grooved lever U, the said latter being pivotally secured at one end to the turn-table and connected to the operating-rod *b'*, directly over the downwardly-projecting tube D. The sliding block T is pivotally secured to the wrist-pin S, and as the shaft G revolves the said block moves in the groove in the lever U, and alternately elevates and lowers the operating-rod *b'*. The operating-rod *b'*, being attached to the lever U, will receive an up-and-down motion to every revolution of the shaft G, the up motion being slow and the down motion fast.

Instead of providing the wrist-pin with the

block before described, it can be dispensed with, and a simple roller, employed instead thereof, will answer all the necessary purposes.

The lower end of the operating-rod can be secured to a pump rod or handle, or connected to any sort of mechanism capable of receiving its motion from a wind-wheel.

The grooved lever U is pivoted to the standard *s*, which latter is secured to the turn-table, a little to one side of the face-plate on the revolving shaft. This grooved lever is open at both ends, which prevents the possibility of snow packing in the groove and retarding the operation of the wheel. When the grooved lever rests in a horizontal position the upper end of the operating-rod rests directly opposite the center of the revolving shaft, or at a point within the horizontal diameter of the circle made by the wrist-pin on face-plate. This construction enables the mill to make nearly two-thirds of a revolution while the pump-rod is being raised and about one-third while the rod is descending. This is a great advantage, as no power is expended in lowering the rod. In all other constructions of mill one half of the power of the mill is employed in elevating the operating-rod and the other half in lowering the same.

The wheel is kept to the wind by any suitable vane or means best suited for the purpose.

Another modification of our improved device is shown in Fig. 4. In this construction the hub J, with its arms, and the guide-rods are dispensed with and the hub H made to perform the functions of the two hubs. In this construction the hub H' is made large at its rear end to rest on the arm F, and small at its front or outer end, so as to closely embrace the shaft G. The hub H is also divided, the portion thereof with the circumferential groove thereon being separated from the remaining portion. The levers K' are connected to this separated portion, and the levers L' to the ears of the hub H'. In this construction only the separated portion of the hub slides on the arm F; but the operation and function of the remaining portions remain the same as described in the first construction.

Our improved machine is simple in construction, is of few parts, is durable and efficient in use, and can be positively regulated and controlled in a few moments without any trouble whatever.

It is evident that slight changes in the construction and arrangement of the different parts might be resorted to without departing from the spirit of our invention, and hence we would have it understood that we do not limit ourselves to the exact construction shown and described, but consider ourselves at liberty to make such changes as come within the spirit and scope of our invention.

Having fully described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. In a windmill, the combination, with a



turn-table and a hollow cylindrical arm secured thereto, of a revolving shaft journaled within said hollow arm, a wheel-hub loosely mounted upon said arm, an outer hub rigidly mounted on the revolving shaft, and connected to the wheel-hub by pivoted links, and guide-rods, substantially as set forth.

2. In a windmill, the combination, with a turn-table and a hollow cylindrical arm rigidly secured thereto, of a revolving shaft journaled in said hollow arm, a grooved wheel-hub loosely mounted on said arm to adapt it to have a sliding movement thereon, an outer hub rigidly mounted on the projecting end of said shaft, and connected to the wheel-hub by pivoted links, and a weighted lever for sliding said wheel-hub, pivoted by links to regulating-levers connected to a collar which bears in the groove of the hub, substantially as set forth.

3. In a windmill, the combination, with the turn-table and hollow arm, of the sliding wheel-hub, laterally-projecting arms, and a weighted lever pivoted to the turn-table and by links to regulating-levers which are guided by said lateral arms, and are secured to a collar which bears in a groove of the sliding hub, substantially as set forth.

4. The combination, with the revolving shaft, having a face-plate secured thereto, and a wrist-pin secured to the said face-plate, of a grooved lever with which the wrist-pin engages, pivotally secured to a standard on the turn-table, and an operating-rod secured to the grooved lever at a point within the horizontal diameter of circle made by wrist-pin on face-plate.

5. The combination, with the revolving shaft, face-plate, and wrist-pin, of the standard secured to the turn-table, the grooved lever open at both ends for the purpose described, and the operating-rod secured to the said grooved lever in the position shown, substantially as and for the purpose set forth.

In testimony whereof we have signed this specification in the presence of two subscribing witnesses.

ANDREW INGLIS.  
ANDREW J. INGLIS.  
CHAS. INGLIS.

Witnesses:

CHARLES ALLEN,  
C. A. HART.