(No Model.)

2 Sheets—Sheet 1.

D. FULLER.

WINDMILL.

No. 542,305.

Patented July 9, 1895.

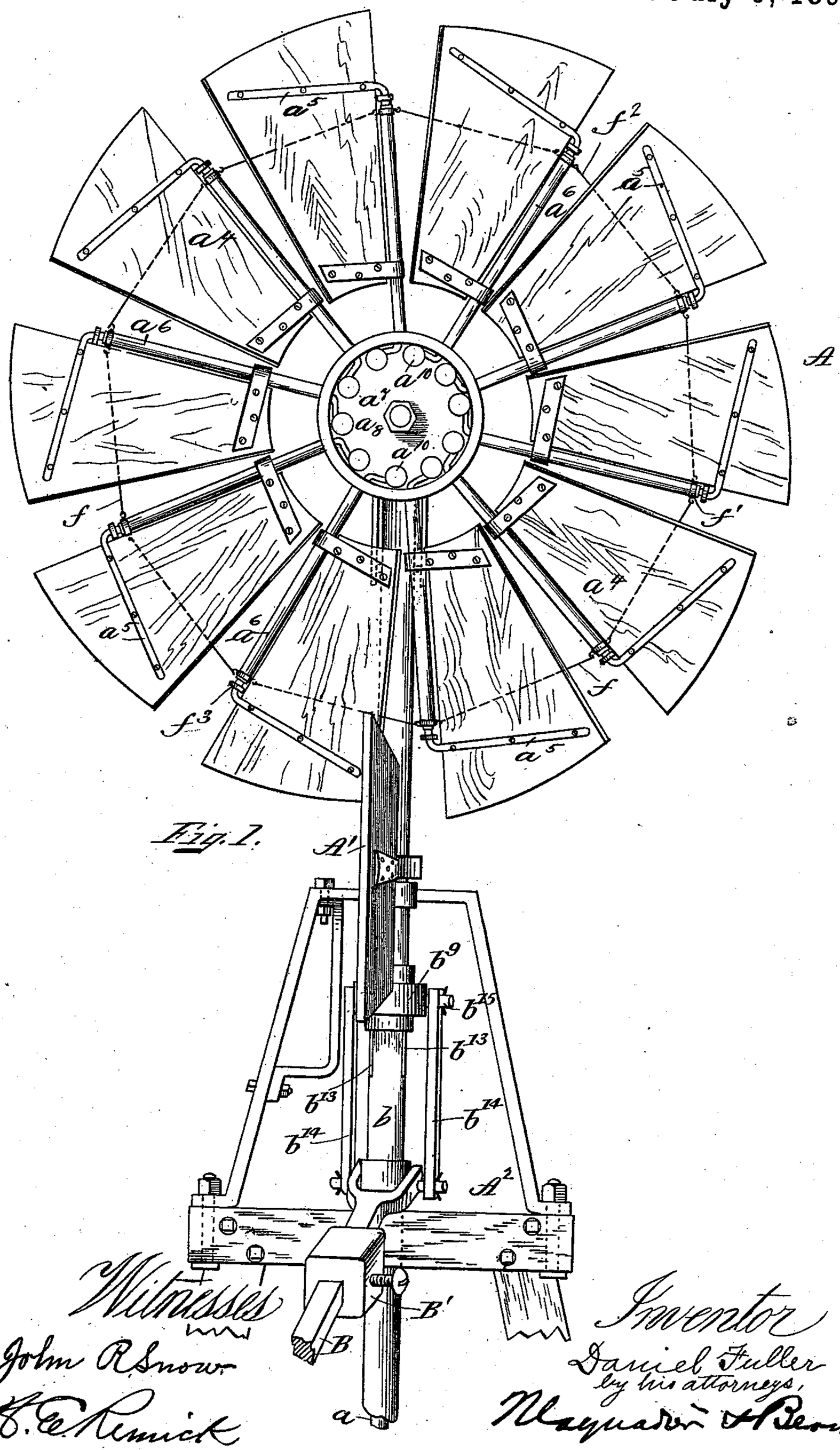

Fig. 1.

Witnesses
John R. Snow.
H. E. Remick

Inventor
Daniel Fuller
by his attorneys,
Maynadier & Booth

(No Model.)

2 Sheets—Sheet 2.

D. FULLER.

WINDMILL.

No. 542,305. Patented July 9, 1895.

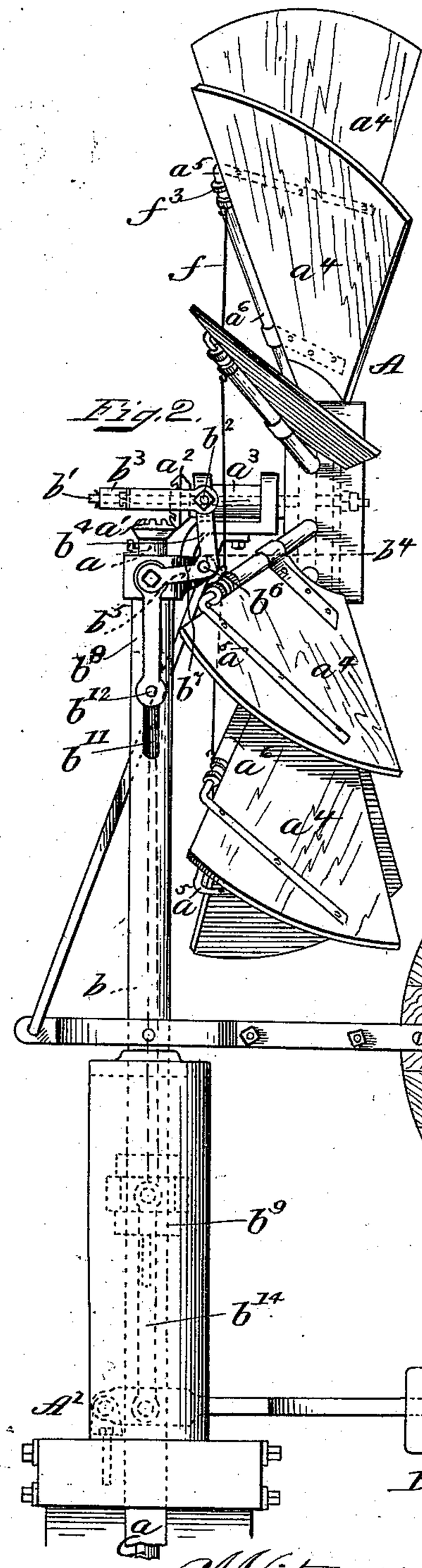

Fig. 2.

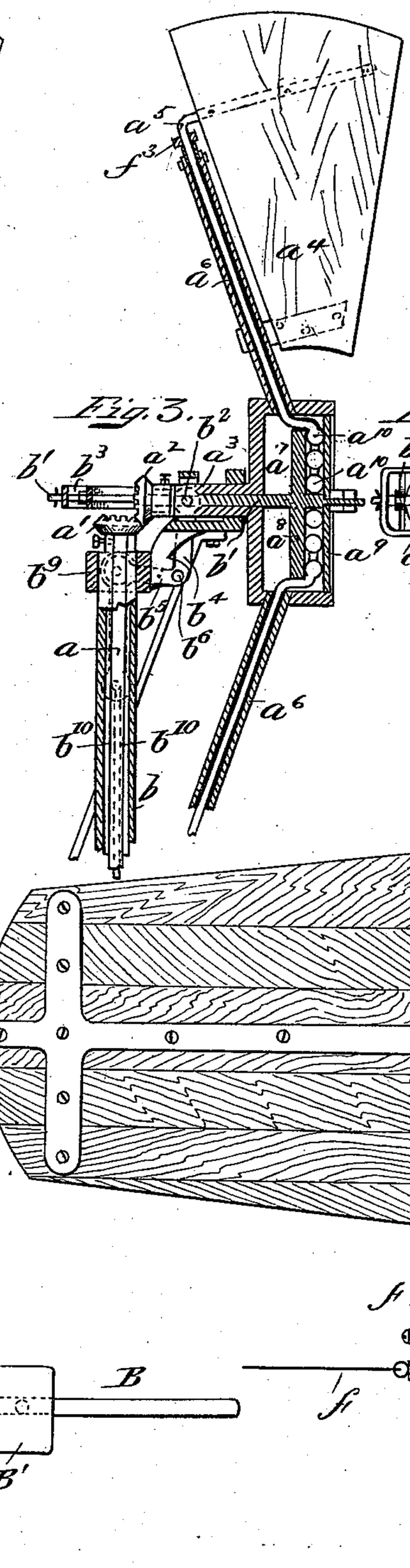

Fig. 3.

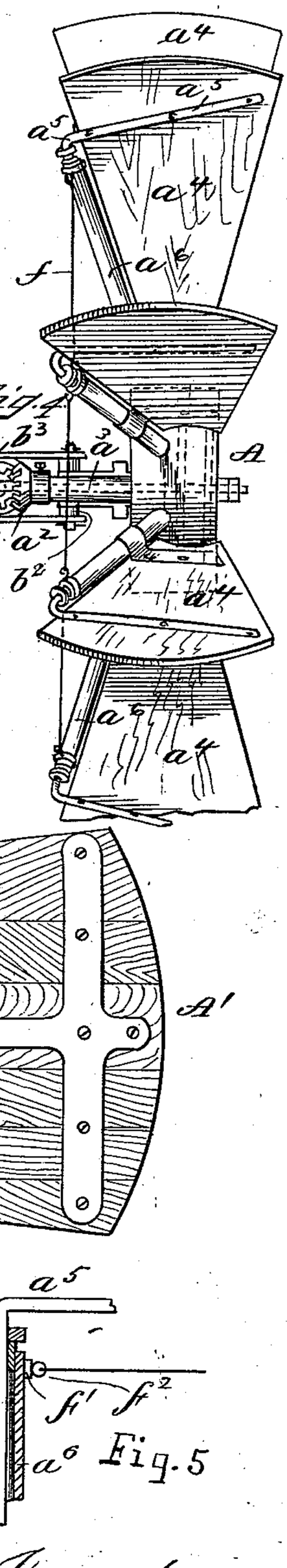

Fig. 4.

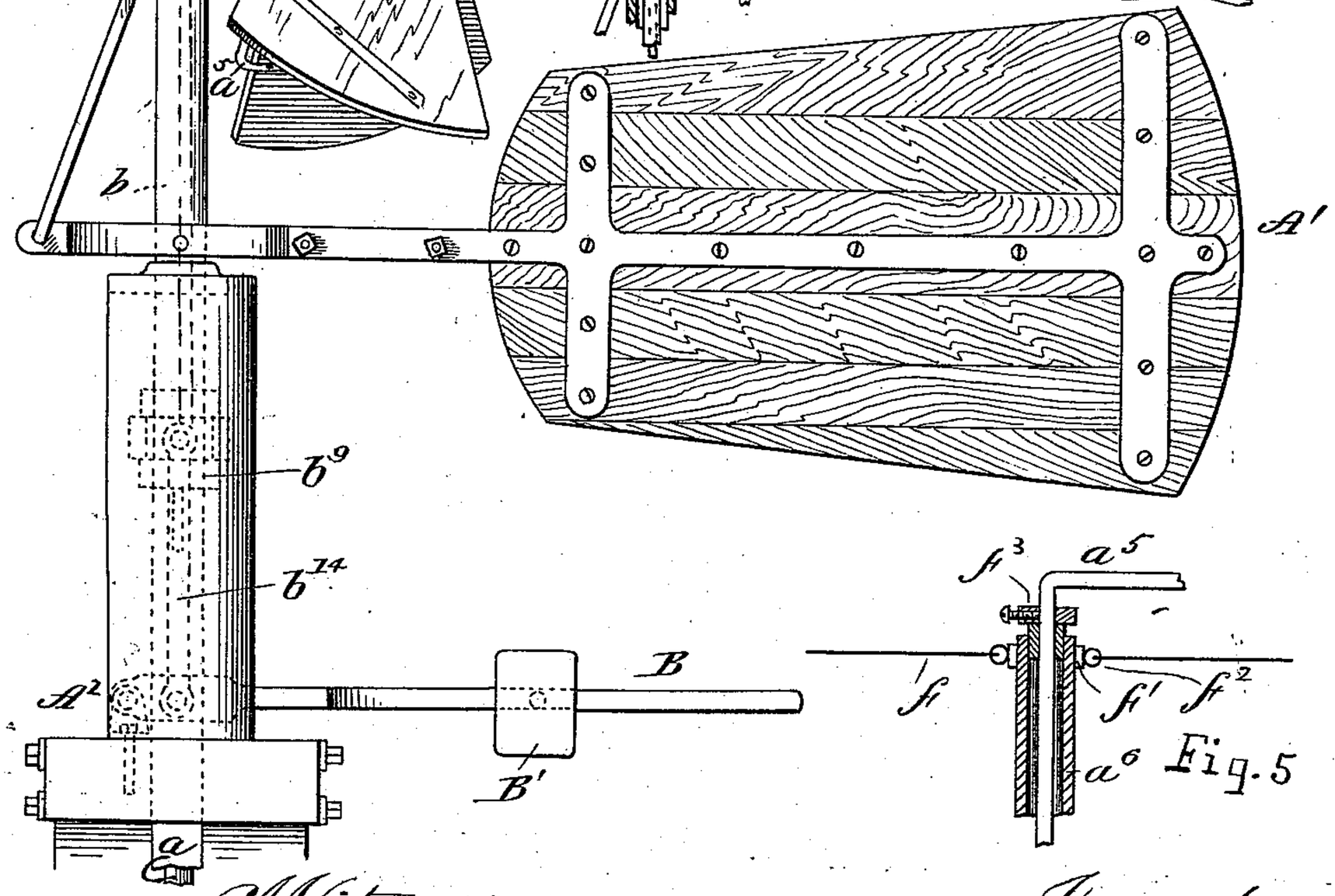

Fig. 5

Witnesses.
John R. Snow.
H. E. Renick.

Inventor.
Daniel Fuller
by his attorneys,
Magnadier & Beach

UNITED STATES PATENT OFFICE.

DANIEL FULLER, OF TOPSFIELD, MASSACHUSETTS.

WINDMILL.

SPECIFICATION forming part of Letters Patent No. 542,305, dated July 9, 1895.

Application filed May 22, 1891. Serial No. 393,716. (No model.)

To all whom it may concern:

Be it known that I, DANIEL FULLER, of Topsfield, in the county of Essex and State of Massachusetts, have invented a new and useful Improvement in Windmills, of which the following is a specification, reference being had to the accompanying drawings, in which—

Figure 1 is a front elevation, and Fig. 2 a side elevation, of a windmill embodying my invention. Fig. 3 is a view, partly in section, on line 3 3 of Fig. 2. Fig. 4 is a partial top plan of my new windmill, and Fig. 5 is an enlarged section on line 5 5 of Fig. 4 to show more clearly a method of bracing the arms and of supporting the blade-supports.

The main object of my invention is to produce a windmill which will run at a uniform speed, whatever the variations in the speed at which the wind travels.

My invention consists in the details of construction pointed out and claimed hereinafter.

In the drawings, a is the work-shaft mounted in a hollow shaft b, which supports wheel A and vane A′, and is journaled in any suitable support A^2. Work-shaft a is provided with a gear a', which meshes with a gear a^2 on the hollow shaft a^3 of wheel A. When the wheel turns the work-shaft a is rotated. The blades a^4 of wheel A feather automatically and are mounted on supports a^5 journaled in the arms (or other suitable supports) a^6 of wheel A. The supports a^5 are bent at their inner ends, crank-like, and project into a chamber a^7 in the hub of wheel A. Within the chamber two disks a^8 a^9 are mounted, and the inner ends a^{10} of supports a^5 are preferably ball-shaped, and between these disks, which are secured on a spindle b', which moves endwise in its bearings, is a hollow shaft a^3. When spindle b' is moved endwise, the disks are moved flatwise and the supports a^5 rocked to move the blades.

The spindle b' is secured to a cross-head b^2 of U-shaped frame b^3, the legs of which are loosely pinned to a U-shaped frame b^4, the legs of which have right-angled extensions b^5. Frame b^4 is pivoted at b^6 to a support b^7 on shaft b, and the extensions b^5 are loosely pinned to bars b^8 b^8, which in turn are connected with a sliding collar b^9 on shaft b by bars b^{10} b^{10}. Shaft b is slotted vertically at b^{11} b^{11}, and a pin b^{12} passing through these slots secures together the bars b^8 b^8 and bars b^{10} b^{10}, which are within shaft b and move up and down beside the work-shaft a. The lower ends of bars b^{10} b^{10} are secured to collar b^9 by a pin b^{15} passing through bars b^{10} b^{10} and slots b^{13} b^{13} in shaft b to the position of collar b^9, and consequently the position of the blades of the wheel A is adjusted by moving the lever B, which is forked and pivoted at one side of the shaft. Links b^{14} b^{14} connect the collar b^9 with the arms of lever B, which is provided with a weight B′. It is desirable to brace the arms a^6 of the wheel, and this is conveniently done by wiring their outer ends together, as shown in the drawings. A convenient manner of attaching the braces or wires f is by providing the arms with sleeves f', having eyes f^2 to receive the wires or braces f. An adjustable sleeve f^3 is provided to keep the inner ends a^{10} of supports a^5 from approaching near enough the edge of disk a^8 to bind against the same.

The wheel A is dished, as shown, and this is a matter of importance, as it is thereby simply and effectually braced and brings the weight over the boxes.

It will be observed that disk a^8 and spindle b' may revolve, and that as disk a^9 is secured to spindle b' by check-nuts disk a^9 is capable of rotation upon spindle b' independently of disk a^8. This is a feature of my invention, and is of much importance, as the disks will be revolved by the action of the balls a^{10} and the friction of the balls against the disks be reduced to a minimum.

The vane is beneath the wheel, and consequently the wheel and vane may be on the same side of the standard. This is of great practical importance, as a small vane may be used effectively, a small vane being easier to mount, offering less resistance to the wind and having less strain on the structure than the usual large vanes.

The operation of the mill will be readily understood by all skilled in the art without further description, it being obvious that the mill will govern itself.

I am aware of the patent to A. and W. Graf, No. 160,588, and disclaim all therein shown.

What I claim is—

1. In a windmill, the combination of a hub;

hollow spokes on the hub; rods within the spokes; cranks on the inner ends of the rods; disks movable flatwise within the hub and controlling the cranks; a counter-weight connected with the disks, and blades secured upon the rods with the axis of each blade near one edge of that blade, all substantially as and for the purposes set forth.

2. In a windmill, a hub with radial hollow spokes a^6, inclined to the axis of the hub and connected at their outer ends by stay rods f extending from each spoke to its neighbor; blade carrying rods a^5 mounted in the hollow spokes a^6; blades a^4 rigidly connected to rods a^5 with their inner edges close to the inclined hollow spokes a^6; and means for controlling the blade carrying rods a^5 and thereby controlling the inclination of the blades a^4, all combined and operating substantially as described.

DANIEL FULLER.

Witnesses:
ANNA H. LOVEJOY,
JESSIE B. LOVEJOY.