(No Model.)

G. H. PATTISON.

GEARING FOR WINDMILLS.

No. 345,722. Patented July 20, 1886.

Fig. 1.

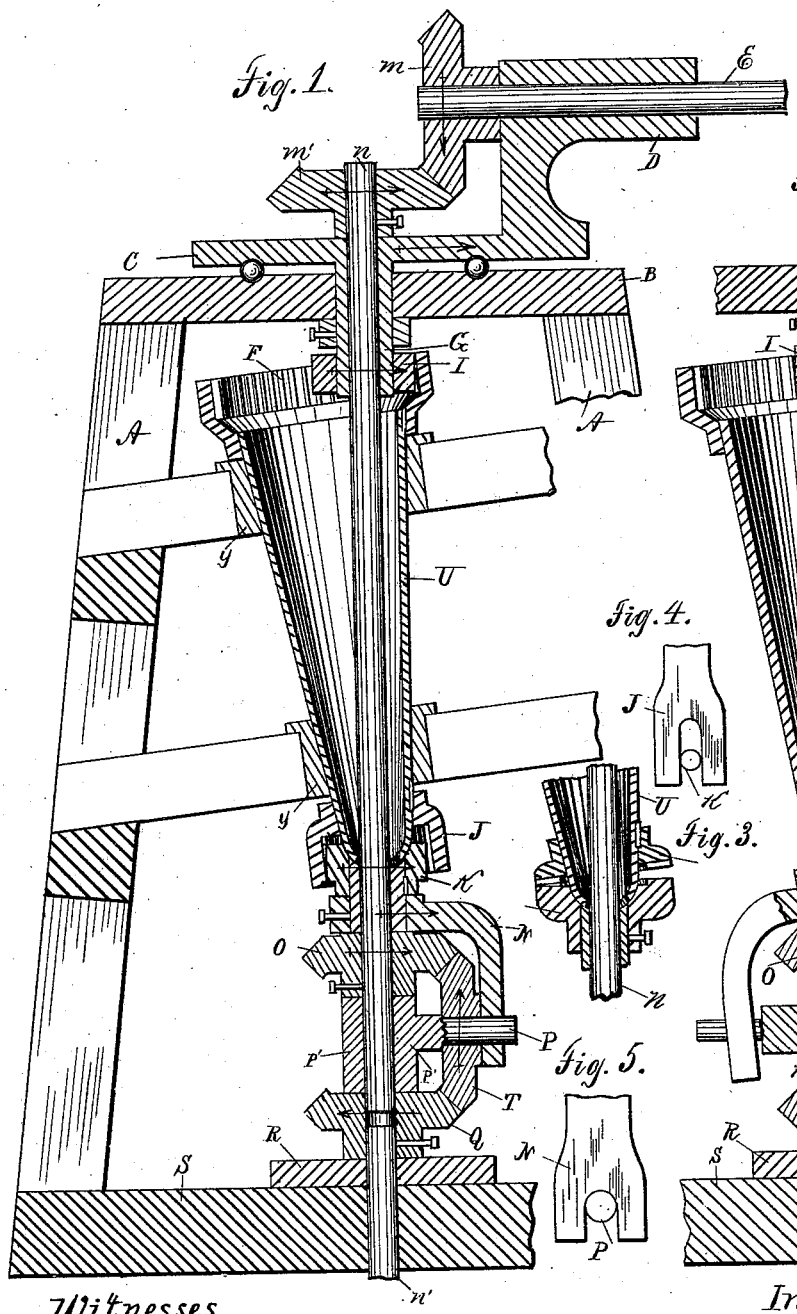

Fig. 2.

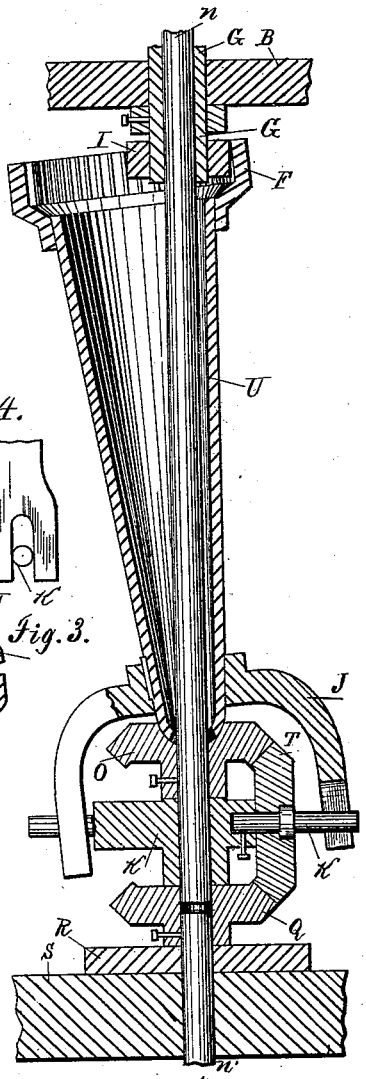

Fig. 4.

Fig. 3.

Fig. 5.

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GEORGE H. PATTISON, OF FREEPORT, ILLINOIS.

GEARING FOR WINDMILLS.

SPECIFICATION forming part of Letters Patent No. 345,722, dated July 20, 1886.

Application filed December 22, 1885. Serial No. 186,428. (No model.)

To all whom it may concern:

Be it known that I, GEORGE H. PATTISON, a resident of Freeport, in the county of Stephenson and State of Illinois, have invented certain new and useful Improvements in Gearings for 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.

My invention relates to improvements in gearings for windmills, and is a modified form of the gearings for windmills for which Letters Patent No. 330,921 were granted to me November 24, 1885, and is fully described and shown in the following specification and drawings, in which—

Figure 1 is a central vertical section of a windmill-tower, on which is mounted the preferable form of the invention. Fig. 2 is a similar view of a modified construction of a part of said gearing. Fig. 3 is a section of a bevel-gearing that can be used in place of the internal and spur gears, J K, Fig. 1. Fig. 4 illustrates what may be called the "segmental gears" shown in Fig. 2. Fig. 5 shows the slotted arm N and the gudgeon P, seen in the direction of the arrow in Fig. 1.

In Fig. 1, A are the posts of an ordinary windmill-tower, B is a top plate fastened to said posts, and C is a turn-table supported by anti-friction balls, which rest on the plate B. On the lower face of the turn-table, and formed integrally therewith or attached thereto, is a hollow cylinder, G, extending downward and journaled in the plate B. The wind-wheel shaft E is journaled in a bearing, D, formed integrally with the turn-table. In the cylinder G is journaled a preferably-hollow vertical shaft, *n*, which is connected with the wind-wheel shaft E by the miter-gears *m' m*, mounted on the shafts E *n*, respectively, and on the lower end of the cylinder G is mounted a spur-gear, I, which engages with the internal gear, F, mounted on the conical shaft U. The gear F is of a diameter double that of the gear I. Connected with and mounted on the same conical shaft U, which is obliquely journaled in the tower, is the internally-toothed gear J, which engages with a spur-gear, K, of equal diameter, loosely mounted on the shaft *n*. The combination of the gear I, mounted on the turn-table, the gear K, loosely mounted on the central shaft, *n*, and the connecting-gears F J and the shaft U, journaled in the tower, is an equivalent form of construction substituted for the combination of the gears I H L K and shaft F, journaled in the tower shown in said prior Patent No. 330,921, internal instead of spur-connecting gearing being used, the proportion between said gears being the same—that is, the gears I I, H, F, L, J, and K K have the same relative sizes and are adapted to transmit the same amount of motion from the gear I to said gear K. The planet-gear T is connected with the gear K by the slotted arm N and gudgeon P, having the collar P', journaled on the shaft *n*. This construction substitutes a mechanical equivalent for the form shown in said prior patent, the gears K T being identical in relative position, action, and purpose in the two cases. The power-transmitting miter-gear Q, mounted on the power-transmitting shaft *n'*, engages with said planet-gear T on one side, while the miter-gear O, mounted on the shaft *n*, engages with the planet-gear T on the opposite side. Therefore the shafts *n n'* rotate in opposite directions.

The operation of this form of gearing is as follows: When the turn-table is stationary, if the wind-wheel shaft be rotated in its bearing in the direction indicated by the arrow on the gear *m*, the gear *m'*, shaft *n*, and gear O must turn in the direction indicated by the arrows on the gears *m'* O, the turn-table being stationary, the gears I F J K are all stationary, and consequently the arm N and gudgeon P are stationary; hence the rotation of the gear O rotates the gear T on the gudgeon P in the direction indicated by the arrow on the gear T, and this rotation of the gear T rotates the miter-gear Q in the direction indicated by the arrow thereon. The gear Q carries with it the shaft *n'*, and the shafts *n n'* turn in opposite directions. On the other hand, if the gear Q be held stationary, either by the resistance of the work or otherwise, and the turn-table be rotated in the direction indicated by the arrow thereon, the gear I must turn in the same direction and rotate the gears F J in the same direction, and the gear K, engaging with the gear J is turned in the same direction as the gear I, and carries with it the arm N and

gudgeon P, and thus rotates the planet-gear T bodily about the vertical shaft *n;* and since the gear Q is stationary the gear T is rolled about the gear Q, and turns the gear O and shaft *n* in the direction indicated by the arrow on the gear O—that is, in the same direction as the direction of rotation of the turn-table. As shown, the gears O T Q are miter-gears, and consequently each rotation of the gear K and arm N turns the gear O and shaft *n* twice, and the gearing K J F I is so proportioned that each rotation of the gear K rotates the turn-table twice; hence, the turn-table and shaft *n* maintain the same relative position and the wind-wheel is not rotated in its bearing. Consequently the swiveling of the mill is not affected by the resistance of the work, and the gearing is balanced.

The form shown in Fig. 2 is the same as that shown in Fig. 1, save only in the location of the universal-joint gears J K. Segments of two gears are used, and the teeth or cogs are round or oval and very deep, as they operate at some distance from the vertical axis of the mill and from the line of intersection of the oblique and vertical shafts. The arm N is dispensed with, as the extended cogs of the segment of the gear J engage with the prolonged gudgeons P, which are the single or double toothed segments of the gear K, journaled on the shaft *n*. Thus the cogs of the gear K form a bearing for the gear T.

Fig. 3 is a sectional view of bevel gearing that may be used instead of the internal and spur gears J K. The joint formed by the gears J K might be simply a universal-joint coupling, and still serve the same purpose without departing from the principle of my invention.

Having now described my invention, in view of my said prior patent, I hereby disclaim for this invention any novelty, except such as is set forth in the following claims:

1. In a windmill of the class described, the combination of the geared turn-table engaging directly with an internal gear and means for communicating the motion imparted to said internal gear by the rotation of the geared turn-table to a loosely-mounted planet-gear, whereby said planet-gear is rotated bodily about the axis of its movable support.

2. In a windmill of the class described, the combination of the central gears, I K, connected by the gears F J, and inclined shaft U, journaled in the tower of the mill.

3. In a windmill of the class described, the combination of the turn-table C, gear I, mounted thereon, inclined shaft U, and gears F J, gear K, and the planet-gear T, all combined and operating substantially as described, and for the purpose set forth.

4. In a windmill of the class described, the combination of a wind-wheel shaft, E, journaled in a geared turn-table, C, and the gearing *m m'* F J K T O Q, constructed substantially as described.

5. In a windmill of the class described, the combination of the gear F, planet-gear T, and a universal-joint gearing connecting the gear F with the planet-gear T, whereby the rotation of the gear F produces bodily rotation of the planet-gear T, uniform with the rotation of said gear F.

6. In a windmill of the class described, the combination of a rotating turn-table, a gear mounted thereon and engaging with an internal gear mounted on a hollow shaft journaled obliquely in the tower, substantially as described.

7. In a windmill of the class described, the combination of a wind-wheel shaft journaled in a geared turn-table, two independently-journaled power-transmitting shafts, and a train of gearing connecting said wind-wheel shaft, geared turn-table, and said power-transmitting shafts, one element of said train of gearing being a geared hollow shaft obliquely journaled in the tower, and operating substantially as described, and for the purpose set forth.

8. In a windmill of the class described, the combination of the gear K, slotted arm N, and gudgeon P, with its collar P', constructed and combined as set forth.

9. In a windmill of the class described, a train of gearing connecting the wind-wheel shaft, turn-table, and power-transmitting shaft, one element of said train being a gear having a slotted arm connected therewith, substantially as and for the purpose set forth.

10. In a windmill of the class described, the combination of the gear K, slotted arm N, and gudgeon P, on which is loosely journaled the planet-gear T, and gearing connecting the gear K with the turn-table of the mill, whereby the rotation of the turn-table rotates the gear K and gives bodily rotation to the gear T.

11. In a windmill of the class described, the combination of a wind-wheel shaft journaled in a geared turn-table, a power-transmitting gear, and a train of gearing connecting said wind-wheel shaft, geared turn-table, and power-transmitting gear, one feature of said train of gearing being the combination of the gear K and slotted arm N, for giving bodily rotation to the planet-gear T.

12. In a windmill of the class described, the combination of the wind-wheel shaft E and gear *m*, turn-table C and gear I, vertical shaft *n* and gears *m'* O, and two gears, F J, mounted on the inclined hollow shaft U, journaled about the shaft *n*, between the gears I and O, substantially as set forth.

13. In a windmill of the class described, the combination of the turn-table C and gear I, wind-wheel shaft E and gear *m*, vertical shaft *n* and gear *m'*, a central gear, K, journaled on the shaft *n*, and a geared hollow shaft journaled obliquely about the shaft *n*, and connecting said gears I and K, whereby the rotation of the gear I rotates the gear K at a different rate of speed.

14. In a windmill of the class described, a chain of gearing connecting the wind-wheel shaft, geared turn-table, and power-transmit-

ting shaft, one element in said train of gearing being a hollow obliquely-journaled internally-geared shaft, substantially as described.

15. The combination of the gears *m'* I J K O T Q, and internal gear, F, substantially as described, and for the purpose set forth.

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

GEORGE H. PATTISON.

Witnesses:
JAMES H. STEARNS,
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