(No Model.) 4 Sheets—Sheet 1.

F. L. BUTLER.

WINDMILL.

No. 414,374. Patented Nov. 5, 1889.

Fig: 1.

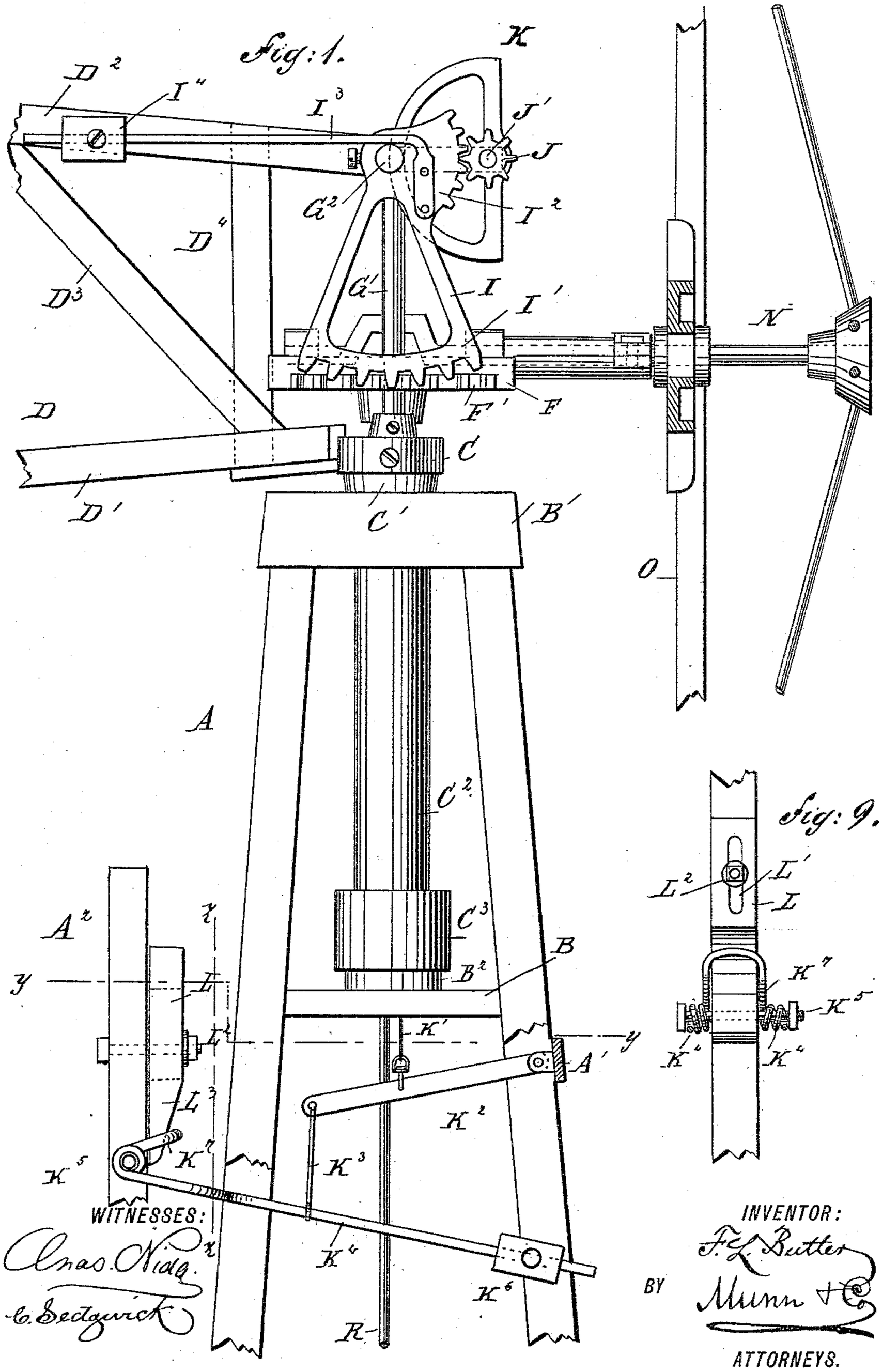

Fig: 9.

WITNESSES:

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C. Sedgwick

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(No Model.)

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Fig: 2.

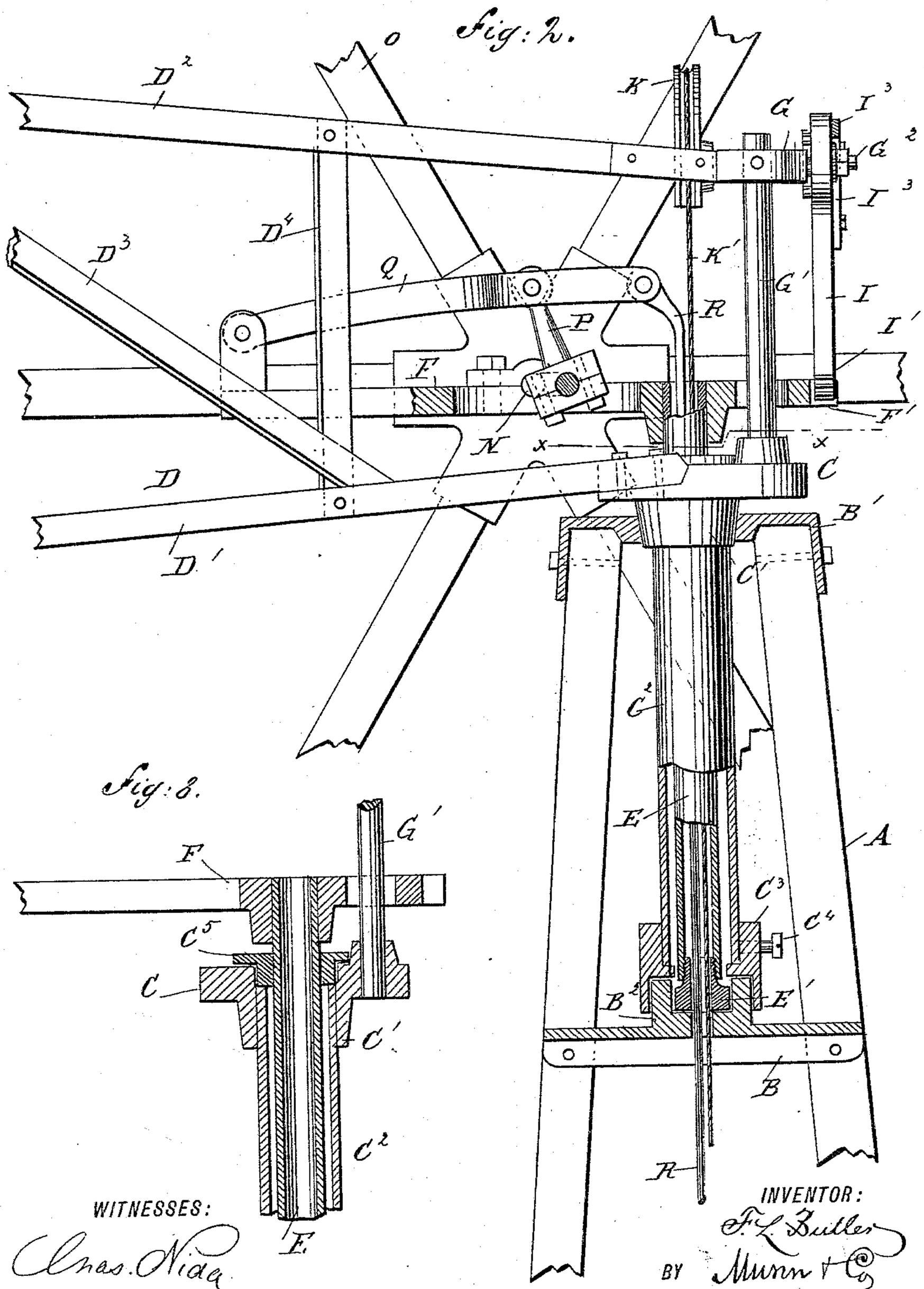

Fig: 8.

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Fig. 3.

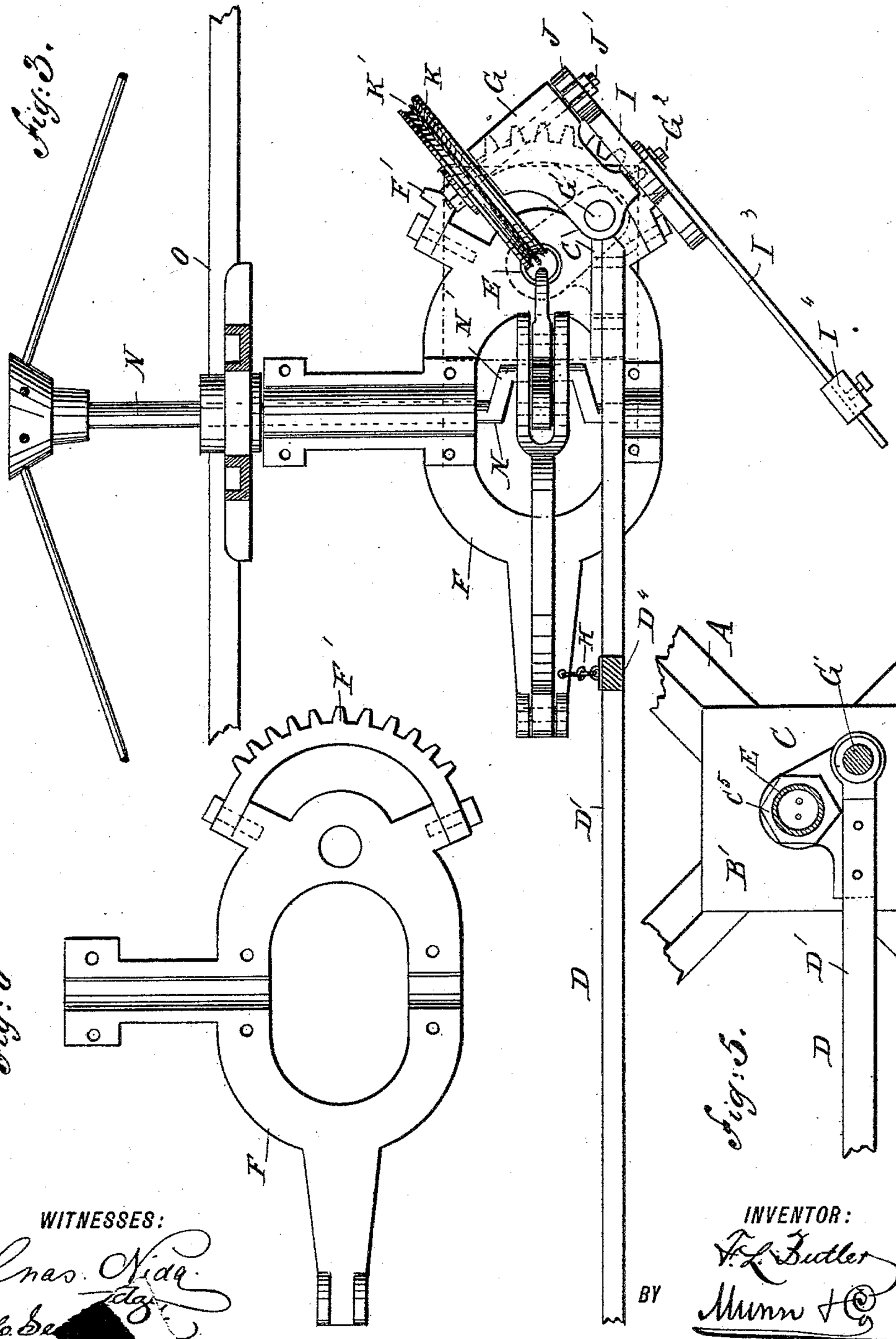

Fig. 6.

Fig. 5.

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WINDMILL.

No. 414,374. Patented Nov. 5, 1889.

Fig: 4.

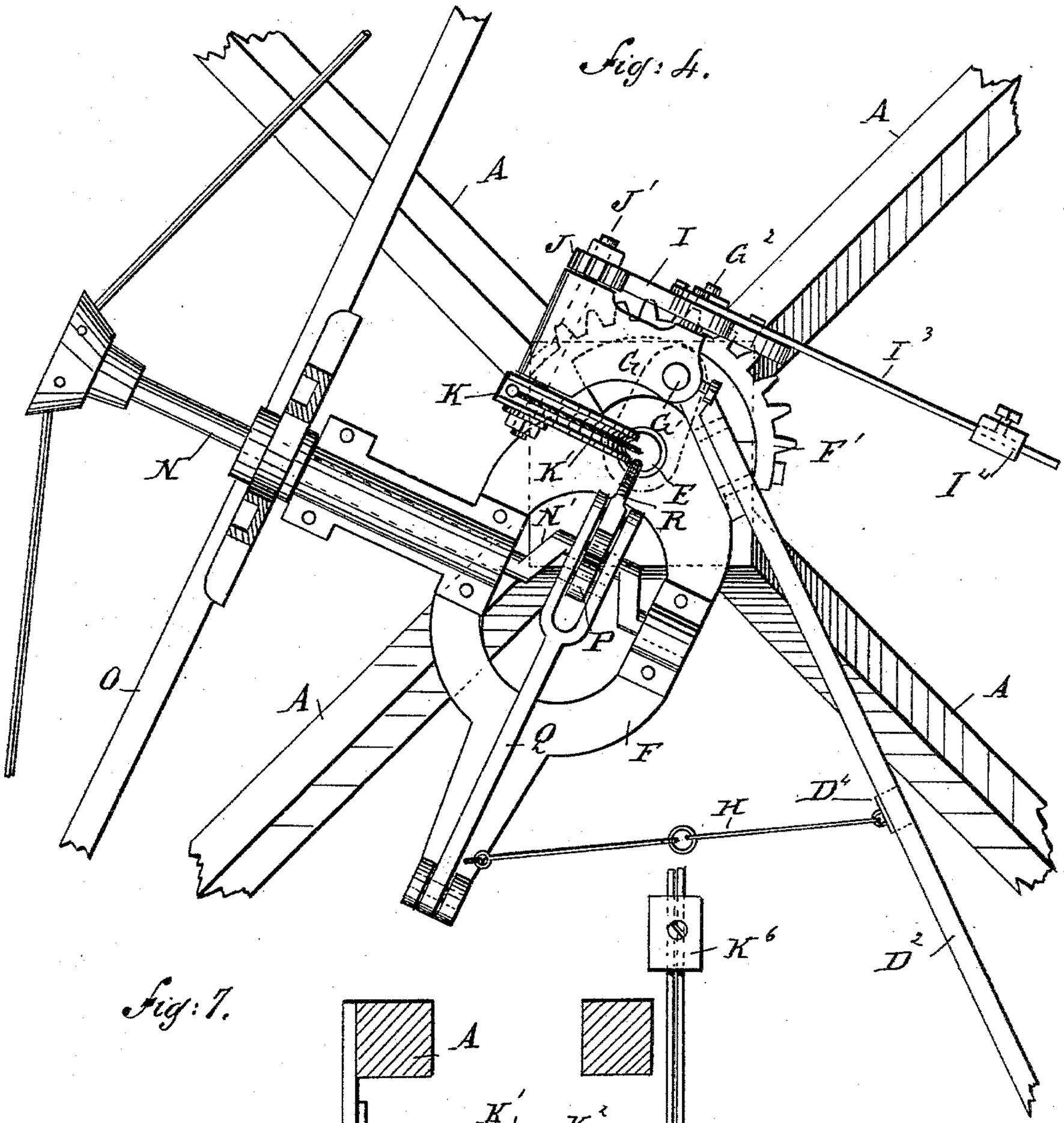
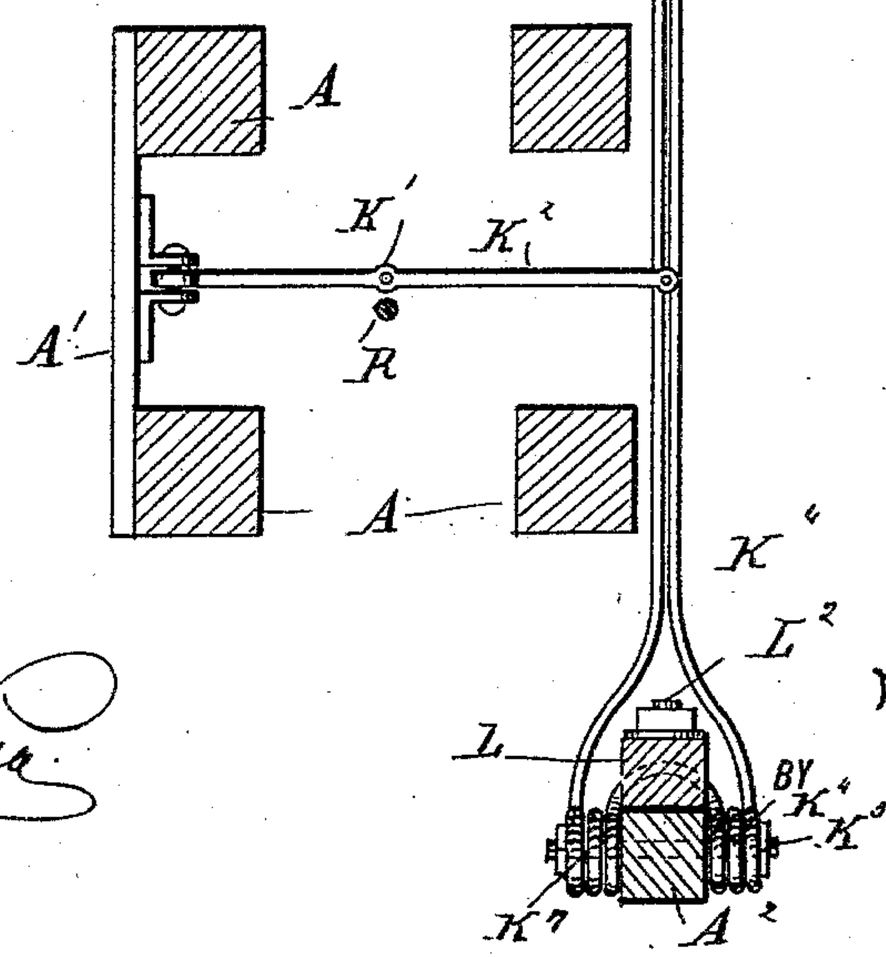


Fig: 7.



WITNESSES:

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C. Sedgwick

INVENTOR:

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UNITED STATES PATENT OFFICE.

FRANK LOWELL BUTLER, OF CONCORDIA, KANSAS.

WINDMILL.

SPECIFICATION forming part of Letters Patent No. 414,374, dated November 5, 1889.

Application filed August 21, 1888. Serial No. 283,342. (No model.)

To all whom it may concern:

Be it known that I, FRANK LOWELL BUTLER, of Concordia, in the county of Cloud and State of Kansas, have invented a new and Improved Windmill, of which the following is a full, clear, and exact description.

The object of the invention is to provide a new and improved windmill, which is simple and durable in construction and very effective in operation, permitting the wheel to run with great uniformity of speed in any wind.

The invention consists of certain parts and details, and combinations of the same, as will be hereinafter described, and then pointed out in the claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 is a side elevation of the improvement, with the wheel turned into the wind. Fig. 2 is a side elevation of the same, with parts in section and the wheel turned out of the wind. Fig. 3 is a plan view of the same, parts being in section. Fig. 4 is a similar view of the same, with the parts in a different position. Fig. 5 is a sectional plan view of part of the improvement on the line *x x* of Fig. 2. Fig. 6 is a plan view of the wind-wheel frame. Fig. 7 is a sectional plan view of the vane-counterbalance on the line *y y* of Fig. 1. Fig. 8 is a sectional side elevation of the upper bearing for the vane-frame and the wheel-frame, and Fig. 9 is a sectional end elevation of part of the vane-counterbalance on the line *z z* of Fig. 1.

The improved windmill is mounted on a tower A of any approved construction and provided near its upper end with a step B, and at its extreme upper end with a tower platform-plate B′. The latter is provided with a central aperture into which fits the conical hub C′, secured on the under side of the vane-frame C, located directly above the platform-plate B′ and supporting the wind-vane D.

In the hub C′ is secured the downwardly-extending tube C^2, on the lower end of which is secured a cap C^3 by a set-screw C^4 or other means. The cap C^3 fits at its lower end over a cup-shaped offset B^2, formed in the center of the step B, so that the tube C^2 and the vane-frame C are held in place and the vane-frame is permitted to turn freely on the tower A. Through the tube C^2 and the vane-frame C passes a tube E, supporting at its upper end the wind-wheel frame F, extending horizontally. The tube E has its upper bearing in a bushing C^5 set loose and free to revolve on the top of the vane-frame C, as is plainly shown in Fig. 8, and on the lower end of the tube E is secured an apertured bearing-block E′, fitting into the cup-shaped offset B^2 on the step B, as is plainly shown in Fig. 2, and thus the upper end of the tube E turns in a bushing C^5 and the lower end in the offset B^2 of the step B.

On the vane-frame C is secured the beam D′ of the vane D, and from the said beam D′ extend the brace D^3 and the vertical beam D^4, which connect with the upper beam D^2, secured at its inner end to a frame G, extending horizontally and fastened at the upper end of a rod G′, secured by its lower end to the vane-frame C, as is plainly shown in the drawings. The rod G′ passes through a slot in the wind-wheel frame F, and the beam D^4 is connected by a link or chain H with one end of the wind-wheel frame F, so as to limit the movement of the vane D in relation to the wind-wheel frame F.

On the upper vane-frame G is formed a stud G^2, on which is mounted to swing a double segmental gear-wheel I, provided on its lower end with gear-teeth I′, meshing into corresponding gear-teeth F′, formed on the wind-wheel frame F. On the upper end of the gear-wheel I are formed the gear-teeth I^2, meshing into a pinion J, secured to one end of a shaft J′, mounted to rotate in horizontal bearings formed on the upper vane-frame G. On the inner end of the shaft J′ is secured a grooved segmental pulley K, on which is secured a rope or chain K′, extending downward through the tube E, the block E′, and the step B to within a short distance of the ground. The lower end of the rope K′ is connected with a lever K^2, fulcrumed on a bracket A′, secured near the lower end of the tower A. The free end of the lever K^2 is pivotally connected by a link K^3 with a spring-lever K^4, fulcrumed on a bolt K^5, held transversely in a post A^2, erected beside the tower A.

On the free end of the spring-lever K^4 a weight K^6 is held to slide, and the fulcrumed

end of the lever K^4 forms a spring K^7, engaged by a wedge L, mounted to slide vertically on the post A^2, and having a slot L′, through which passes a bolt L^2, secured in the post A^2, and serving to adjust said wedge L upward or downward to any desired position, in order to increase or diminish the tension of the spring K^7 of the lever K^4. Thus, when the operator desires to increase the tension of the spring K^7, and the consequent downward pressure of the lever K^4, he moves the wedge L downward against the bent part of the spring K^7, and if the operator desires to diminish the tension of the spring K^7 and to lighten the downward pressure of the lever K^4, he moves the wedge L upward and fastens it in position by the bolt L^2. On the double segmental gear-wheel I is also secured an arm I^3, carrying on its outer end a weight I^4, held adjustably on the said arm by a set-screw or other suitable means. This weighted arm I^3 serves to keep the wheel out of the wind until the segmental gear-wheel I is turned by pulling the rope K′ downward.

The wind-wheel frame F is provided with the usual bearings for the wind-wheel shaft N, carrying a wind-wheel O of any approved construction. On the inner end of the shaft N is formed the usual crank-arm N′, connected by the pitman P with a lever Q, fulcrumed on top of the wind-wheel frame F, and pivotally connected at its free end with the pump-rod R, extending downward through the tube E, alongside the rope K′.

The inward motion of the vane D is limited by the beam D^4 striking against the wind-wheel frame F, and the outward motion of the said vane D is limited by the chain H, connecting the said vane D with the wind-wheel frame F, as is plainly shown in Fig. 4. The shaft N of the wind-wheel O is located at one side of the shaft of the vane D, so that the pressure of the wind on the wheel will tend to rotate the same, whereby the wheel is held parallel with the vane or out of the wind, as is plainly shown in Fig. 2.

When the wheel turns from the wind, the spring-lever K^4 and its weight K^6 are lifted, so that the spring K^7 and the weight K^6 exert a constant downward pressure against the rope K′, in order to retard the further progress of the wheel in the direction of the turning from the wind, so that when the wind decreases to a normal velocity said spring-lever K^4 causes a return motion of the wheel O, by the turning of the segmental pulley K, by the action of the rope K′ and the said lever K^4, and the consequent turning of the pinion J, which turns the segmental gear-wheel I, the teeth I′ of which mesh into the teeth F′ of the wind-wheel frame F, so that the latter, with its wheel, swings in the right direction—that is, into the wind.

The rotary motion of the wind-wheel O is transmitted by the crank-arm N′ and the pitman P to the lever Q, which imparts an up-and-down movement to the pump-rod R.

It will be seen that the operator, by adjusting the tension of the spring K^7 and adjusting the weight K^6, can regulate the vane in such a manner that the latter will cause the wheel to turn out of the wind whenever the wind increases above a certain velocity.

Having thus fully described my invention, I claim as new and desire to secure by Letters Patent—

1. In a windmill, the combination, with a tower supporting a step and a platform, of a tube supporting a cap fitting on an offset on the said step, a vane-frame held on the said tube and provided with a hub mounted to turn in the said platform, a bushing held in the said tube, a second tube passing through the said first tube and having its upper bearing in the said bushing, a block held on the lower end of the said second tube and fitting into the cup-shaped offset of the said step, and a wheel-frame supported on the upper end of the said second tube, substantially as shown and described.

2. In a windmill, the combination, with a tower, of a vane-frame mounted to turn in the tower, and a wind-wheel frame secured to a tube mounted to rotate in the vane-frame, each frame bearing its own weight on its respective bearings in the tower, whereby each is independent of the weight of the other, substantially as described.

3. In a windmill, the combination, with a vane-frame provided with a tube mounted in a cup to rotate on the step of the tower and independent of the weight of the wheel-frame, of a wheel-frame secured to a tube, to which is secured a block fitted to rotate in the step and within the tube of the vane-frame and independent of the weight or motion of the said vane-frame, substantially as herein shown and described.

4. In a windmill, the combination, with a support, of the lever K^4, provided with the spring K^7, and the wedge L, adjustable on the said support, substantially as herein shown and described.

FRANK LOWELL BUTLER.

Witnesses:
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F. R. LOWELL.