

No. 614,812.

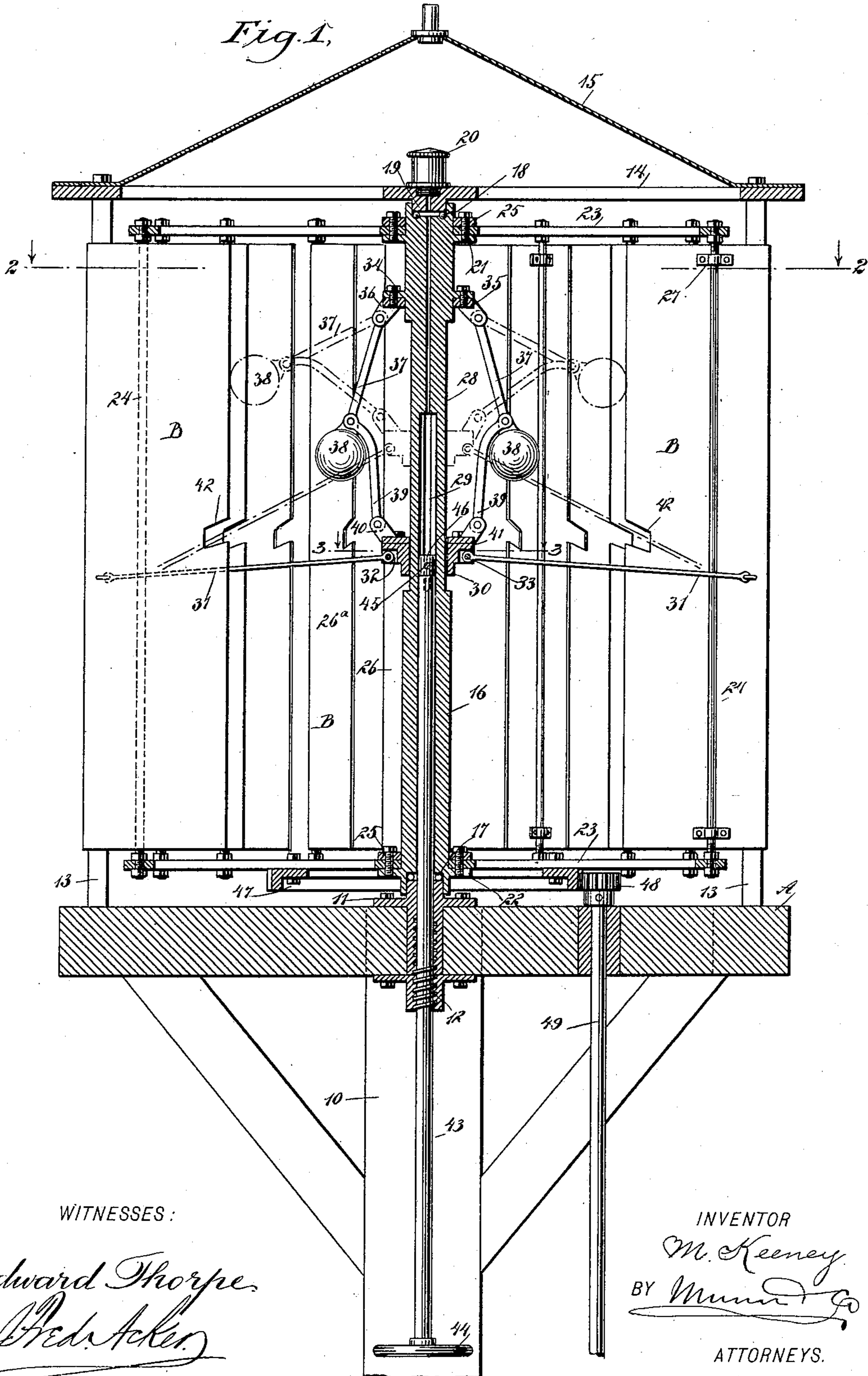
Patented Nov. 22, 1898.

M. KEENEY.
TOWER WINDMILL.

(Application filed Sept. 24, 1897.)

(No Model.)

3 Sheets—Sheet 1.



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Fig. 2.

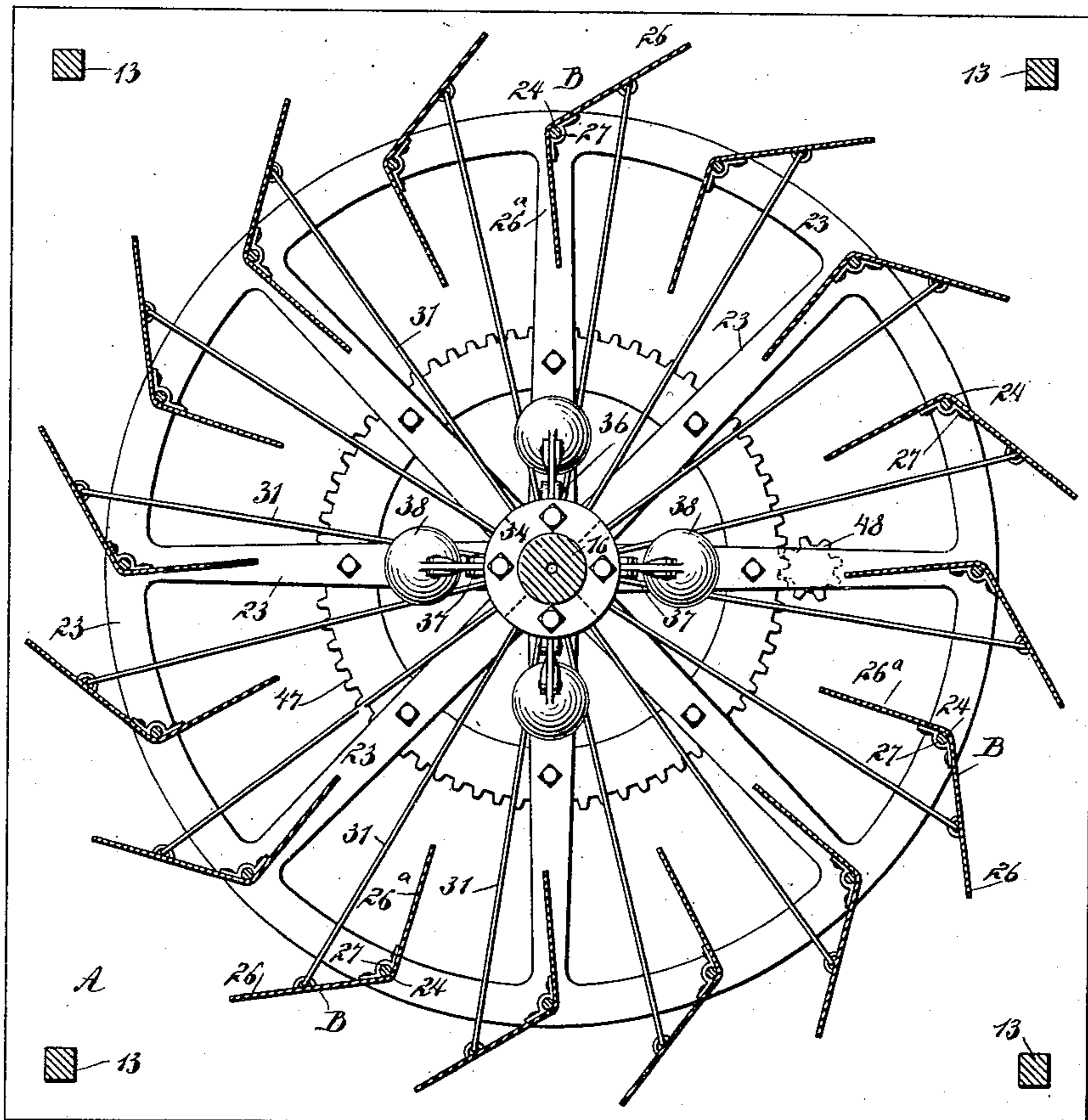
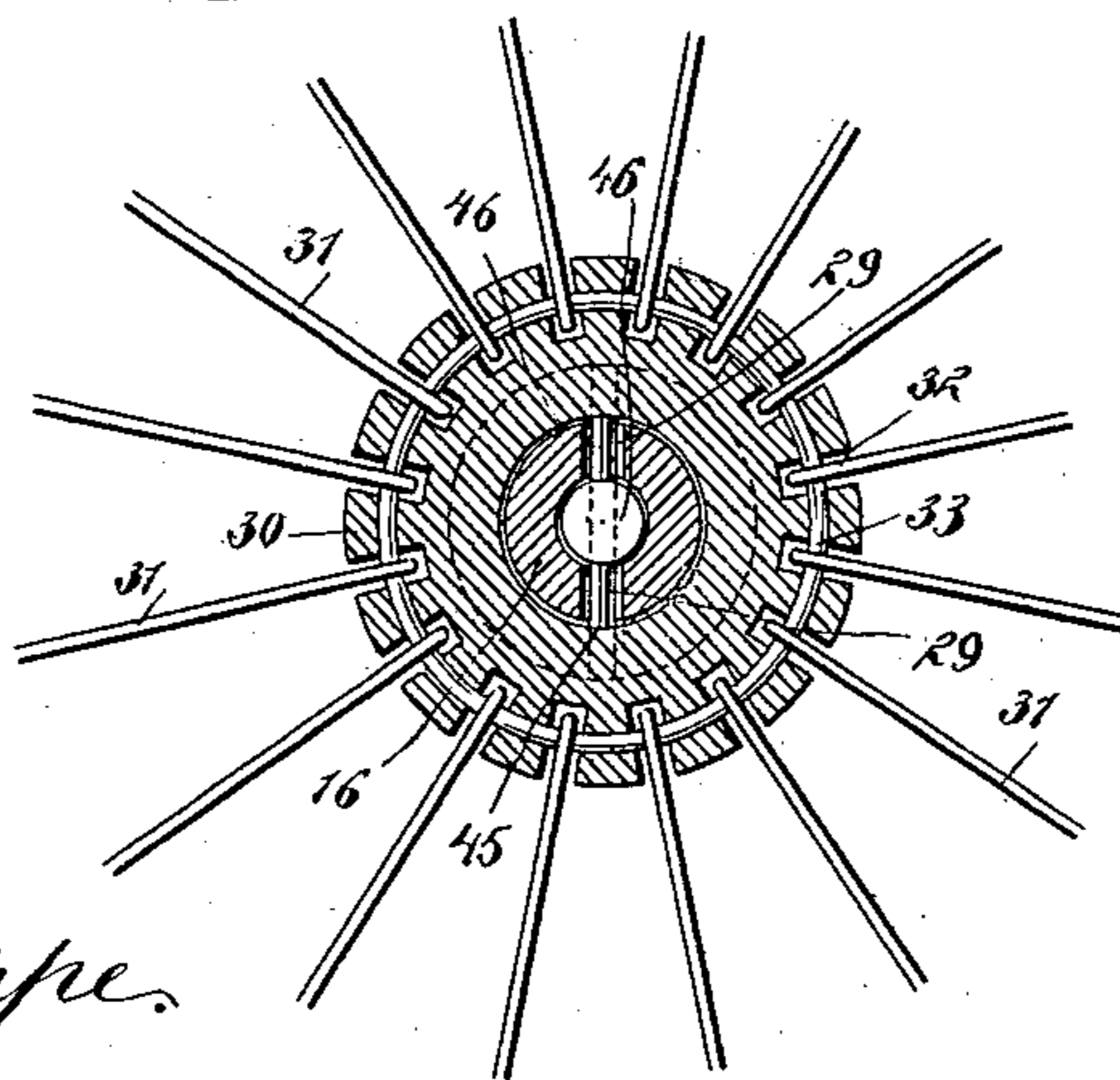


Fig. 3.



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Fig. 4.

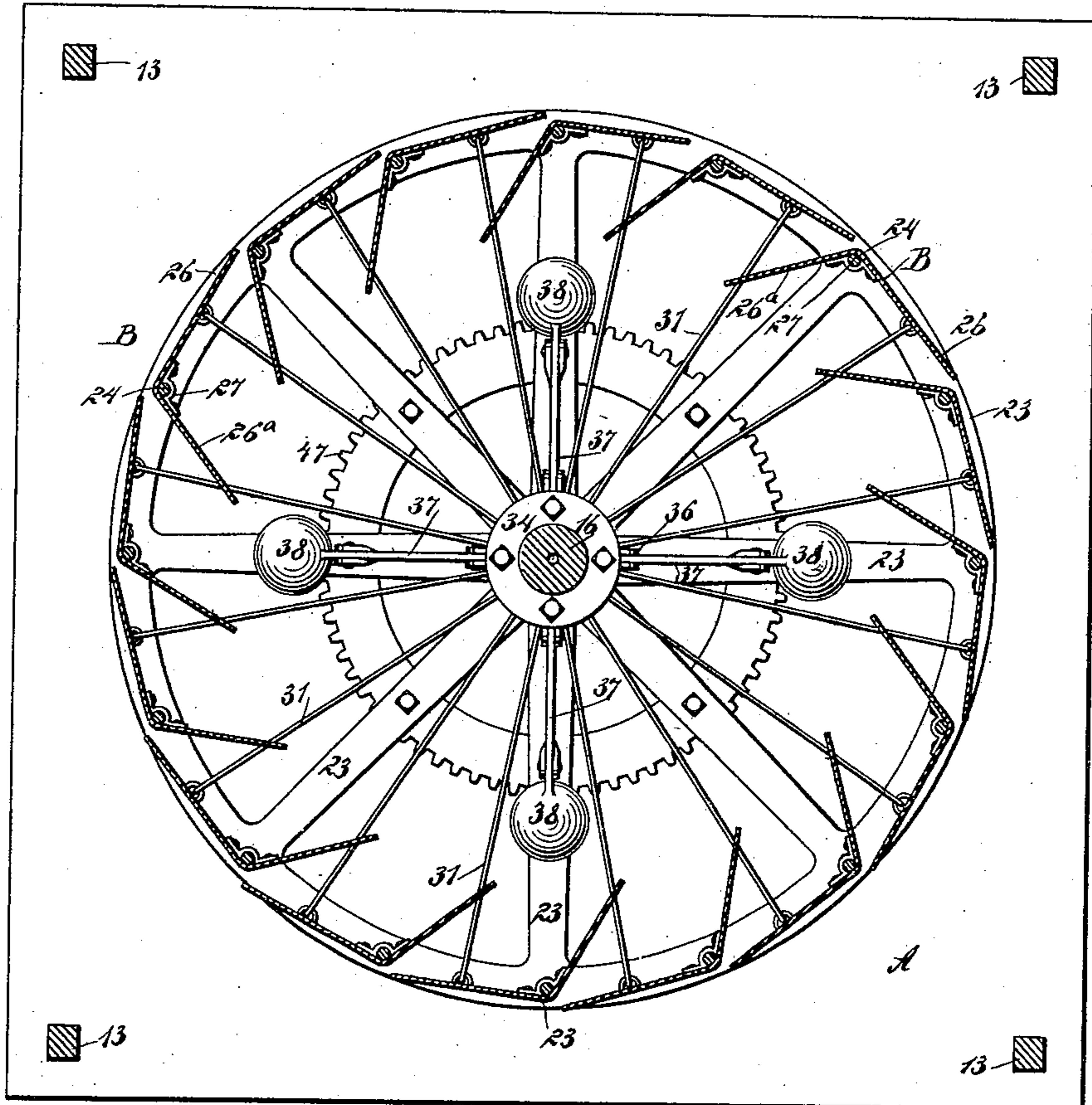
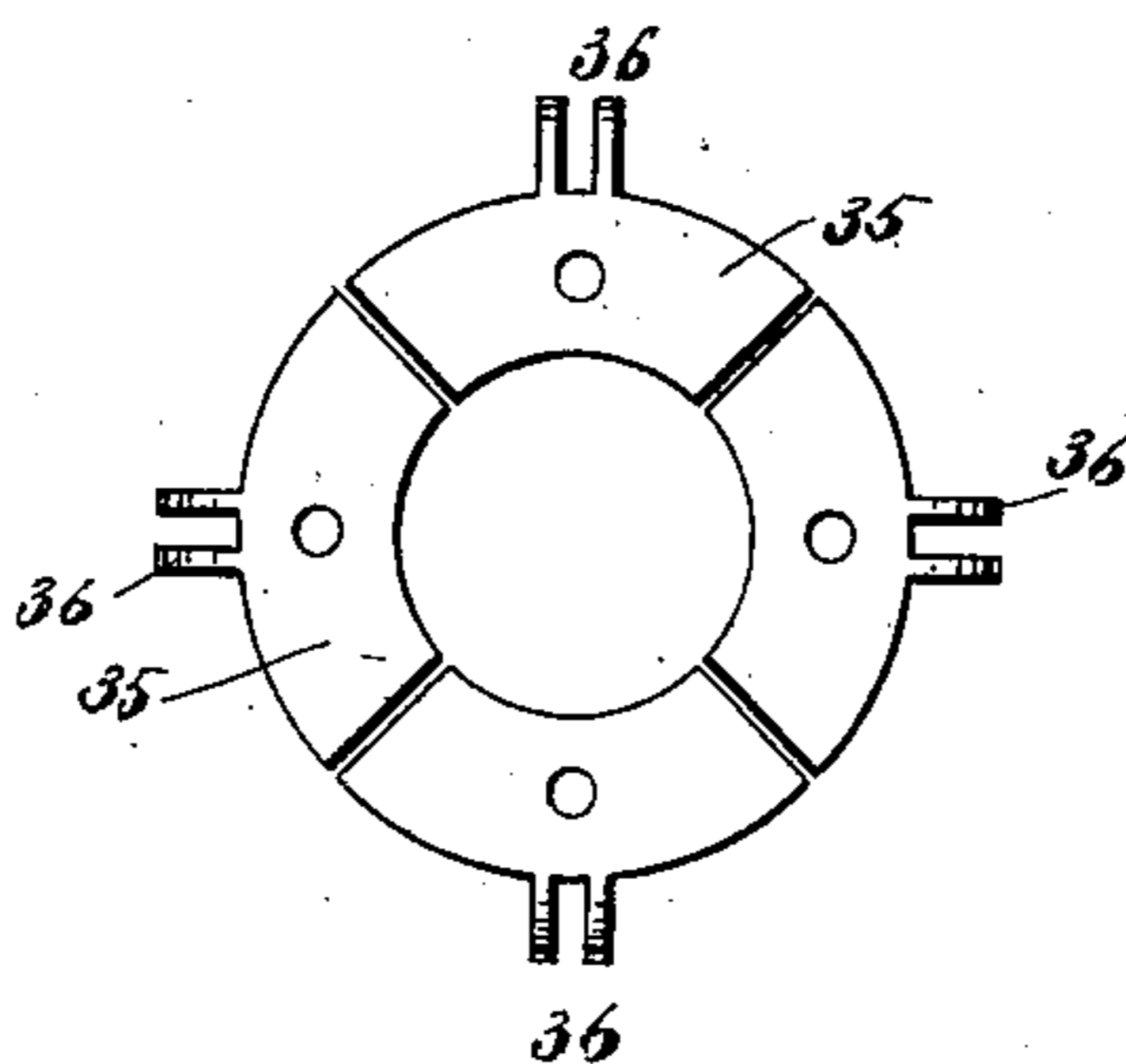


Fig. 5.



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UNITED STATES PATENT OFFICE.

MAYRO KEENEY, OF SOMERSVILLE, CONNECTICUT.

TOWER-WINDMILL.

SPECIFICATION forming part of Letters Patent No. 614,812, dated November 22, 1898.

Application filed September 24, 1897. Serial No. 652,794. (No model.)

To all whom it may concern:

Be it known that I, MAYRO KEENEY, of Somersville, in the county of Tolland and State of Connecticut, have invented a new and useful Improvement in Tower-Windmills, of which the following is a full, clear, and exact description.

The object of my invention is to so construct the wind-wheel of a tower-windmill that it will be durable, simple, and economic and also self-governing, the regulator being capable of such adjustment as to nearly close the fans or blades if the revolutions of the wheel are above a predetermined number.

Another object of the invention is to so construct the wheel that its fans or blades will catch the wind from all quarters without changing position, obviating the loss of speed or power and the irregular motion that is common to various other windmills while shifting to meet varying winds.

Another object of the invention is to provide a means whereby one oil-cup may supply lubricating material to all working parts, and whereby the speed of the wind-wheel may be regulated by hand when necessary.

The invention consists in the novel construction and combination of these several parts, as will be hereinafter fully set forth, and pointed out 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 figures.

Figure 1 is a central vertical section through the wind-wheel and its support. Fig. 2 is a horizontal section on the line 2 2 of Fig. 1. Fig. 3 is a horizontal section taken through the runner of the wheel and through its hub-shaft, the section being on the line 3 3 of Fig. 1. Fig. 4 is a view similar to Figure 2, the blades or fans, however, being shown closed; and Fig. 5 is a detail plan view of one of the clamps used for attaching the governor-arms to the wheel.

A represents the fixed table of the tower, supported by suitable standards 10. In the central portion of the table A a hollow bearing-block 11 is secured. This bearing-block is preferably of metal and extends beyond the top and the bottom of the table, being

provided with an interior thread 12, as shown in Fig. 1. Uprights 13 extend from the table and support the skeleton frame 14, which frame is provided with a covering 15. The frame of the wind-wheel consists of a tubular shaft 16, which may be termed a "hub-shaft," and an upper and a lower head 23. The bore of the hub-shaft 16 is of less diameter at the top than at its central and bottom portions. In fact the upper portion of the bore of the said shaft is employed only as a channel to receive and feed oil or other lubricant. A socket is formed in the bottom of the hub-shaft, which socket receives the upper projecting end of the bearing-block 11, and balls 17 are located between the bottom wall of the said socket and the opposing surface of the bearing-block. A second socket is formed in the upper end of the hub-shaft, receiving a metallic bearing-block secured to the upper frame 14, the said upper bearing-block 19 being provided with an opening which communicates with the reduced opening at the upper end of the hub-shaft. Balls 18 intervene the upper bearing and the bottom wall of the upper socket of the shaft.

An oil-cup 20 is secured in the upper bearing-block 19 and supplies oil to the bore in the hub-shaft. An annular flange 21 is formed upon the hub-shaft near its upper end and a corresponding flange 22 is formed on the shaft near its lower end. These flanges respectively receive the heads 23 of the wheel, and the heads usually consist of a rim and spokes connected with the rim and with a central hub. Washers 25 are placed upon the hub portions of the wheel-heads, and the flanges, the hubs of the wheel-heads, and the washers are securely fastened together by bolts or the equivalents thereof.

Rods 24 extend from one head 23 of the wheel to the other, the rods being passed through the rim portions of the said heads, and the said rods are preferably equidistant apart. Each of these rods is adapted to carry in a pivotal manner a vertical fan or blade B. These fans or blades are angular in cross-section, comprising two members 26 and 26' of substantially equal width, one member being at an obtuse angle to the other or at an angle greater than a right angle. At the

junction of these members each vertical fan or blade is provided with bearings 27, through which the supporting-rods 24 pass.

Near the central portion of the hub-shaft 16 said shaft is provided with an exterior annular recess 28, whereby this portion of the shaft is reduced in diameter, and at the upper end of the wider portion of the bore in the shaft, or at that end which is in the reduced portion of the shaft, opposing longitudinal slots 29 are made, which extend from the bore outward through the shaft, as shown in Figs. 1 and 3.

A runner 30 is mounted to slide upon the reduced or recessed portion 28 of the hub-shaft, and controlling rods or links 31 are pivoted to the runner, extending outwardly therefrom, each rod being attached to an outer member 26 of a fan or blade B. The controlling rods or links 31 may be secured to the runner in any approved manner. Usually, however, they are attached as shown in Fig. 3, in which it will be observed peripheral slots 32 are made in the runner, and the inner ends of the controlling rods or links are pivoted upon a binding-ring 33, which crosses the slots 32.

Below the upper flange 21 of the hub-shaft, yet above the reduced portion of the shaft, a third annular flange 34 is formed, to which a ring-like plate 35 is bolted, the ring-like plate being on the under side of the flange 34, and the said plate, as illustrated in Fig. 5, is also made in sections, and each section is furnished with downwardly and outwardly extending ears 36. In the ears of each section of the ring-like plate 35 the upper end of a governor or regulating-arm 37 is pivoted, the arms being provided with balls 38 at their lower extremities. Each governor or controlling-arm is connected by a link 39 with ears 40, the ears being secured upon and extending upwardly from a ring-like plate 41, secured upon the upper surface of the runner, the plate 41 being preferably of the same construction as the plate 35.

It is evident that when the runner 30 is carried upward on the hub-shaft the blades or fans will be so turned that the corresponding members of the various blades will be in close relation to each other, thus preventing the wind from taking hold of them and also causing a stoppage of the wheel. In order that the blades or fans may readily assume this closed position, recesses 42 are made in the inner edges of the blades, as shown in Fig. 1, to receive the controlling rods or links 31.

In the operation of the wheel when the fans or blades are open they will receive the wind, no matter from what direction it may blow, and when the wheel has attained a speed beyond that determined upon the governor-balls will be thrown outward to a greater or to a less extent, as shown in dotted lines in Fig. 1, causing the controlling-rods to be drawn inward and the fans or blades closed to a greater or less degree. It is frequently

desirable to control the blades or fans by hand. To this end an adjusting-shaft 43, terminating at its lower end, for example, in a hand-wheel 44, is passed upward through the bore of the hub-shaft 16, and the adjusting-shaft 43 is provided with an exterior thread, as shown in Fig. 1, adapted for engagement with the threaded portion of the lower bearing-block 11.

The upper end of the adjusting-shaft is in engagement with a block 45 when the runner 30 is in its lower position and the blades are open. The block 45 is held to slide in the hub-shaft and a pin 46 is passed through the block and through the vertical slots 29 in the hub-shaft into the runner 30, as shown in Fig. 3. Thus, it will be observed, by carrying the adjusting-shaft 43 upward the runner may be made to travel in the same direction and the blades may be entirely or completely closed. It is furthermore evident that the oil from the cup 20 will pass through the hub-shaft its entire length and will reach all bearings that are necessary to be lubricated.

The power may be transmitted from the wheel in any approved manner. As illustrated, a gear-wheel 47 is secured on the lower head of the wheel, as shown particularly in Fig. 1, and the gear is made to mesh with a pinion 48, attached to a power-transmitting shaft 49, journaled at its upper end in the table A.

Fans or blades constructed as above set forth utilize the wind to better advantage than fans which are straight transversely of the mill or the fans which are usually employed in windmills. The angular construction of the improved fans enables the wheel to derive power from the wind not only when the wind is entering the wheel, but likewise when the wind is leaving the wheel. The automatic regulator is exceedingly simple, durable, and economic, as is likewise the construction of the entire wheel, and the danger of the wheel breaking or quickly wearing out is reduced to a minimum, as is likewise the possibility of the wheel running loose in heavy winds.

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

1. In a wind-wheel, a frame consisting of a hub-shaft and a top and a bottom head, blades or fans vertically pivoted between the heads, a ball-governor carried by the hub, a runner connected with the ball-governor, a link connection between the runner and the fans or blades, an adjusting-shaft held to travel in the hub-shaft of the wheel, and a block adapted when the runner is in its lower position to engage with the adjusting-shaft, the said block being free to move within the hub-shaft and being attached to the said runner, for the purpose specified.

2. The combination of a tower, a tubular shaft mounted to turn on the tower and form-

ing a hub, a head carried at the lower end of
the tubular shaft, a head carried at the up-
per end of the tubular shaft, a series of blades
mounted on vertical pivots between the heads,
5 a runner extending along the tubular shaft,
rods connecting the runner with the blades,
a governor controlling the runner and moving
the same vertically on the shaft, an adjust-
ing-shaft movable in the hollow shaft, means
10 located in the hollow shaft and engaged by
the adjusting-shaft, such means being in con-
nection with the runner.

3. In a windmill, the combination with a
tower, of a hollow shaft mounted to turn
15 thereon and forming a hub, heads carried by
the hollow shaft, a series of blades mounted
to swing between the heads on vertical piv-
ots, a runner carried on the hollow shaft and
movable vertically thereon, rods connecting
20 the runner with the blades to adjust the same,
and means extending through the hollow shaft
and movable longitudinally therein, such
means being connected with the runner to
actuate the same.

4. The combination with a tower, of a hol- 25
low shaft revolubly mounted thereon and
forming a hub, blades supported on the shaft
and turning therewith, a governor carried on
the shaft and automatically adjusting the
blades, a block slidable in the hollow shaft 30
and in connection with the governor to con-
trol the governor, and an adjusting-shaft
movable in the hollow shaft and engaging the
block.

5. The combination with a tower, of a hol- 35
low shaft revolubly mounted thereon and
forming a hub, blades supported on the shaft
and turning therewith, means mounted to
slide on the exterior of the hollow shaft and
connected with the blades to actuate the same, 40
a block slidable in the hollow shaft and con-
nected with the runner, and a rod slidable in
the hollow shaft and engaging the block to
move the same.

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Witnesses:

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A. E. BRAINARD.