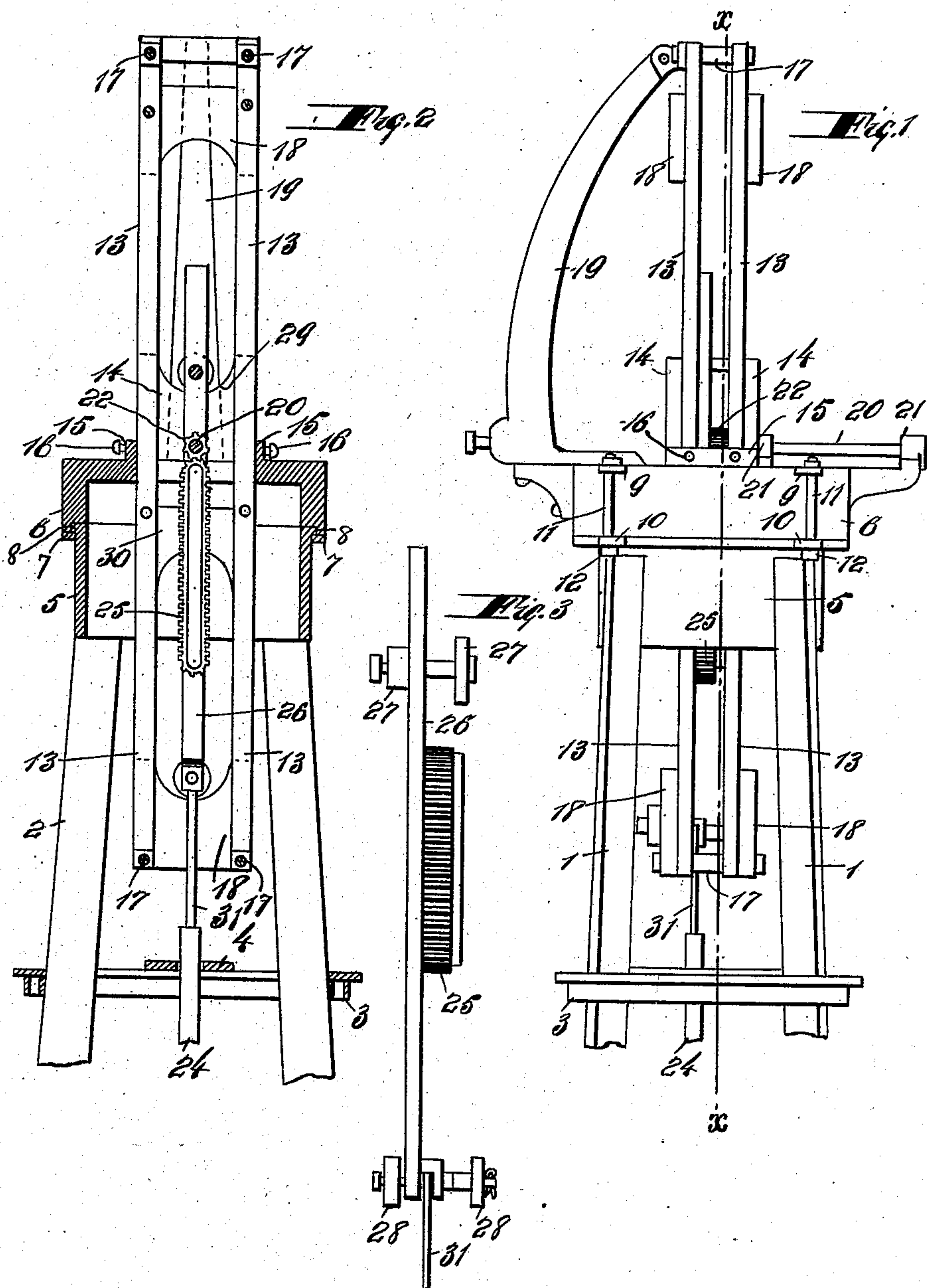


M. KEYS.
WINDMILL GEARING.
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899,872.

Patented Sept. 29, 1908.



Witnesses:

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UNITED STATES PATENT OFFICE.

MILTON KEYS, OF FORT WORTH, TEXAS.

WINDMILL-GEARING.

No. 899,872.

Specification of Letters Patent.

Patented Sept. 29, 1908.

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To all whom it may concern:

Be it known that I, MILTON KEYS, a citizen of the United States, residing at Fort Worth, Texas, have invented certain new and useful Improvements in Windmill-Gearing, of which the following is a specification.

My invention relates to gearing for windmills, and the object is to simplify the construction of the gearing and to secure a more even and steady and direct stroke of the pump rod and to improve the turntable.

One of the advantages of the improved gearing is that I obtain a long stroke of the pump rod with less power. This is accomplished by using a small cog wheel and a continuous rack so that the power exerting rack is never far from the center of the driving cog wheel.

Other objects and advantages will be fully explained in the following description and the invention will be more particularly pointed out in the claims.

Reference is had to the accompanying drawings which form a part of this application and specification.

Figure 1 is a side elevation of a portion of a windmill tower, showing the improvements, the wheel and the vane being omitted. Fig. 2 is a vertical section, taken along the line *xx* of Fig. 1. Fig. 3 is a side elevation of the vertically reciprocating driving rack.

Similar characters of reference are used to indicate the same parts throughout the several views.

The tower frame is shown only in part consisting of uprights 1 and 2 and horizontal connecting beams 3. A guide 4 for the pump rod is mounted on the beams 3. The upper ends of the uprights 1 and 2 are bolted to a cylindrical rest 5 for the turntable 6. The turntable 6 and the rest 5 are coupled together by a ring 7. The turntable has an interior annular cut-out and the rest 5 has an exterior annular flange 8 which operates in said cut-out. The turntable 6 thus has an annular shoulder and the upper end of the rest supports the turntable, the shoulder bearing on the upper end of the rest. The ring 7 engages the flange 8 and the lower end of the turntable. The turntable 6 has radially projecting lugs 9 and the ring 7 has radially projecting lugs 10. Rods 11 run through the lugs 9 and 10 and nuts 12 are screwed on the lower ends of the rods or bolts 11. The turntable 6 and the rest 7 are thus held in operative relation. A verti-

cal guide frame consisting of uprights 13 are secured to the turntable 6. The turntable has a central opening for the guide frame and has upwardly projecting standards 14 to which the frame pieces 13 are bolted. The standards 14 form braces for the guide frame. The turntable 6 further has flanges 15 projecting upwardly which serve to brace the guide frame and set bolts 16 are used to tighten the frame pieces 13 in the turntable. The frame pieces 13 are braced in one direction at the top and the bottom by cross beams or bolts 17 and braced in the other direction by the tracks 18 which are bolted to the uprights 13. The tracks 18 are guiding tracks for the purpose hereinafter explained. The uprights 13 are further braced by the brace 19 which is bolted to the turntable and to the upper part of the guide frame.

The driving shaft 20 is journaled in bearings 21 which are mounted on the turntable 6. The shaft 20 carries the driving cog wheel 22. The pump rod 24 is driven by a continuous rack 25. The rack 25 is provided with a vertical guide 26 integral therewith. In Fig. 2 the rack 25 is shown at the lowest point. When the rack is moving upwardly it is held in engagement with the cog wheel 22 by the guide 26 and the guide 26 is held in place by the frame piece 13 on the left side as shown in Fig. 2. When the rack is going downwardly it is held in engagement with the cog wheel 22 by the guide 26 which is held in place by the frame piece 13 on the right side of the guiding frame as shown in Fig. 2. The rack 25 thus moves or is moved upwardly by the cog wheel 22 on the left side of the cog wheel as shown in Fig. 2 and the rack passes on above the cog wheel and down the right side of the cog wheel. Means are provided for holding the rack 25 in engagement with the cog wheel while the rack is passing over the cog wheel and while passing under the cog wheel so that the cog wheel will drive the rack positively at all points. The guide 26 is provided with anti-friction rollers 27 and 28 near the upper and lower ends respectively. When the rack is passing over the cog wheel 22 the rollers 27 follow the tracks 18 and thus hold the rack in engagement with the cog wheel 22. When the rack is passing under the cog wheel 22 the rollers 28 follow the tracks 18 at the lower end of the guiding frame 13, and thus hold the rack 26 in engagement with the cog

wheel 22. At the same time the rollers 27 engage the tracks 29 which are formed in the standards 14 and thus the guide 26 is held in place when passing over the cog wheel. Also when the rollers 27 are engaging the tracks 18 at the upper end of the guide frame 13, the rollers 28 are engaging the tracks 30 which are bolted to frame pieces 13 below the turntable 6. The guide 26 is thus provided with guiding means at both ends when the rack 25 is passing over the cog wheel 22 and also when this rack is passing under the cog wheel. The pump rod 24 is connected to the guide 26 by the connecting rod 31 which is connected to the pump rod and pivotally connected to the rack 26.

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

1. A windmill provided with a suitable tower, an annular rest attached to said tower and having an annular flange, a turntable mounted on said rest and having radiating lugs, a coupling ring engaging said flange, bolts attaching said ring to said lugs, said turntable having upwardly extending flanges and standards, a guide frame extending vertically through said turntable and attached to said standards and braced by said standards and flanges, a driving shaft journaled on said turntable and provided with a cog wheel, a vertically reciprocating endless rack actuated by said cog-wheel and provided with a guide integral therewith, said rack ascending on one side of said cog wheel and descending on the other side thereof, said guide in its vertical motion being guided by said guiding frame and holding said rack in operative relation with said cog wheel, means for holding said rack in operative relation to said cog wheel while said rack is passing over and under said cog wheel from one side thereof to the other, and a pump rod operatively connected with said rack.

2. A windmill having a suitable tower, an annular rest mounted on said tower, a turntable operatively coupled to said rest, said turntable having an opening through the central part thereof and guiding flanges and standards projecting upwardly from the

edges of said opening, a guiding frame extending vertically through said turntable and attached to said standards and braced thereby and by said flanges, a driving shaft journaled on said turntable and projecting within said guiding frame, a cog wheel mounted on said shaft, a vertically reciprocating endless rack engaging said cog wheel and provided with a guide, said rack ascending on one side of said rack and descending on the other side thereof, said guide being guided by said guiding frame to hold said rack in engagement with said cog wheel in the vertical motion of said guide and rack, and means for holding said rack in engagement with said cog wheel while said rack is passing under and over said cog wheel, said means consisting of antifriction rollers carried by said guide and tracks attached to said guiding frame to be engaged by said rollers.

3. A windmill having a suitable tower, a rest attached to said tower, a rotatable turntable mounted on said rest and provided with a central perforation, standards projecting from the edges of said perforation upwardly, a guiding frame projecting through said turntable and attached to and braced by said standards, a driving shaft journaled on said turntable and provided with a cog wheel, a vertically reciprocating exterior endless rack actuated by said cog wheel, a guide for said rack guided by one side of said frame when said rack is ascending and by the other side of said frame when said rack is descending and holding said rack in engagement with said cog wheel, means for holding said rack in engagement with said cog-wheel when said rack is passing under said cog wheel and over said cog wheel consisting of roller carried by said guide and tracks formed on said standards and tracks attached to said guiding frame, and a pump rod operatively connected with said rack.

In testimony whereof, I set my hand in the presence of two witnesses, this 10th day of January, 1908.

MILTON KEYS.

Witnesses:

A. L. JACKSON,
J. W. STITT.