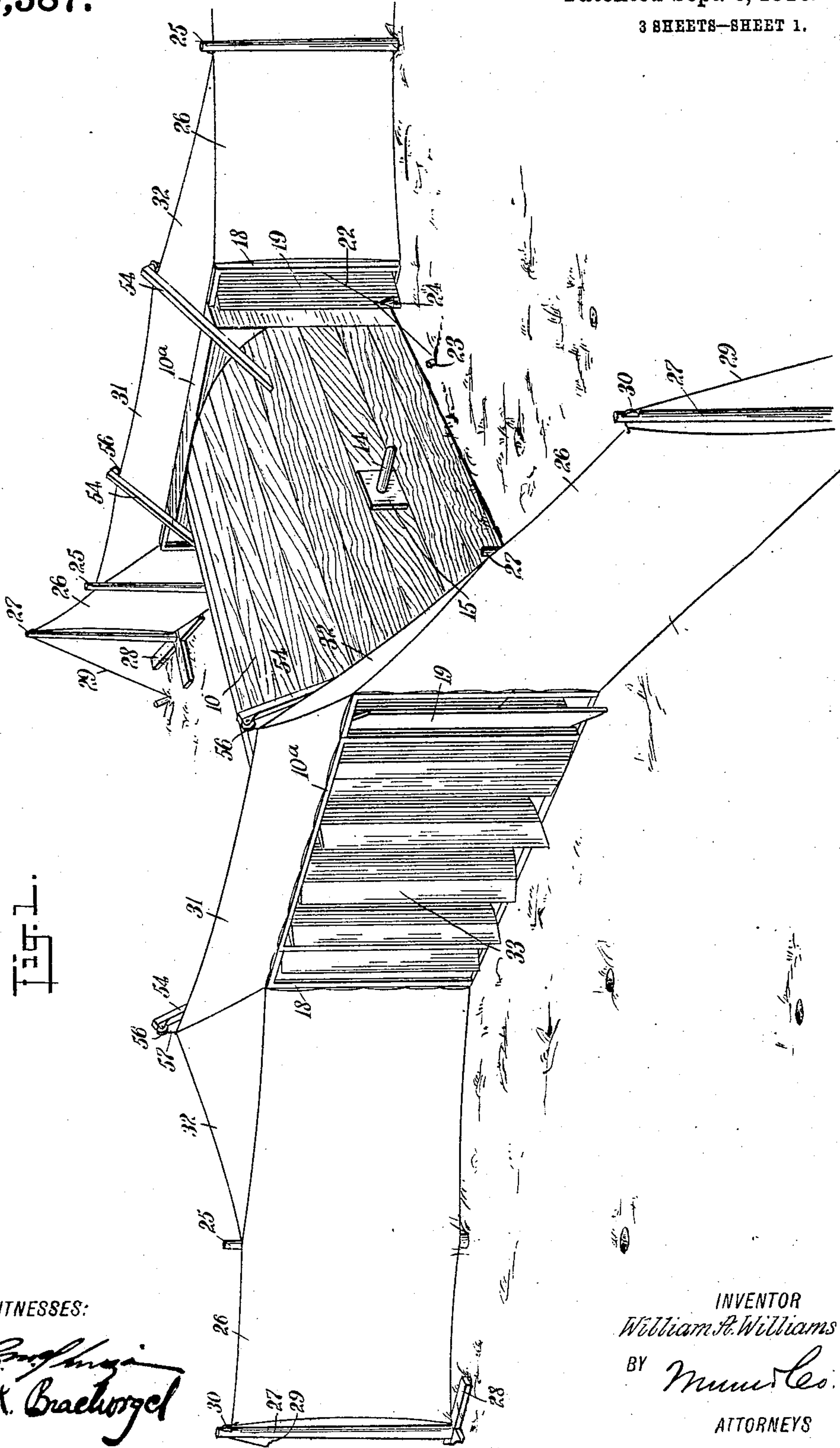


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WIND MOTOR.  
APPLICATION FILED JAN. 14, 1910.

Patented Sept. 6, 1910.  
3 SHEETS—SHEET 1.



WITNESSES:

*John K. Brachvogel*

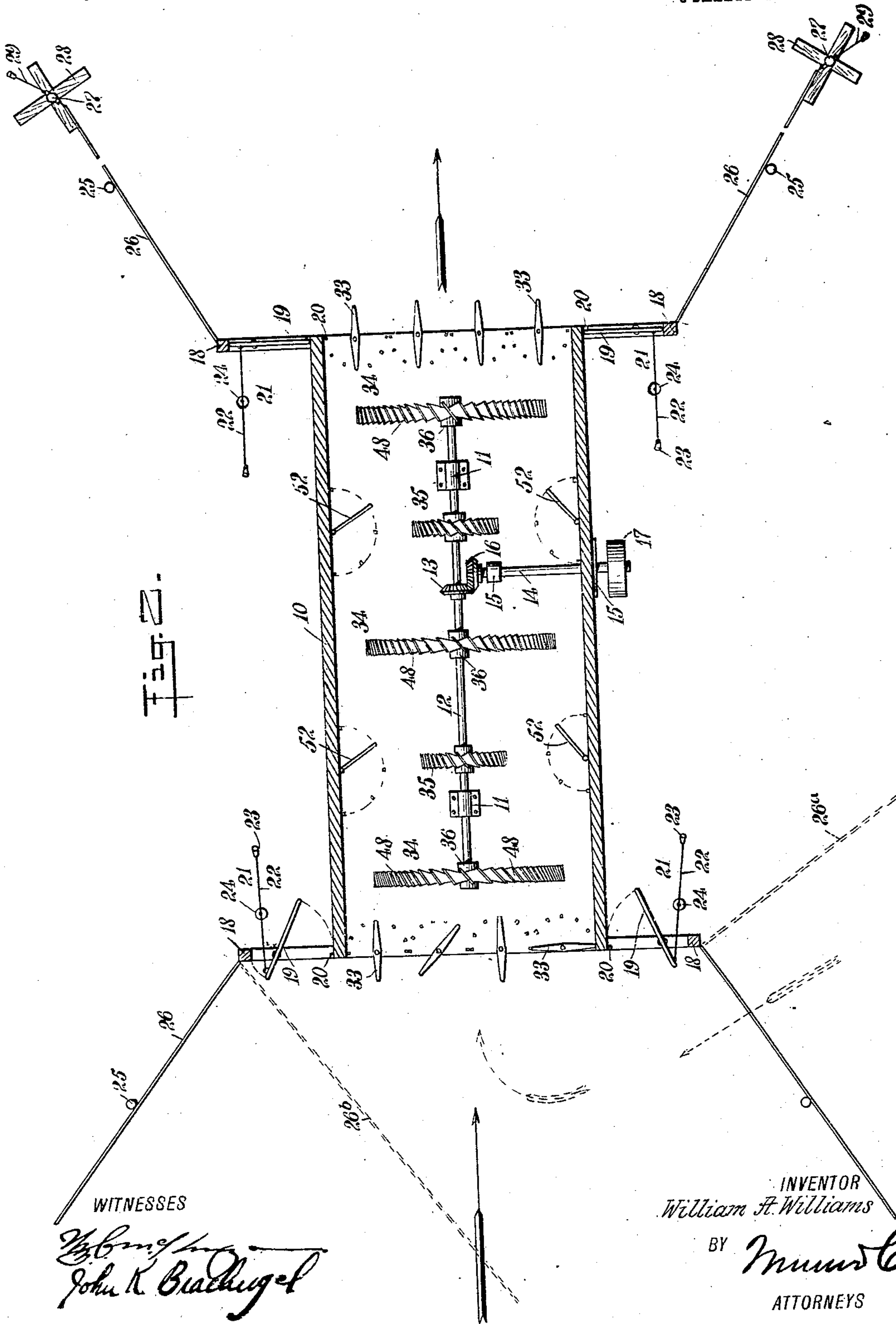
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Fig. 3.

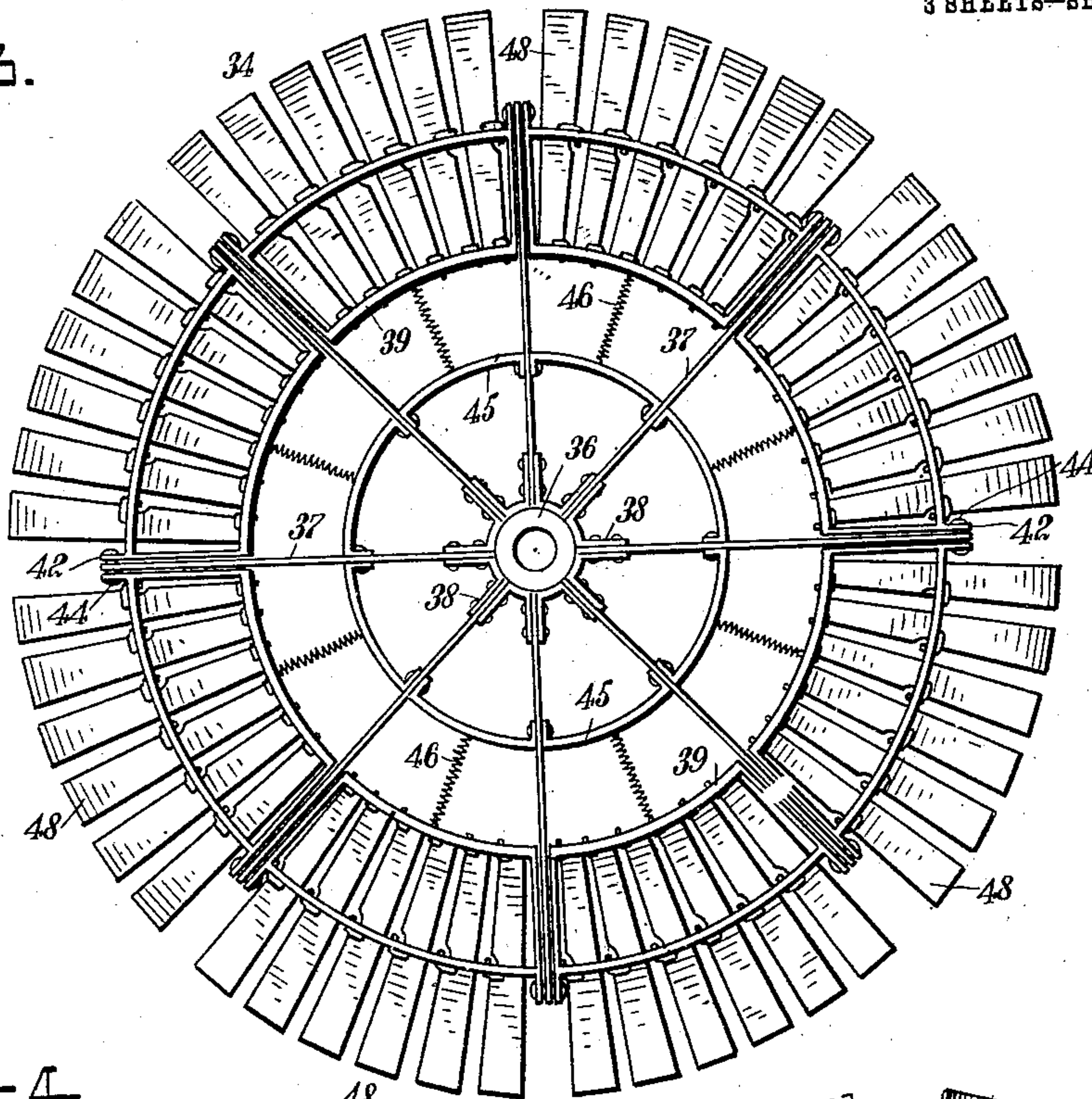


Fig. 4.

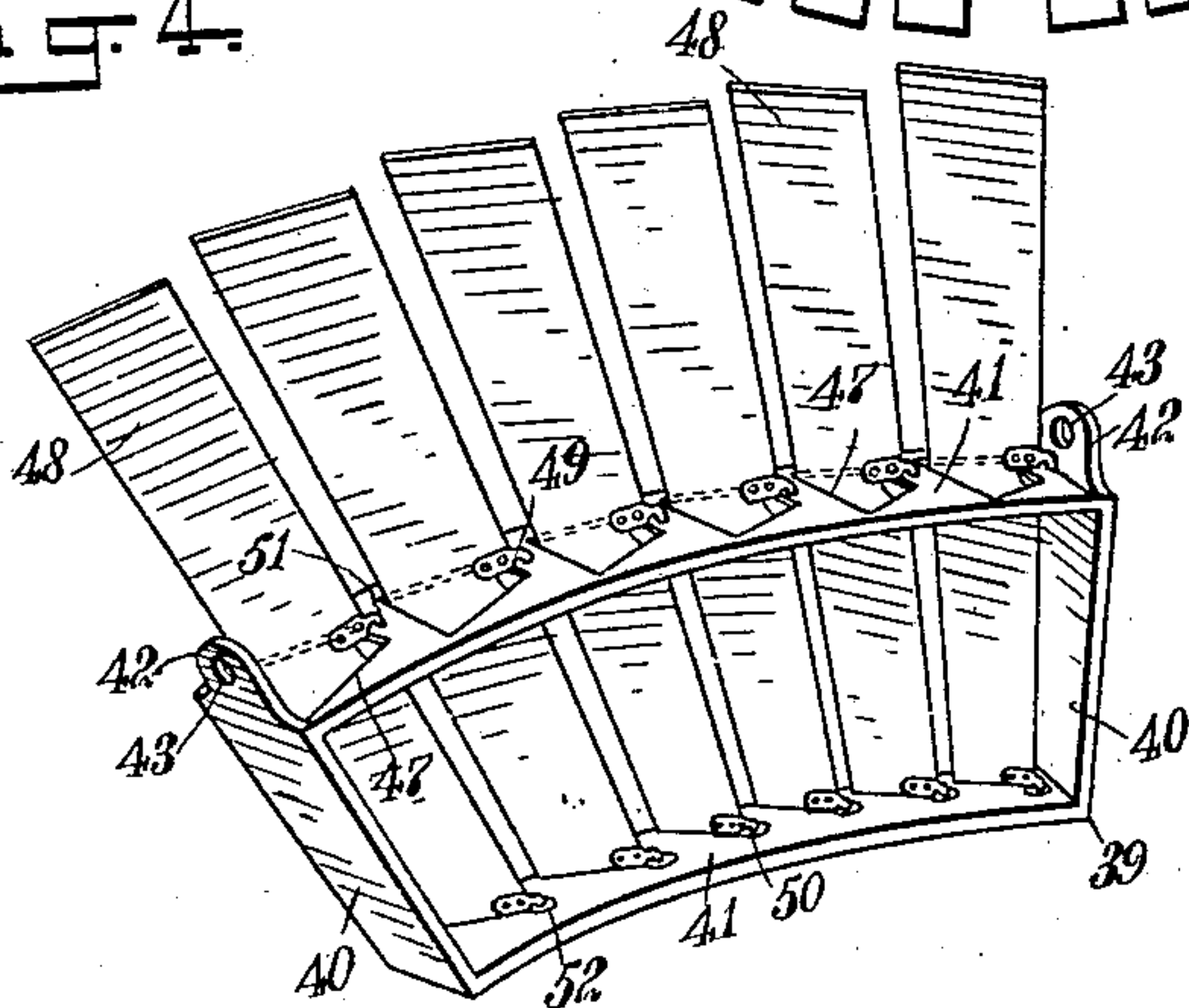


Fig. 5.

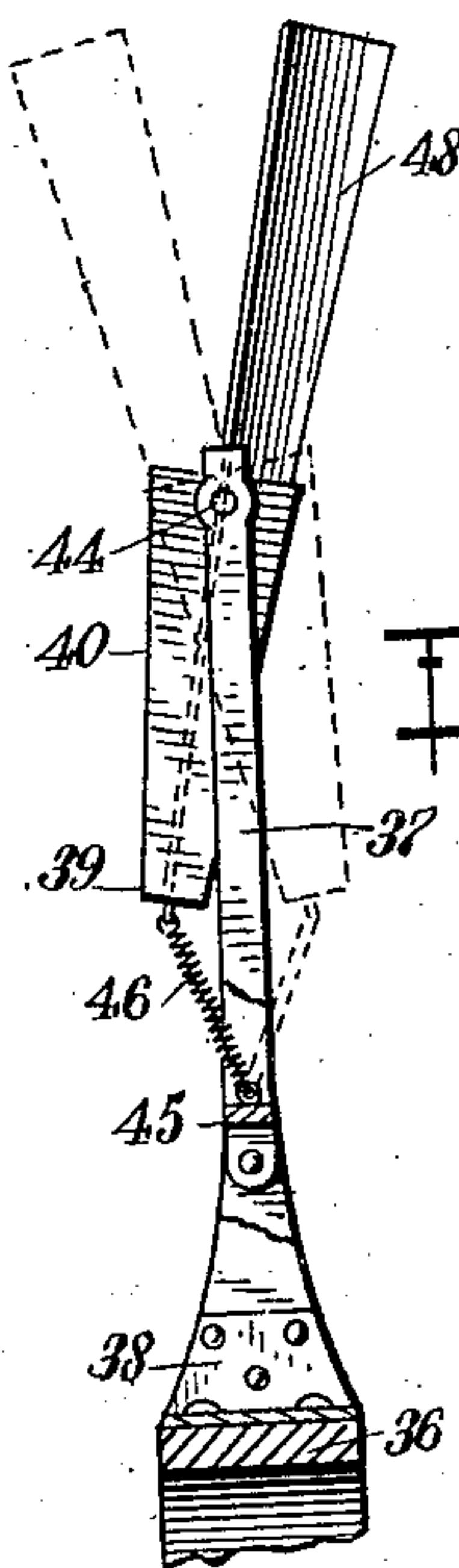
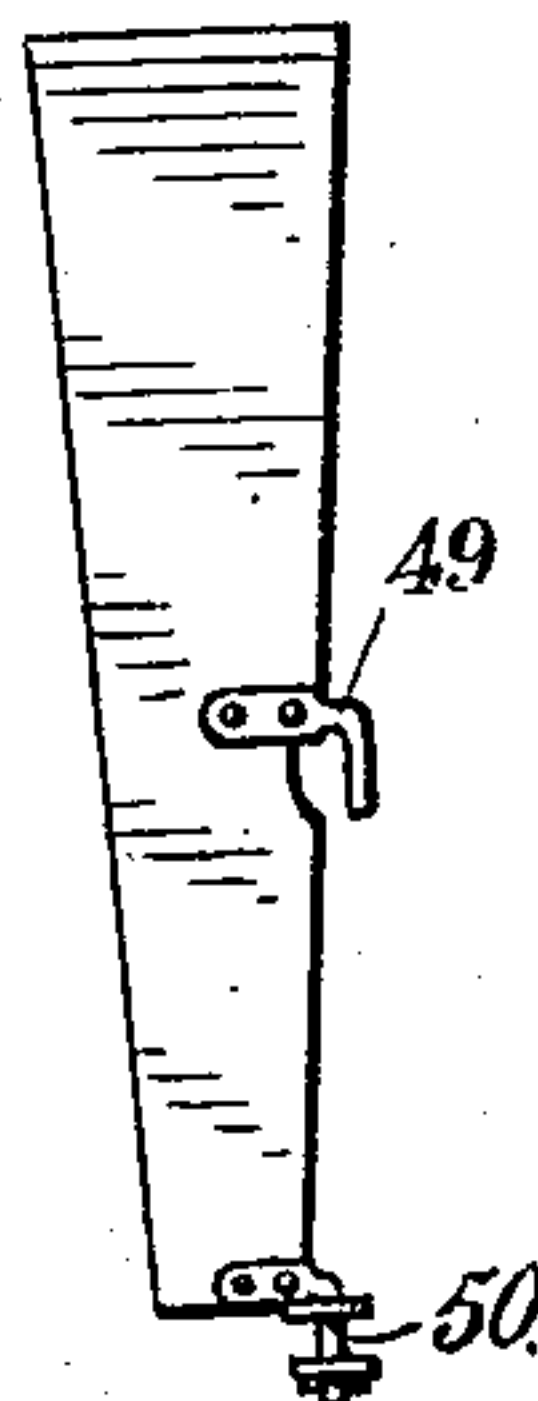


Fig. 5.

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# UNITED STATES PATENT OFFICE.

WILLIAM A. WILLIAMS, OF OLIVET, SOUTH DAKOTA.

WIND-MOTOR.

969,587.

Specification of Letters Patent.

Patented Sept. 6, 1910.

Application filed January 14, 1910. Serial No. 538,103.

*To all whom it may concern:*

Be it known that I, WILLIAM A. WILLIAMS, a citizen of the United States, and a resident of Olivet, in the county of Hutchinson and State of South Dakota, have invented a new and Improved Wind-Motor, of which the following is a full, clear, and exact description.

This invention relates to motors for developing power through the agency of winds and air currents, and relates more particularly to a device of this class comprising a casing constituting a wind conduit and having a wind concentrating and directing inlet, and wind-operable power-producing mechanism in the casing.

The object of the invention is to provide a simple, economic and efficient apparatus for producing power through the agency of the winds or other air currents, which can be easily set up at any suitable place, which can be utilized to produce power from the winds blowing in any direction, which can be located close to the ground, whereby is obviated the necessity of towers or other elevated structures as is customary with wind mills and like devices, and in which the power-producing mechanism is automatically governed regardless of the force of the air current operating it.

The invention consists in the construction and combination of parts to be more fully described hereinafter and particularly set forth in the claims.

Reference is to be had to the accompanying drawings forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the views, and in which—

Figure 1 is a perspective view of an embodiment of my invention; Fig. 2 is a longitudinal section of the device, showing certain of the parts in different positions in dotted outline; Fig. 3 is a front elevation of one of the power-producing wheels or elements directly operated by the air current; Fig. 4 is a perspective view of one of the units comprised in certain of the power-producing wheels; Fig. 5 is a side elevation of one of the units shown in Fig. 4, certain of the parts being indicated in different positions in dotted outline; and Fig. 6 is a side elevation of one of the vanes or wings of the power-producing mechanism.

Before proceeding to a more detailed ex-

planation of my invention, it should be clearly understood that the casing of the motor which constitutes the conduit through which the air currents are directed to drive the power-producing elements, can be fashioned from any suitable material such as lumber, metal or the like, and may have any dimensions desired, depending upon the power to be produced, and upon special conditions. The conduit at each end is open, and has associated therewith wings or other devices for directing the air currents into the conduit and concentrating them, the wings being suitably positioned for the purpose. It will be understood that each end may constitute an inlet, depending upon the direction from which the wind is blowing. Furthermore, the wings can be so shifted and adjusted that the air currents can be directed into the conduit even if blowing at substantially right angles to the length thereof. Any suitable number of power-producing wheels or elements can be located within the conduit, depending upon the length of the same and upon the power to be produced. Owing to the adjustable nature of the wind-directing and concentrating wings at the inlets of the conduit, the latter can be permanently located, and there is no necessity for shifting it or altering its longitudinal direction in accordance with the direction of the wind. With certain forms of wind motors, such as wind mills, it will be remembered that the power-producing elements must be shifted, or must be so arranged that they can automatically shift, in accordance with the changes in the direction of the wind. My invention obviates the necessity for such shifting and at the same time eliminates the use of towers or other elevated structures to carry the power-producing elements, for it can be located directly upon the ground and can be operated efficiently and economically when so located.

Referring more particularly to the drawings, I provide a casing 10, preferably semi-cylindrical in cross-section and having at the ends open entrances 10<sup>a</sup> substantially rectangular in form. Within the casing are bearings 11 in which is journaled a main driving shaft 12 having intermediate its ends a bevel gear 13. A power-transmitting shaft 14 is journaled in bearings 15 and has a bevel gear 16 in mesh with the gear 13.



At one end, the transmitting shaft 14 projects through a wall of the casing and has a pulley 17 so that it can be operatively connected with any suitable mechanism for  
5 utilizing the power developed, as will appear hereinafter, at the shaft 12.

At each end, the casing at both sides has frames 18 extending at substantially right angles to the length of the casing and having pivotally mounted therein doors or closures 19. These are pivotally movable about longitudinal axes, laterally offset from the longitudinal center lines, and are adapted to engage stops 20 of the frames, which  
15 serve to limit the movement of the doors. Suitable means 21 are provided for normally holding the doors closed. The devices 21 may consist of springs, or as shown for example, of lines 22 secured respectively to  
20 the doors and to pegs 23 driven into the ground, and provided with weights 24 which act gravitationally to close the doors.

Secured at the outer edges of the frames 18 are wings 26 consisting of strips of canvas or the like, movable into different positions, lying in substantially vertical planes. The wings 26 may be provided with any suitable means for holding them removably in position, for example, posts 27 having  
30 bases or stands 28, used to support the wings, together with posts 25 adapted to be driven into the ground at different points. Guy ropes 29 may be secured to the wings 26 at the outer corners thereof, and pass  
35 over the pulleys 30 of the posts 27, and be secured to suitable pegs driven into the ground, or may be secured in any other manner. The upper wings 31, consisting of canvas or the like, are fastened to the upper  
40 portions of the entrances, and have tapered, laterally extended sides 32 connected with the wings 26, and extending longitudinally thereof. The upper wings 31 are preferably inclined with respect to the horizontal. In  
45 this way, the casings at the ends, have outwardly flared inlets, which serve to concentrate and direct air currents to the conduit.

When the wind is blowing longitudinally of the casing, as is indicated by the arrows in Fig. 2, the wings 26 are arranged as shown, flaring outwardly and serving to concentrate the wind and direct it into the conduit. If the wind is blowing, however, at  
55 an angle with respect to the length of the conduit, as indicated for example, by the dotted arrows, the wings are arranged as indicated in dotted outline, so that one wing 26<sup>a</sup> serves to direct the wind to the other wing 26<sup>b</sup>, which is at an angle therewith.  
60 The last-mentioned wing, in turn, deflects the wind at a sharp angle into the conduit.

Mounted upon the casing, at each end, are supports 54 provided with pulleys 56. Lines  
65 57 are secured to the wings 31 and pass over

the pulleys 56 so that they can be used to raise or lower the wings 31 for purposes of adjustment.

The doors 19 constitute regulators, and open to permit the escape of wind at the sides of the casing, if sudden gusts of great  
70 force arise. In this way a substantially constant flow of air through the conduit is maintained, and the power-producing devices in the conduit are not subject to sudden and extreme air currents. As soon as  
75 the pressure of the air against the doors 19 diminishes, the doors return to their normal closed positions. At each end, within the casing, are also located doors 33, pivotally  
80 adjustable about vertical axes and having suitable means for holding them in pluralities of positions to regulate the flow of air through the conduit. By suitably adjusting  
85 the doors 33, which may be wholly or partly closed, independently of one another, the entrance of air currents into the casing can be exactly regulated.

Upon the shaft 12 are mounted any suitable number of power-producing devices 34  
90 and 35 consisting, as shown for example, of vaned wheels of different diameters, which are turned under the influence of air currents, and thus drive the shaft 12, which in turn operates the power-transmitting shaft  
95 14 from which the power developed is taken. The devices 34 and 35 may be of any suitable type, though I prefer to employ the form of power-producing device shown in Figs. 3, 4, 5 and 6. This includes a hub 36  
100 by means of which the wheel is mounted upon the shaft and has radial spokes 37 secured to the hub in any suitable manner, by means, for example, of bolted or riveted  
105 angle irons 38. Positioned between adjacent spokes are frames 39 having radial ends 40 connected by circularly curved sides 41. The ends 40 have at the upper extremities, ears 42 provided with openings 43 by means of which they are movably mounted  
110 upon pivot pins or rivets 44 at the ends of the spokes. The latter are connected by circular bars 45. Springs 46 are secured respectively, to the frames 39 and the circular bars 45, for a purpose which will appear  
115 hereinafter. The outer sides 41 of the frame have series of apertures 47 therein which are similar, and each of which has divergent sides. I employ vanes 48 having intermediate their ends laterally disposed  
120 pivots 49 and at their inner ends similar pivots 50. The pivots 49 and 50 are movably received by pivot openings 51 and 52 of the respective sides 41 of the frame, the vanes extending through the apertures 47.  
125 The vanes are preferably tapered from their outer ends to their inner ends at which the pivots 50 are located. It will be seen that owing to the pivotal mounting of the vanes they can engage at both sides of the open-  
130



ings so that their angularity can be varied. It will be understood that this angularity depends upon the direction of the air currents flowing against the vanes, and consequently, the wheels will always be turned in the same direction, despite the direction from which the wind blows. In this way, the shaft 12 is always turned in the same direction, regardless of whether the wind enters at one end or the other of the casing.

Owing to the pivotal mounting of the frames 38, the power-producing elements are not subject to sudden increases in their speed of revolution owing to heavy gusts of wind, or to sudden augmentation in the quantity of air flowing through the conduit. If a sudden gust of wind blows against the vanes, the frames are pivotally operated against the tension of the springs 46, as is shown clearly in Fig. 5, and in consequence the wheel is little affected by this sudden gust of wind, the radial angularity of the vanes tending to diminish the influence of the air pressure.

Within the casing I prefer to employ deflectors 52 consisting of pivoted, vertical members mounted at the side walls of the casing and movable into a plurality of angular positions, suitable means being provided for holding the deflectors in these different positions. They serve to concentrate the air flowing through the conduit, and direct it to one or the other of the power-producing elements, in order to operate these elements as efficiently as possible.

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

1. A wind motor, comprising a casing constituting a wind conduit, said casing being open at the ends, wings for directing wind into said ends of said casing, wind-operable power-producing mechanism within said casing, and a normally closed door at the outside of said casing and adapted to regulate the wind pressure entering said casing.

2. A wind motor, comprising a casing constituting a wind conduit and having wind-operable power-producing mechanism therein, said casing being open at the ends, wings mounted at the ends of said casing and serving to concentrate wind and direct it into said casing, and a normally closed, resiliently held door adjacent to each end of said casing and operable under excess wind pressure, whereby it can be opened said doors being positioned between said casing and said wings.

3. A wind motor, comprising a casing constituting a wind conduit having open ends, adjustable wings at said open ends and serving to concentrate wind and direct it into said casing, wind-operable power-producing mechanism within said casing, a

normally closed, resiliently held door at each end of said casing between said wings and said end, and adjustable doors for regulating the flow of air into said open ends of said casing.

4. A wind motor, comprising an open-ended casing having wind-operable power-producing mechanism therein, pluralities of adjustable doors at said open ends of said casing, frames at each side of each of said open ends, pivoted closures mounted in said frames, means tending to hold said closures shut, and adjustable wings associated with each of said frames at the outer side thereof.

5. A wind motor, comprising an open-ended casing having wind-operable, power-producing mechanism therein, pluralities of adjustable doors at said open ends of said casing, frames at each side of each of said open ends, pivoted closures mounted in said frames, weighted lines secured to said closures and to the ground, and tending to hold said closures shut, adjustable posts near the ends of said casing, wings secured to said posts and said frames at the outer sides thereof, supports carried by said casing at the top thereof, and further wings held by said supports and connected with said first-mentioned wings and with said casing.

6. A wind motor, comprising an open-ended casing, means for directing wind into said casing, a shaft arranged longitudinally of said casing, and having wind wheels mounted thereon, and a plurality of substantially vertical, adjustable deflectors mounted within said casing at the side walls thereof and normally disposed inward toward said wheels.

7. In a wind motor, a power-producing element comprising a hub, radial spokes associated therewith, frames pivotally mounted between said adjacent spokes, springs tending to hold said frames in normal positions, and pluralities of pivoted vanes carried by said frames.

8. In a wind motor, a power-producing element, comprising a hub, radial spokes associated therewith, frames pivotally mounted between said adjacent spokes, springs tending to hold said frames in normal positions, each of said frames comprising curved sides, one of said sides having openings formed therein, and vanes positioned in said openings and pivotally connected with said sides, whereby said vanes can assume positions of different angularity.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

WILLIAM A. WILLIAMS.

Witnesses:

G. W. MURNER,  
M. K. HOFER.