No. 725,829. PATENTED APR. 21, 1903.

R. DECKER.

WINDMILL.

APPLICATION FILED MAY 5, 1902.

NO MODEL. 2 SHEETS—SHEET 1.

Fig. 1.

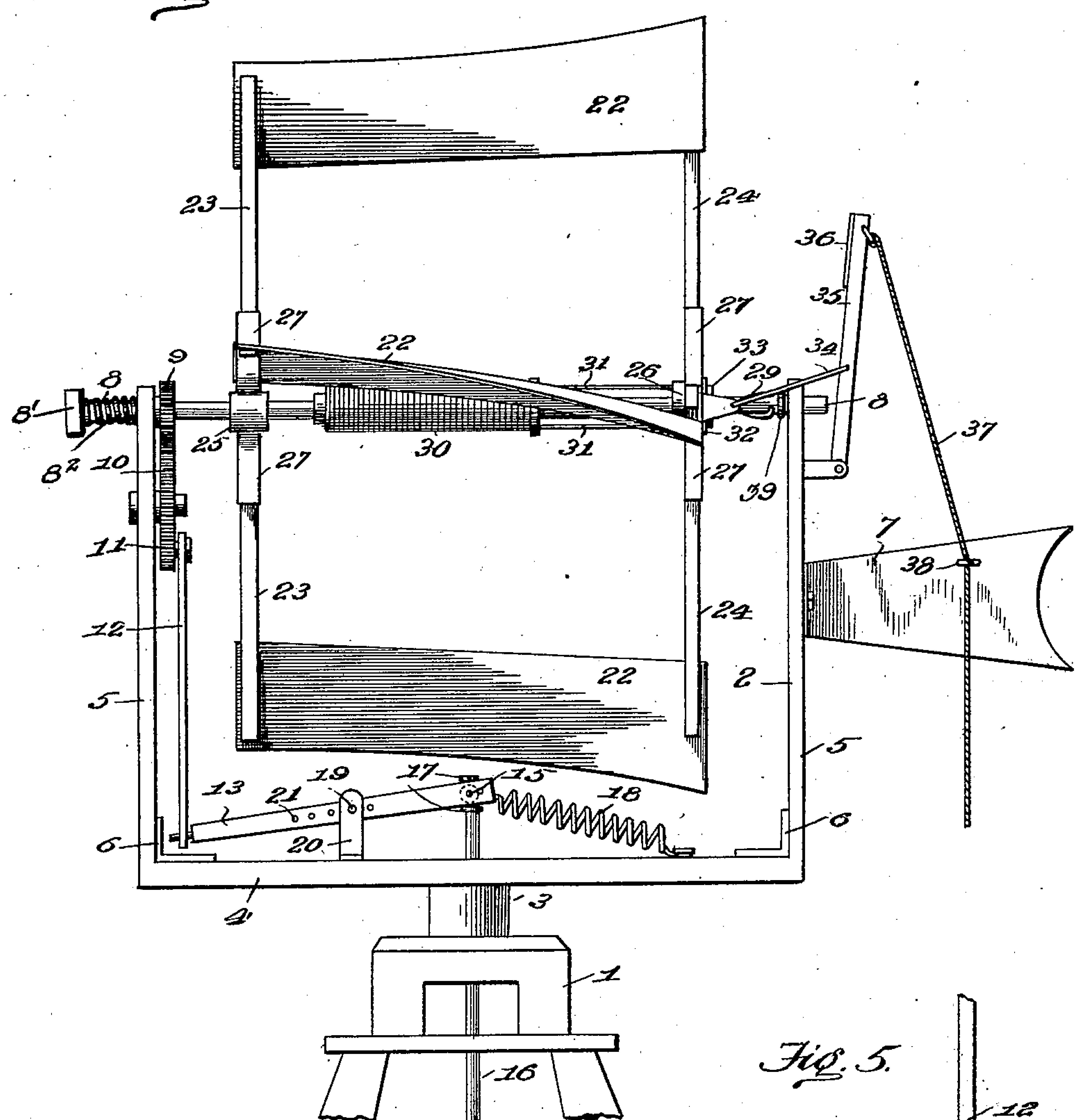
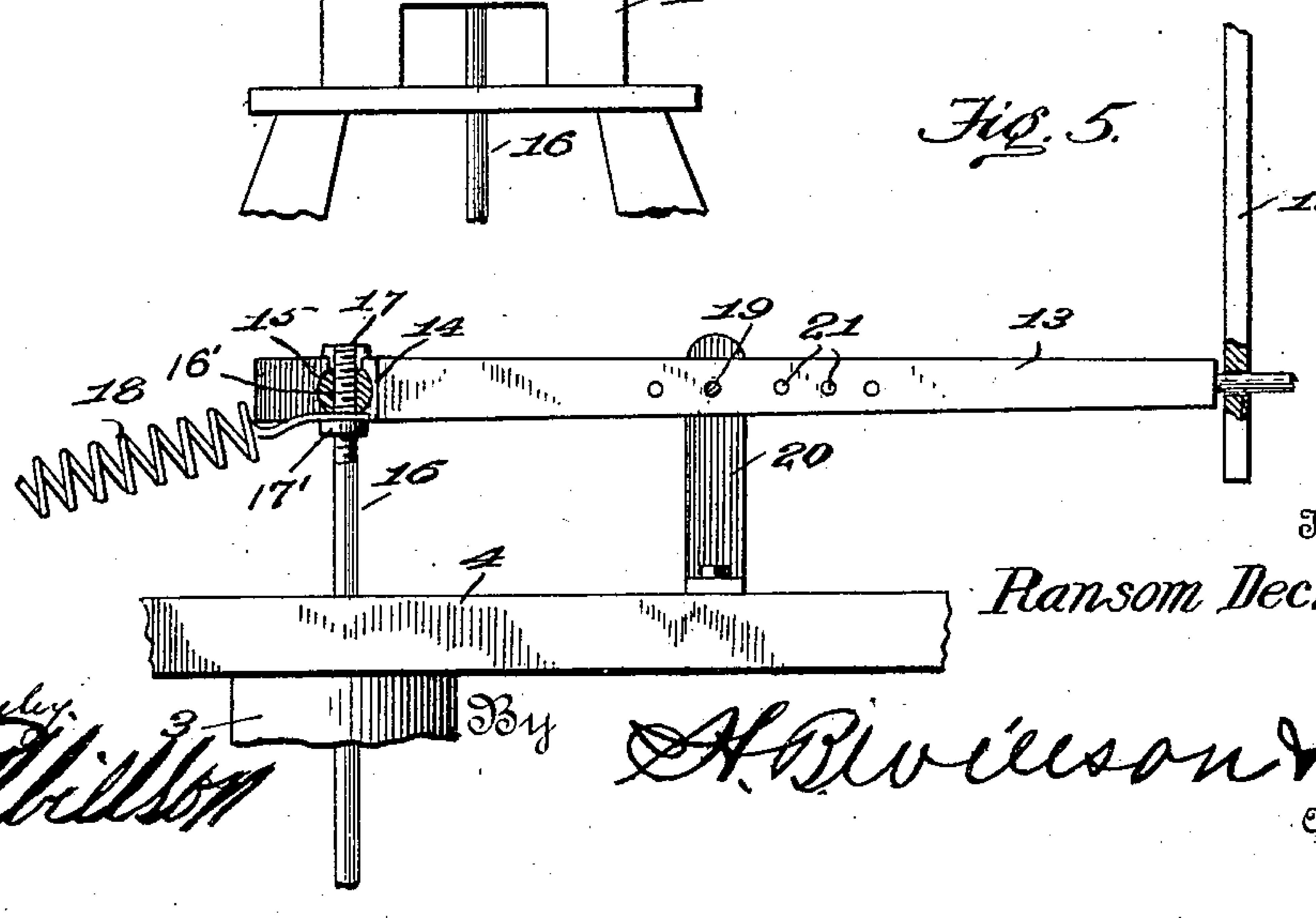


Fig. 5.



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NO MODEL. 2 SHEETS—SHEET 2.

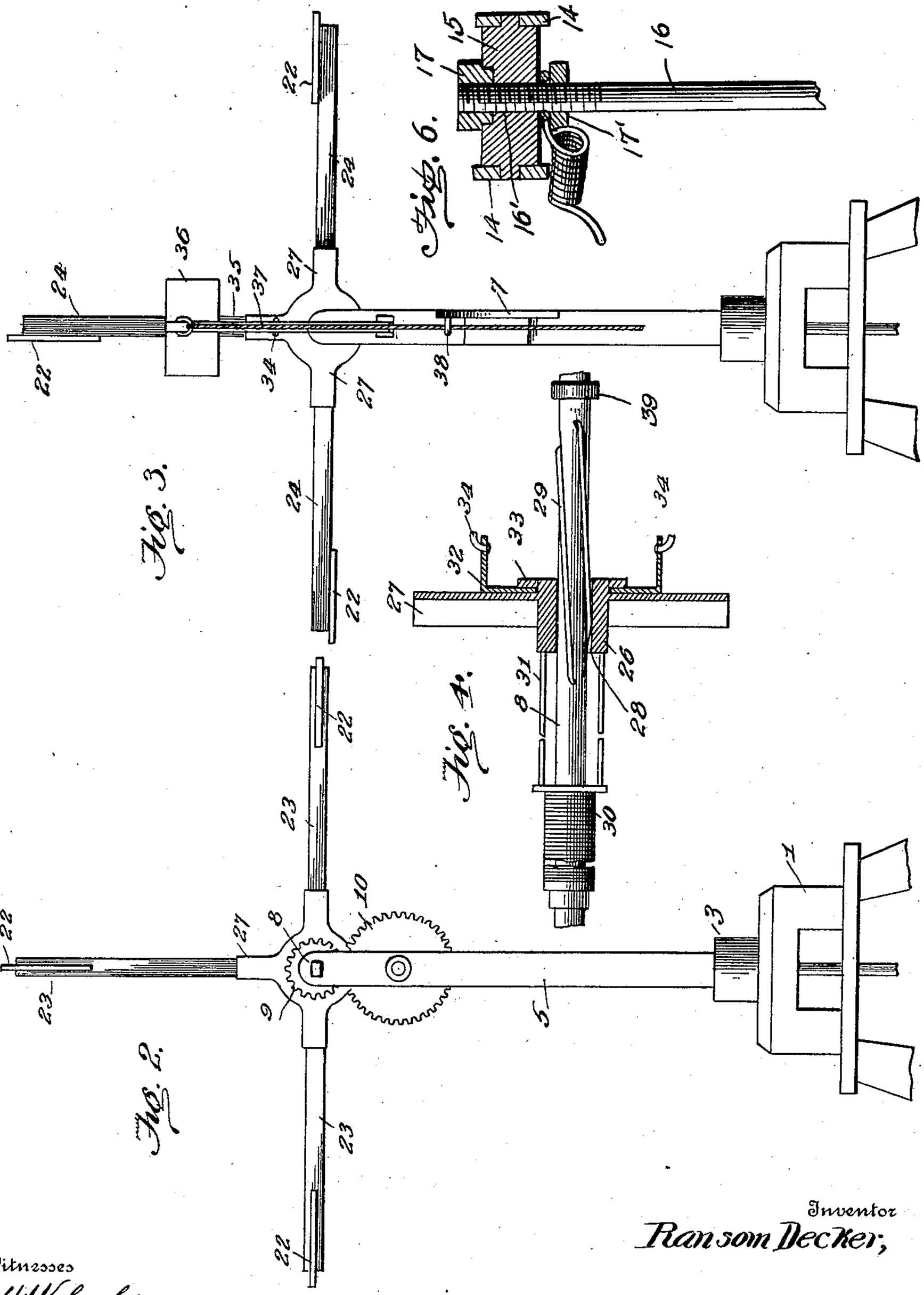

Fig. 3.

Fig. 6.

Fig. 4.

Fig. 2.

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UNITED STATES PATENT OFFICE.

RANSOM DECKER, OF MEDFORD, OKLAHOMA TERRITORY.

WINDMILL.

SPECIFICATION forming part of Letters Patent No. 725,829, dated April 21, 1903.

Application filed May 5, 1902. Serial No. 105,985. (No model.)

To all whom it may concern:

Be it known that I, RANSOM DECKER, a citizen of the United States, residing at Medford, in the county of Grant and Territory of Oklahoma, have invented certain new and useful Improvements in Windmills; and I 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.

The invention has relation to improvements in windmills.

The object of the invention is to provide a windmill which shall be simple of construction, durable and efficient in use, and comparatively inexpensive of production and one in which the pressure of the wind on the sails is automatically governed.

With the above and other objects in view, which will readily appear as the nature of the invention is better understood, said invention consists in certain novel features of construction and combination and arrangement of parts, which will be hereinafter fully described, defined in the appended claims, and illustrated in the accompanying drawings, in which—

Figure 1 is a side elevation of a windmill embodying my invention. Figs. 2 and 3 are opposite end elevations of the same. Fig. 4 is a horizontal section through the sliding collar and adjacent parts, showing the means for regulating the curvature of the sails. Fig. 5 is a detail view of the walking-beam and connections. Fig. 6 is a detail cross-section through one end of the vibrating lever, showing the pivotal connection of the pump-rod.

The numeral 1 in the drawings represents the upper end of the windmill-tower, and 2 the windmill-frame, having the usual pivotal connection at 3 with said tower. This frame comprises a horizontal base-piece 4, from which rise vertical standards 5, stayed by suitable knee-braces 6. To one of these standards is attached the usual tail-board or vane 7. In the upper ends of the standards is journaled an endwise-movable horizontal drive-shaft 8, provided at one end with a pinion 9, meshing with a gear-wheel 10, journaled upon one of said standards, which pinion is adjustable into and out of engagement with the gear by the endwise movement of the shaft in one direction or the other. The gear 10 carries a crank or wrist pin 11, to which is connected one end of a pitman-rod 12, the opposite end of which is connected to one end of a walking-beam or vibrating lever 13. The other end of this walking-beam or vibrating lever is provided with bearings 14, in which a rock-shaft 15 is journaled. The upper end of the pump-rod or operating-rod works through the tubular pivotal connection 3 and projects at its upper end through an opening 16′ in the shaft and is threaded to receive stop-nuts 17 and 17′, located above and below the shaft. By this construction the shaft 15 forms a rocking connection, allowing the movement of the beam 13 to be transmitted smoothly and easily to the rod 16 without overstrain at the point of connection. By this construction as the walking-beam oscillates or vibrates the pump-rod is reciprocated in a vertical plane and is also allowed to have a slight independent axial movement, so as to obviate excessive twisting strain on said rod and the coöperating parts of the gearing. A spring 18, secured at one end to the horizontal base-piece 4 of the windmill-frame, is attached at its opposite end to the upper end of the rod or adjacent end of the lever and exerts its pressure to aid in the lifting of the rod, whereby ease of operation of the parts is insured.

The beam or lever 13 is pivotally mounted at 19 upon a bearing bracket or support 20, fixed to the base-piece 4. The pivotal connection or pin 19 is adapted to be passed through either one of a series of openings 21 in the lever, by means of which said lever may be adjusted to regulate the stroke of the rod in an obvious manner.

The windmill sails or fans 22 are composed of some suitable flexible material, such as sheet metal, and are attached at their opposite ends to two series of arms 23 and 24, radiating from the drive-shaft 8. The arms 23 are carried by a collar 25, fixed to said shaft, while the arms 24 are carried by a collar 26, loosely mounted upon the shaft to slide and rotate thereon. The arms are secured to and seated in sockets or receptacles 27, radiating from the collars, and the collar 26 is provided with grooves 28, engaging spiral threads 29,

formed on the shaft, by means of which when the collar is slid upon said shaft in one direction or the other a partial rotation will be imparted thereto to move the arms 24 and regulate the curvature of the sails 22. As stated, the sails 22 are composed of flexible metal and are adapted to be bent or curved to present more or less area or surface to the action of the wind. When the sails are curved or bowed out to the position shown in Fig. 1, a large area or surface is presented for the action of the wind thereon and the collar 26 is adjusted to the limit of its inward movement.

Fixed at one end to the shaft 8 is a spiral spring 30, which is attached at its opposite ends to rods or connections 31, which connect the same with the collar 26. This spring normally serves to draw the collar 26 inwardly to bow or curve out the sails to throw the same into action and exerts a resistance to the outward movement of said collar.

A coupling 32 is loosely mounted upon the collar 26 and is held in position thereon against displacement by a flange or cap 33. Connected to this coupling is a bail 34, which is connected at its outer end to an arm 35, pivoted at its lower end to one of the standards above the tail-board or vane 7 and carrying at its upper end a wind-board or vane 36. To this arm 35 is connected a controlling cord or rope 37, which extends downwardly in practice to a convenient position to be operated from the ground and is adapted to be engaged with a hook 38 upon the tail-board 7 to enable the arm 35 to be held in retracted position.

That end of the shaft 8 which is journaled in the standard 5, carrying the gear 10, extends beyond said standard and is provided with a collar or head 8′, and surrounding said shaft between the standard and head is a coiled spring 8^2, which slides the shaft to the left in Fig. 1 to move gear 9 in engagement with gear 10, thus normally maintaining said gears in mesh.

In the operation of the windmill the sails are automatically thrown into the wind through the action of the spring 30, which slides the collar 26 inwardly, thereby causing said collar to be given a partial rotation by the spiral threads 29, causing the adjacent ends of the blades to be turned or twisted to increase the acting surface or area thereof. When the wheel is running too fast or the pressure of the wind increases to a point which causes the revolution of the wheel beyond the normal speed, the wind-board 36 is acted on to press back the arm or lever 35, whereby the coupling 32 is drawn on through the instrumentality of the bail 34 and the collar 26 moved out and turned by the spiral threads 29 in the reverse direction, thereby decreasing the curvature of the sails and the area exposed to the action of the wind and reducing the speed of the mill to the proper point. When the speed of the wind-wheel becomes too excessive, the coupling 32 abuts against the collar 39 on the shaft and moves said shaft longitudinally in the proper direction against the resistance of spring 8^2 to draw the pinion 9 out of gear with the gear-wheel 10, thus stopping the operation of the apparatus. When it is desired to maintain the wheel out of operation, the controlling rope or cord 37 is engaged with the hook 38, whereby the collar 26 is held at the limit of its outward movement against the tension of the spring 30 and spring 8^2. To throw the wheel into operation again, it is simply necessary to release the cord or rope 37, whereupon the spring 30 will slide the collar 26 inwardly, while the spring 8^2 will slide shaft 8 in the reverse direction to connect the gears 9 and 10, causing the sails to be bowed or curved and thrown into action in the manner previously described.

From the foregoing description, taken in connection with the accompanying drawings, it is thought that the construction, mode of operation, and advantages of this invention will be readily apparent without requiring a more extended explanation.

Various changes in the form, proportion, and the minor details of construction may be resorted to without departing from the principle or sacrificing any of the advantages of this invention.

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

1. In a windmill, the combination with a supporting-frame; of a shaft journaled therein and having endwise movement, a wind-wheel mounted upon said shaft, means for adjusting the sails of the wheel for throwing the same into and out of operation, a vibrating lever, gearing between the shaft and lever for imparting motion to the latter, said gearing being thrown into and out of operation by moving the shaft endwise, and automatic means for regulating the means for controlling the sails so as to reduce or stop the action of the wheel, substantially as specified.

2. In a windmill, the combination with a supporting-frame; of a drive-shaft rotatably mounted and endwise adjustable therein, gearing operated by said shaft and thrown into and out of operation by the endwise movement thereof, a wind-wheel carried by the shaft and comprising sets of radial arms, one set of arms being fixed to the shaft and the other longitudinally adjustable thereon, a collar connected to the adjustable arms, means upon the shaft and acting upon the collar for giving a partial rotation to said collar as it is longitudinally adjusted to increase or decrease the curvature of the sails, a spring acting on the collar to move the same in one direction to increase the curvature of the sails, a wind-board, and connections between the wind-board and collar for adjusting the lat-

ter in the reverse direction to decrease the curvature of the sails, substantially as and for the purpose set forth.

3. In a windmill, the combination with the supporting-frame; of a drive-shaft rotatably mounted and endwise adjustable therein, gearing operated by said shaft and thrown into and out of operation by the endwise movement thereof, a wind-wheel carried by the shaft and comprising sets of radial arms, one set of arms being fixed to the shaft and the other longitudinally adjustable thereon, a collar connected to the adjustable arms, means upon the shaft and acting upon the collar for giving a partial rotation to said collar as it is longitudinally adjusted to increase or decrease the curvature of the sails, a spring acting on the collar to move the same in one direction to increase the curvature of the sails, a wind-board, connections between the wind-board and collar for adjusting the latter in the reverse direction to decrease the curvature of the sails, and means for automatically shifting the shaft endwise to throw the gearing out of action when the collar is moved outward a prescribed distance, substantially as and for the purpose described.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

RANSOM DECKER.

Witnesses:
JOB THARP,
J. A. CURTIS.