

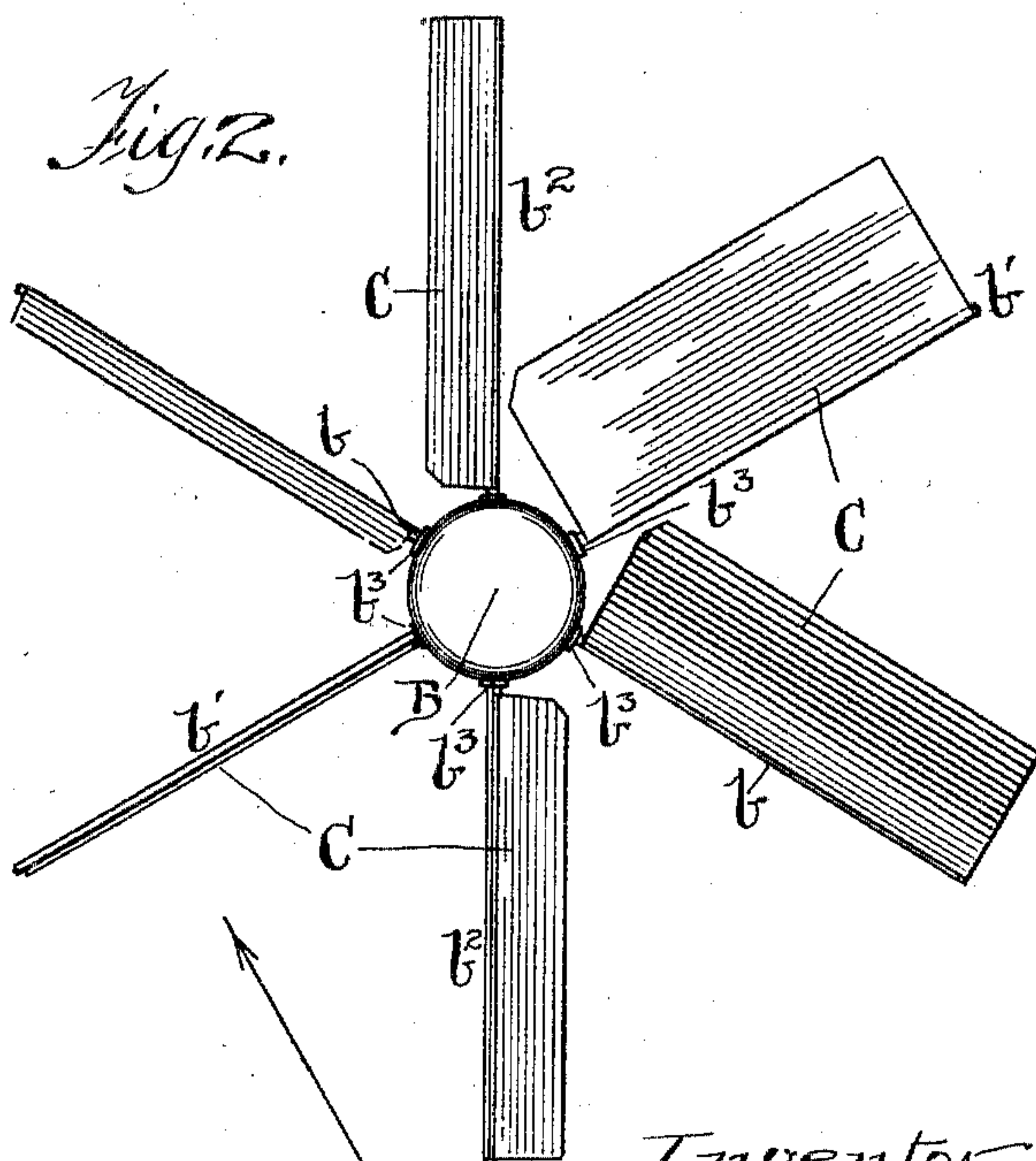
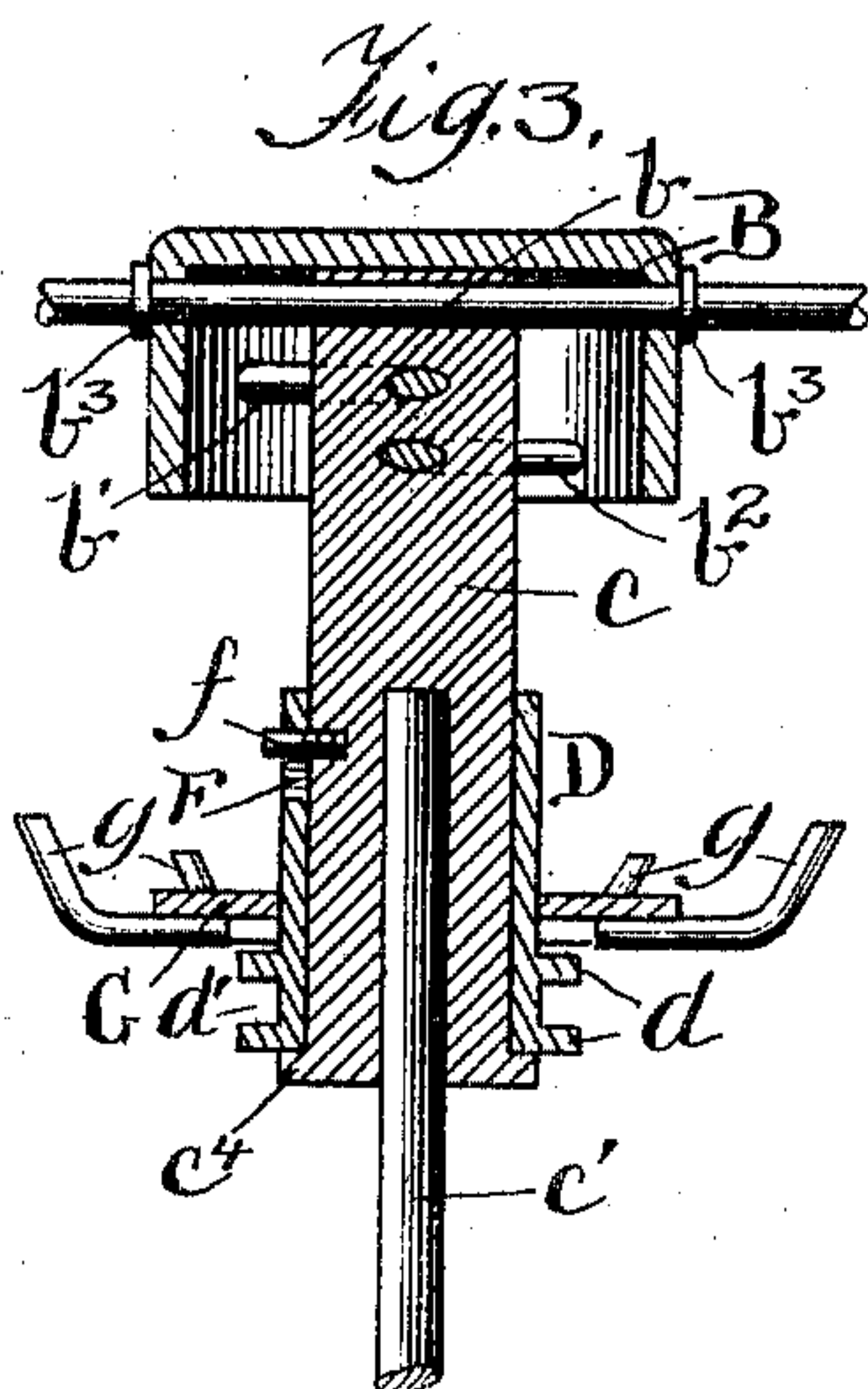
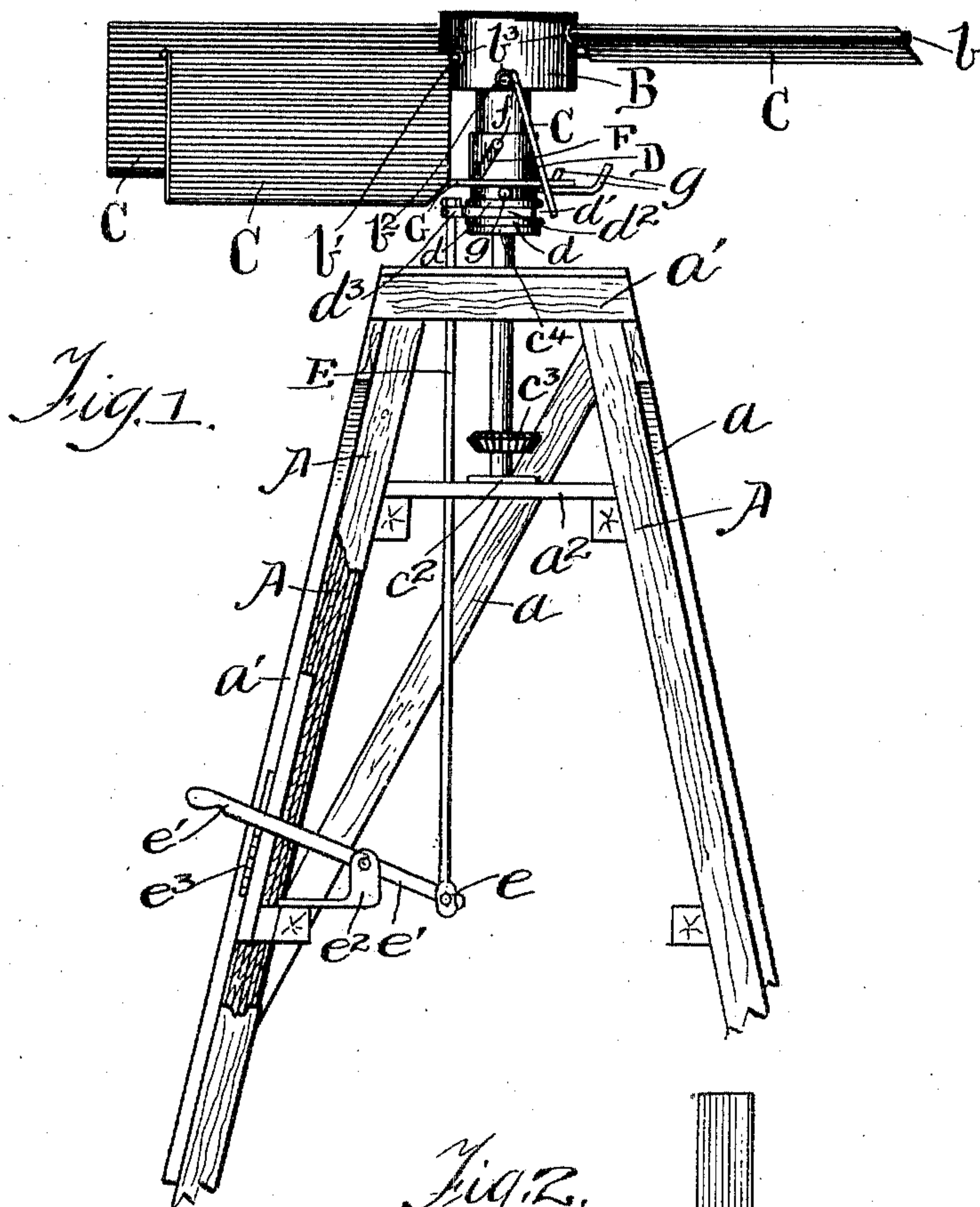
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PATENTED NOV. 29, 1904.

E. E. GOULD.
WINDMILL.

APPLICATION FILED MAR. 19, 1904.

NO MODEL.



Witnesses
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UNITED STATES PATENT OFFICE.

EARL E. GOULD, OF CHICAGO, ILLINOIS.

WINDMILL.

SPECIFICATION forming part of Letters Patent No. 776,019, dated November 29, 1904.

Application filed March 19, 1904. Serial No. 199,038. (No model.)

To all whom it may concern:

Be it known that I, EARL E. GOULD, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Windmills, of which the following is a specification.

The object of this invention is to provide a simple and efficient windmill in which the wheel is positioned horizontally rather than vertically, so that rotation is imparted directly to the shaft without the necessity for gearing or other intermediate mechanism, and the wheel is so constructed that it will revolve whenever the wind is blowing without the necessity for a tail or other mechanism for turning the wheel toward the wind, since the blades of the wheel are so constructed that a pressure of wind from any point will bear against the blades of the wheel on but one side, the blades on the opposite side being so arranged that they will swing into the wind in edgewise position, thereby allowing the wheel to revolve and bring the blades successively from edgewise position when approaching the wind into transverse position when carried by the wind.

A further object of the present invention is to minimize the lateral pressure exerted against the tower or structure upon which the wheel is mounted, so that the operating parts may be sustained by a much lighter structure than is the case with vertical wheels against which strong lateral pressure is at all times exerted.

A further object of the present invention is to provide means for regulating and stopping the revolution of the wheel by adjusting the blades to maintain a uniform position on both sides of the wheel, in which case the revolution will stop, or by allowing a greater or less speed of revolution, depending upon the angular position to which the blades are adjusted.

The invention consists in the features of construction and combination of parts hereinafter described and claimed.

In the drawings illustrating the invention, Figure 1 is a side elevation of the wheel in operative position, showing the tower partially broken away; Fig. 2, a plan view of

the wheel with the wind in the direction indicated by the arrow, and Fig. 3 an enlarged sectional detail of the hub and mounting for the blades.

As shown, the wheel is mounted upon a square tower having supporting-uprights A, one at each corner, and said uprights are connected by braces a of any usual and well-known construction, and the tower is provided at its top with a platform a' , immediately beneath which and at suitable distance therefrom is a flooring a'' , which serves as a support for the operative mechanism. The wheel is constructed to have a hollow hub B, through which pass a series of laterally-extending rods b , b' , and b'' , and, as shown, the rods are rotatably mounted one above the other in the way indicated and project outwardly at each side, forming six arms in the construction shown, for the mounting thereon of an equal number of blades. In order to prevent the lateral displacement of the arms and at the same time allow of their rotation, said arms are each provided with collars b^3 , which bear against the exterior face of the hub.

Upon the arms are mounted a series of six blades C, two blades being mounted upon each rod, and the blades are fixedly secured at their upper edges, one on each side, to the rods and positioned at right angles to one another, so that when the wheel is in normal position the blades will hang at an angle of about forty-five degrees from perpendicular, since the blades and supporting-arms are of equal weight on both sides of the hub.

The hollow hub is fixedly supported upon a shank c , through which the arms pass, and into said shank is inserted a rotary power-shaft c' , which, as shown, is journaled to the flooring c'' and provided with a pinion c^3 for imparting rotation, although it is obvious that the shaft may be carried down any suitable distance and that the power may be imparted thereby in any suitable and well-known manner. The shank c is preferably provided at its lower end with an outwardly-projecting flange c^4 , and said flange serves as a support for a slidable sleeve D, which is provided, near its lower end, with flanges d , leaving a groove d' for the insertion of a curved yoke

d^2 , which is provided at its end with an ear d^3 , to which is attached a vertical rod E, which depends a suitable distance and is pivoted, by means of a pivot e , to a lever e' , which lever is
 5 pivoted to a support e^2 , suitably and conveniently mounted upon the framework of a windmill, and said lever is adapted to engage a series of teeth e^3 to regulate the vertical movement of the lever, and the lever is adapted
 10 to raise and lower the sleeve D. The sleeve is provided with a diagonal slot F, through which projects a stud f , which is carried by the shank, so that as the sleeve is thrust upwardly by the movement of the lever, it will
 15 be simultaneously rotated by the contact of the stud with the slot.

To the sleeve is attached an outwardly-projecting circular disk G, to which are secured a series of abutments g , and the abutments are
 20 so formed and arranged that they will serve to limit the downward movement of the blades when the same have assumed a vertical position, and, as will be seen from an inspection of Figs. 1 and 2, the abutments for the upper
 25 and middle blades of the wheel have a greater vertical elevation than the abutments for the lower blades, so that the blades will all be brought into vertical position before they strike against the respective abutments.

30 In operation with the wind in the direction indicated by the arrow in Fig. 2 the blade which is in direct transverse position to the wind on the operative side of the wheel will be thrown down against its abutment by the force
 35 of the wind, and the opposite blade on the same shaft will be thrown into edgewise position with respect to the wind, thereby causing the wheel to revolve until the next succeeding blade is brought into transverse position to the wind, so that the wheel will receive the impact of the wind on but one side, and the blades as they approach the wind will be successively thrown into edgewise position.
 40 As the blades are turned from transverse position they will receive the wind at a tangent and will begin to return to their normal angular position of forty-five degrees, and said return movement will be continued until the rod has turned through an angle of ninety degrees and brought the blade on the opposite
 45 end thereof into transverse position to receive the impact of the wind. By positioning the blades one above the other the forward blades, which are directly in the path of the wind,
 50 will not interfere to any material extent with the blades which are behind, which would be the case if the blades were all mounted in the same vertical plane.

When it is desired to impart the entire force
 60 of the wind to the wheel, the sleeve, with its disk and abutments carried thereby, is drawn down to its lowest position, so that the stud F will contact with the end of the diagonal slot and the lower flange d contact with flange c^4 , which
 65 takes all friction off from the yoke d^2 and al-

lows the blades to swing down into vertical position when in operative relation. By upwardly moving the sleeve a portion of the distance it will also be forwardly turned toward the approaching blades, so that the same will
 70 contact with their abutments before they have been able to swing into vertical position, thereby decreasing the speed of rotation of the wheel, and said decrease can be continued until the abutments are in their uppermost position,
 75 in which case the sleeve will have been turned a partial revolution and the abutments thrown into a position to hold all of the blades at an angle of forty-five degrees, thereby preventing any rotation of the wheel whatsoever.
 80

It will be seen from the foregoing description that the windmill of the present invention is simple in construction and operation and that the parts are so regulated and adjusted that the wheel may be instantly
 85 stopped or its speed of rotation regulated without the necessity for the use of a tail or other complicated and cumbersome regulating means.

Although the device has been described 90 with considerable particularity, it is obvious that the parts may be changed or modified without departing from the spirit of the invention.

What I regard as new, and desire to secure 95 by Letters Patent, is—

1. In a windmill, the combination of a hub, a series of rods projecting therethrough and rotatably mounted therein, blades on the outwardly-projecting ends of the rods, the blades
 100 on the same rod being fixedly mounted in angular position to one another, a slidable collar provided with a diagonally-extending slot, a stud positioned in the diagonal slot, abutments for the blades carried by the collar, and
 105 means for vertically moving and turning the collar to regulate the position of the abutments and limit the movement of the blades on the operative side of the wheel, substantially as described.
 110

2. In a windmill, the combination of a hub, a series of blades radially projecting from the hub and adapted to be swung into transverse relation to the wind when in operative position and adapted to be swung into edgewise
 115 relation when approaching the wind, a shank fixedly secured to the hub, a vertically-movable collar on the shank provided with a diagonally-extending slot, a stud on the shank outwardly projecting through the slot, a yoke
 120 for vertically moving the collar and allowing it to turn on the shank, and outwardly-projecting abutments connected with the collar and vertically movable therewith for regulating and limiting the movement of the blades
 125 on the opposite side of the wheel, substantially as described.

3. In a windmill, the combination of a hub and a series of rods passing through the hub at different points of vertical elevation and 130

rotatable therein, blades fixedly secured to the projecting ends of the rods, the blades on a single rod being secured in angular relation to one another, a power-shaft connected with the hub, a collar slidably mounted with respect to the power-shaft and provided with a diagonally-extending slot, a stud outwardly projecting through the slot and connected with the power-shaft, means for moving the collar and outwardly-projecting abutments connected with the collar and vertically movable therewith for regulating and limiting the movement of the blades on the operative side of the wheel, substantially as described.

4. In a windmill, the combination of a hub, a series of blades radially projecting from the hub and adapted to be swung into transverse relation to the wind when in operative posi-

tion and adapted to be swung into edgewise relation when approaching the wind, a power-shaft, a collar carried by the power-shaft and vertically movable with respect thereto and provided with a diagonally-extending slot, a stud connected with the power-shaft and outwardly projected through the slot, a yoke for vertically moving the collar and allowing it to turn with respect to the power-shaft and outwardly-projecting abutments connected with the collar and vertically movable therewith for regulating and limiting the movements of the blades on the operative side of the wheel, substantially as described.

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