No. 710,277. Patented Sept. 30, 1902.

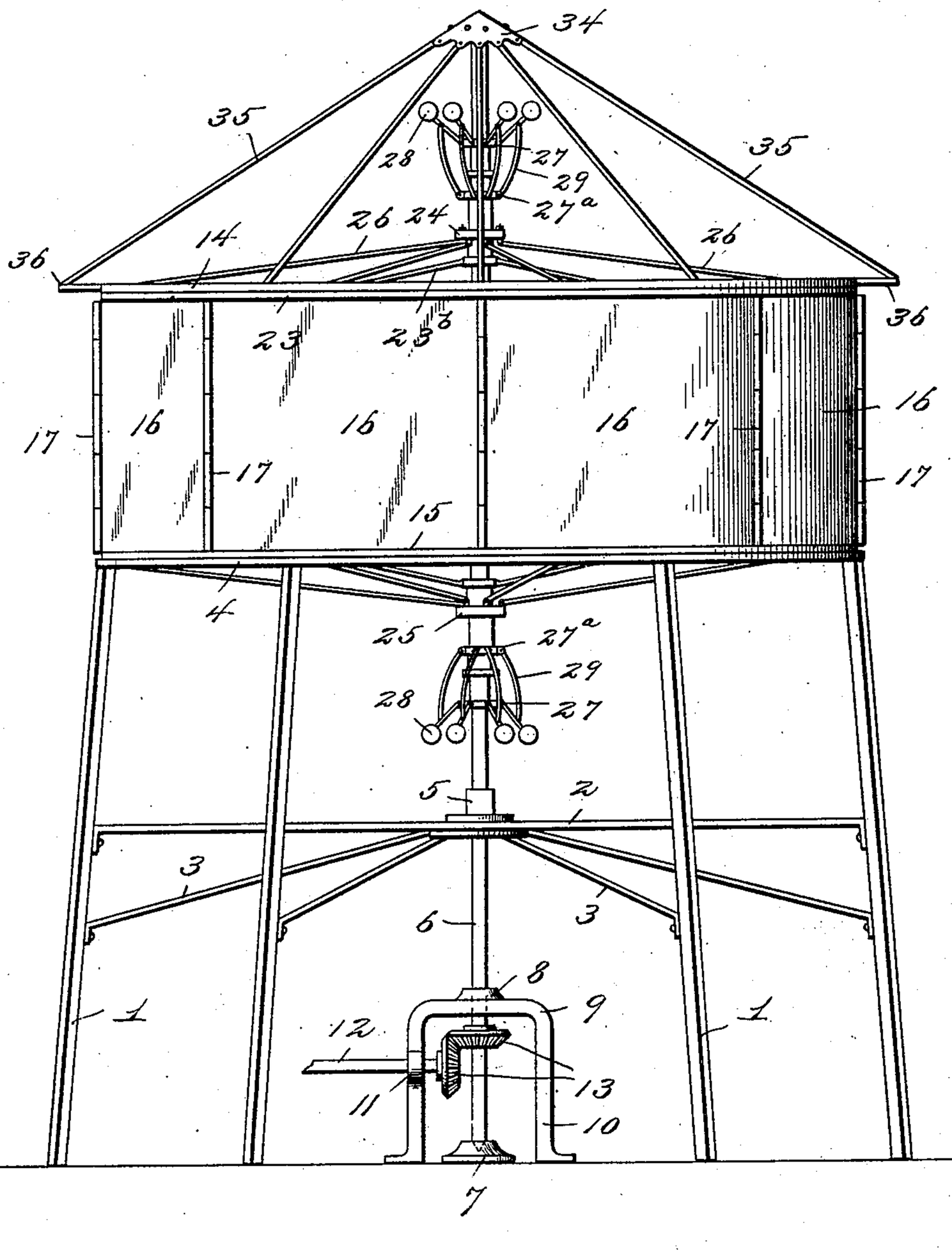
J. KAISER.

WIND TURBINE.

(Application filed July 13, 1901.)

(No Model.) 3 Sheets—Sheet 1.

Fig. 1.



Witnesses.

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(No Model.) 3 Sheets—Sheet 2.

Fig. 2.

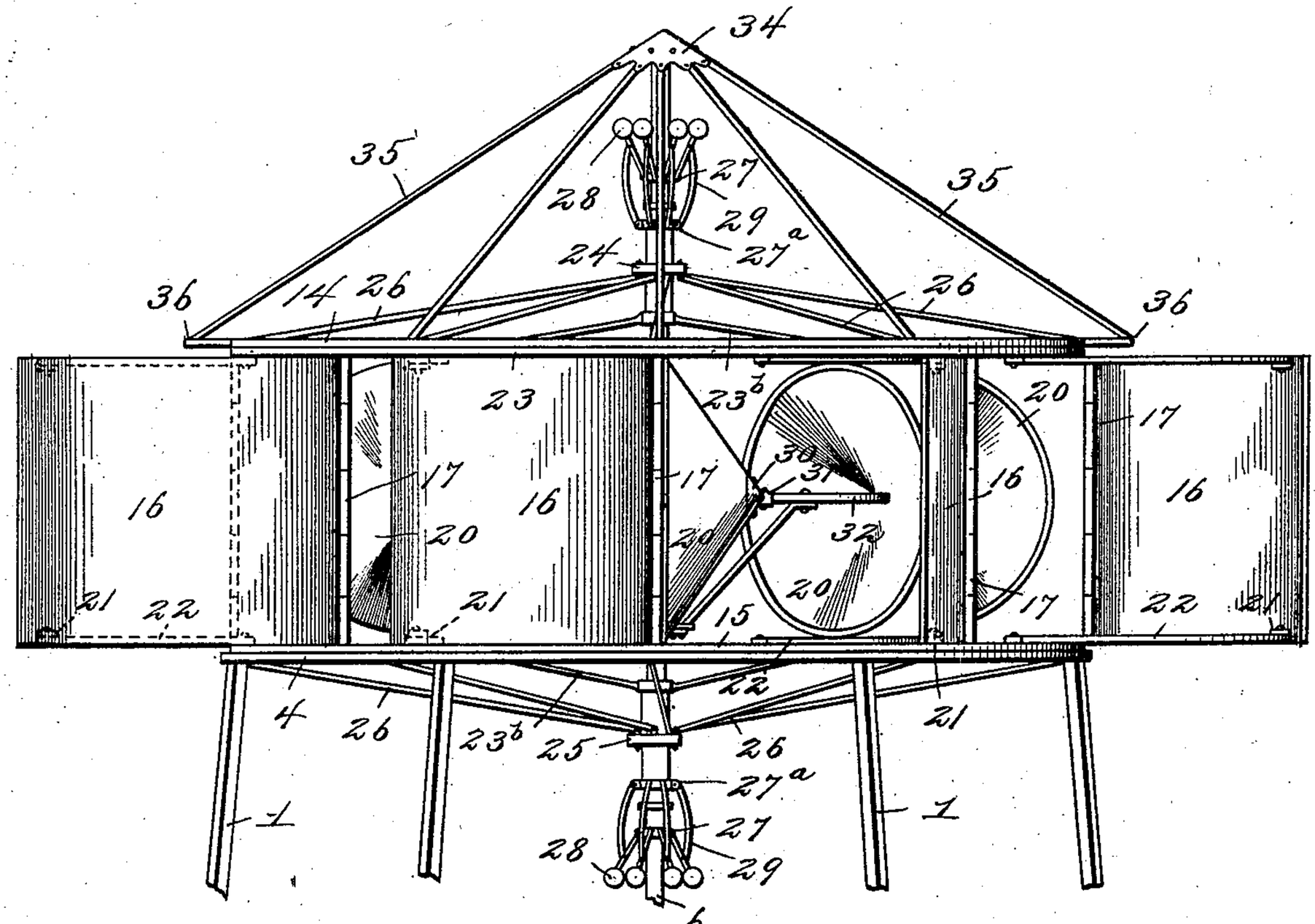

Fig. 5.

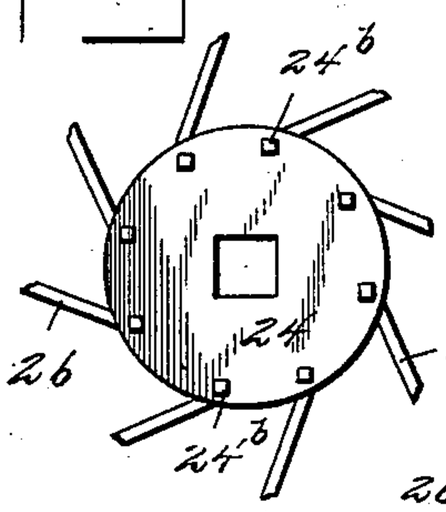

Fig. 4.

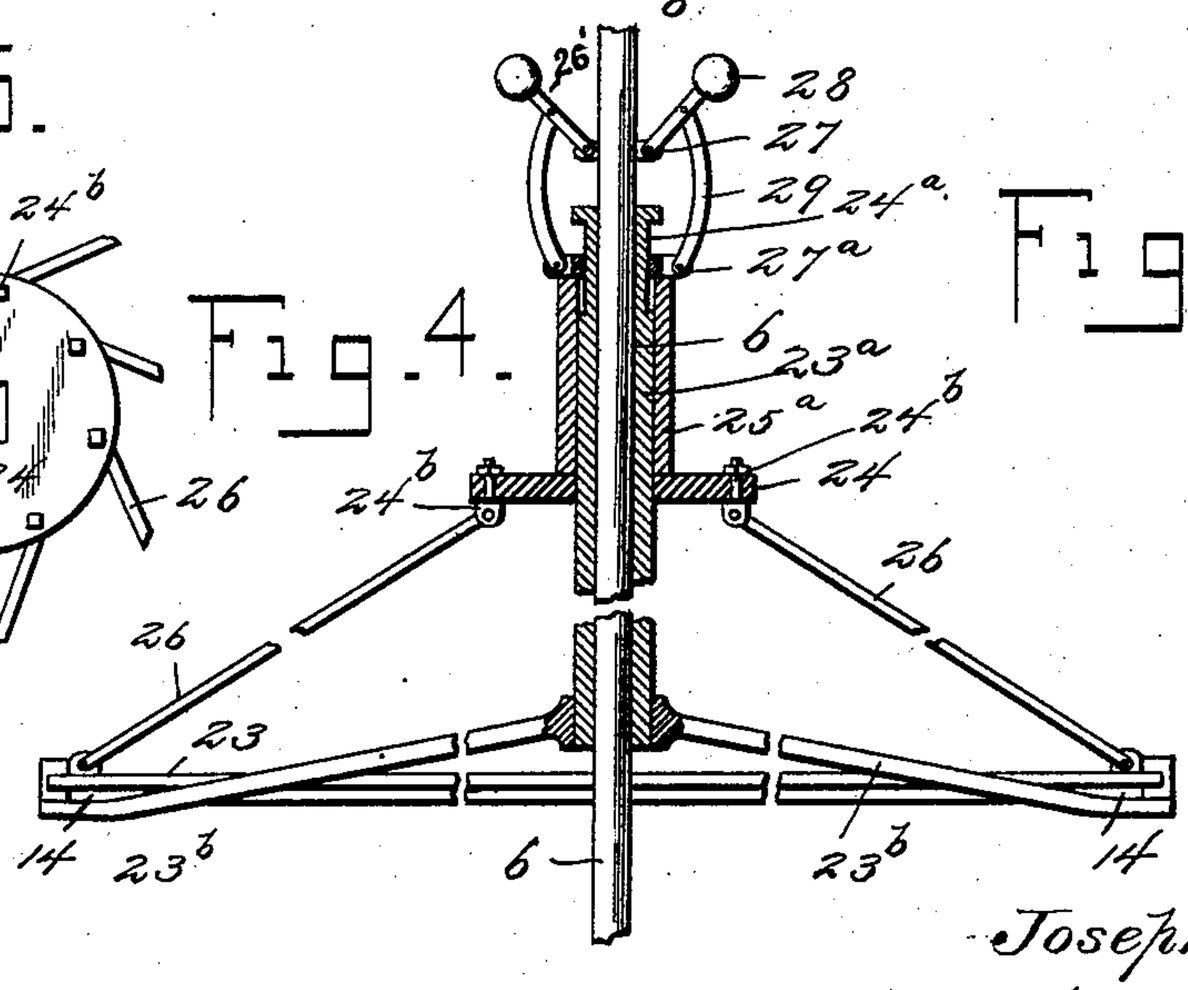

Fig. 6.

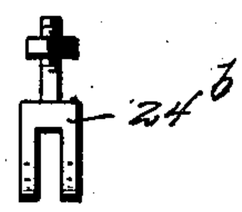

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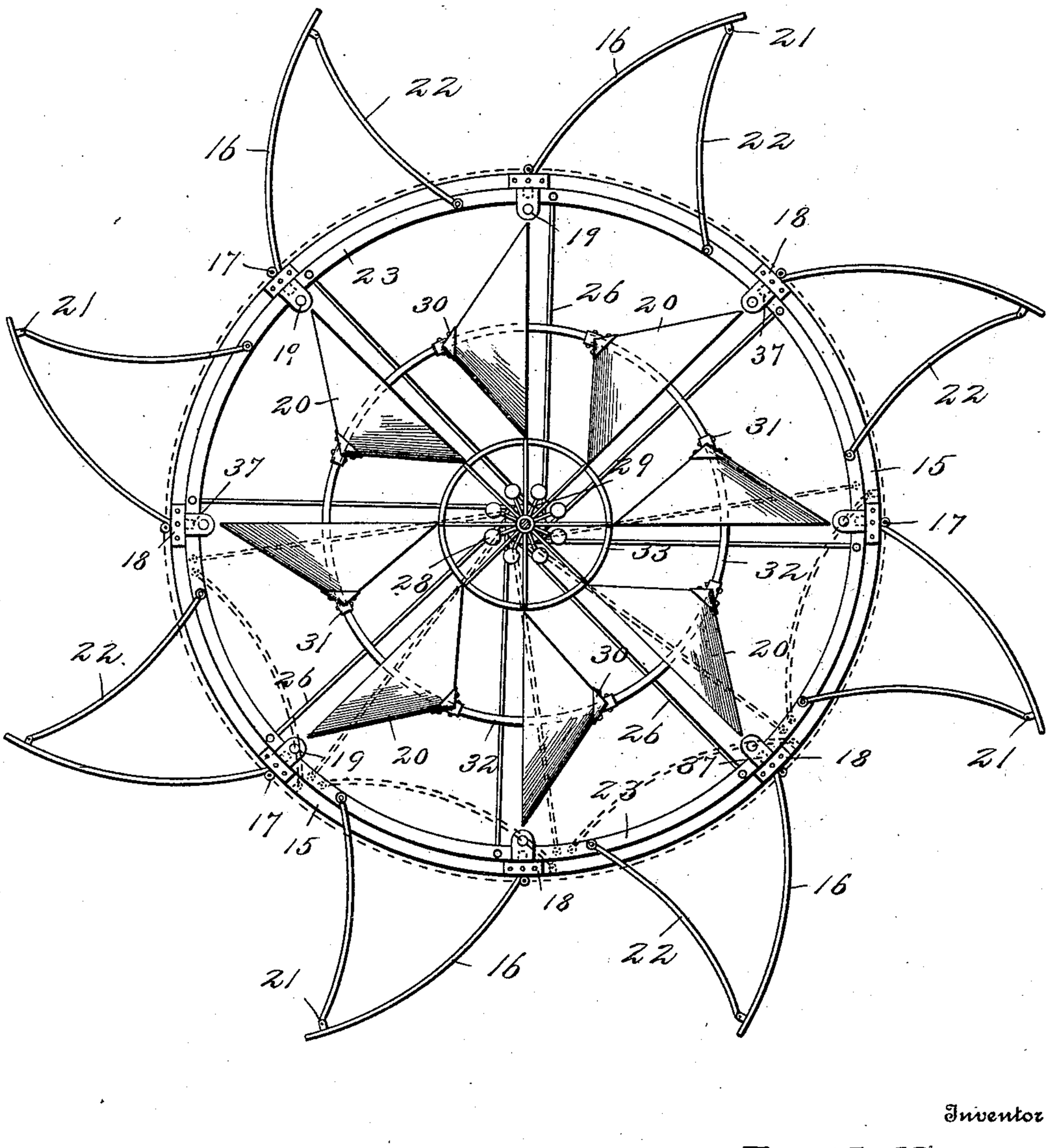
Fig. 3.



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UNITED STATES PATENT OFFICE.

JOSEPH KAISER, OF COLUMBUS, OHIO.

WIND-TURBINE.

SPECIFICATION forming part of Letters Patent No. 710,277, dated September 30, 1902.

Application filed July 13, 1901. Serial No. 68,220. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH KAISER, a citizen of the United States, residing at 53 Gate street, Columbus, in the county of Franklin and State of Ohio, have invented new and useful Improvements in Wind-Turbines, of which the following is a specification.

This invention relates to wind-turbines, the object in view being to provide a windmill mounted upon a suitable tower or stand and rotatable upon a vertical axis, the said turbine or mill comprising a cylindrical casing composed of a continuous series of curved wings, which serve to gather in the air-currents and deflect and cause the same to impinge against a corresponding series of interiorly-arranged cup-shaped blades, thus producing a reactionary or double impulse and utilizing to a greater degree than ordinary the air-currents, deriving a greater amount of impulse or power from a given velocity of wind.

It is also an object of the invention to provide in connection with said gathering-wings means for automatically opening and closing the wings, so as to regulate the amount of air admitted to the cup-shaped blades, the arrangement being such that when the velocity of the wind becomes excessive the gathering-wings are entirely closed, thus throwing the mill out of operation.

With the above and other objects in view the invention consists in the novel construction, combination, and arrangement of parts hereinafter fully described, illustrated, and claimed.

In the accompanying drawings, Figure 1 is a side elevation of a wind turbine or mill constructed in accordance with the present invention, showing the wings closed. Fig. 2 is a similar view showing the wings open, parts being broken away. Fig. 3 is a top plan view of the turbine with the truss-rods and cap removed, a portion of the braces being omitted for the sake of clearness. Fig. 4 is an enlarged vertical sectional view of the upper portion of the turbine, showing the position of the governor-arms and connecting-rods while the doors of the casing are closed, parts being broken away. Fig. 5 is a detail view of one of the runners, showing the arrangement of the operating-rods in relation thereto. Fig. 6 is a detail view of one of the rod-connecting swivel-bolts.

Similar numerals of reference designate like parts in all figures of the drawings.

The wind-turbine contemplated in this invention is in practice supported upon a tower or structure, which for convenience is illustrated as comprised of a circular series of posts or uprights 1, connected by horizontal and radially-disposed cross-bars 2, the structure being stiffened by braces 3, connecting the cross-bars and uprights, while the upper ends of the uprights are rigidly connected with the horizontally-disposed annular track 4. The cross-bars 2 are connected with and serve as a support for a centrally-located bearing 5, in which is journaled a vertical rotary shaft 6, which is operated by the turbine. The lower extremity of said shaft is stepped in a bottom bearing 7. Adjacent to its lower end the shaft 6 is journaled in another bearing 8, formed in the connecting cross-bar 9 of a yoke or bracket 10, and said bracket is provided with a bearing 11 for the reception of a horizontal power-shaft 12, which is driven by the shaft 6 through the medium of miter or bevel gears 13, whereby the power derived from the shaft of the turbine may be communicated or transmitted to a pump or other device or machine to be driven.

The rotary turbine comprises upper and lower hoops 14 and 15, respectively, suitably connected together at the required distance apart.

18 designates clips secured to the hoops and provided with inwardly-projecting lugs or ears 19, which serve as guides or supports for the oscillatory rings hereinafter described.

The gathering-wings 16 are described on the same arc of a circle as the hoops 14 and 15, and when closed, as shown in Fig. 1, they form a cylindrical casing in which the blades 20 are housed and concealed, the wings when in this position serving to exclude the currents of air from the propelling-blades. Each of the wings 16 has pivotally connected thereto at 21 a pair of links 22, which extend inward and connect pivotally with a pair of oscillatory rings 23, so that as said rings are simultaneously oscillated the gathering-wings are drawn inward or allowed to move outward, the outward position of the rings being indicated in

full lines in Fig. 3 and the inward position in dotted lines in the same figure.

23ª designates upper and lower sleeves mounted upon the shaft 6 above and below the turbine-casing, respectively, and held against rotary movement by the truss-rods 23ᵇ, connected to said sleeves and the hoops 14 and 15. The sleeves 23ª for the greater part of their lengths are square in cross-section and for the remaining portion circular, as indicated at 24ª.

In order to oscillate the rings 23, I mount upon the squared portions of the sleeves 23ª upper and lower runners 24 and 25, respectively, each of said runners having a square central bore to register with the squared portions of the sleeves and being pivotally connected through the medium of swivel-bolts 24ᵇ to a series of tangentially-arranged rods 26, which are in turn pivotally connected with the oscillatory rings 23. By this arrangement of the rods 26 as the runners 24 and 25 move toward or away from each other the pressure thereon will serve to impart a partial rotation to the said rings, thereby opening and closing the gathering-doors.

25ª designates sleeves having square central bores and mounted upon the sleeves 23ª between the runners 24 and 25, respectively, and the governor-arms hereinafter referred to.

The runners are controlled and actuated by means of a series of governor-arms 26′, pivotally connected at one end to a collar 27, fixed on the shaft 6, and provided at their opposite or free ends with weights 28. The governor-arms 26′ are connected by curved pivotal links 29 to collars 27ª, which bear upon sleeves 25ª, which are provided with squared central bores to correspond with the squared portions of the sleeves 23ª, so that as the governor-arms are rapidly rotated and brought to a substantially horizontal position they serve to push the collars 27ª along the shaft into engagement with the sleeves 25ª, which in turn force the runners 24 and 25 inward toward the body of the turbine, with the result above stated. In this way the turbine is automatic and self-regulating, and in a wind of high velocity the mill throws itself out of operation, thereby preventing injury to and the destruction of the operative parts of the mill.

The blades 20 are preferably constructed of sheet metal and are in the form of hollow cones, with their hollow sides disposed toward the incoming air-currents. Each of the blades 20 is provided at the apex of the cone with a cap 30, conforming to the shape of the cone and suitably bolted or riveted thereto. The cap 30 is provided with a cuff 31, extending from its vertex, and an annular brace or spacing-ring 32 passes through all of the cuffs 31 of the several blades, thereby securely bracing the blades relative to each other and holding them at a uniform distance apart. In addition to the support afforded by the ring 32 the blades are further supported by connecting their inner edges to an auxiliary and smaller ring 33, connected with the frame of the turbine. The inner edges of the gathering-wings are arranged about in line with the outer edges of the blades 20, and therefore the said gathering-wings when open or partially open serve to divert and direct the air-currents inward, so that they may act upon the blades 20, thus utilizing the air-currents a second time. When the gathering-wings fold inward, they meet or overlap, and thereby prevent the admission of air to the turbine.

The shaft 6 is extended a suitable distance above the frame of the turbine, where it is provided with a cap 34, from which radiates a series of downwardly-inclining truss-rods 35, which connect at their outer lower ends with spokes 36, projecting outward from the upper hoop 14, forming part of the turbine-frame.

The lugs or ears 19 are provided with recesses, in which are placed antifriction-rollers 37, which contact with the oscillatory ring or rings 23 for the purpose of relieving the friction thereof and rendering the automatic feathering of the gathering-wings more reliable.

From the foregoing description it will be seen that I have produced a simple and effective wind-turbine in which, in addition to the utilization of the primary air-currents, the said currents are used a second time or caused to react upon a series of interiorly-arranged cup-shaped blades, and, further, that the gathering-wings are automatically controlled and regulated, the same being partially or wholly closed or open in proportion to the velocity of the wind operating upon the turbine. It will be apparent that the wind-turbine is susceptible of changes in the form, proportions, and minor details of construction, which may accordingly be resorted to without departing from the principle or sacrificing any of the advantages of the invention.

Having thus fully described the invention, what is claimed as new is—

1. A wind-turbine comprising a supporting stand or tower, a frame including a ring mounted thereon, cup-shaped blades mounted and spaced apart upon the said ring, a vertical shaft upon which the said ring is mounted, and hinged gathering-wings carried by the turbine-frame and adapted to extend outward therefrom so as to direct the air-currents to the blades.

2. A wind-turbine comprising a supporting stand or tower, a cylindrical rotary frame mounted thereon, blades mounted within said frame, hinged gathering-wings carried by the turbine-frame, and adapted to extend outward therefrom, an oscillatory ring, links interposed between said ring and the gathering-wings, a governor connected with the said turbine, and operative connections between

the said governor and ring for automatically controlling the gathering-wings.

3. A wind-turbine comprising a suitable stand or tower, a turbine-frame rotatably mounted thereon, a vertical shaft on which said turbine-frame is fastened, a series of blades mounted within the turbine-frame, gathering-wings hinged to the frame and adapted to project outward therefrom, an oscillatory ring, links interposed between said ring and gathering-wings, pivoted governor-arms mounted on said shaft, and means for rotating the said ring through the medium of the said governor-arms.

4. A wind-turbine comprising a suitable stand or tower, a rotatable turbine-frame mounted thereon, a vertical rotary shaft on which the turbine-frame is fastened, blades within the turbine-frame, gathering-wings hinged to the frame, an oscillatory ring, links connecting the gathering-wings with said ring, governor-arms mounted on the shaft, runners on the shaft, links connecting said runners with the governor-arms, means for preventing rotary movement of said runners, and connecting-rods interposed between said runners and oscillatory ring.

5. A wind-turbine comprising a suitable stand or tower, a rotary turbine-frame mounted thereon, curved gathering-wings hinged to said frame and projecting outward therefrom, cone-shaped blades mounted within the turbine-frame, cuffs extending from the apex of the blades, an annular brace and spacing-ring adapted to pass through each cuff of the several blades, and means for folding the gathering-wings.

6. A wind-turbine comprising a supporting stand or tower, a cylindrical turbine-frame rotatably mounted thereon, a vertical shaft on which the turbine-frame is fastened, cup-shaped blades mounted within the frame, gathering-wings hinged to the frame, and adapted to project outward therefrom, a pair of oscillatory rings mounted above and below the said cup-shaped blades, link connections between the said rings and gathering-wings, governor-arms fixed to the said shaft above and below the turbine, and operative connections between the said governor-arms and oscillatory rings for automatically opening and closing the gathering-wings.

7. A wind-turbine comprising a supporting stand or tower, a cylindrical turbine-frame rotatably mounted thereon, cup-shaped blades mounted within the frame, curved gathering-wings hinged to the frame and adapted to project outward therefrom, said wings being described on the same arc of a circle as the outer portion of the turbine-frame, an oscillatory ring, links interposed between said ring and the gathering-wings, and means controlled by the wind for oscillating said ring.

8. A wind-turbine comprising a suitable stand or tower, a rotatable turbine-frame mounted thereon, a vertical rotary shaft on which the turbine-frame is fastened, a series of cup-shaped blades within the turbine-frame, a corresponding series of gathering-wings hinged to the frame, an oscillatory ring, links connecting the gathering-wings with said ring, governor-arms mounted on the shaft, runners on the shaft operated by the governor-arms, and connecting-rods interposed between said runners and oscillatory ring.

9. A wind-turbine comprising a stand or tower, a turbine-frame rotatably mounted thereon, gathering-wings hinged to the turbine-frame, means for automatically swinging said wings, hollow conical blades rigidly mounted within the turbine-frame and arranged approximately in radial alinement with the inner ends of the gathering-wings, cuffs applied to the vertices of said blades, and an annular brace and spacing-ring passing through the cuffs of the several blades.

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

JOSEPH KAISER.

Witnesses:
ROBT. B. COLLIER,
JACKOB NIEUZYLER.