

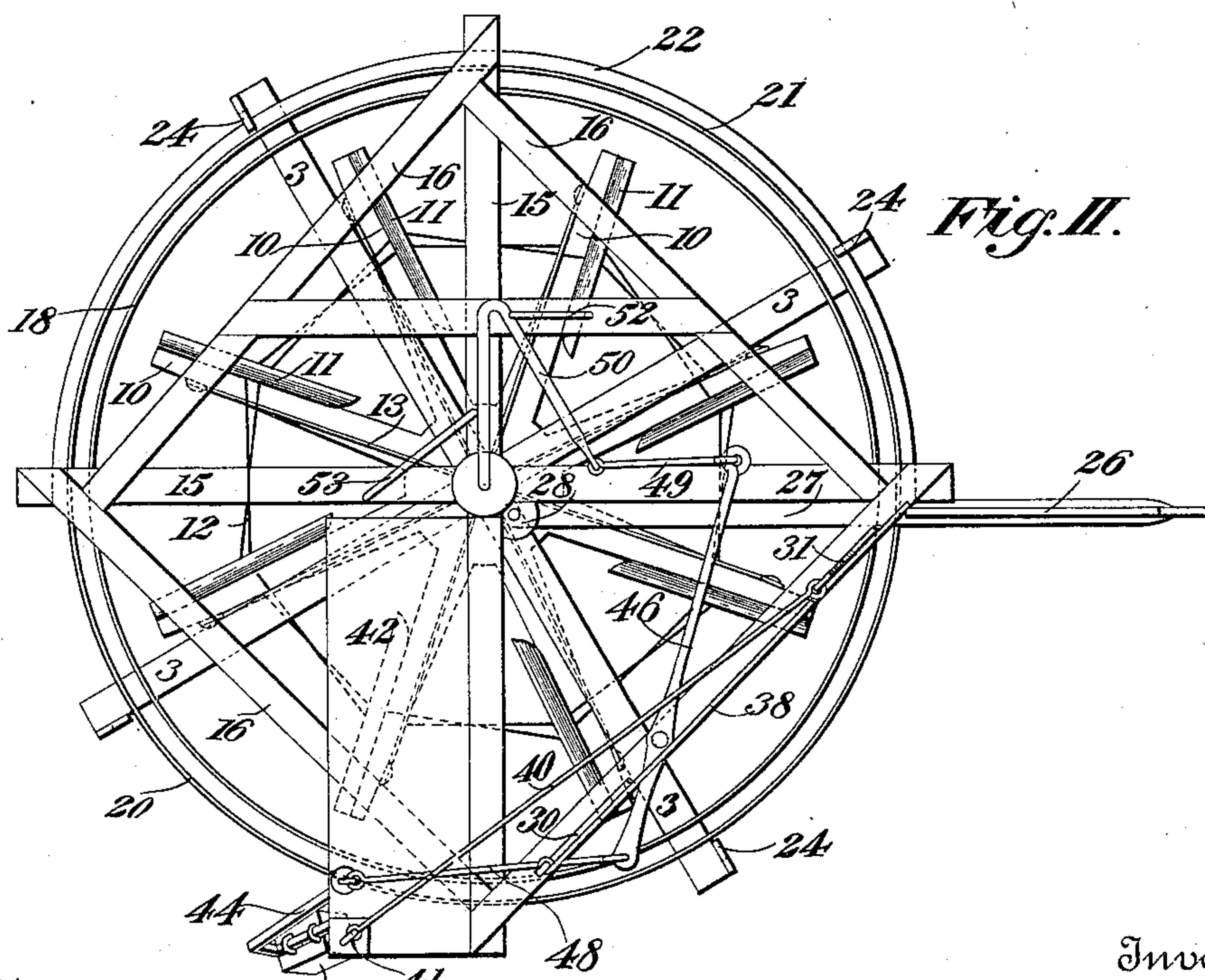
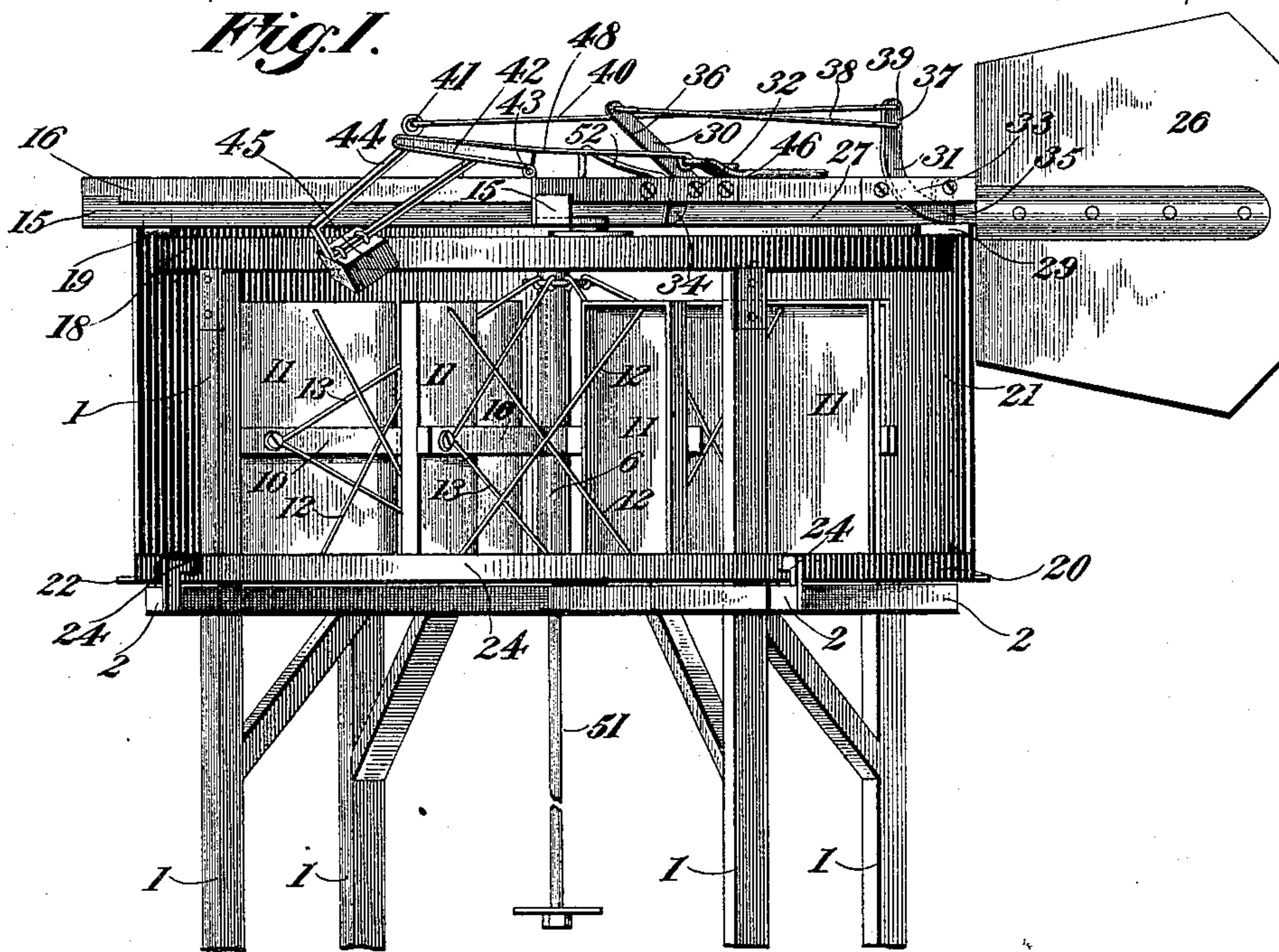
(No Model.)

2 Sheets—Sheet 1.

W. A. WINN.
WINDMILL.

No. 585,146..

Patented June 22, 1897.



Witnesses
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S. M. McKee

Inventor
William A. Winn
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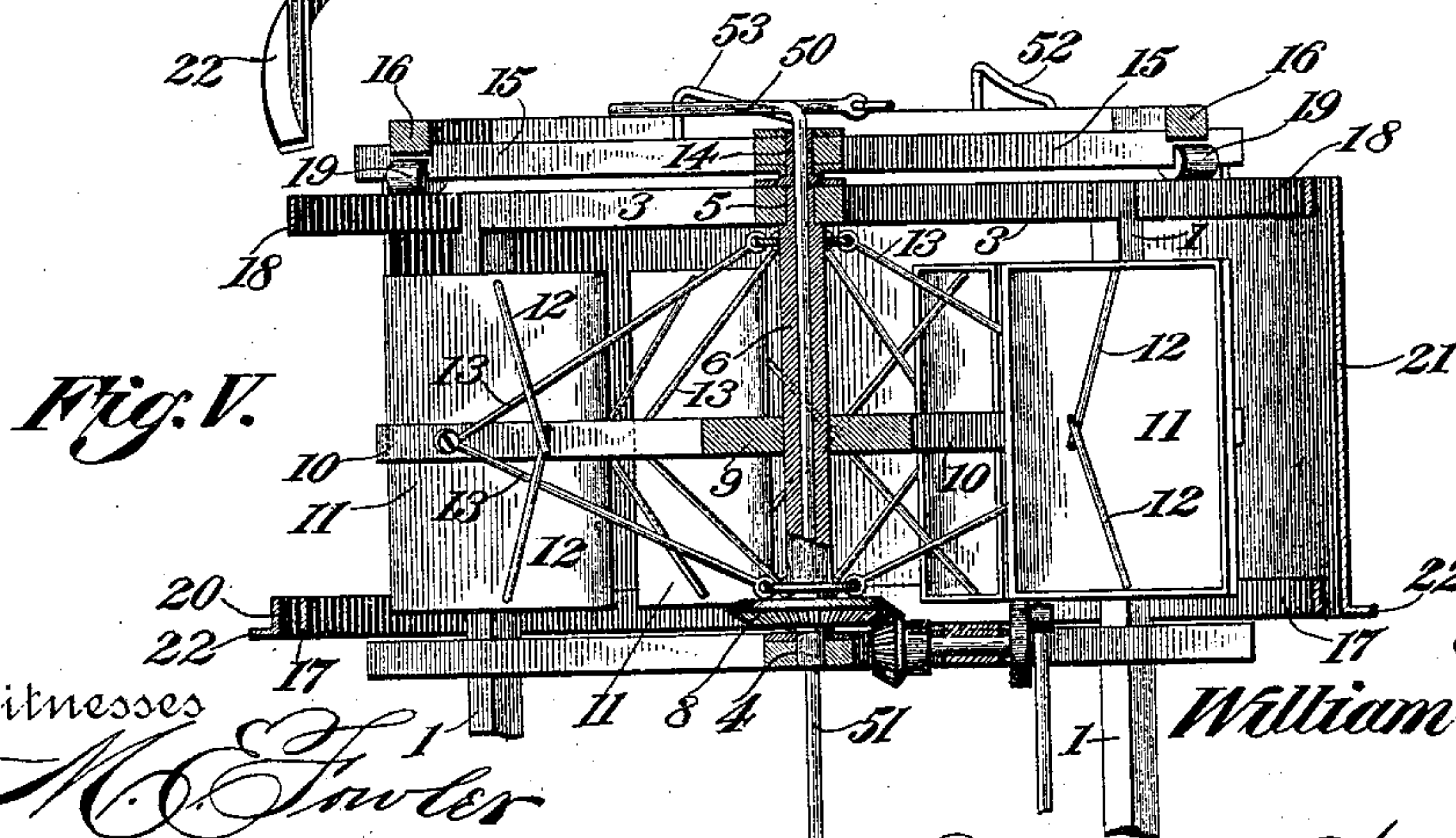
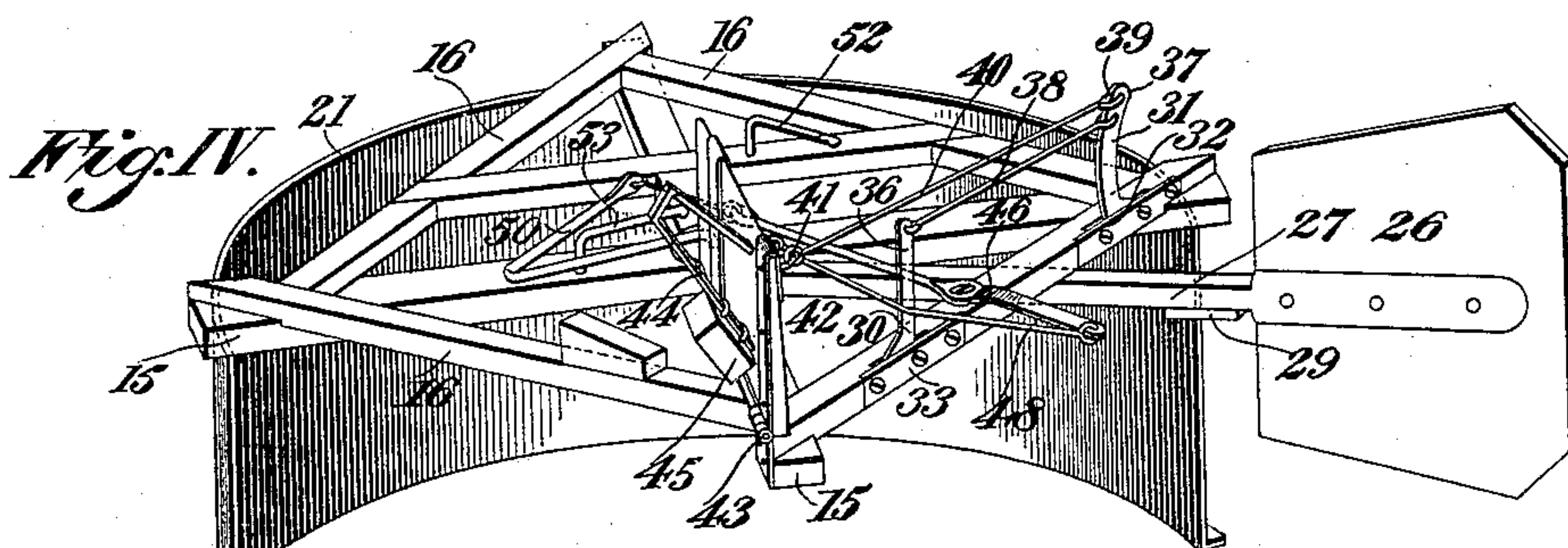
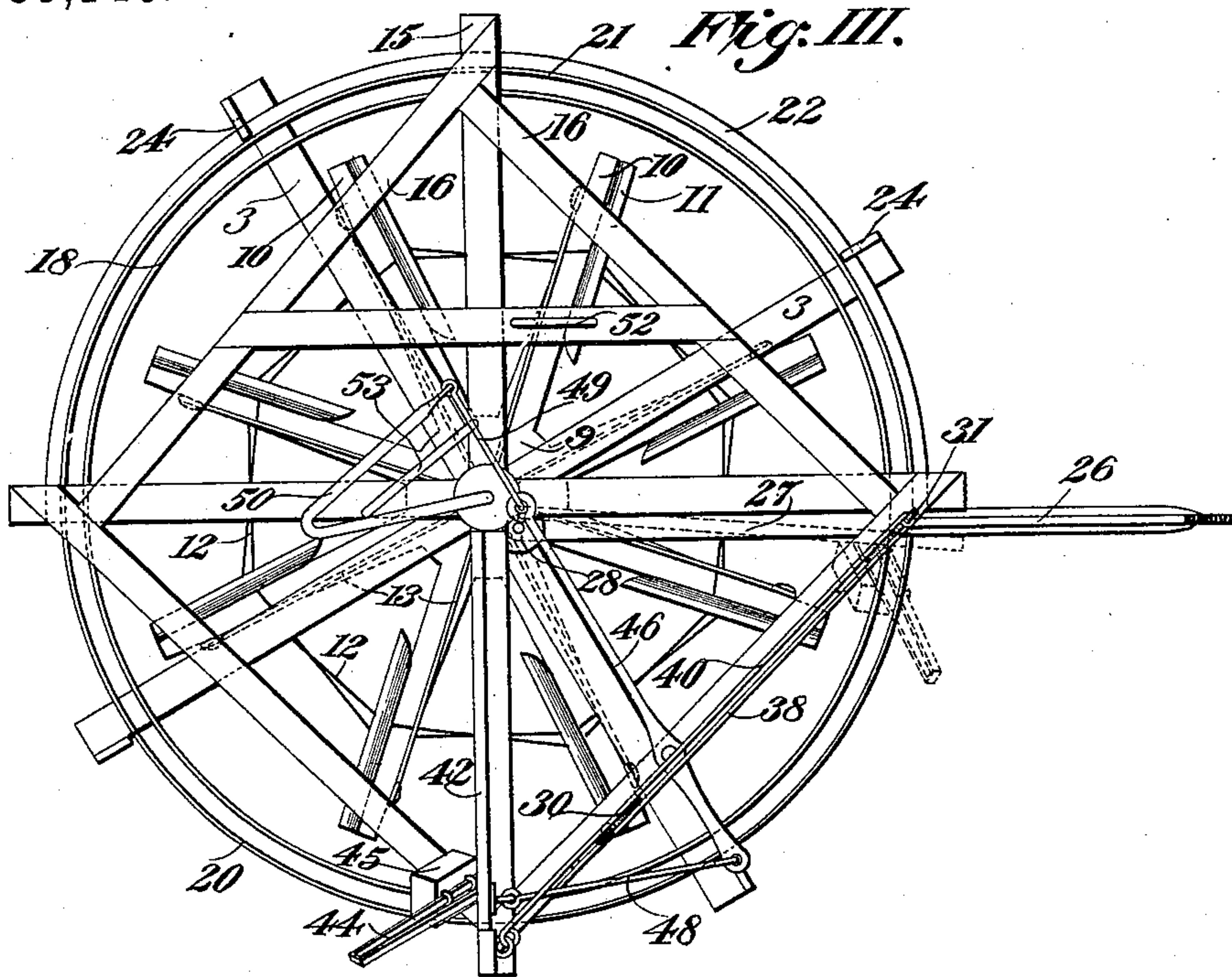
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UNITED STATES PATENT OFFICE.

WILLIAM A. WINN, OF BERWYN, NEBRASKA.

WINDMILL.

SPECIFICATION forming part of Letters Patent No. 585,146, dated June 22, 1897.

Application filed June 1, 1896. Serial No. 593,868. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM A. WINN, of Berwyn, county of Custer, State of Nebraska, have invented certain new and useful Improvements in Windmills, of which the following is a specification, reference being had to the accompanying drawings.

The object of my invention is to produce an improved horizontal windmill the mechanism whereof is adapted to automatically protect it against excessively high winds and which may be adjusted to start or stop the mill as often as required.

In the accompanying drawings, Figure I is a side elevation of my mill with the vane in the operative position, the vane-locking mechanism being shown in the locked position. Fig. II is a top plan view of the subject-matter of Fig. I. Fig. III is a similar view showing the vane in the position to throw the mill out of the wind. Fig. IV is a view of a portion of the screen-frame, showing the locking mechanism in the unlocked position. Fig. V is a central vertical section of the view shown in Fig. I, taken in the line of the vane.

Referring to the figures on the drawings, 1 indicates four legs of a tower or frame, which support the timbers 2 of a lower cross-frame and the timbers 3 of an upper cross-frame. Between the cross-frames, in bearings 4 and 5, respectively, seated at the respective junctions of the timbers 2 and 3, is carried a hollow shaft 6, of a height to accommodate it between the bearings 4 and 5, or, in other words, the cross-frames upon which the bearings are located. The shaft 6 carries at its lower end one element of the driving mechanism which the mill is designed to operate—as, for example, a cog-gear 8. In its middle part the shaft 6 carries a hub 9, secured to it, upon the respective ends of the radii or spokes 10 of which are secured dish-shaped plates 11, which are in effect the sails of the machine. The plates 11 are preferably suitably cross-braced, as by guys 12 or the like. Guys 13, secured at their respective ends to the extremities of the spokes 10 and to the shaft 6, are preferably employed for securing the spokes firmly upon the shaft.

14 indicates a hollow stud fastened upon the timbers 3 at their junction in a line coaxial with the shaft 6. It serves as a central

bearing-support for a screen-frame composed of cross-pieces 15 and transverse terminal braces 16.

Upon the timbers 2 and 3, respectively, are carried annular bands 17 and 18, respectively. The upper band is preferably made of metal and constitutes a circular track for the support of the outer ends of the screen-frame, the cross-pieces 15 thereof being provided with wheels or rollers 19, that travel upon it.

The lower band 17 is substantially a guide-band, being surrounded by a band 20, to which is secured at its lower edge a screen 21, whose upper edge is secured to and supported by the screen-support above referred to. The screen should be of sufficient width to protect the plates 11 and of a length equal to about half the circumference of the bands 17 and 18. Therefore it covers at all times one-half the machine and when interposed between the plates and the wind is adapted to shut off all effective force from the plates, which are actuated by the wind.

The screen is preferably provided with a flange 22, which projects from it substantially at right angles at its lower edge. This is properly a guide-flange and moves under retaining-lugs 24, that are secured to the projecting ends of each of the cross-pieces 2.

Having described those elements of my machine which are adapted to be directly actuated by wind-power and means for exposing them to or protecting them from the wind—to wit, the screen—I shall now proceed to describe my mechanism for operating this screen for the purpose suggested, either automatically or manually from time to time as occasion may require.

26 indicates the vane of my machine, which is carried upon an arm 27, hinged between adjacent cross-pieces 15 in a suitable bearing 28. Its outer end moves upon the annular band 18 and is on that account preferably provided with an armor or bearing plate 29 upon its under side next to the vane. The movement of the arm 27 upon its bearing 28 is limited to a quarter-circle, as defined by the adjacent cross-pieces 15, with which, respectively, in the opposite limitations of its movement the arm 27 comes into contact. The arm 27 is held upon the edge of the band 18 by one of the cross-pieces 16, which is se-

cured at its opposite ends to the cross-pieces 15, between which the arm is pivoted. The brace 16 is provided at its opposite ends with cam-levers 30 and 31, secured in suitable bearings 32 and 33 in the opposite ends of the brace. These cam-levers have downwardly-projecting latching ends 34 and 35, respectively, and upwardly-extending operating ends 36 and 37, respectively. The latching ends are designed to hold the arm 27 in one of two positions—that is, adjacent to one of the cross-pieces 15 or adjacent to the other. The operating ends of the cam-pieces are united, as by a rod 38, and to the end of the lever 31 is pivotally secured, as indicated at 39, a rod 40, that is pivotally united, as indicated at 41, to a shutter 42, that is hinged, as indicated at 43, to a cross-piece 15. The shutter 42 is half the length of the cross-piece. It is so attached by means of the rod 40 to the cam-levers that when it is substantially in the flat or horizontal position it holds the latching ends 34 and 35 in the latched position, thereby tending to confine the arm 27 in one position. When it is elevated, it retracts the latch ends from the latching position and allows free sweep of the arm 27. The shutter 42 carries a bracket-arm 44, upon which is secured a sliding counterweight 45, that is adapted to slide thereon to and from the shutter, for a purpose which will be hereinafter explained.

46 indicates a lever pivoted, as indicated at 47, to the brace 16, that carries the cam-levers. At one end, as by a pitman 48, it is operatively secured to the shutter 42 and at the other end, as by a link 49, it is in like manner secured to a V-shaped arm 50. The arm 50 is fastened to or forms a continuation of a rod 51, that is loosely carried within the hollow shaft 6.

52 indicates a stop-lug on the shutter-frame located in the path of the arm 50 and which limits the movement of the arm in one direction or in that direction in which it takes when the shutter 42 is descending toward the horizontal position.

53 indicates a catch-piece located also in the path of the arm 50 and which serves to hold the arm 40 in that fixed position which secures the shutter 42 to the vertical position, as clearly shown in Fig. III.

The operation of my machine is as follows: Suppose the vane to be secured by the latching end 35 of the lever 31 in the position next to that cross-piece 15 that does not carry the shutter 42, as shown in Fig. I. In this position the sweep of the wind, by means of the vane 26, throws the screen 21 into position to expose one-half of the whole number of plates 11 to the action of the wind, protecting the other plates from the force of the wind, which would tend to retard their movement. At the same time the shutter 42 is presented against the wind, being held in the position approaching the horizontal by the counterweight 45. So long as the wind does not over-

come the counteracting gravity of the counterweight the shutter remains in the position just referred to, in which position the arm 27 is locked to the screen-frame and at right angles to the shutter 42. As soon, however, as the force of the wind becomes excessive the shutter 42 is thrown into the vertical position, as shown in full lines in Fig. IV. By that movement the cam-levers 30 and 31 are operated and the arm 27 is freed from the brace 16. The wind consequently acting against the shutter 42 forces the screen-frame around a quarter of a revolution, the vane meantime, through the force of the wind and its own inertia, retaining its original position. When the wind has caused the screen-frame to make a quarter-revolution, the vane and shutter are brought substantially in line, as shown in dotted lines in Fig. III, in which position the force of the wind being no longer exerted against the shutter 42 its counterweight causes it to drop toward the horizontal position, thereby locking the vane to the cross-piece 15 that carries the shutter 42. Locked in this position the vane serves thereafter to cause the screen-frame to turn with the wind, thereby always exposing the screen to the force of the wind and, shutting off all power from the plates, consequently stopping the mill.

From the foregoing description it will appear that the mill is at all times protected from excessive force of wind, being adapted to throw itself automatically into the inoperative position at any time or when the wind finds it in the inoperative position to continue in that condition until it is set to work.

In addition to the automatic mechanism above described I provide means for setting the mill into or out of the operative position whenever required. This may be readily accomplished by means of the rod 51, which controls the movement of the V-shaped arm 50.

Suppose the machine to be in the operative position shown in Fig. I. The operator, wishing to throw the mill into the inoperative position, turns the rod 51 until the arm 50, riding over the catch 53, is caught thereby on that side of the V-shaped arm which is hinged to the link 49. In this position (clearly shown in Fig. IV) by the continuous rotation in the same direction of the rod 51 the screen-frame is caused to turn upon its axis until the shutter 42 and the vane 26 are brought substantially in line. By this means the mill may be turned manually out of the wind in the same manner that it may be automatically operated as above described. When the shutter and the vane are brought in substantial alignment, as above described, the operator raises the rod 51, so as to release the arm 50 from the catch-piece 53, whereupon the shutter 42, actuated by its counterweight, serves to carry the arm 50 into engagement with its stop-lug 52, thereby locking, in the manner previously described, the latches 30 and 31 and confining the vane 26, through

the arm 27, in the inoperative position. By a reverse movement of the rod 51 the vane may be at any time set into the operative position and locked therein through the operation of the latch 31 and the intermediate shutter-connecting mechanism.

What I claim is—

1. In a windmill, the combination with a fixed frame, shaft, sails, and revoluble screen-frame, of a vibratory vane carried on the screen-frame, a shutter, vane-locking mechanism secured thereto, a bracket-support upon the shutter, and a sliding counterweight thereon, substantially as set forth.

2. In a windmill, the combination with a fixed frame, shaft, sails and revoluble screen-frame, of a vibratory vane, latching-levers carried in the path of the vane, mechanism uniting the levers, and mechanism for operating the levers, simultaneously, substantially as set forth.

3. In a windmill, the combination with a

fixed frame, shaft, sails, and revoluble screen-frame, of a vibratory vane carried upon the screen-frame, a pair of connected locking-levers, and a hinged shutter connected with one of the levers, substantially as set forth.

4. In a windmill, the combination with a fixed frame, hollow shaft, sails, and revoluble screen-frame, of a vibratory vane carried upon the screen-frame, a pair of connected locking-levers, a hinged shutter connected with one of the levers, a rod passing through the hollow shaft, a V-shaped arm secured to the end of the rod, a system of levers connecting the shutter to the free end of the V-shaped arm, and a catch-piece in the path of the arm, substantially as set forth.

In testimony of all which I have hereunto subscribed my name.

WILLIAM A. WINN.

Witnesses:

C. T. ORR,

T. M. LEISURE.