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WINDMILL.

No. 580,808. Patented Apr. 13, 1897.

Fig. 1.

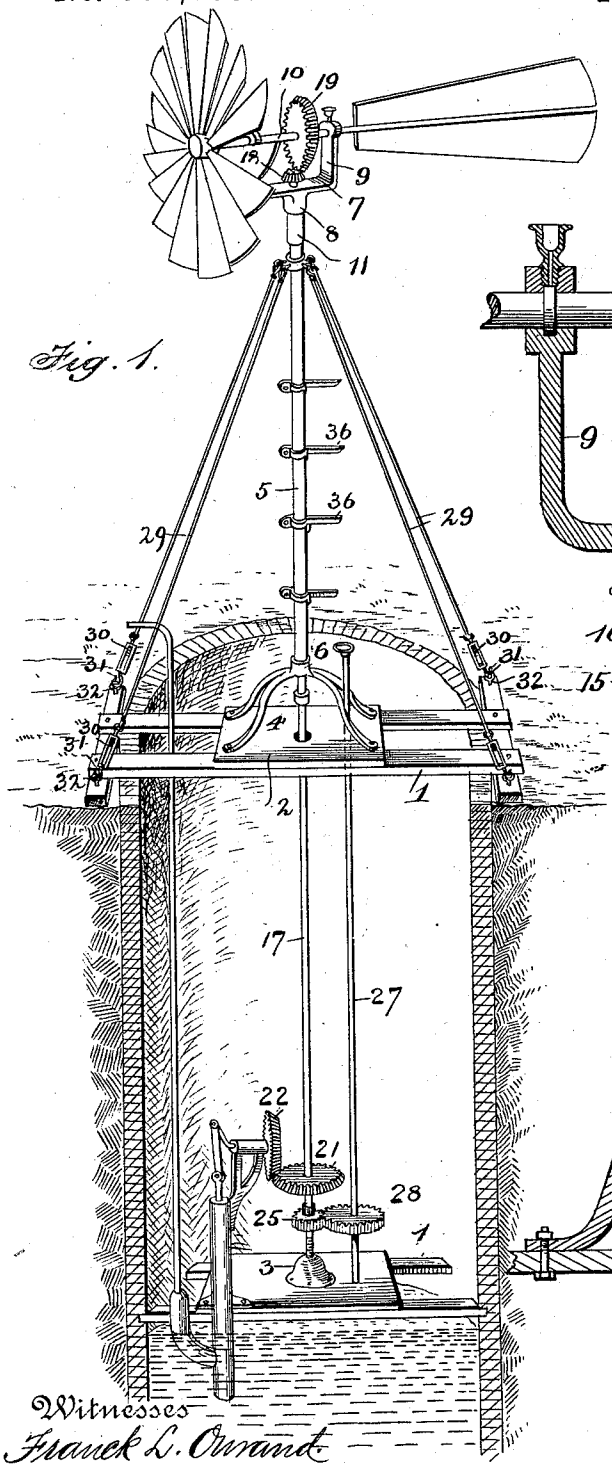

Fig. 2.

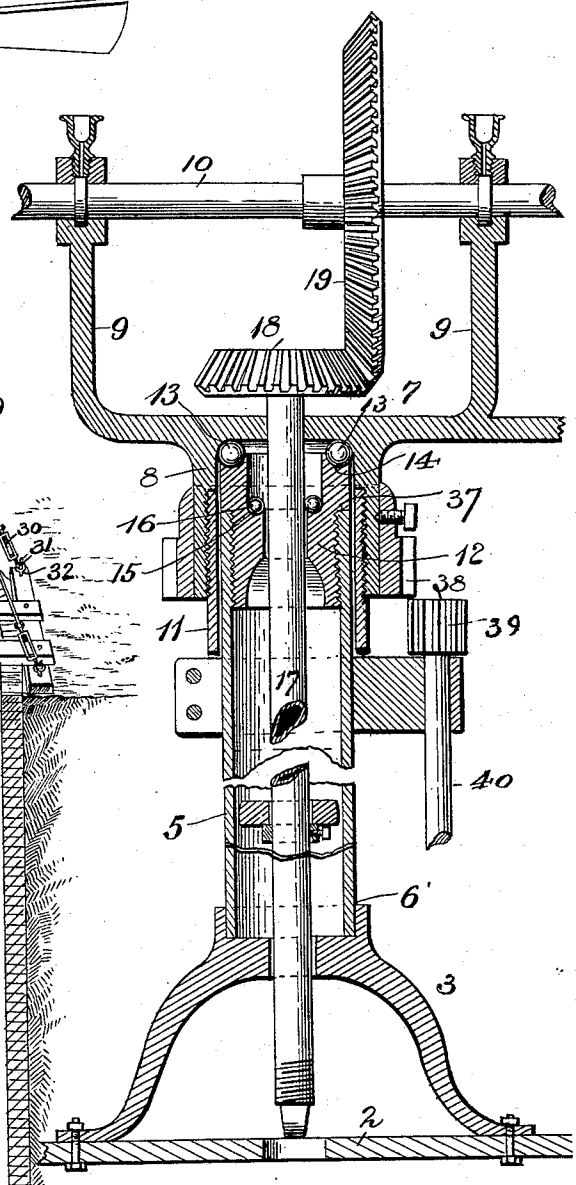

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Fig. 4

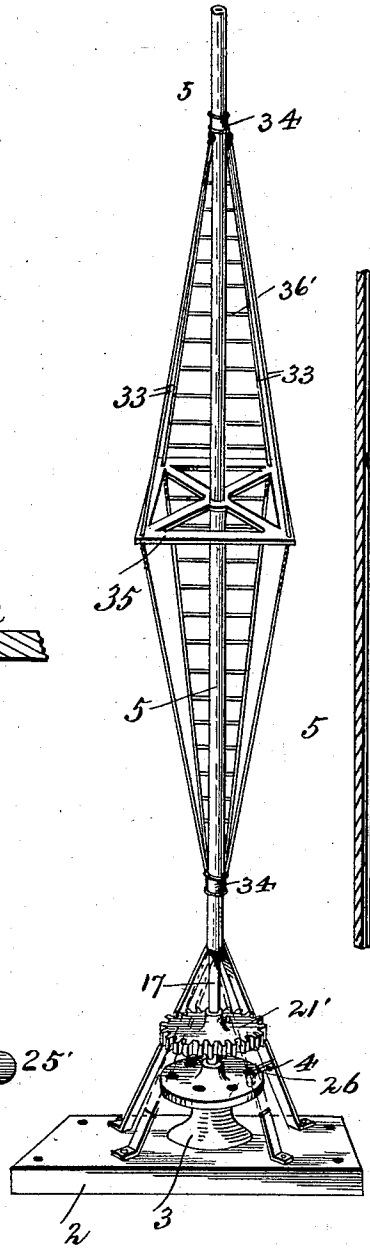

Fig. 3.

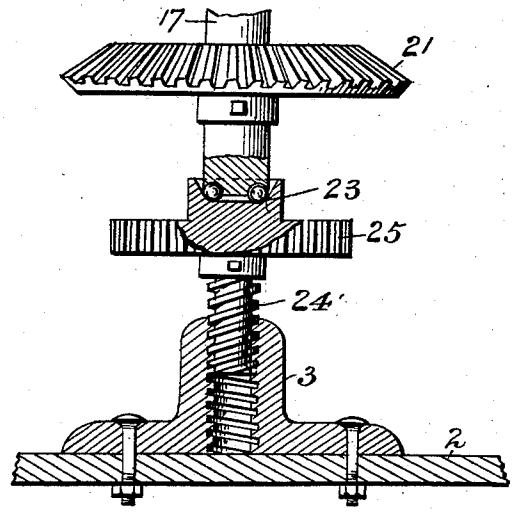

Fig. 7.

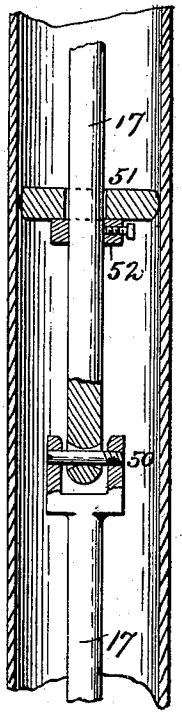

Fig 6

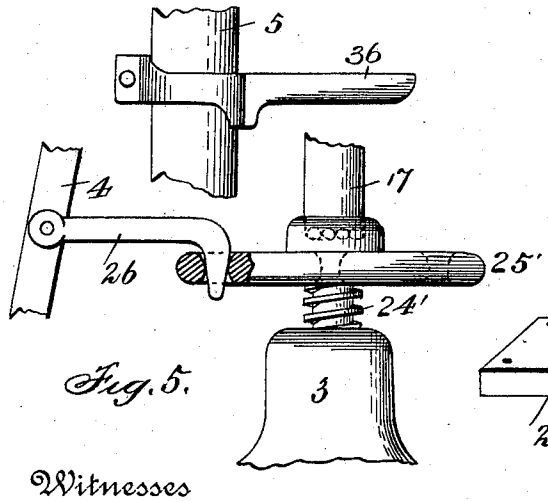

Fig. 5.

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Fig. 8

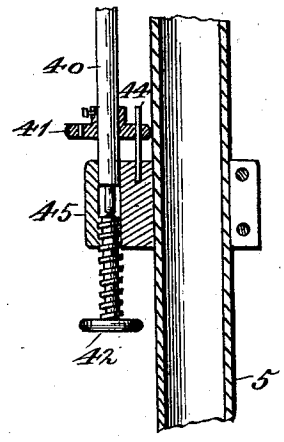


Fig. 9

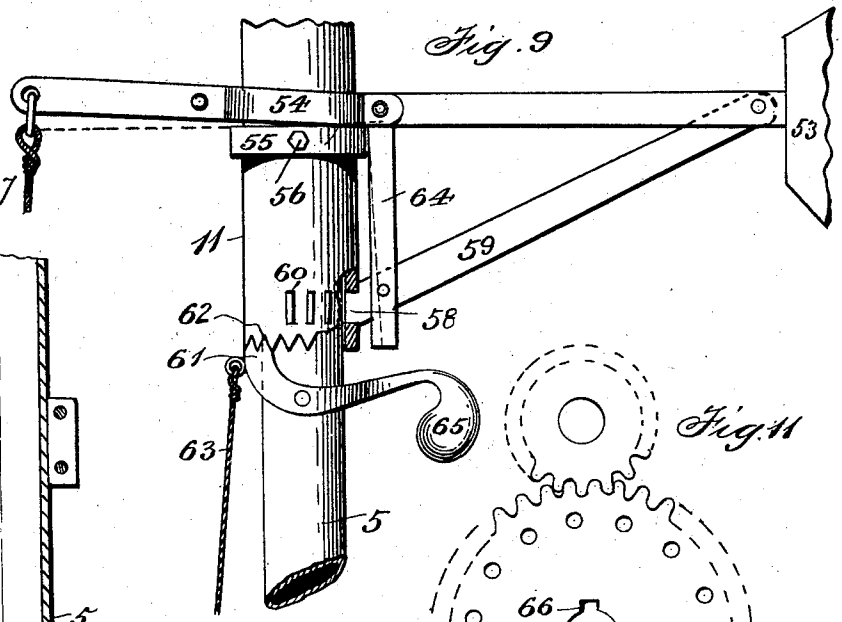


Fig. 11

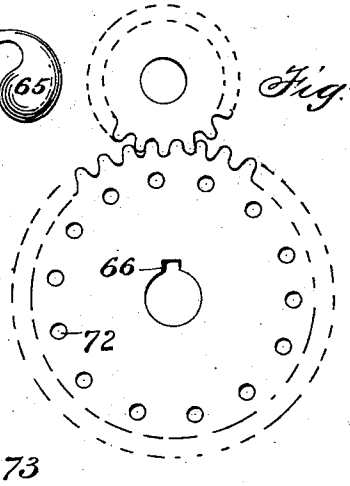
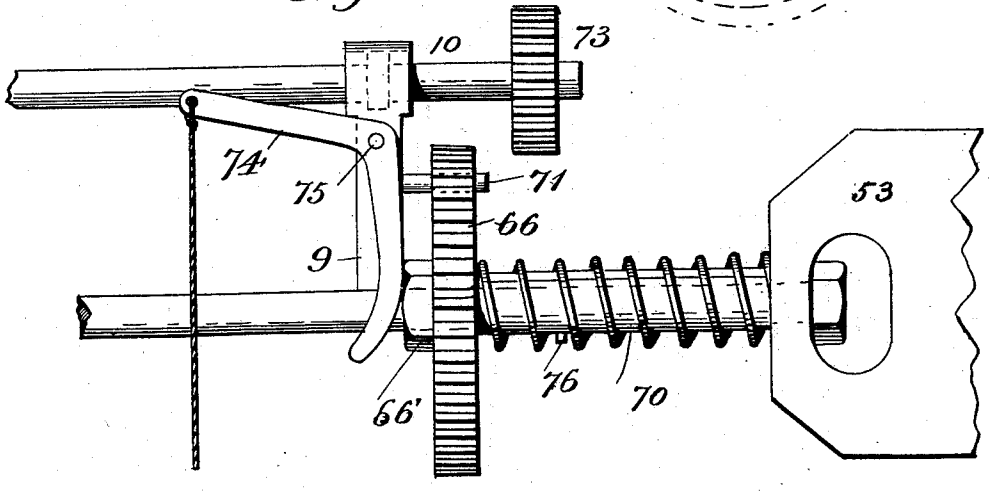


Fig. 10



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UNITED STATES PATENT OFFICE.

HERMAN SOELLNER, OF SAN FRANCISCO, CALIFORNIA.

WINDMILL.

SPECIFICATION forming part of Letters Patent No. 580,808, dated April 13, 1897.

Application filed November 5, 1896. Serial No. 611,141. (No model.)

To all whom it may concern:

Be it known that I, HERMAN SOELLNER, a resident of San Francisco, in the county of San Francisco and State of California, have invented certain new and useful Improvements in Windmills; and I do hereby 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 pertains to make and use the same.

The invention relates to windmills, and has for its object to simplify their construction, diminish their cost, increase their portability, and add to their efficiency.

The invention consists in the construction hereinafter described and particularly pointed out.

In the accompanying drawings, Figure 1 is an isometric view of the improved mill. Fig. 2 is a partial section on an enlarged scale. Fig. 3 is a vertical central section of the lower part of the mill-support. Fig. 4 is an isometric view of a modification of pipe-bracing devices. Fig. 5 is an elevation of a base, partly broken away. Fig. 6 is an elevation of one form of step. Fig. 7 is a partial section of a stand-pipe and power-transmitting rod. Fig. 8 is a partial section of devices for rotating the windmill-head at will. Fig. 9 is a partial side elevation of a vane supported on the guide-tube. Fig. 10 is a similar view of a modification of devices for supporting a vane. Fig. 11 is a plan of the gears shown in Fig. 10.

Numeral 1 denotes a foundation or base-frame surmounted by a platform 2. As illustrated in Fig. 1, there are two base-frames, one being subterraneous and supporting upon its platform 2 a base 3.

Upon the platform near the ground-level are bolted the feet of several braces 4, that support a stand-pipe 5. These braces may be connected with a collar 6, adapted to support the pipe, as indicated in Fig. 1.

The pipe 5 supports a frame or head 7, comprising a cap or case 8 and arms 9, in which arms are bearings for the wind-wheel shaft 10. The cap is screwed onto a guide-tube 11, that embraces the upper end of the stand-pipe 5 and steadies the rotating frame 7. The latter rests upon and is supported by balls 13, resting in an annular groove 14, formed in the upper end of a hollow plug or stop 12, screwed into the top of the said stand-pipe. Said plug is also grooved at 15 to provide a seat for the balls 16, which are loosely held between the plug and a driving-rod 17, which rod transmits power from the wind-wheel. The balls 16 act as antifriction-bearings either when the driving-rod is rotated to transmit power or when it is lowered or raised, as hereinafter described.

To the rod 17, which may be tubular, if desired, as indicated in Fig. 2, is fixed a bevel-gear 18, driven by a similar gear 19, fixed on the wind-wheel shaft 10. These gears are preferably made interchangeable with corresponding gears of other sizes to vary the speed, as may be found desirable under various circumstances.

21 indicates a gear whereby power is transmitted from the driving rod or shaft 17 to a pump or machine driving gear 22.

The rod or shaft 17 stands upon balls 23, which rest in a basin 24, fixed to a wheel 25 (see Fig. 3) or hand-wheel 25′. (See Fig. 5.) To this hand-wheel 25′ is fixed an axial screw 24′, that is adapted to be screwed into the base 3, having an opening suitably threaded for the purpose. The wheel can be turned for this purpose by means of a gear 28, operated by a rod 27. As shown in Fig. 5, a hand-wheel 25′ can be used with like effect. By either of these constructions the shaft 17 can be raised or lowered to throw the gears 18 and 19 into and out of mesh.

26 denotes a movable hook for holding the hand-wheel and rod 17.

29 indicates guy ropes, rods, or chains connecting the stand-pipe and the foundation. These are rigidly connected to the said pipe in any suitable manner and have a swiveling link 30 and screw-hook 31, connected to an eyebolt 32, whereby the ropes can be strained.

In case the mill is very high the stand-pipe can be further supported and braced by ropes, rods, or chains 33. These are fixed to the pipe at their upper and lower ends in any suitable manner, as by the medium of sleeves 34, and they may each be provided with a screw-threaded hook and swivel-link whereby they may be strained.

35 denotes a frame or bridge fixed to the pipe 5 to hold the ropes or rods 33 away from said pipe, as shown. These ropes or rods

connected to the pipe and to frame 35 support or stiffen the pipe and hold it against lateral pressure by wind or other force. The parts are made of small dimensions in cross-section and offer comparatively little obstruction to the wind and do not interfere materially with its current.

36′ denotes transverse connecting-pieces which serve as ladder-steps. These may be used on one or more sides. They not only serve as ladder-rounds, but they stiffen and strengthen the whole bracing-frame, comprising the ropes or rods 33 and the bridge or supplemental frame 35.

In Fig. 1 steps 36, connected directly to the stand-pipe, are indicated, a few of the steps being illustrated.

The improved windmill-frame can be easily transported, erected, and taken down when required. It is much less bulky and heavy than ordinary frames, and it offers less resistance to the wind and interferes less with its flow past or through the wheel. Its great simplicity also lessens its cost, repairs, and weight and adds to its ornamental appearance. Among other features of practical importance is the means for throwing the shaft of the wind-wheel into or out of gear, including the novel ball-bearings, which are operative both when the driving-rod is rotated and when it is raised or lowered. The construction of the head is very simple and its situation in a horizontal plane is maintained by a sleeve embracing the stand-pipe. This sleeve can be made of any desired length. Twelve inches is suitable, but greater length is admissible. The particular construction and arrangement of the stop or plug 12 for the stand-pipe, said stop being provided, preferably, with shoulders 37 and having in its end a groove for ball-bearings to support the head, are deemed of practical importance.

In some cases I provide the head or its guide-tube with a gear 38, meshing with a pinion 39, fixed on an operating-rod 40. (See Fig. 2.) This rod has a hand-wheel 41 and its foot rests upon and is supported by a raising and lowering screw 42, working in a collar 43, surrounding and fixed to the stand-pipe. (See Fig. 8.) By means of the screw 42 the pinion can be raised to the level of the spur gear-wheel 38 or dropped below it.

44 denotes a locking-pin which will be removed before rotating the head to move the wind-wheel into or out of the eye of the wind.

The invention is not limited to a particular form of wind-wheel, and any desired form may be used with the usual or with any preferred attachment, such as a wing or vane.

The power-transmitting rod 17 is preferably joined substantially as indicated at 50 in Fig. 7, whereby the sections are permitted a slight relative angular movement in any vertical plane.

51 denotes a loose or rotatable guide-wheel supported by a ring 52, adjustably secured on the rod. The vertical adjustability of the wheel can be utilized to obviate excessive wear on the interior of the pipe. The periphery of the wheel 51 is rounded, as shown, to prevent jamming. The central opening, through which the rod passes, is made a little longer in diameter than the rod. In case the stand-pipe is swayed by a strong gust of wind its inner surface will or may bear on the wheel and the latter on the rod in such manner that the lateral resistance of the pipe is supplemented by that of the rod.

Any desired number of the above-described rod-joints and guide-wheels may be used.

In Fig. 9 is indicated a vane 53, supported on the guide-pipe 11 by means of a loose ring 54, which rests upon a ring 55, fixed to said pipe by means of screw-stops 56′, one on each side. The bottom of the ring 54 is provided with an angle or fulcrum at 56 on each lower side.

57 denotes a cord or the like for slightly tilting said ring on said fulcrum with the effect to withdraw the foot 58 of a brace 59, constituting a part of the vane frame or support, from one of a series of sockets or slots 60, formed in the guide-tube.

The vane-frame can be tilted to disconnect its foot 58, whereupon the vane and its supporting-ring can be turned around the pipe until the frame-bar 64 is stopped by one of the screws 56′.

61 indicates a weighted pivoted retaining-pawl, normally engaging a rack 62 on the foot of the guide-pipe, fixed to the head and mediately to the wind-wheel, and 63 is a cord for moving the pawl about its pivot to disengage it from the rack. When cord 63 is released, the weight 65 causes the pawl to re-engage the rack.

Devices heretofore described for rotating the guide-pipe, head, and wind-wheel supports are shown in Figs. 2 and 8, the views being in opposite directions.

In Fig. 10 is shown a modified form of vane-operating devices.

66 indicates a gear sliding on a tubular vane-supporting shaft 67, to which it is connected by a spline 68 to prevent independent rotation. The vane and tubular shaft are secured to a prolongation of the lower part of the head 7 by a nut 66′.

70 is a spring normally pushing the gear 66 or its securing-nut 66′ against the arm 9 of the head, and 71 is a stud entering one of a series of holes 72 to lock the gear.

73 denotes a pinion on a wind-wheel shaft 10. The lever 74, having a fulcrum at 75, can be operated by a cord or other suitable means to disengage gear 66 from the stop 71 by sliding it on the splined tubular shaft 67 until the said gear is stopped by a pin 76. This will cause said gear to mesh with pinion 73, whereby the vane can be turned into a horizontal plane. The wind-wheel can then be turned by means of its supporting head or frame out of the eye of the wind and into an inoperative position. This rotation of the

head can be effected at will by the devices shown in Figs. 2 and 8.

Having thus described my invention, what I claim is—

1. In combination the wind-wheel-supporting head, the pipe supporting said head, a hollow plug fixed in the pipe and extending lengthwise beyond its upper end said extension having an enlarged diameter and provided with a shoulder adapted to rest upon the upper end of the pipe and with an annular seat in its upper end for balls, said seat being over the pipe-wall and the head being hollowed to fit the outer part of the plug and ball and also an upper part of the latter, and a power-transmitting rod passing through the plug, substantially as described.

2. In combination the wind-wheel-supporting head, the pipe supporting said head, a hollow plug fixed in the pipe and extending lengthwise beyond its upper end said extension having an enlarged diameter and provided with a shoulder adapted to rest upon the upper end of the pipe and with an annular seat in its upper end for balls, and having an interior chamber with a grooved bottom adapted to hold balls loosely against the power-transmitting rod, and said rod, substantially as described.

3. The combination of the stand-pipe having at its upper end a tubular plug or stop, a head supported on said pipe and itself supporting a wind-wheel, a power-transmission rod situated within the pipe, and ball-bearings between said rod and the interior of the pipe-plug, and means for raising and lowering the rod to connect or disconnect it with the wind-wheel, said means consisting of a wheel loosely supporting the rod, substantially as described.

4. The combination of the stand-pipe having at its upper end a tubular plug or stop, a head supported on said pipe and itself supporting a wind-wheel, a power-transmission rod situated within the pipe, and ball-bearings between said rod and the interior of the pipe-plug, and means for raising and lowering the rod to connect or disconnect it with the wind-wheel, said means consisting of a wheel loosely supporting the rod, said wheel having a basin or depression to receive the foot of the rod, and balls interposed between said foot and the floor of the basin, substantially as described.

5. The combination of the stand-pipe, the power-transmission rod, the wind-wheel, suitable gearing connecting the rod and wheel, the base, and a wheel loosely supporting the power-transmitting rod, said wheel and base having a screw-thread connection, substantially as described.

6. The combination of the stand-pipe, the power-transmission rod, the wind-wheel, suitable gearing connecting the rod and wheel, the base, and a wheel loosely supporting the power-transmission rod, said wheel having a ball-holding basin 24 and said wheel and base having a screw-thread connection, substantially as described.

7. In a windmill the combination of the head, the head-supporting pipe, a gear-wheel fixed to the head, a pinion meshing with said wheel, a rod carrying the pinion provided with means for rotating it situated near the bottom of the mill, a block 45 secured to the pipe, and an adjustable screw-support for the rod, substantially as described.

8. In a windmill the combination of the stand-pipe, the power-transmission rod, and the guiding supporting-wheel situated within the pipe and loosely surrounding the rod whereby the central position of the rod in the pipe may be maintained, said rod being freely movable vertically through the wheel, substantially as described.

9. The combination of the loosely-supported ring 54 having an angle 56 on its bottom at each side forming a fulcrum for said ring, the vane-frame connected to said ring, the cord and the vane-frame support having slots 60 whereby the frame can be tilted to disconnect it from its support and permit its rotation about the same, substantially as described.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

HERMAN SOELLNER.

Witnesses:
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M. W. WYNNE.