

No. 618,807.

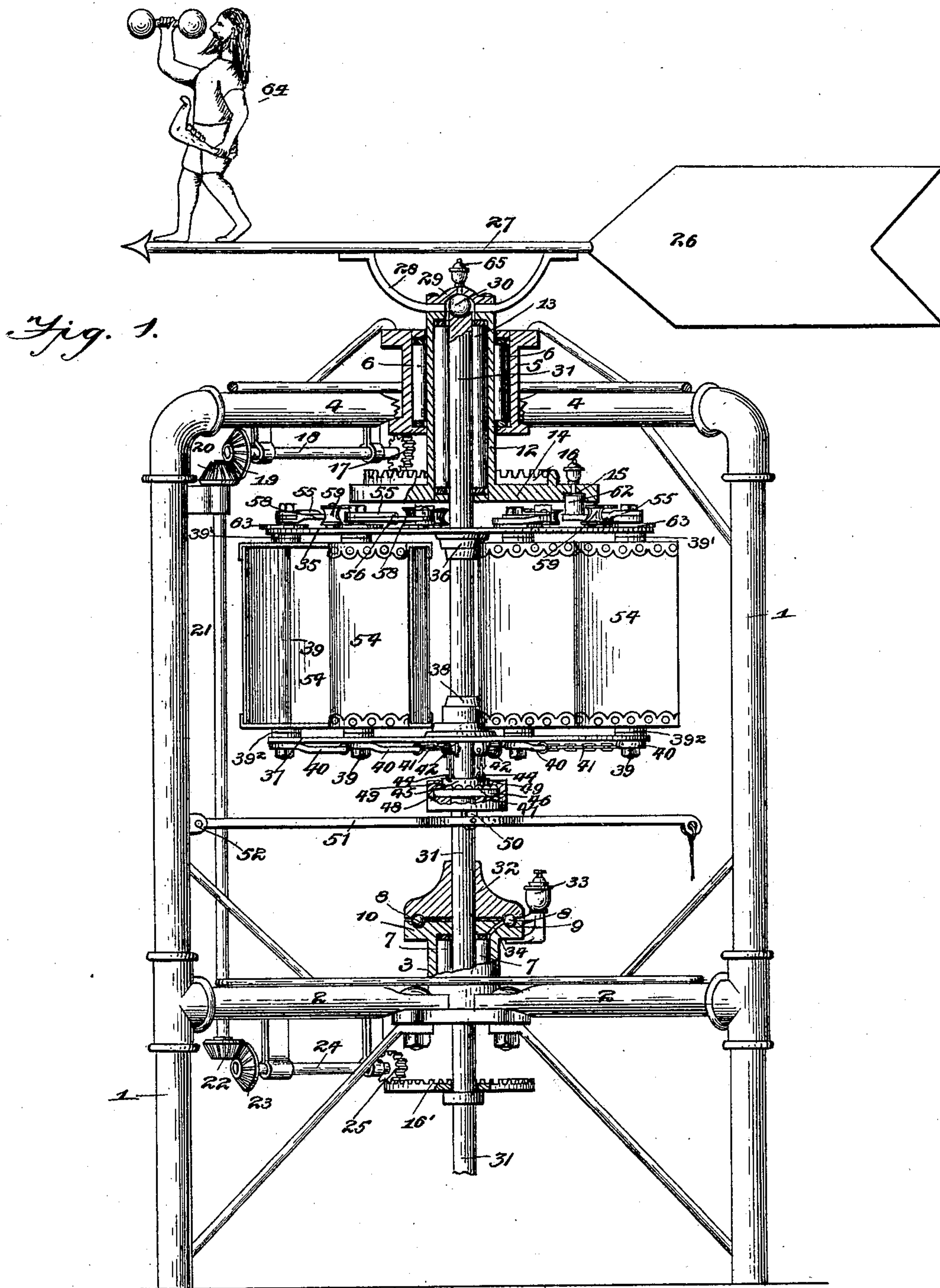
Patented Jan. 31, 1899.

W. D., W. M. & A. M. STAPLIN.
WIND ENGINE.

(Application filed Apr. 12, 1898.)

(No Model.)

3 Sheets—Sheet 1.



Witnesses
E. Hunt
J. H. Hill

Wayland D. Staplin
William M. Staplin
Alvin M. Staplin
Inventors
by *A. B. Wilson & Co.*
Attorneys

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Fig. 2.

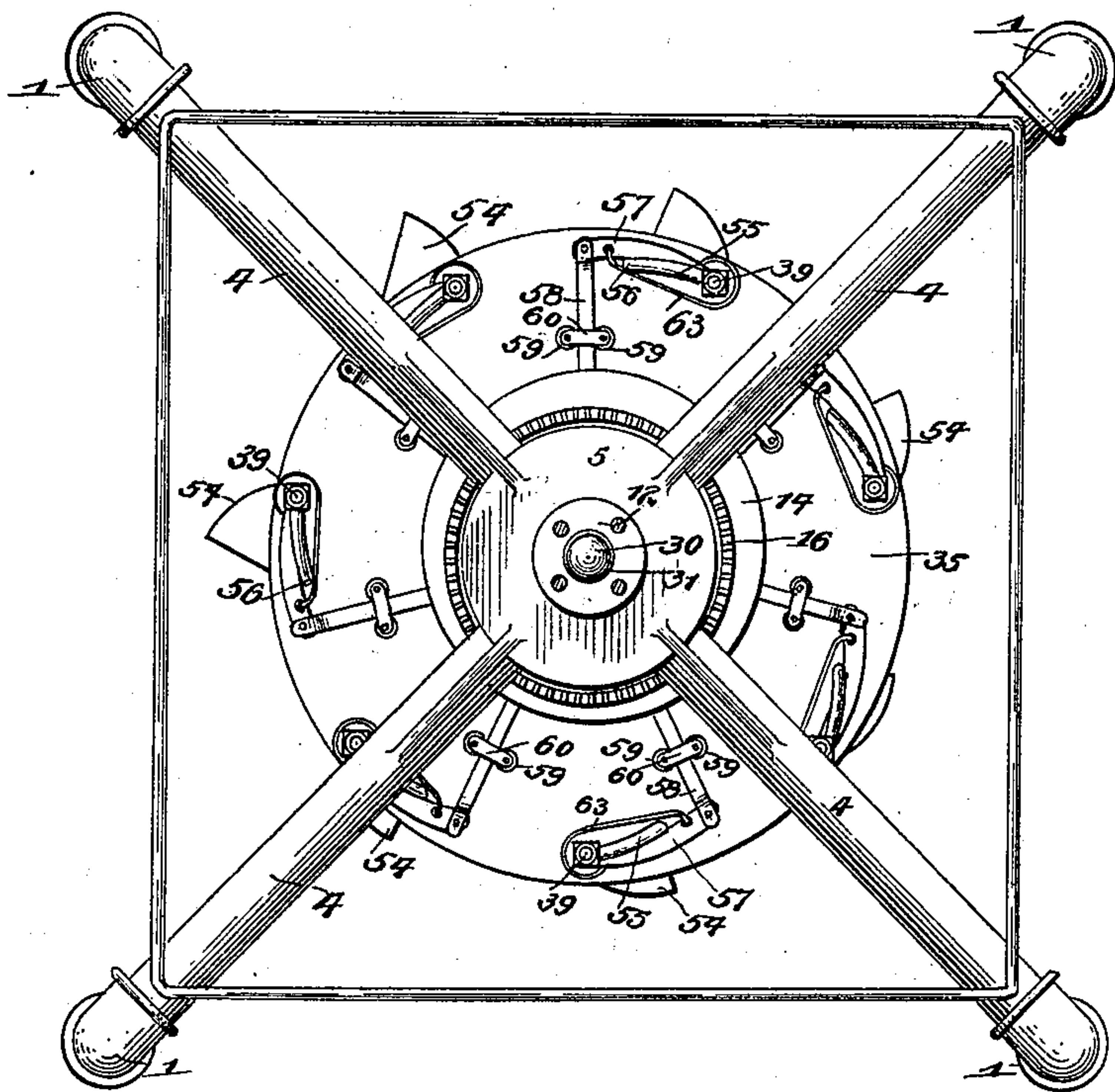
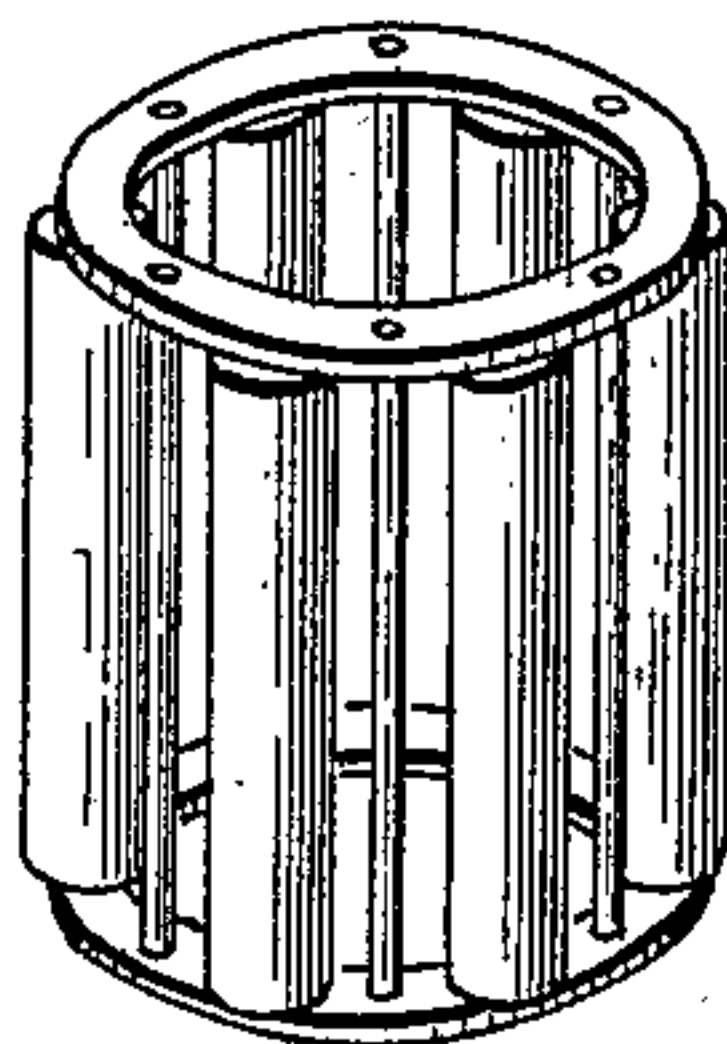


Fig. 5.



Witnesses

E. Hunt.
J. H. Wilson

Wayland D. Staplin, Inventors

William M. Staplin and

Alvin M. Staplin,

by *H. B. Wilson & Co.*

Attorneys

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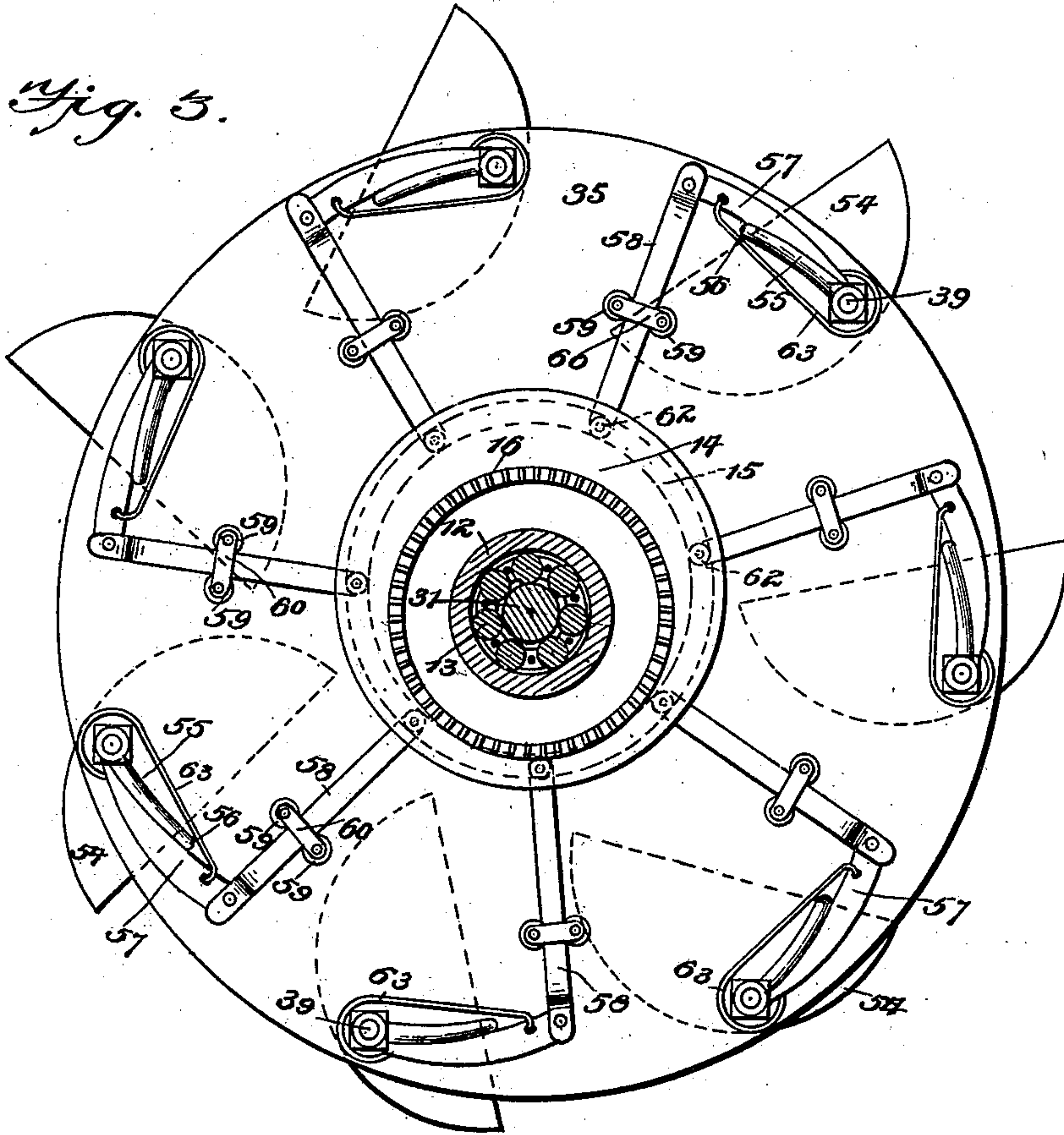
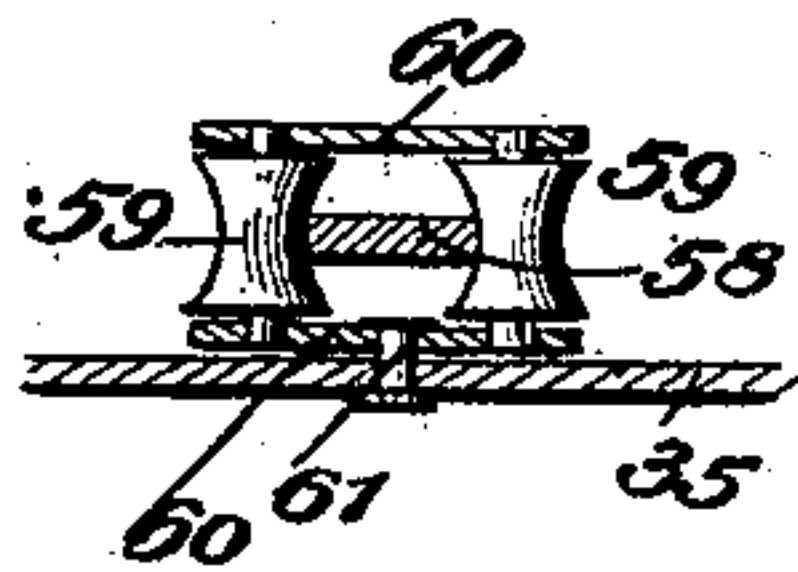


Fig. 4.



Witnesses

C. E. Hunt.
J. H. Miller.

Wayland D. Staplin Inventors

William M. Staplin and

Alvin M. Staplin,

by *A. B. Wilson & Co.*

Attorneys

UNITED STATES PATENT OFFICE.

WAYLAND D. STAPLIN, WILLIAM M. STAPLIN, AND ALVIN M. STAPLIN, OF HUTCHINS, IOWA.

WIND-ENGINE.

SPECIFICATION forming part of Letters Patent No. 618,807, dated January 31, 1899.

Application filed April 12, 1898. Serial No. 677,373. (No model.)

To all whom it may concern:

Be it known that we, WAYLAND D. STAPLIN, WILLIAM M. STAPLIN, and ALVIN M. STAPLIN, citizens of the United States, residing at Hutchins, in the county of Hancock and State of Iowa, have invented certain new and useful Improvements in Wind-Engines; and we do 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 appertains to make and use the same.

Our invention relates to certain novel improvements in wind-engines; and the object is to provide an effective and durable engine of this class.

To this end the invention consists in the construction, combination, and arrangement of the device, as will be hereinafter fully described and claimed.

The accompanying drawings show our invention in the best form now known to us; but many changes in the details might be made within the skill of a good mechanic without departing from the spirit of our invention as set forth in the claim at the end of this specification.

The same reference characters indicate the same parts of the device.

Figure 1 is a side elevation, partly in section, of our improved wind-engine. Fig. 2 is a top plan view, partly in section. Fig. 3 is an outline view to show the manner of opening and closing the fans. Fig. 4 is a detail sectional view through the guide-rollers and brackets, and Fig. 5 is a perspective view of one of the vertical roller-bearings and its cage.

1 1 1 1 represent four uprights, which are suitably braced to form a rectangular frame, as shown.

2 2 denote the lower horizontal braces, connected at their inner ends to the vertical bearing 3, and 4 4 represent the corresponding upper braces, also connected at their inner ends to the vertical bearing 5, which is aligned with the lower bearing 3.

6 and 7 denote an annular series of vertical bearing-rollers arranged in the bearings 3 and 5, and 8 represents a horizontal series of balls arranged in an annular groove 9 in the upper face of the flange 10, formed integral with the bearing 3.

12 denotes a vertical sleeve journaled in the upper bearing 5, and it in turn is provided with an annular series of vertical bearing-rollers 13. Its lower end terminates in a circular horizontal flange 14, the bottom face of which is formed with an annular groove 15, formed eccentric with the sleeve 12, and its upper face with an annular crown gear-wheel 16, which meshes with a pinion 17, fixed on the inner end of a horizontal shaft 18, the outer end of which carries a bevel-gear 19, which meshes with a similar gear 20 on the vertical shaft 21, the lower end of which carries a bevel-gear 22, meshing with a corresponding gear 23 on the horizontal shaft 24, the inner end of which is provided with a spur-gear 25.

26 denotes the wind-vane, fixed on the bar 27, secured to a bracket 28, which in turn is bolted to the upper end of the sleeve 12, and it is provided with a bearing-cap 29 to receive the bearing-ball 30, resting in the cup-shaped end of the main driving-shaft 31, which extends through the sleeve 12 and bearing 3, the lower portion of the shaft being provided with a fixed collar 32, having an annular ball-race which rests upon the bearing-balls 8.

33 denotes an oil-cup which supplies oil to the balls and from thence by means of a groove 34 to the vertical rollers 7.

35 represents a horizontal disk fixed to the collar 36, secured to the shaft 31, and 37 denotes a corresponding parallel disk fixed to the collar 38, also secured to said shaft.

39 39 denote an annular series of vertical shafts journaled in the outer ends of the disks 35 and 37, parallel with and equidistant from each other, and also equidistant from the main driving-shaft 31. Each of these shafts 39 is provided at its lower projecting end with an arm 40, from the free end of which a chain 41 extends radially inward over a grooved pulley 42, journaled in a bracket 43, fixed on the bottom of the disk 37, and thence downward, its free end being secured to an eye 44 on a cylindrical collar 45, loosely encompassing the main driving-shaft. The shaft at this point is provided with a vertical key carried by the shaft and the collar 45 with a corresponding keyway, so that the collar rotates with the shaft, but at the same time is per-

mitted to slide longitudinally when the engine is being thrown in and out of gear. This collar is formed with an annular grooved shoulder 46, which forms the raceway for the bearing-balls 47.

48 denotes an annular cap which loosely encompasses the shaft 31 and collar 45, and it is formed with an inwardly-projecting flange 49, which has a bearing on the balls, as shown.

Oppositely-disposed lugs 50 50 depend from the bottom of cap 48 on either side of the shaft 31, and these lugs are pivoted to the central bifurcated section of the lever 51, which is fulcrumed on the bolt 52, fixed in one of the uprights 1.

54 represents a semicircular fan closed at its top and bottom ends, and one of these fan-blades is fixed to each shaft 39, the entire series being mounted so as to face the same direction concentrically around the main driving-shaft. The shaft 39 is provided with ball-bearings 39' and 39².

55 represents an arm fixed to the upper projecting end of each shaft 39, and its outer or free end is turned downwardly to form a toe 56.

57 denotes a second arm loosely mounted on the upper end of each shaft 39, and its free end extends across the path of the toe 56 and is pivoted to a bar 58, which extends radially inward between the grooved parallel guide-rollers 59 59, journaled in a bracket 60, centrally swiveled on a bolt 61, fixed in the disk 35, and the upper face of the inner end of the bar 58 carries a friction-roller 62, which has a bearing in the annular groove 15 of the flange 14, carried by the vane-sleeve 12.

In Fig. 5 we have shown the roller-bearing and its cage, which is the form used for the roller-bearings 6, 7, and 13, and a similar though smaller roller-bearing is employed inside of the friction-roller 62.

63 denotes a spiral spring having its inner end fixed to the shaft 39 and its outer end to the arm 57, the tension of the spring being exerted to hold the toe 56 in contact with the arm 57, so that when the lever 51 is depressed the convex face of the fans 54 will be turned radially outward from the main shaft, so as to offer no resistance to the wind, and which is their position when the mill is thrown out of action.

By referring to Fig. 1 it will be seen that the pinion 25 moves in unison with the pinion

17, so that a second mill-wheel may be placed lower down on the main shaft, and it is provided with a bearing-sleeve which is a facsimile of the vane-sleeve 12, and while the upper sleeve 12 is controlled directly by the wind-vane the lower sleeve and its grooved flange are provided with a crown-gear 16', which meshes with and is therefore controlled by the pinion 25.

64 denotes a figure fixed on the forward end of the vane-bar 27 to indicate the point from which the wind is blowing.

65 represents an oil-cup fixed to the cap 29, so as to lubricate the surface of the ball-bearing 30 and also the journal 31 and rollers 13 when the mill is in operation; but when the mill is stationary the ball 30 acts as a valve and closes the duct or passage from the oil-cup, and thus prevents the oil wasting, and a similar oil-cup 66 is shown on the flange 14 immediately over the groove 15.

Having thus described our invention, what we claim, and desire to secure by Letters Patent, is—

The combination in a wind-engine, of the main driving-shaft 31, the parallel disks 35 37 fixed on said shaft, the annular series of vertical parallel shafts 39 journaled in said disks, the arms 55 fixed on the upper ends of said shafts and having a toe 56 formed on each of their outer ends, a spring-actuated arm 57 loosely mounted on each of the shafts 39 and in contact with said toe, a bar 58 pivoted at one end to said arm 57, and a guide-roller 59 journaled on the free end of said bar, the sleeve 12 encompassing the main driving-shaft, and having its lower end terminating in a horizontal flange 14 formed with an endless groove 15 arranged eccentric with the shaft 31 and adapted to receive the guide-roller 59, and the wind-vane 26 fixed to the upper end of said sleeve and arranged to automatically control the position of said sleeve with reference to the direction of the wind, substantially as shown and described.

In testimony whereof we have hereunto set our hands in presence of two subscribing witnesses.

WAYLAND D. STAPLIN.

WILLIAM M. STAPLIN.

ALVIN M. STAPLIN.

Witnesses:

C. H. BURKE,

GERTRUDE KRAMER.