(No Model.)

A. H. NELLER.

WINDMILL.

No. 504,994. Patented Sept. 12, 1893.

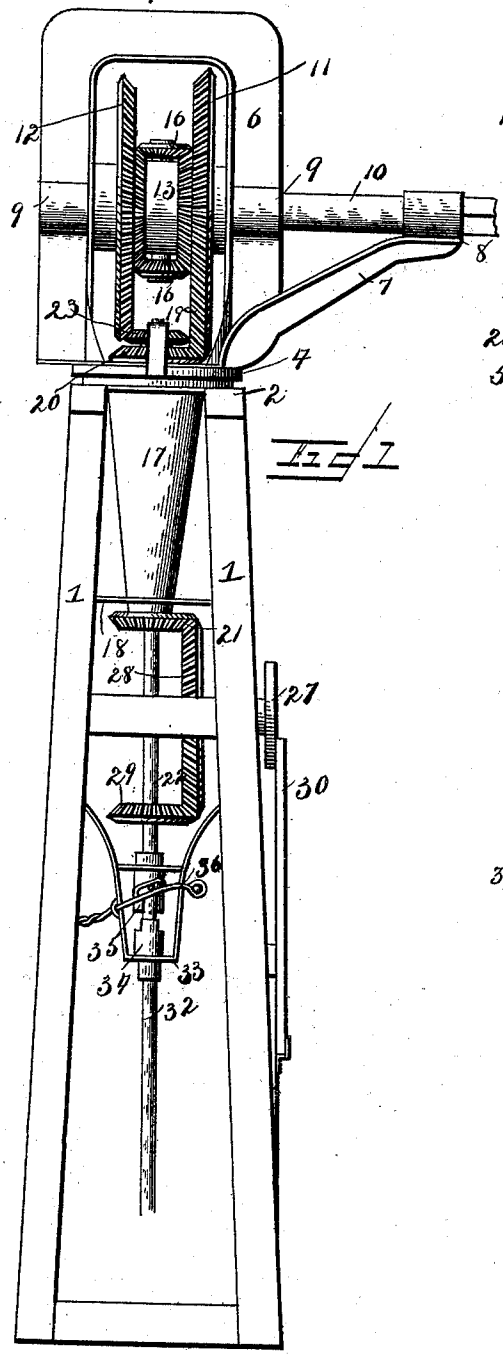

Fig. 1.

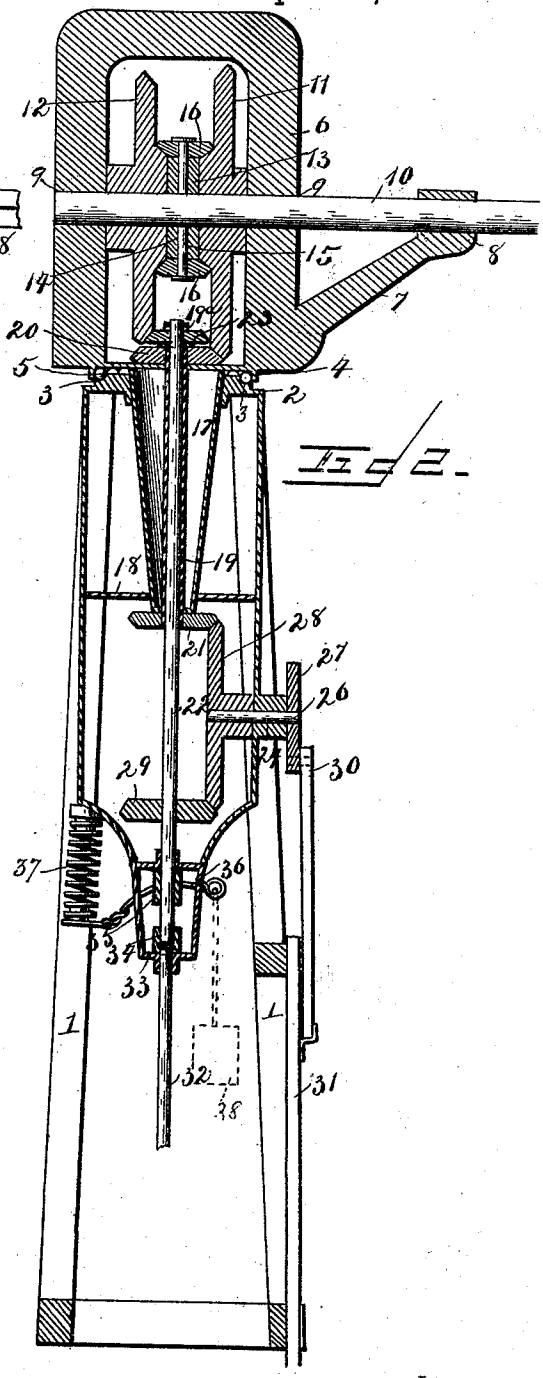

Fig. 2.

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UNITED STATES PATENT OFFICE.

ALBERT H. NELLER, OF MAPLETON, MINNESOTA.

WINDMILL.

SPECIFICATION forming part of Letters Patent No. 504,994, dated September 12, 1893.

Application filed February 24, 1893. Serial No. 463,613. (No model.)

To all whom it may concern:

Be it known that I, ALBERT H. NELLER, a citizen of the United States, residing at Mapleton, in the county of Blue Earth and State of Minnesota, have invented a new and useful Windmill, of which the following is a specification.

My invention relates to improvements in windmills, and has special reference to the gearing for conveying the motion from the windmill shaft to the driving-shaft and pump-rod; the objects in view being to produce a cheap and simple construction and arrangement of gearing, whereby the same is what might be termed balanced, that is the strain is equally divided and diffused over the entire system and hence the gears are retained in snug working contact for a greater length of time.

Various other objects and advantages of the invention will appear in the following description and the novel features thereof will be particularly pointed out in the claims.

Referring to the drawings:—Figure 1 is a side elevation of a windmill-tower and gearing embodying my invention. Fig. 2 is a vertical sectional view thereof.

Like numerals of reference indicate like parts in both the figures of the drawings.

In practicing my invention I employ an ordinary tower, the same in this instance comprising the four corner posts 1, which posts converge toward their upper ends, are braced at suitable points, and are surmounted by a cap 2. The cap is provided upon its upper side with an annular channel 3, and mounted upon said cap is the turn-table 4. The turn-table 4 is provided with a depending peripheral flange that surrounds the cap and between the turn-table and cap there is located a series of anti-friction balls 5. An inverted U-shaped yoke 6 surmounts the turn-table and the same has projecting from one side an inclined bearing-arm 7. The outer end of the bearing-arm 7 is provided with a horizontal bearing 8, and in transverse alignment therewith there is formed in the terminals of the yoke 6 a pair of bearings 9.

Mounted loosely for rotation in the bearings 8 and 9 is the wheel-shaft 10, and the same carries at its outer end any desired construction of wheel.

Between the terminals of the yoke there is mounted on the shaft a pair of gear-wheels 11 and 12, the latter being slightly less in diameter than the former. These gear-wheels in addition to their peripheral teeth have their inner faces provided with radial teeth.

Mounted upon and carried by the shaft 10 between the gear-wheels 11 and 12 is a disk 13, and the same is provided with a transverse opening or bearing 14, in which is mounted a shaft 15. The shaft 15 extends beyond the disk and has at its ends small gears 16 each of whose teeth engage the facial teeth of the gears 11 and 12.

The center of the cap 4 is provided with an opening, and depending therethrough and from the under side of the turn-table is a conical hollow leg 17. The conical hollow leg 17 extends down into and through a cross-piece 18 connecting the posts 1, and journaled in the lower end of said hollow leg and the revolving cap 4 is a hollow shaft 19 which extends a short distance below its bearing in the lower end of the hollow leg and a short distance above its bearing in the cap. At its upper end it carries a beveled-gear 20 and at its lower end a beveled gear 21, each adapted to revolve with the shaft.

Loosely mounted in the hollow shaft 19 and in a bearing-yoke 19^a is a cylindrical shaft 22, the upper end of which projects beyond the hollow shaft and carries a small beveled gear 23. The gear 20, which is arranged below the gear 23, engages with the large gear 11, while the upper gear 23 engages with the small gear 12, the latter gear being somewhat smaller than the gear 11, as before stated.

In a suitable bearing 24, with which the tower is provided, a crank-shaft 26 is journaled, the same being provided at its outer end with a crank-disk 27 and at its inner end with a gear 28, which is engaged by the gear 21 carried by the hollow shaft 19. Below the gear 21 the solid shaft 22 carries a corresponding gear 29, and the same engages the under side of the gear 28.

To the crank-disk 27 there is connected a crank-arm 30, and to this is attached the pump-rod 31. The shaft 22 extends a short distance below the gear 29 and loosely enters the upper end of a clutch-member 34, which is secured rigidly to the upper end of a sub-

jacent shaft 32, that passes through a bearing that is formed in a depending stirrup 33. The upper member 35 of the clutch is splined on the shaft 22 and is engaged by a bifurcated lever 36, the said member 35 being rotatably located within or embraced by said lever. A coiled spring 37 is interposed between one end of the lever and the frame of the structure and serves to elevate the said lever 36 and hence raise the clutch member 35 out of engagement with the clutch member 34. This is the normal position of the parts, and should it be desired to impart motion from the motor to the power-transmitting shaft 32 it is simply necessary to connect the weight 38 to that end of the clutch-operating lever 36 that is not occupied by the spring, said weight serving to compress the spring and the lever and engage the two members of the clutch, whereby the two shafts 22 and 32 are locked together and motion transmitted from one to the other in a manner that will be obvious. It will be seen that the shaft 10 rotating will carry with it the disk, and the disk through the medium of the small pinions or gears 16 being locked to the gear-wheels 11 and 12, will serve to revolve the latter. These gear wheels 11 and 12 in turn transmit rotary motion to the gears 23 and 20, respectively, thus rotating the shafts 22 and 19. In this manner the gears 21 and 29 are rotated in reverse directions and operating upon opposite sides of the gear 28 carried by the crank-shaft serve to rotate the crank-shaft and operate the pump-rod. It will be seen that the entire system of gearing is perfectly balanced so that no undue wear and looseness will take place, and the consequence is that a perfectly smooth and easy running movement is secured. When the turn-table revolves to bring the wheel into or out of the wind the gears 23 and 20 of the shafts remain stationary, the large gears 11 and 12 rotating as do also the small gears 16.

Various changes in the details of construction of my invention will readily suggest themselves to those skilled in this art, and I therefore do not limit my invention to the details herein set forth, but hold that I may vary the same to any extent within the scope of my claims without departing from the spirit of my invention.

Having described my invention, what I claim is—

1. The combination with a tower, a shaft supported thereon, a pair of main gears of different sizes having peripheral and facial teeth mounted loosely on the shaft, a bearing carried by the shaft between the gears, and a short shaft mounted in the bearing, small gears mounted on the short shaft and engaging the facial-teeth of the main gears, of vertically-opposite bearings arranged below the short shaft, a hollow shaft arranged therein, upper and lower gears on said shaft, the upper gear being engaged by the teeth of the smaller of the main gears, a solid shaft located in the hollow shaft and extending above and below the same, upper and lower gears thereon, the upper gear engaging the teeth of the remaining or larger main gear, a crank-shaft located between the lower gears of the hollow and solid shafts, a pump-rod connected therewith, and a gear-wheel arranged on the crank-shaft and meshing with the teeth of said lower gears of the two shafts, substantially as specified.

2. In a windmill, the combination with the tower, the revoluble turn-table, the inverted U-shaped yoke surmounting the same and provided with a hollow arm, the bearings 8 and 9 formed in the arm, the wheel-carrying shaft 10 journaled in the bearings, the large and small gears 11 and 12 mounted loosely on the shaft 10 and provided with peripheral and facial teeth, the disk 13 mounted on the shaft 10 between the gears, the short shaft 15 journaled in the disk, the small gears 16 journaled on the ends of the short shaft and engaging the facial teeth of the gears 11 and 12, of the depending leg 17 secured to the table and having upper and lower bearings, the tubular shaft 19 arranged in the bearings, the gear 20 at the upper end and the gear 21 at the lower end thereof beyond the leg, said upper gear 20 engaging the peripheral teeth of the large gear 11, the solid shaft 22 located in and extending beyond the hollow shaft 19, the gear 23 at the upper end thereof the teeth of which engage with those of the gear 12, the gear 29 at the lower portion of the solid shaft 22, the intermediate horizontal shaft 26, the gear 28 at the inner end thereof engaging the teeth of the gears 21 and 29, the disk 27 at the outer end of the shaft 26, and the pump-rod connected with the disk, substantially as specified.

3. In a windmill, the combination with the tower, the revoluble turn-table, the inverted U-shaped yoke surmounting the same and provided with a hollow arm, the bearings 8 and 9 formed in the arm, the wheel-carrying shaft 10 journaled in the bearings, the large and small gears 11 and 12 mounted loosely on the shaft 10 and provided with peripheral and facial teeth, the disk 13 mounted on the shaft 10 between the gears, a short shaft journaled in the disk, the small gears 15 journaled on the ends of the short shaft and engaging the facial teeth of the gears 11 and 12, of the depending leg 17 secured to the table and having upper and lower bearings, the tubular shaft 19 arranged in the bearings, the gear 20 at the upper end and the gear 21 at the lower end thereof beyond the leg, said upper gear 20 engaging the peripheral teeth of the large gear 11, the solid shaft 22 located in and extending beyond the hollow shaft 19, the gear 23 at the upper end thereof the teeth of which engage with those of the gear 12, substantially as specified.

4. In a windmill, the combination with the hollow shaft having a gear 21 at its lower end, and the solid shaft 22 having a gear 29, the intermediate shaft 26, the gear 28 at the in-

ner end thereof engaging the teeth of the gears 21 and 29, the disk 27 at the outer end of the shaft 26, and the pump-rod connected with the disk, of the shaft 32 arranged below the solid shaft 22, the clutch-member 34 carried at the upper end of the shaft 32 and loosely receiving the lower end of the solid shaft, the upper sliding clutch-member 35 carried by the lower end of the said solid shaft, the lever 36 loosely connected with the member 35, the spring for normally elevating the same and separating the clutches, the weight for depressing said lever, and means for rotating the hollow and solid shafts, substantially as specified.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

ALBERT H. NELLER.

Witnesses:
M. SCHIMMEL,
M. NELLER.