

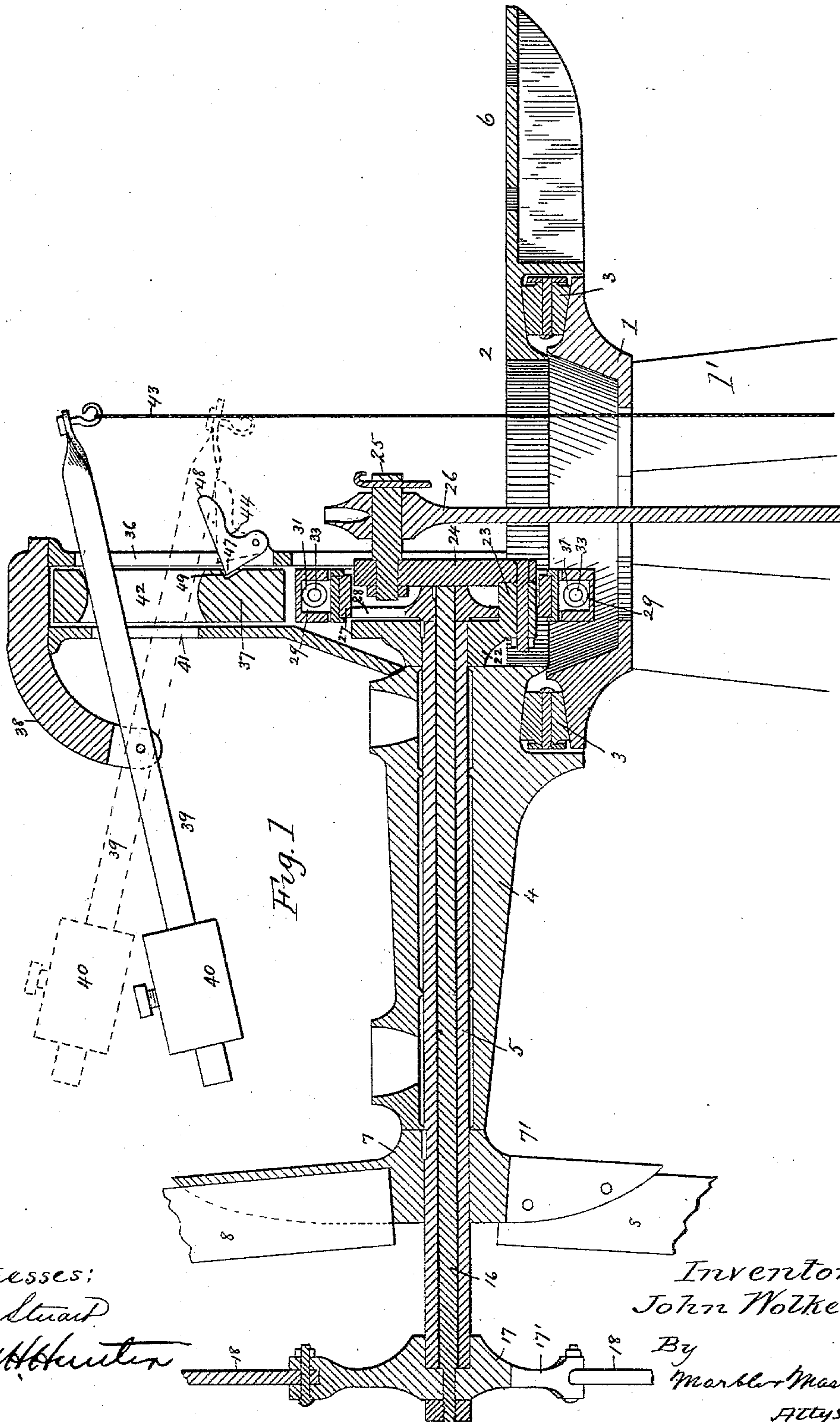
(No Model.)

3 Sheets—Sheet 1.

J. WOLKE.  
WINDMILL.

No. 414,468.

Patented Nov. 5, 1889.



Witnesses:  
J. R. Stuart  
J. M. Hunter

Inventor  
John Wolke  
By  
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Attys.

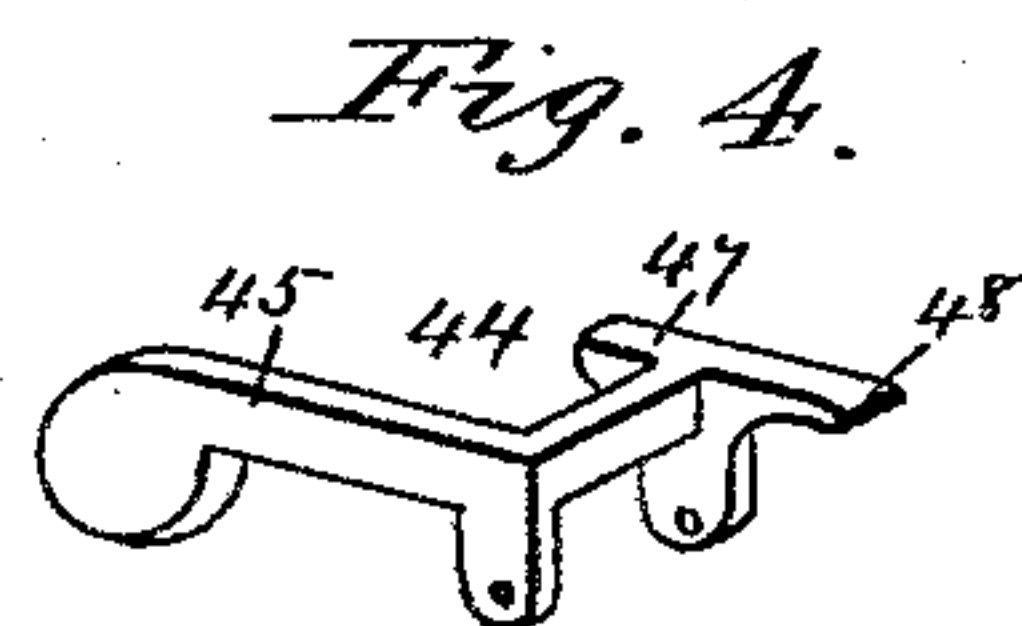
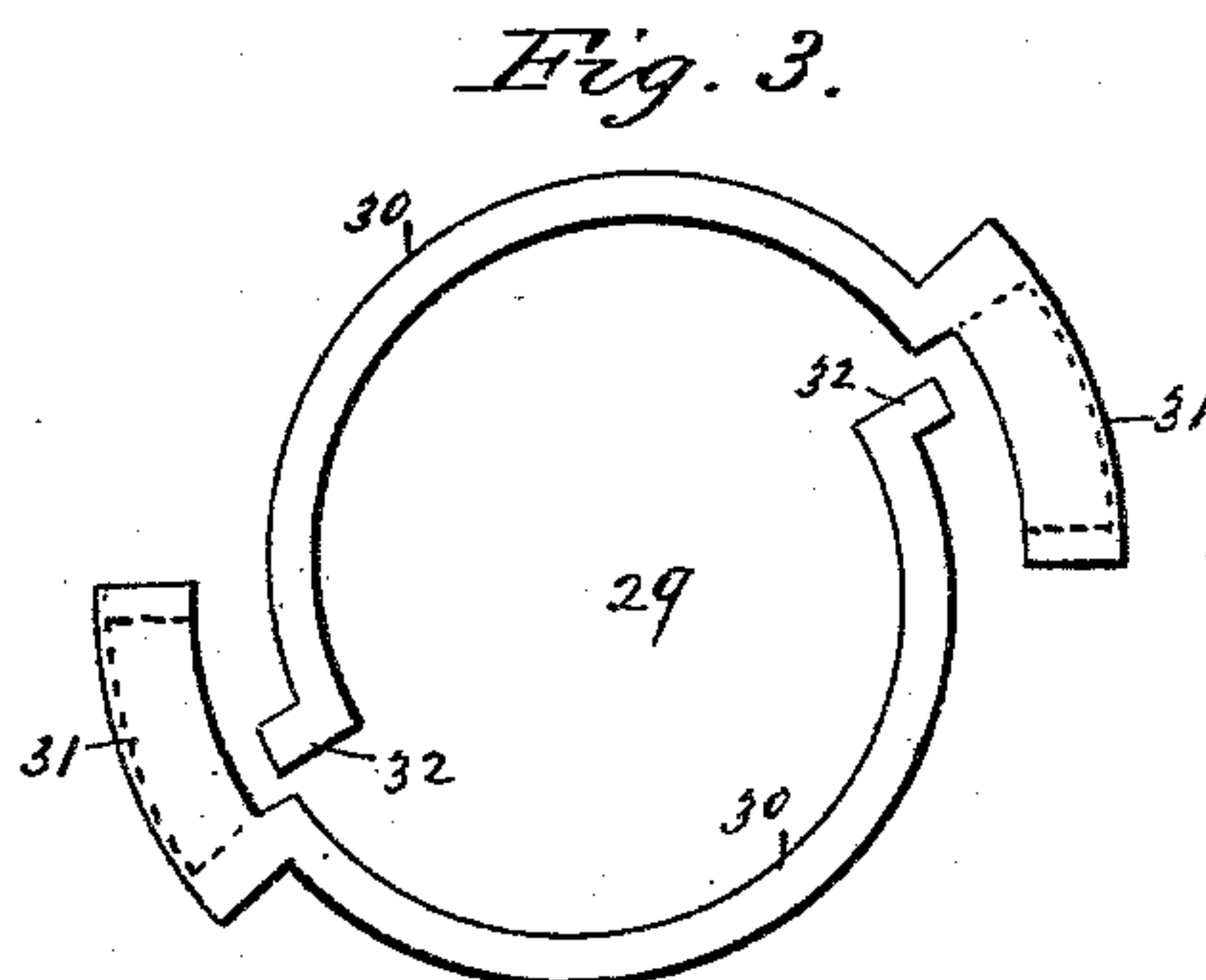
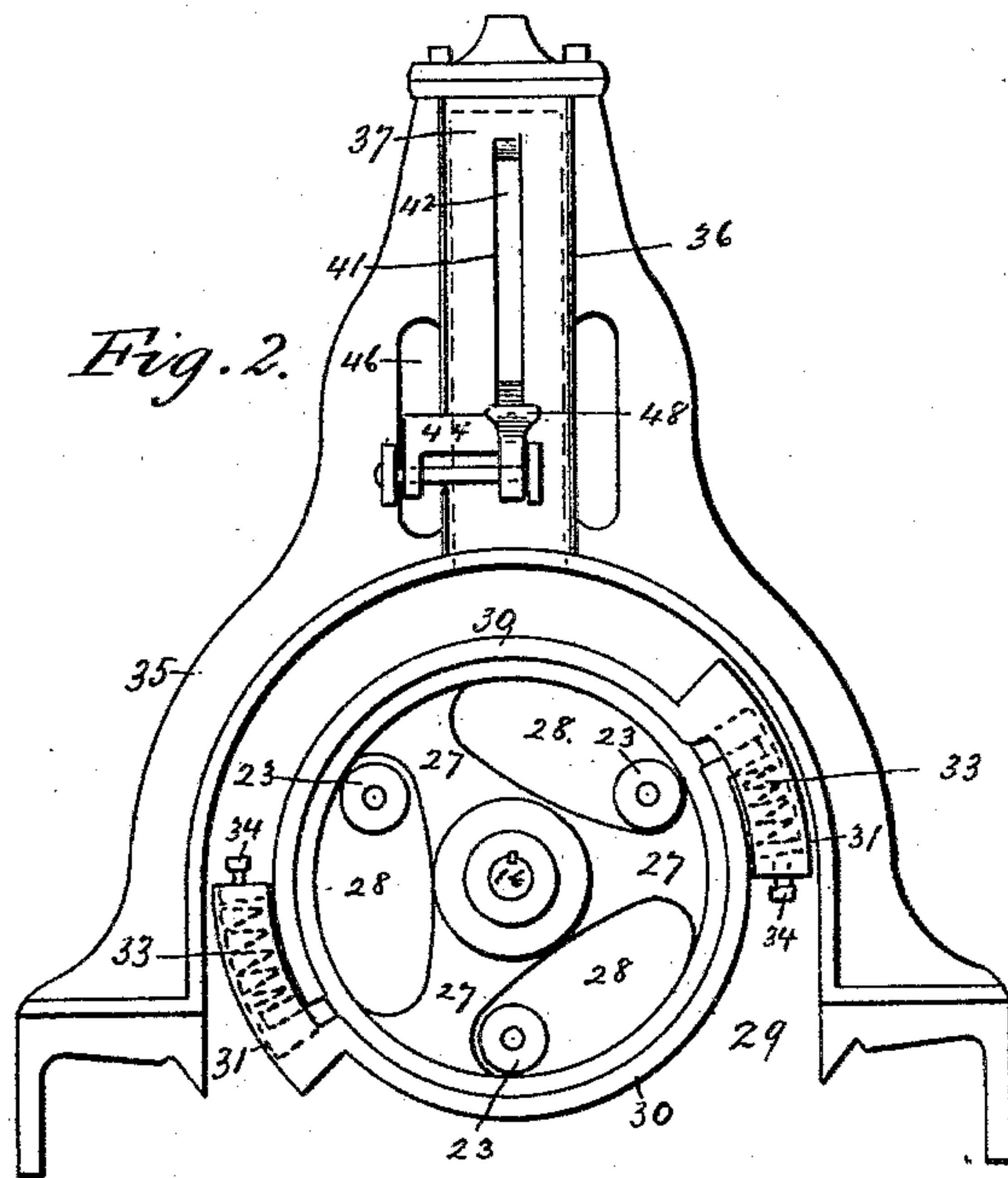
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J. WOLKE.  
WINDMILL.

No. 414,468.

Patented Nov. 5, 1889.



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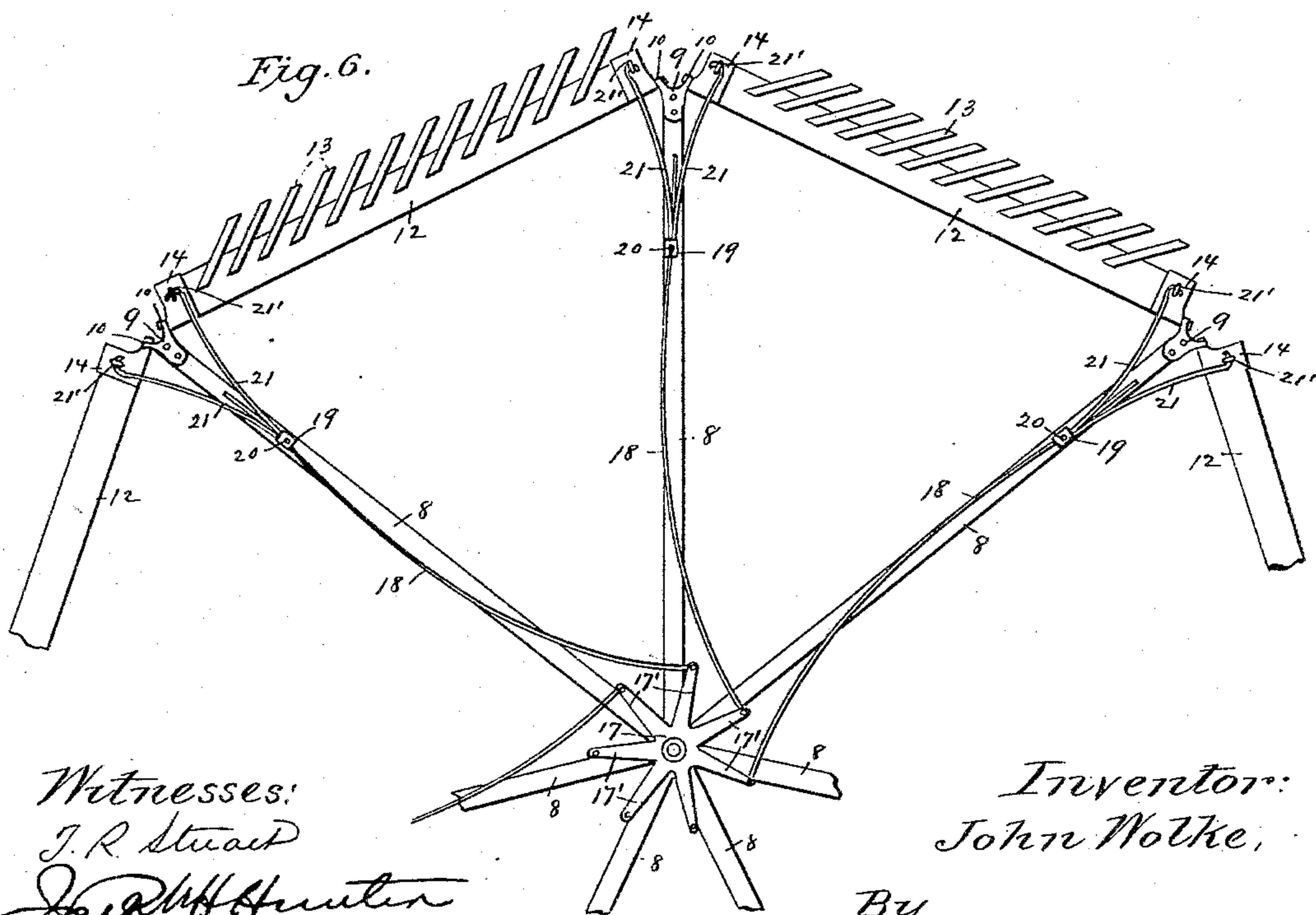
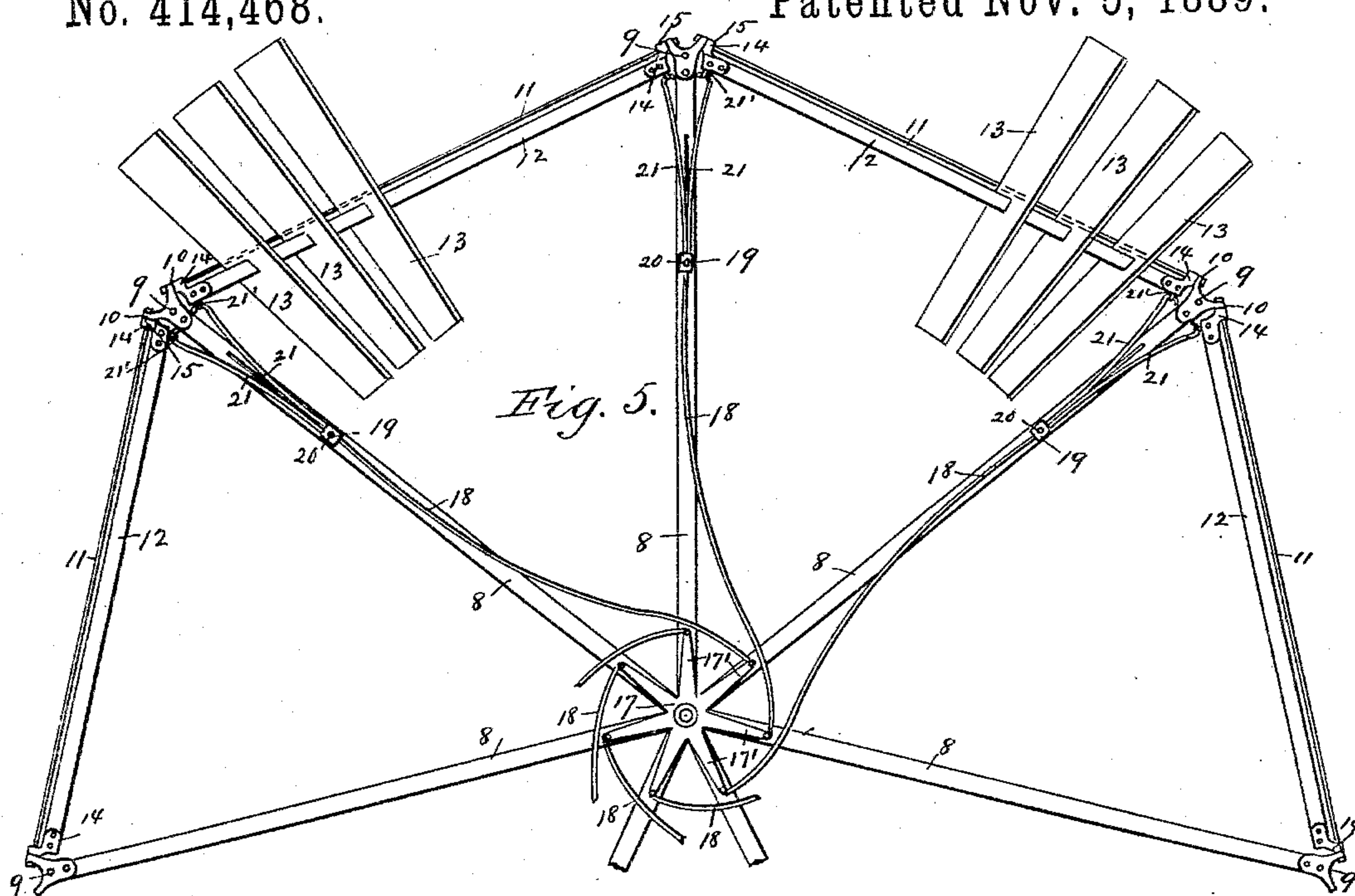
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3 Sheets—Sheet 3.

J. WOLKE.  
WINDMILL.

No. 414,468.

Patented Nov. 5, 1889.



Witnesses:  
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# UNITED STATES PATENT OFFICE.

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## WINDMILL.

SPECIFICATION forming part of Letters Patent No. 414,468, dated November 5, 1889.

Application filed May 19, 1888. Serial No. 274,395. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN WOLKE, a citizen of the United States, residing at Jacksonville, in the county of Morgan and State of Illinois, have invented certain new and useful Improvements in Windmills; and I 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 ap-  
10 pertains to make and use the same.

My invention relates to windmills for operating pumps or other machinery, and generally to the class in which the wind-wheels are made in sections, each section being hung  
15 on pivots and provided with means for tilting it, so as to stand at different angles to the direction of the wind; and it relates more especially to improvements in the construction of this particular kind of windmills, in which  
20 the moment the wheel begins to revolve the sections will be automatically tilted out of the wind, or at a right angle to the face of the wheel, by centrifugal force, in which curved rods and spring-rods attached to a spider or  
25 hub, which is concentric with the wind-wheel and revolves therewith, but independently thereof, will serve to force said sections back into the wind, or parallel to the face of said wheel, and in which a brake-clamp  
30 will retard said spider or hub, so as to cause said wheel to revolve slightly ahead of the same, and thus bend or force the spring-rods so that they will tilt the sections out of the wind, or at right angles to the face of the  
35 wheel; and it consists in the improved construction and arrangement or combination of parts hereinafter fully disclosed in the description, drawings, and claims.

The objects of my invention are, first, to  
40 provide a windmill in which the construction and arrangement of the parts are such that it will automatically regulate or govern itself without the use of weights, expensive regulators, or other complicated mechanism;  
45 second, to provide a windmill in which the force is applied directly where it is needed without the interposition of a large number of joints, rods, sliding collars, &c.; third, to  
50 provide a wind-wheel in which its sections or tumbling-bars and vanes may be tilted

out of the wind by the centrifugal force, due to the revolution of said wheel, against the action or resistance of pairs of spring-steel rods attached to the ends of the tumbling-bars of said sections; fourth, to connect said  
55 spring-steel rods and the curved rods to which they are attached to the ends of the tumbling-bars; fifth, to provide improved devices for adjusting the tension of said spring-rods; sixth, to provide a spring-actuated  
60 brake-clamp which applies friction to the disk by which the mechanism for operating the wheel-sections is controlled, which permits said disk to slip slightly therein, if necessary, without any sudden jar or injury to  
65 the mill, but which is applied to said disk with its full force, and instantly throws the wheel-sections out of the wind, said sections being rather thrown out of the wind before  
70 the brake is applied than otherwise; seventh, to provide a disk on the tubular shaft of the wind-wheel with studs or lugs, and also the section-operating disk with segmental slots for said studs or lugs and for permitting  
75 limited play between said disks, and, eighth, to provide a stop-bolt or dog and a trigger, or trip for supporting said stop-bolt or dog, which applies the brake, and a weighted lever for raising said stop-bolt or dog.

I accomplish the above objects by the  
80 mechanism shown in the accompanying drawings, forming a part of this specification, in which the same reference-numerals indicate the same parts, and in which—

Figure 1 represents a vertical longitudinal  
85 section of the upper portion of my improved windmill, the section being taken through the tubular shaft of the wind-wheel; Fig. 2, an end view of the casting or upright frame which contains the stop-bolt or dog and covers  
90 and protects the brake-clamp and the metallic disk within the same, the face-plate, which carries the wrist-pin for the pump rod or pitman, being removed; Fig. 3, a detail view of the two-part brake-clamp; Fig. 4, a perspective  
95 view of the trigger or trip; Fig. 5, a face or front view of the wind-wheel with the vanes omitted from some of the sections, the other vanes showing said wheel as set in the wind, or in position to be revolved; Fig. 6, a  
100



similar view of said wind-wheel with the vanes omitted from some of its sections, and showing said wheel as out of the wind, or with its vanes tilted at a right angle to its face.

5 In the drawings, the numeral 1 indicates the circular cap-piece at the upper end of the pedestal 1', upon which the turn-table 2 is placed with interposed anti-friction rollers 3. This turn-table is provided with a laterally-  
10 projecting horizontal bearing 4 for the tubular shaft 5, and with the projecting diametrically-opposite socket 6, for the steering-vane or rudder, all of which parts may be of the usual or any preferred construction.

15 The hub or spider 7 of the wind-wheel 7' is keyed or otherwise secured upon the outer portion of the tubular shaft 5, and has radial arms 8 secured thereto. Boxes or clamps 9, having each two perforated ears 10, are se-  
20 cured upon the outer ends of said arms, and round rods 11 are secured at their nuted ends in said ears and connect the outer ends of each pair of said arms. The tumbling-bars 12, in the edges of which the vanes 13  
25 are inserted in the usual manner, are provided upon their ends with the boxes or caps 14, which are formed with perforated ears 15, which are located at the inner edges of said tumbling-bars. The tumbling-bars are piv-  
30 oted upon the round rods 11, which connect the outer ends of the arms. As said ears 15 project outward from the boxes or caps 14 upon the tumbling-bars when the latter and the vanes are in the wind, it will be obvious  
35 that by hanging the wheel-sections in this manner, said sections being made up of said tumbling-bars and vanes, the tendency of the centrifugal force due to the rotation of the wheel, will be to throw outward the inner ends  
40 of said vanes when the wind-wheel is revolved faster than its proper speed, and thus present less surface to the force of the wind and maintain a nearly-uniform rate of speed.

A shaft 16 is journaled within the shaft 5,  
45 and has secured at its outer end a hub or spider 17, formed with radiating arms 17', which correspond in number to and normally register with the arms 8 of the wind-wheel. Rods 18, which are slightly curved at their  
50 inner portions, are secured with their inner ends to the ends of the arms 17' of said hub or spider 17, and are provided at their outer ends with sleeves or clamps 19, which are pro-  
55 vided with set-screws 20, which secure them upon said rods, and at the same time adjustably secure the inner ends of two spring-steel rods 21 within said sleeves and against said rods. The outer ends of these spring-  
60 steel rods are pivotally secured to the open lugs 21' upon the sides of the boxes or caps 14 of the tumbling-bars upon the sides of the boxes or caps which face inward when the tumbling-bars and vanes are tilted into the wind, or parallel to the face of the wind-wheel.  
65 These sliding rods of course have a tendency to contract or draw toward each other when spread apart or against their tension. Also, it

will be observed on reference to Figs. 5 and 6 of the drawings that said spring-rods will be spread apart when the vanes are tilted out of  
70 the wind; that the resistance or tendency of said spring-rods to draw together will tilt the vanes parallel to the face of the wheel or into the wind when the force of the latter upon said vanes decreases; that whenever the tumbling-  
75 bars and vanes are tilted by centrifugal force out of the wind, or at right angles to the face of the wind-wheel, the spring-rods will return them into the wind, or into position parallel with the face of the wheel, whenever the  
80 pressure of the wind decreases.

As the solid shaft 16 is journaled to revolve with the tubular shaft 5, but independently thereof, whenever the bars and vanes or wheel-sections are tilted the spider or hub 17  
85 upon the end of said solid shaft will be turned by the rods 18 moving its arms 17' slightly out of register or alignment with the wheel-arm 8. The tension of the spring-steel rods 21 is ad-  
90 justable by moving the clamping-sleeves 19 in or out over their inner ends and over the rods 18, and by securing said sleeves in their adjusted positions by the set-screws 20. By  
95 means of these devices suitable adjustments can be made for the force of the wind and velocity of rotation of the wheel required to tilt the wheel-sections; also, the wheel-sections are prevented from being thrown out too easily by said spring-steel rods.

A disk 22 is secured upon the inner end of  
100 the tubular shaft 5, and is provided with lugs or studs 23 upon its face. To the outer ends of these lugs is bolted the face-plate or disk 24, which is secured in a plane parallel to said disk 22 and provided with a wrist-pin 25, to  
105 which is attached a pitman or pump rod 26.

A flanged disk 27 is secured upon the inner end of the inner shaft 16, is located between the disk 22 and face-plate 24, and is provided with segmental slots 28, within which the  
110 studs or lugs 23 project and are adapted to be moved from one end of said slots to the other, whereby said disks 22 and 27 are permitted to revolve for a short distance independent of each other; but when revolved together  
115 they move at the same speed and are simultaneously rotated by the wind-wheel 7' and the hub or spider 17. A brake-clamp 29, which is composed of two semicircular bands 30, provided at their ends with outwardly-  
120 projecting longitudinally-slotted casings 31 and lugs 32, the latter being adapted to fit and slide within said slotted casings, is placed around the disk 27. Coiled springs 33 are located within said slotted casings between  
125 said lugs and set-screws 34, the latter passing through the ends of said casings and serving to yieldingly clamp said brake around the rim of said disk 27. The clamp-  
130 ing force of this brake may be adjusted by the set-screws 34, which serve to regulate the tension of the springs 33.

An upright casting or frame 35, which is bolted to the turn-table and suitably braced,



serves to cover and protect the brake-clamp 29 and the disk 27, and is formed with a vertically-cored upright bearing 36, in which a stop-bolt or dog 37 is adapted to be moved.

5 An arm 38 projects forward from the upper end of said bearing. In the lower end of this arm is fulcrumed a lever 39, the forward arm of which is provided with an adjustable weight 40, and its rear arm projects through  
10 and is adapted to be moved up and down within vertically-aligned slots 41 and 42, formed, respectively, in the upright bearing 36 and in the stop-bolt or dog 37. A cord or wire 43 is attached to the rear end of said lever, and passes down through the windmill  
15 frame or pedestal, being connected at its lower end to a bucket arranged within the reservoir, (from which the water is pumped when the mill is employed for pumping purposes,) the operation being such that said  
20 cord or wire will be automatically pulled downward by the weight of the bucket and its contents when the pump and mill are required to be stopped; or said cord or wire  
25 can be operated by other regulating devices or by hand.

A trigger or trip 44, which is provided with a forwardly-projecting weighted arm 45, which passes through a slot 46 in the upright  
30 bearing 36, with a beveled catch or lip 47 and with a rearwardly-projecting arm 48, is pivoted upon the rear side of the upright casing or frame, and engages by its catch or lip 47 with a beveled notch 49 in the vertically-  
35 movable bolt or dog 37 when the latter is in its raised position in the bearing. On reference to the drawings it will be observed that the weight upon the lever 39 will hold said lever normally tilted forward, that the rear  
40 arm of said lever will raise the vertically-movable stop-bolt or dog 37, and that the latter will be held in its raised position by the catch or lip 47. When the rear arm of  
45 said lever is drawn or pulled down by the cord or wire 43, it will strike the rear arm 48 of the trigger or trip 44, tilt the same, and release the stop-bolt or dog 37, which will then drop down with its end against the periphery of the brake-clamp 29. As this  
50 brake-clamp normally revolves with the disks 22 and 27 upon the tubular shaft 5 and inner shaft 16 it will be stopped when the end of one of its projecting casings 31 strikes the lower end of said bolt and stops  
55 the revolution of the inner disk 27, which it encircles and clamps; but as the slots 28 in said disk are elongated they will permit the lugs 23 on the disk 22 of the tubular shaft to move on to the ends of said slots and revolve  
60 the disk 27 a short distance farther. The hub or spider 7 of the wind-wheel will thus be turned so as to bring its arms 8 slightly out of register or alignment with the arms 17  
65 of the section-operating hub or spider 17 upon the inner shaft 16, causing the rods 18, which are secured to said hub or spider, to be pushed outward and the wheel-sections or tumbling-

bars and vanes to be tilted out of the wind, or at right angles to the face of the wind-wheel, as before described. The disk 22 upon the  
70 inner end of the tubular shaft 5 will be stopped when the studs or lugs 23 upon the face of the same strike the ends of the segmental slots 28 in the disk 27, which is then held by the brake-clamp 29 and stop-bolt or dog 37,  
75 when the wind-wheel will thus be stopped, with its sections out of the wind. If the speed or momentum of the wheel be too great to be immediately stopped, the disk 27 upon the inner end of the inner shaft 16 will slide a  
80 little within the brake-clamp, and thus there will be no sudden jarring of the working parts of the mill in stopping the same; but ordinarily the brake will be applied and the wheel-sections tilted out of the wind simul-  
85 taneously, or rather the sections will be thrown out of the wind a very short time before the brake-clamp is applied, and thus the latter will only have to resist or hold against the momentum of the wheel, and not against  
90 the force of the wind, as said sections are tilted as soon as the revolution of the disk 27 begins to be retarded by said brake-clamp, and before the wind-wheel is fully stopped by the studs 23 upon the disk 22 of the tubular  
95 shaft coming in contact with the ends of the slots 28 in said disk 27. This action is perfectly and quickly effected, stopping the mill at once, as the brake-clamp only permits about one-seventh of a revolution of the  
100 wind-wheel before it throws its sections out of the wind and prevents them from tilting back and forth and straining the mill. It will also be observed that by having the spring-  
105 rods 21, which are attached near the ends of the section-operating rods 18, secured at both ends of the tumbling-bars, said tumbling-bars and the sections of which they form parts can still be operated, even if one of the operating-rods or one or both of the spring-rods  
110 should break or fail to work, which would not be possible with ordinary wind-wheels, in which said operating-rods are attached to the centers of said tumbling-bars.

Having thus fully described the construc-  
115 tion and arrangement or combination of the several parts of my windmill and the operation and advantages of the same, what I claim as new is—

1. In a windmill, the combination of a  
120 wind-wheel provided with radial arms, and tumbling-bars provided with vanes and pivoted at their ends between the ends of said radial arms, with a hub or spider arranged adjacent to said wind-wheel and provided  
125 with radial rods, and spring-rods attached at their inner ends to each of said rods and at their outer ends to the ends of said tumbling-bars, substantially as and for the purpose described.  
130

2. In a windmill, the combination of a wind-wheel provided with radial arms, and tumbling-bars provided with vanes and pivoted at their ends between the ends of said



radial arms, with a hub or spider arranged adjacent to said wind-wheel and provided with radial rods, and spring-rods adjustably attached at their inner ends to each of said rods and pivotally attached at their outer ends to the ends of said tumbling-bars, substantially as and for the purpose described.

3. In a windmill, the combination, with the wind-wheel provided with the hub or spider, the radial arms, and the tumbling-bars provided with the vanes and pivoted at their ends between the ends of said radial arms, of a hub or spider arranged concentrically with the hub or spider of said wind-wheel and adapted to be slightly revolved independently thereof and provided with curved radial rods, and spring-rods adjustably secured at their inner ends to the end of each of said rods and pivotally connected at their outer ends to the ends of said tumbling-bars, substantially as described.

4. In a windmill, the combination of the wind-wheel 7', provided with the radial arms 8, having boxes or clamps 9 formed with apertured ears 10, the round rods 11, and the tumbling-bars 12, having the vanes 13 and provided at their ends with boxes or caps 14, formed with ears 15, and open lugs 21', with the hub or spider 17, the rods 18, and the spring-rods 21, substantially as described.

5. In a windmill, the combination, with the wind-wheel 7', provided with the hub or spider 7, the arms 8, and the tumbling-bars 12, provided with the vanes 13, and pivoted at their ends between said arms, of a hub or spider 17, arranged concentrically with said hub 7 and adapted to be slightly turned independently of the same and provided with the rods 18, secured at their inner ends to the arms thereof, the clamping-sleeves 19, the set-screws 20, and the spring-rods 21, adjustably secured in said clamping-sleeves and pivoted at their outer ends to the ends of said tumbling-bars, substantially as described.

6. The combination of a wind-wheel provided with tilting sections, a tubular shaft, an inner shaft, disks upon the inner ends of said shafts, a two-part brake-clamp surrounding one of said disks, and devices, substantially as described, for operating the same, substantially as described.

7. The combination, with a wind-wheel provided with tilting sections, a tubular shaft upon which said wheel is secured, a hub or spider provided with devices, substantially as described, for tilting said sections, and a shaft journaled within said tubular shaft and having said hub or spider secured to its outer end, of a disk secured upon the inner end of said tubular shaft and provided with studs or lugs upon its face, a disk secured upon the inner end of said inner shaft and formed with segmental slots, in which said studs or lugs are adapted to move, a brake-clamp movably secured around the last-named disk, and devices, substantially as described, for clamping the same to and releasing it

from the periphery of said disk, substantially as described.

8. The combination, with a wind-wheel provided with tilting sections, a tubular shaft upon which said wheel is secured, a hub or spider provided with devices, substantially as described, for tilting said sections, and a shaft journaled within said tubular shaft and having said hub or spider secured to its outer end, of a disk secured upon the inner end of said tubular shaft, and provided with studs or lugs upon its face, a disk secured upon the inner end of said inner shaft and formed with segmental slots, in which said studs or lugs are adapted to slide, a brake-clamp movably secured around the last-named disk and provided with projections upon its periphery, a stop-bolt or dog, and devices, substantially as described, for bringing the same into contact with and removing it from the periphery of said brake-clamp, substantially as described.

9. The combination, with a wind-wheel provided with tilting sections, a tubular shaft upon which said wheel is secured, a hub or spider provided with devices, substantially as described, for tilting said sections, and a shaft journaled within said tubular shaft and having said hub or spider secured to its outer end, of a disk secured upon the inner end of said tubular shaft and provided with studs or lugs upon its face, and a disk secured upon the inner end of said inner shaft and formed with segmental slots for the passage or play of said studs or lugs, and a brake-clamp fitted around the last-named disk and formed in two parts, having lugs, casings, and springs, a stop-bolt or dog, and devices, substantially as described, for bringing the same into contact with and removing it from the periphery of said brake-clamp, substantially as described.

10. The combination of the wind-wheel 7', provided with the tilting sections, the tubular shaft 5, upon which said wheel is secured, the inner shaft 16, journaled in said tubular shaft, the hub 17, provided with the section-operating rods 18, the spring-rods 21, the disk 22, secured upon the inner end of said tubular shaft and provided with studs or lugs 23, the disk 27, having slots 28, the face-plate 24, having the wrist-pin 25, the pitman or pump rod 26, the brake-clamp 29, formed in two parts 30 and provided with spring-casings 31, lips 32, springs 33, and set-screws 34, the stop-bolt or dog 37, a weighted lever for raising the same, and a trigger or trip for holding and releasing it, substantially as described.

11. A windmill provided with the cap-piece 1, the turn-table 2, the arched frame 35, having the vertical bearing 36 formed with the slot 41, the wind-wheel 7', provided with the tilting sections, the tubular shaft 5, the inner shaft 16, the hub or spider 17, the rods 18, spring-rods 21, the disk 22, arranged upon the inner end of said tubular shaft and pro-



vided with the studs or lugs 23, the face-plate 24, having wrist-pin 25, the pitman or pump rod 26, the disk 27, having slots 28 for said studs or lugs, the brake-clamp 29, having  
5 projecting lugs 32 and slotted casings 31, screws 34, and springs 33, the stop-bolt 37, having vertical slot 42 and beveled notch 49, the trigger or trip 44, having the front weighted arm 45, catch or lip 47, and rear

arm 48, the lever 39, having weight 40, and the cord or wire 43, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

JOHN WOLKE.

Witnesses:

DAN. E. PIERSON,  
JOHN F. CLARK.