(No Model.) 3 Sheets—Sheet 1.

J. Q. ADAMS.
WINDMILL.

No. 454,196. Patented June 16, 1891.

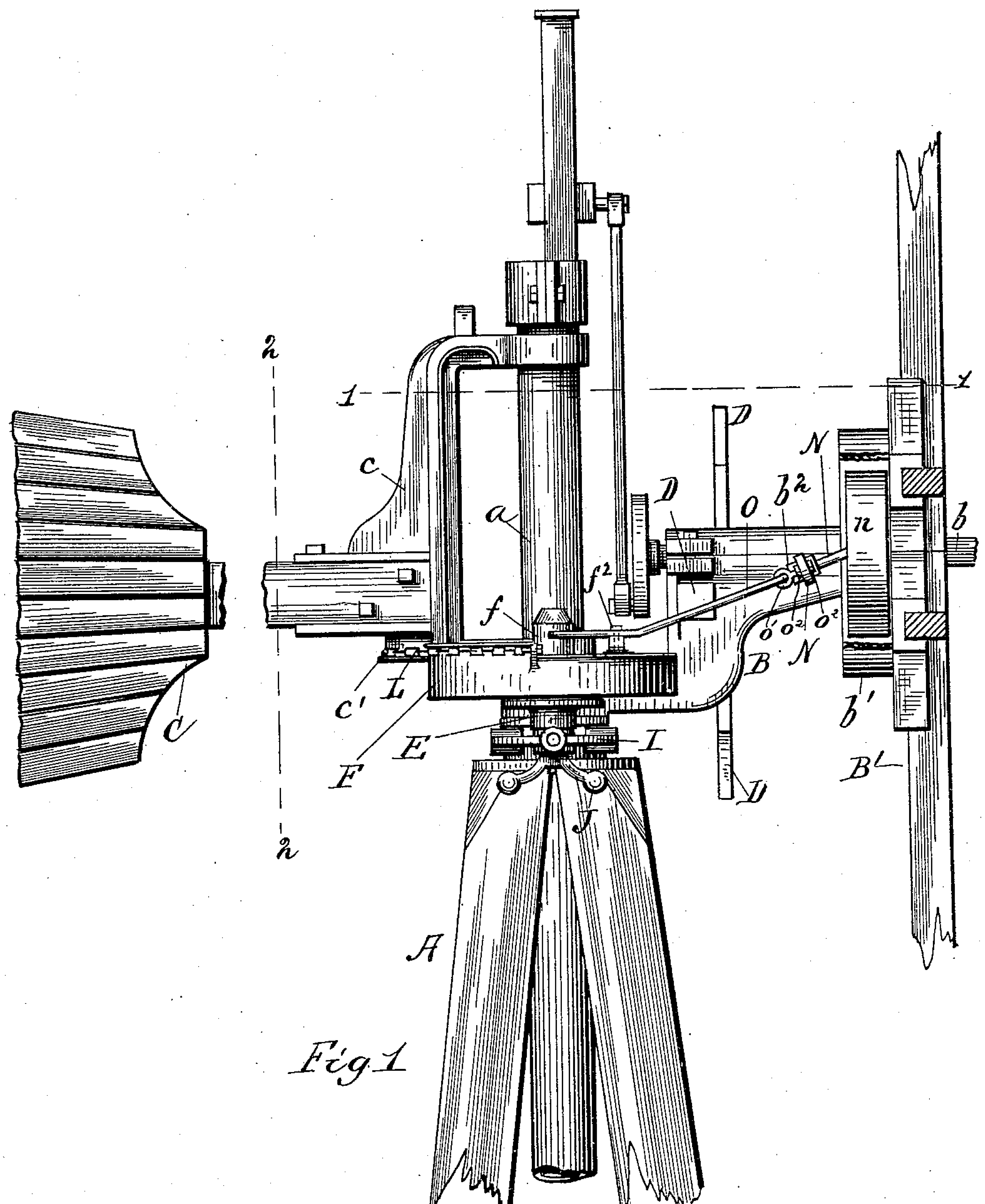

Fig 1

Witnesses
W. C. Corlies
Wm. H. Scott.

Inventor
John Q. Adams
By Coburn & Thacher
Attys

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

(No Model.)

3 Sheets—Sheet 2.

J. Q. ADAMS.

WINDMILL.

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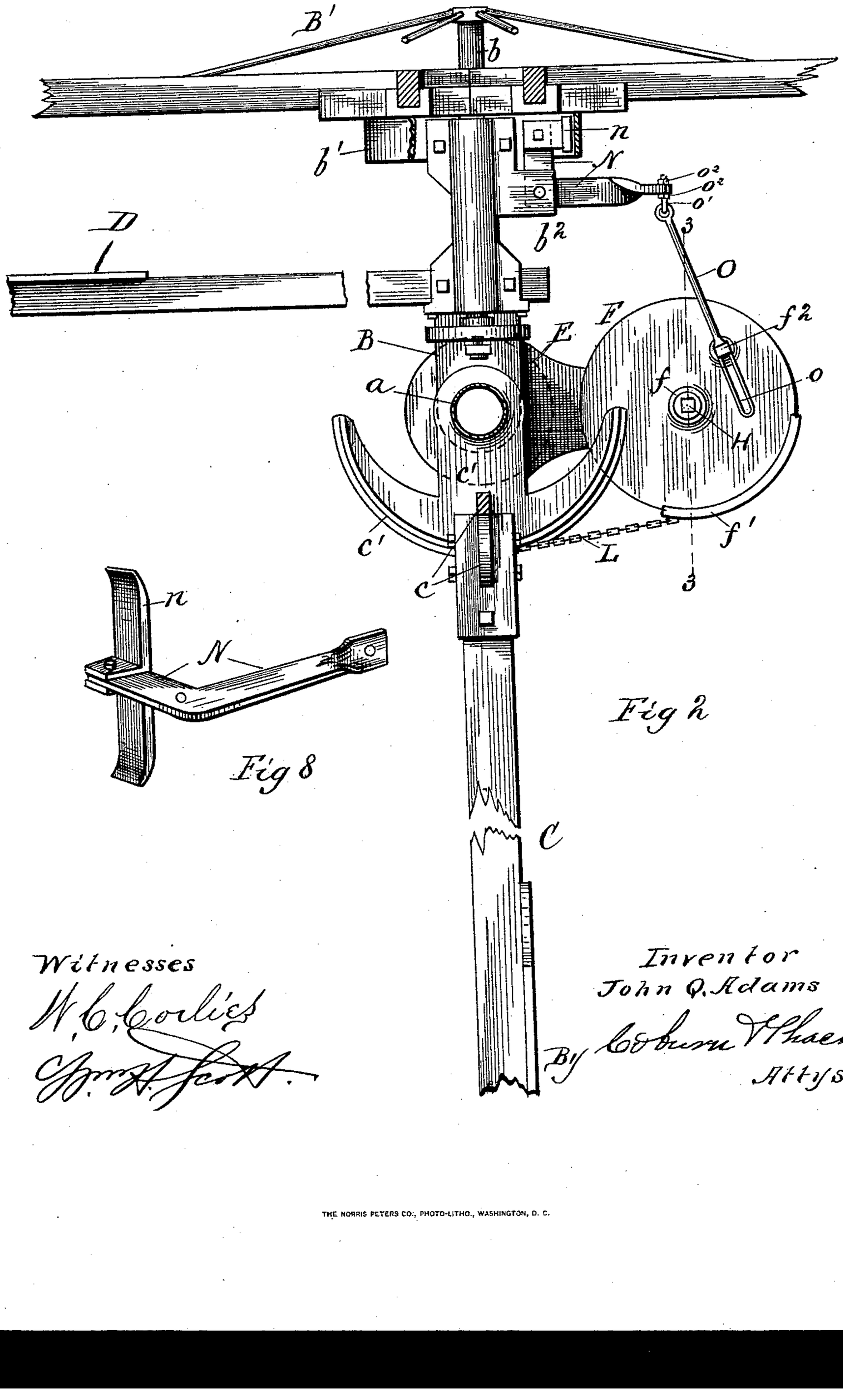

Fig 2

Fig 8

Witnesses
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(No Model.) 3 Sheets—Sheet 3.

J. Q. ADAMS.

WINDMILL.

No. 454,196. Patented June 16, 1891.

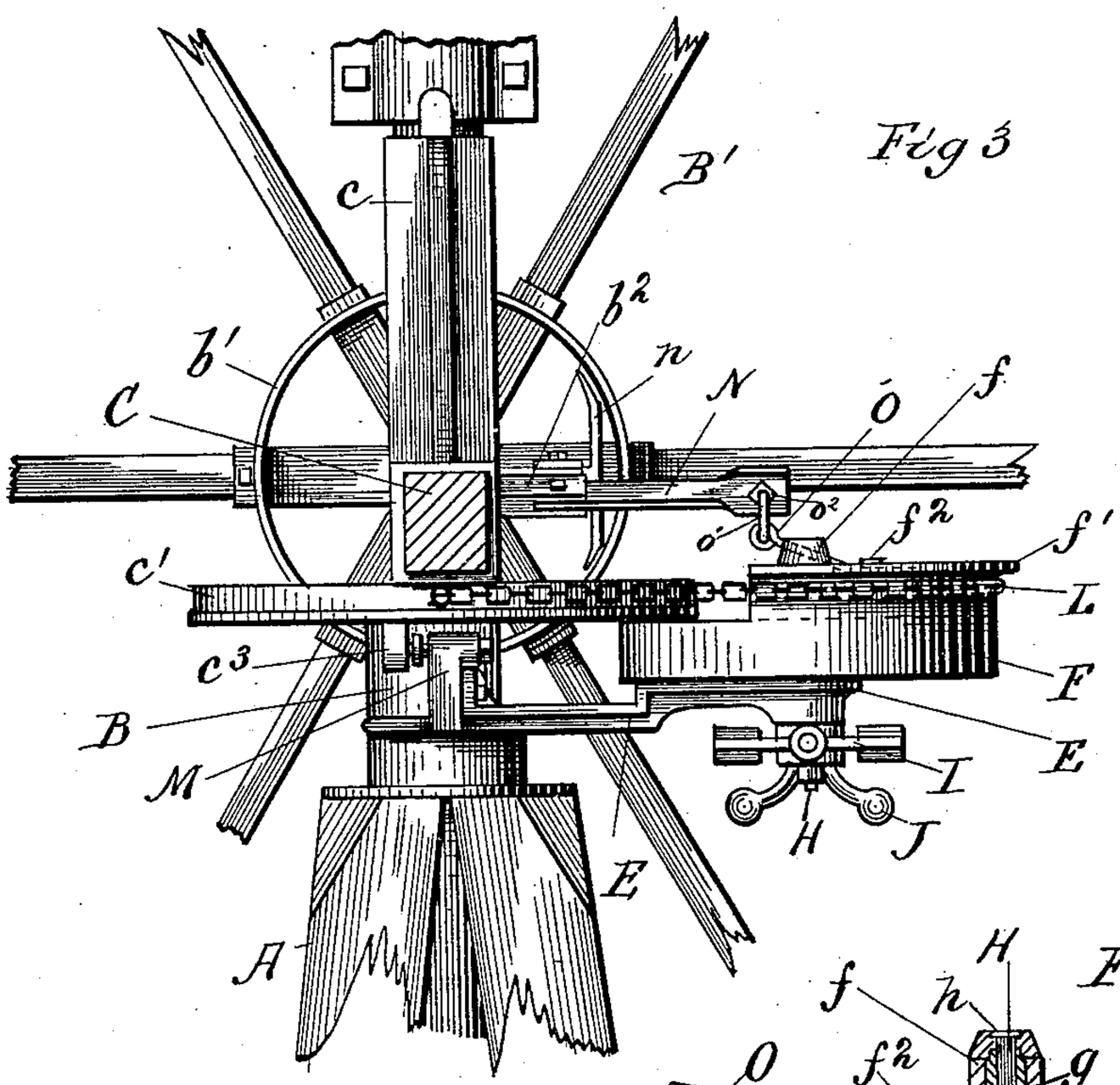

Fig 3

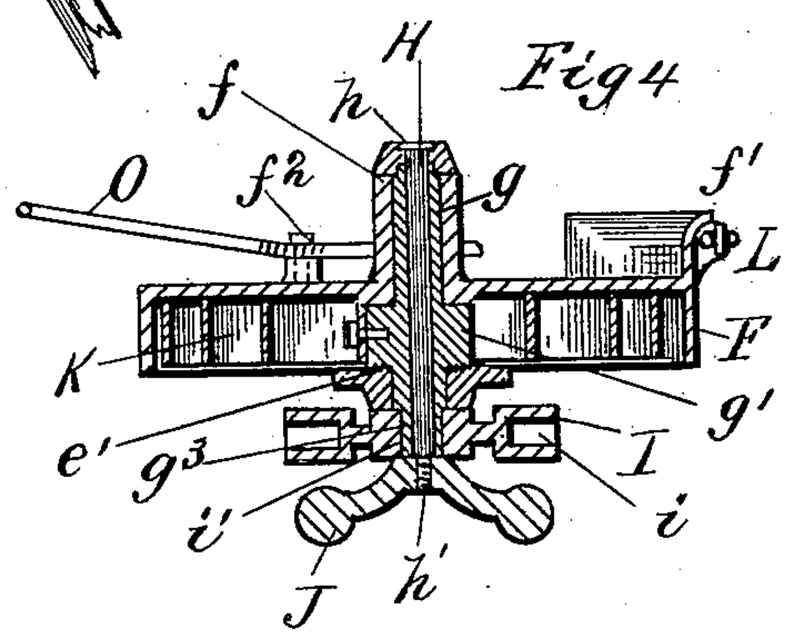

Fig 4

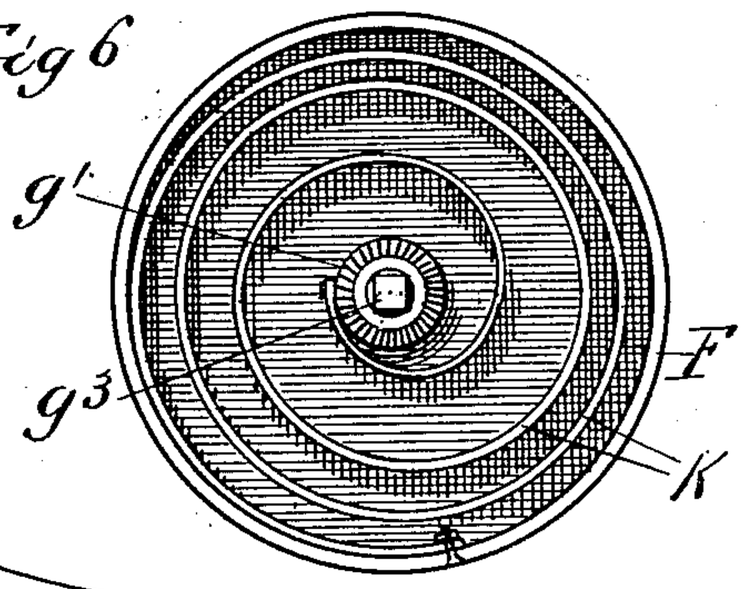

Fig 6

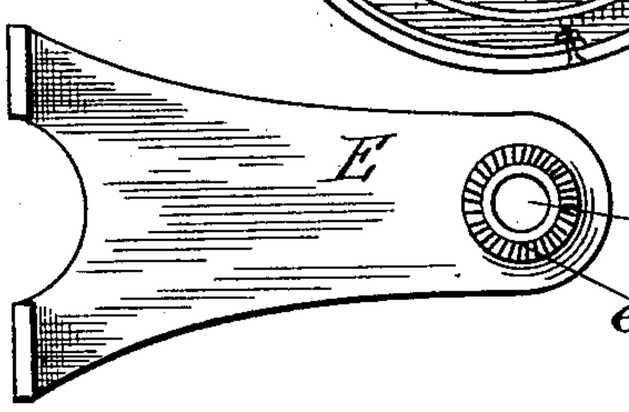

Fig 7

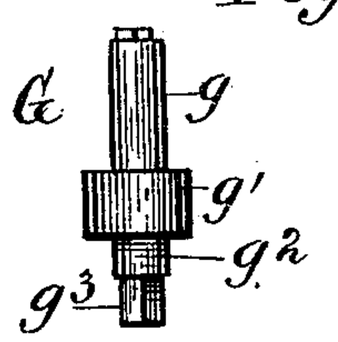

Fig 5

Witnesses
W. C. Corliss
Jno. W. Serrell

Inventor
John Q. Adams
By Coburn & Thacher
Attys

UNITED STATES PATENT OFFICE.

JOHN Q. ADAMS, OF MARSEILLES, ILLINOIS.

WINDMILL.

SPECIFICATION forming part of Letters Patent No. 454,196, dated June 16, 1891.

Application filed October 7, 1889. Serial No. 326,161. (No model.)

To all whom it may concern:

Be it known that I, JOHN Q. ADAMS, a citizen of the United States, and residing at Marseilles, in the county of La Salle and State of Illinois, have invented certain new and useful Improvements in Windmills, which are fully set forth in the following specification, reference being had to the accompanying drawings, in which—

Figure 1 represents an elevation of a windmill embodying my present improvements, the tower and some other parts being broken away; Fig. 2, a plan section of the same, taken on the line 1 1 of Fig. 1; Fig. 3, a vertical section taken on the line 2 2 of Fig. 1; Fig. 4, a detail vertical section taken on the line 3 3 of Fig. 2; Fig. 5, an elevation of the spring-shaft detached; Fig. 6, a bottom plan of the spring and its casing; Fig. 7, a detail plan of the bracket on which the spring is mounted, and Fig. 8 a perspective of the brake-lever and brake detached.

My invention relates to that class of windmills generally known as "solid-wheel" mills. In this class of mills provision is made for turning the wheel out of wind when a certain degree of wind force is reached. A yielding resistance mechanism is employed, which holds the wind-wheel shaft and vane in line under ordinary circumstances and holds the wheel to the wind up to a certain degree of wind force operating in the contrary direction to turn it out of wind. A device now largely used for this purpose is a coiled spring, and my present improvements relate to the mounting and regulating of this spring, and also to a brake device connected therewith, so as to be applied by the operation of the latter when the wheel is turned out of wind.

I will proceed to describe in detail one way in which I have carried out my invention in practical form, and will then point out definitely in claims the improvements which I believe to be new and wish to secure by Letters Patent.

In the drawings, A represents the upper part of the tower, from which rises a post *a*. The wheel-frame or bed-piece B is pivoted at its rear end to this post, while at its front end is the solid wheel B′ on a shaft *b*, mounted in suitable bearings on the bed-piece. The rudder-vane C is also pivoted to the upright post by means of a forked bracket *c*, the upper branch of which surrounds the post near its upper end, as seen in Fig. 1 of the drawings, while the lower branch is similarly connected to the lower end of the post. This lower portion of the bracket is enlarged at the rear of the post to form a sector *c′*. A side vane D is rigidly attached to the bed-piece B between the wheel and the post, to which the bed is hinged. A bracket E is rigidly fastened to the inner end or hinge portion of the wheel-frame or bed B. This bracket is therefore below the lower pivot of the rudder-vane and extends out horizontally at the side of the mill opposite to that on which the side vane is located. On the outer end of this stationary bracket is mounted a circular case F, which is closed at the top and open at the bottom and from the top of which rises a short central boss or hub *f*, which is perforated for the purpose of mounting.

A shaft G is constructed as follows: At one end there is a section *g*, adapted to enter the perforation in the hub or boss of the case, this being the upper end of the shaft when it is set in place. Just below this section is a section *g′*, very considerably enlarged. Immediately below this is a section g^2, about the same size as *g*, it may be a little larger, and immediately below this and at the extreme lower end is a section g^3, cut away a little more than g^2 and made square or angular in cross-section. This shaft is bored or perforated throughout its entire length to receive the fastening bolt or pin H, having a small head *h* at one end and a threaded section *h′* at the other end, being longer than the shaft G. The outer end of the bracket E is provided with a perforation *e*, which is adapted to receive the section g^2 of the shaft G, and upon the upper face of the bracket there is a circle of serrations *e′*, surrounding the opening.

The casing is mounted on the bracket, as follows: The shaft G is set in the hole *e* of the bracket, the enlargement or collar *g′* resting upon the bracket and being serrated on its under side to correspond with and engage with the serrations on the bracket. The casing sits upon the upper portion of the shaft, the upper end of which is received in the hub and the enlargement or collar *g′* of which

supports the case in part. A spider-wrench I, having socketed arms *i*, is applied to the lower end of the shaft, being provided with a central angular opening *i'*, adapted to fit upon the angular lower end of the shaft G. The bolt or pin H passes down from the top of the case-hub through the shaft G, from the lower end of which it projects to receive a nut J. The relative arrangement of these parts is shown in Fig. 4 of the drawings, and when the nut is turned up upon the lower end of the fastening-bolt it is evident that the serrated faces of the bracket and the shaft will be drawn into engagement, so that the shaft will be firmly held in position; but upon loosening the nut the parts may be disengaged sufficiently to permit the shaft to be turned into any other position desired by means of the wrench I, a suitable pin or pins being inserted in the sockets of this wrench for the purpose. A spring K is coiled within the case F, the outer end being fastened to the inside of the rim of the case and the inner end fastened to the enlargement or collar *g'* on the shaft G, as seen in Fig. 6 of the drawings. A cord or chain L is fastened at one end to the outer rim of the spring-case, and at the outer end to the sector *c'* preferably a flange *f'* is raised from the top of the spring-case to provide an attachment for the chain and bring it in the same plane with the sector. A lug c^3 depends from the under side of the sector, and a spring-stop M is fixed on the bracket E to engage this lug, being arranged so that when these two parts are in contact the wheel-shaft and rudder-vane will be in line, or substantially so. It will be seen from this description that the case within which the spring is placed is left free to turn on the shaft G, and that the spring acts always to turn this case, so as to bring a strain through the chain upon the sector to hold the latter in the position just described, and so keep the wheel-shaft and rudder directly in line. This is the usual action of springs used for this purpose, and its action is also the same as usual when the force of the wind becomes so great as to overcome the effect of the spring by means of the side vane, so as to turn the wheel out of wind—that is, the force of the spring will act constantly in opposition to the side vane, and as soon as the velocity of the wind decreases sufficiently, the spring will bring the wheel back into wind again, this being accomplished, of course, when the velocity of the wind decreases to that point where force exerted upon the side vane is less than the force of the spring acting in opposition.

The tension of the spring is easily regulated by means of the mounting devices described above, for it is evident that when the shaft G is turned by the wrench in one direction or the other, the spring is tightened up or relaxed according to the direction in which the shaft is turned, and when the proper position is obtained for the tension desired it is fixed by means of the serrated faces, as already mentioned. It will be seen that the spring is mounted horizontally, and is close to the sector upon which it is to act, and about in the same horizontal plane as the latter. This arrangement is very compact and brings the parts into such relation to each as to secure the most efficient and sensitive work from the spring.

At the back of the wind-wheel is a small circular rim or flange *b'*, fastened to the spider of the wheel and concentric therewith. A horizontal bell-crank lever N is pivoted to a lug or projection b^2 at one side of the bed or frame B. The inner arm of this lever extends outward toward the wind-wheel within the rim *b'*, and has fastened to it a brake-shoe *n*, which is adapted to fit the inside of the rim. The other or outer end of the lever is connected by a rod O to a pin f^2 on the top of the case F, this end of the rod having a slot *o* to receive the pin, which is loose enough in the slot to move freely back and forth therein. It will be seen from this description that when the wheel is turned out of wind, the pin will move in the slot to the outer end of the rod, and the slot is made of such length that just as the wheel comes edgewise to the wind the pin will strike at the outer end and at once vibrate the lever N and apply the brake, so as to hold the wheel perfectly still when in this position. As the wheel is turned into wind again, the brake will be released by the rotation of the case under the influence of the spring, and the pin will move toward the other or inner end of the slot, the latter being of such length in this direction that when the wheel comes full face to the wind the pin will strike at this inner end of the slot and throw the brake entirely clear from the flange *b'*, so that there will be no impediment to the revolution of the wheel. In order to secure the proper adjustment of the slotted rod to the pin, the former is connected to the brake-lever by means of an eyebolt *o'*, having a long shank which is threaded. This shank passes through the end of the brake-lever, and on each side of the latter is a nut o^2, by means of which the eyebolt may be adjusted back and forth in the lever and so adjust the rod accurately to the pin on the spring-case, so that the latter will engage with the respective ends of the slot at just the proper time to effect the operation described above. It will be seen that the slotted rod and pin permit the spring-case to oscillate as the position of the wheel is varied under the action of the wind when at work without applying the brake or affecting it at all until it is desired to throw the wheel entirely out of the wind for the suspension of work.

Changes may be made in some of the devices described above, and I do not therefore wish to be understood as limiting my invention to the precise details of construction in all parts, as herein shown and described.

Having thus described my invention, what

I claim as new, and desire to secure by Letters Patent, is—

1. The hinged wheel-frame or bed-piece, in combination with the hinged rudder-vane, the sector connected to the rudder-vane, the coiled spring and the pivoted case within which it is mounted, arranged in substantially the same horizontal plane as the sector, and the chain or cable connecting the sector and the spring-case, substantially as and for the purposes specified.

2. The hinged bed-piece B, in combination with the wind-wheel B′, mounted thereon, the hinged rudder-vane C, provided with the sector *c′*, the side vane D, the horizontal bracket E, secured to the bed-piece B, the spring-case F, pivoted on the outer end of the bracket E, the spring K, coiled within the case, and the chain L, connecting the sector and case, substantially as and for the purposes specified.

3. The bracket E, fastened to the bed-piece on which the wind-wheel is mounted, perforated at its outer end and provided with serrations *e′*, in combination with the shaft G, having the enlarged central portion *g′* serrated on its lower face, the spring-case F, mounted loosely on said shaft, the spring K, coiled within the case and attached, respectively, to the latter and the shaft G, the pin or bolt H, the nut J, and a chain connecting the spring-case to a sector on the rudder-vane, substantially as and for the purposes specified.

4. The bracket E, provided with the hole *e* and serrations *e′*, in combination with the shaft G, composed of the sections *g*, *g′*, g^2, and g^3, and having serrations on the under face of *g′*, the spring-case F, mounted loosely on the upper end of said shaft, the spring K, coiled within the case and fastened, respectively, to it and the shaft G, the wrench I, the bolt H, and the nut J, substantially as and for the purposes specified.

5. The wind-wheel, in combination with the hinged bed-piece on which it is mounted, the hinged rudder-vane, the spring-case pivoted to its support and connected to the rudder-vane, and a brake also connected to the pivoted spring-case, whereby the oscillation of the latter will positively apply and take off the brake as the wheel is thrown out of or brought into wind, substantially as and for the purposes specified.

6. The wind-wheel B′, provided with a brake-flange *b′*, in combination with the brake-lever N, the spring-case F, the slotted lever O, the eyebolt *o′*, adjustable in the brake-lever, and the hinged rudder-vane, substantially as and for the purposes specified.

7. The wind-wheel B′, provided with the rim or flange *b′*, in combination with the hinged bed-piece B′, on which it is mounted, the hinged rudder-vane, the pivoted spring-case F, mounted on a support connected to the bed-piece, a chain connecting the spring-case with the rudder-vane, the bell-crank lever N, pivoted to the bed-piece, the brake *n*, and the slotted rod O, connecting the lever to the spring-case, substantially as and for the purposes specified.

JOHN Q. ADAMS.

Witnesses:
H. R. ADAMS,
F. T. NEFF.