(No Model.)

# G. H. PATTISON.

## GEARING FOR WINDMILLS.

No. 333,026. Patented Dec. 22, 1885.

*Fig. 1.*

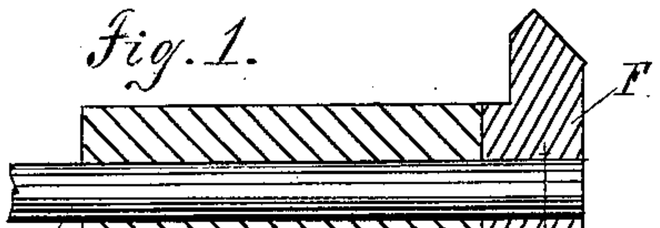



*Fig. 2.*

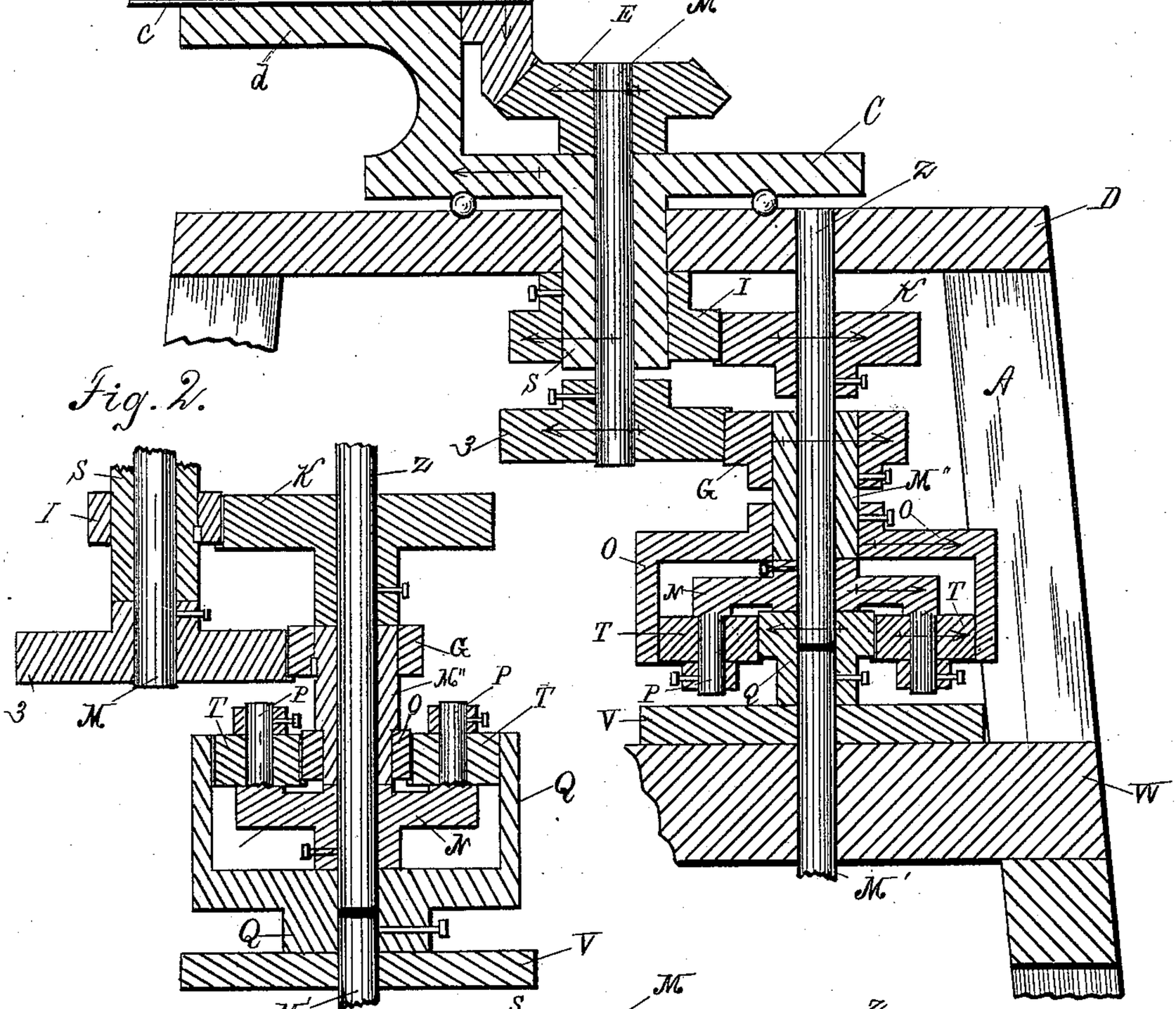
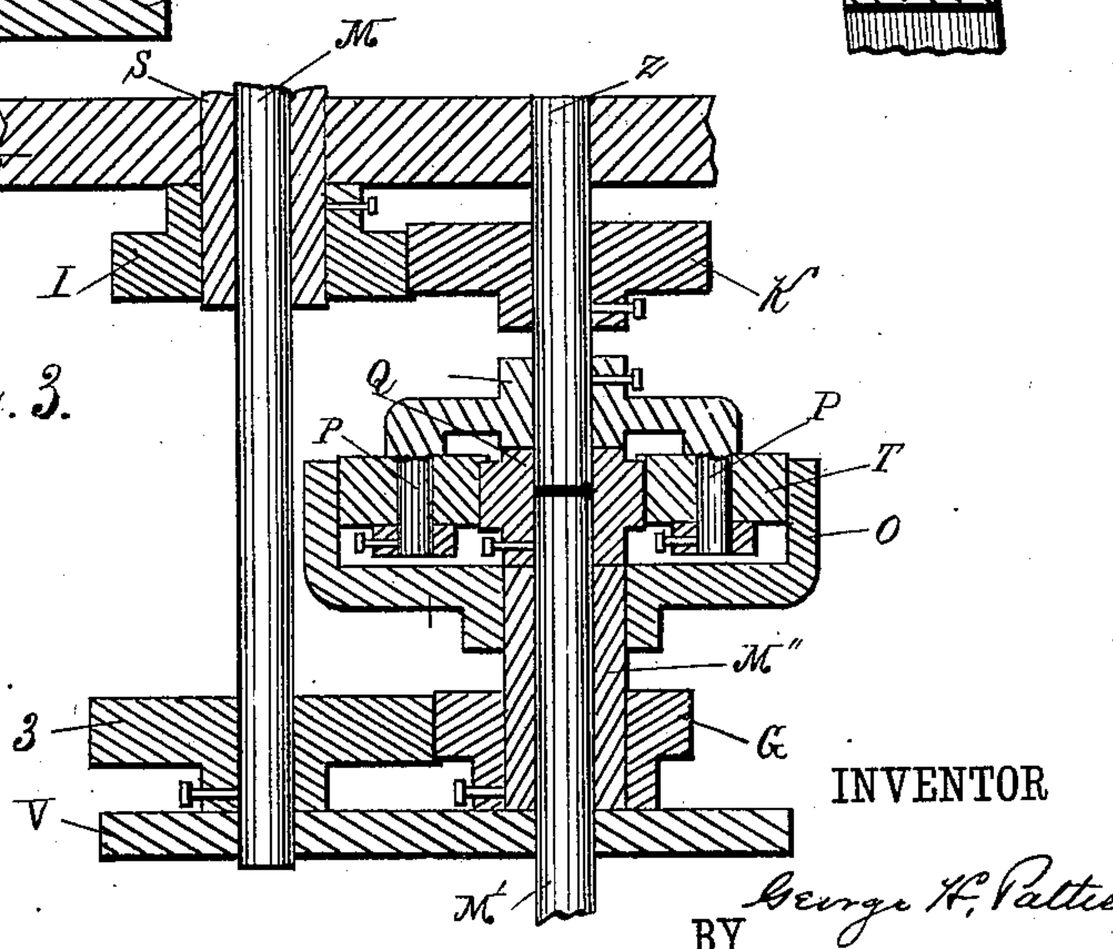



*Fig. 3.*

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# UNITED STATES PATENT OFFICE.

GEORGE H. PATTISON, OF FREEPORT, ILLINOIS.

## GEARING FOR WINDMILLS.

SPECIFICATION forming part of Letters Patent No. 333,026, dated December 22 1885.

Application filed October 14, 1885. Serial No. 179,875. (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 of the class known as "power-mills" in contradistinction from pumping-mills.

The invention is fully described and explained in this specification, and shown in the accompanying drawings, in which—

Figure 1 is a central vertical section of a tower on which is mounted one form of the gearing constituting the subject-matter of this application. Fig. 2 is a similar view of a modified form of the gearing. Fig. 3 shows a slightly-modified position of the identical gearing shown in Fig. 1.

The arrows on the gears are intended to indicate the same directions of rotation as if the gears were shown in elevation.

In Fig. 1, A are the posts of an ordinary windmill-tower, and D is a top plate fastened to the posts.

C is a turn-table resting on the usual anti-friction balls set on the top-plate, D, and *c* is a horizontal wind-wheel shaft journaled in the turn-table, and provided on its inner end with a rigidly-mounted miter-gear, F.

S is a sleeve dependent from the center of the turn-table, and I is a gear rigidly attached thereto. A preferably-hollow shaft, M, is journaled in the turn-table, and has on its lower end a rigidly-mounted spur-gear, 3, and on its upper end a rigidly-mounted miter-gear, E, which engages with the miter-gear F on the wind-wheel shaft. At one side of the vertical axis of the mill are two independently-rotating power-transmitting vertical shafts, M′ M″, suitably journaled in the tower. The gear-wheel 3 engages with the spur-gear G, rigidly mounted on the shaft M″, and the gear-wheel I engages with the spur-gear K, rigidly mounted on the shaft Z. A horizontal arm, N, carrying two vertical gudgeons, P, is rigidly connected with the shaft Z and gear K, and on each of the gudgeons P is mounted loosely a a planet-gear, T, engaging with an internal gear, O, fastened to the shaft M″, and also engaging with the spur-gear Q, rigidly fastened to the shaft M′.

The operation of this gearing is as follows: If the turn-table, with its sleeve S and gear I, be held stationary, and the wind-wheel shaft *c* and gear F be rotated in the direction indicated by the arrow on the gear, the hollow shaft M, with its gears E 3, turns in the direction indicated by the arrow on either of said gears, and consequently the gear G, shaft M″, and gear O must turn in the opposite direction, as indicated by the arrows on the gears. The turn-table, the sleeve S, and the gear I being stationary, the gear K, arm N, and gudgeon P are also stationary, and consequently the rotation of the gear O rotates the planet-gears T about the respective gudgeons P without revolving them about the vertical axis of the shafts Z M′ or about the axis of the gear O. The rotation of the planet-gears T rotates the spur-gear Q in the direction indicated by the arrow thereon, and as the gear Q is rigidly fastened to the shaft M′ the shaft turns with the gear and transmits the motion of the mill to any mechanism to be operated. On the other hand, if the power-transmitting shaft M′ be held stationary, and the turn-table be rotated in the direction indicated by the arrow thereon, the sleeve S and gear I turn in the same direction, and the gear K, arm N, and gudgeon P turn in the opposite direction. The shaft M′ and spur-gear Q being stationary, the rotation of the arm N rolls the planet-gears T about the spur-gear Q, and thus rotates the gear O in the direction indicated by the arrow thereon. This rotation of the gear O is communicated, through the shaft M″ and gears G 3, to the hollow shaft M, which is thus made to rotate in the same direction as the turn-table. The relative sizes of the gears are such as to give the shaft M and the turn-table the same speed of rotation, and thus the rotation of the turn-table when the shaft M′ is at rest turns the shaft M at a speed uniform with that of the turn-table itself, thereby

preventing any rotation of the shaft *c* in its bearing—in other words, the rotation of the turn-table neither rotates the shaft *c* nor the shaft M′, and consequently the gearing is perfectly balanced and the side draft is obviated. The gearing shown in Fig. 2 is the same as that shown in Fig. 1, except that the gear O is a spur-gear instead of an internal gear, and the gear Q is an internal gear instead of a spur-gear. The only effect of the change is to vary the ratio of the speed of the shaft M′ to that of the shaft *c*, the operation of the gearing in all other respects being the same.

The form shown in Fig. 3 differs from that of Fig. 1 only in having the shaft M″ and gears G O journaled on the shaft M′ instead of on the shaft Z.

In my pending application, No. 180,409, I show and describe a gearing similar in many respects to the one forming the subject of this application. The two forms differ, however, in one very important particular. In the form shown and described herein the arm N, which supports the planet-gear T, is connected, by means of the gears K I, with the turn-table, and is therefore stationary, except when the turn-table rotates, whereas in the form set out in the application No. 180,409, referred to, the corresponding arm, N, is connected by suitable gears with the vertical shaft M, and revolves with the rotation of the wind-wheel shaft.

In my patent of May 5, 1885, I have shown and claimed certain features which are shown and described in this application.

Without particularly specifying the features which have been so shown and claimed in said prior patent, I hereby disclaim any novelty for the features covered by this application, except such as is set forth in the following claims, to wit:

1. In a windmill of the class described, the combination of the gear K, located at one side of the vertical axis of the mill, the planet-gear T, whose support is rigidly connected with and rotated by said gear K, and a gear engaging directly with the gear K and having its axis coincident with the vertical axis of the mill.

2. In a windmill of the class described, the combination of a rotating turn-table and a gear-wheel rigidly fastened thereto, a wind-wheel shaft journaled in the turn-table, a power-transmitting gear at one side of the vertical axis of the mill, and a train of gearing connecting said wind-wheel shaft, turn-table gear, and said power-transmitting gear, one element of said train of gearing being a loosely-mounted gear free to rotate on its own axis and to revolve about the axis of rotation of said power-transmitting gear, whereby the rotation of the wind-wheel shaft in its bearing rotates said loosely-mounted gear about its own axis only.

3. The combination of the turn-table C, the gear I, rigidly mounted on said turn-table, the gear K, engaging with the gear I, and the planet-gear T, whose support is rigidly connected with and rotated by said gear K, substantially as shown and described, and for the purpose set forth.

4. In a windmill of the class described, the combination of a rotating turn-table, a wind-wheel shaft journaled therein, two independently-journaled vertical shafts located at one side of the vertical axis of the mill, one of said shafts being adapted to transmit the power of the mill to other machinery, and a train of gearing connecting said vertical shafts with the wind-wheel shaft and said turn-table, whereby the rotation of the wind-wheel shaft in its bearing rotates said vertical shaft in opposite directions, one element of said train of gearing being a loosely-mounted gear free to rotate on its own axis and about an axis at one side of the vertical axis of the mill.

5. In a windmill of the class described, a planet-gear whose rotating support is located at one side of the vertical axis of the turn-table, said support being connected with said turn-table by means adapted to insure their simultaneous rotation.

6. In a windmill of the class described, the combination of a geared turn-table and a wind-wheel shaft journaled therein, a power-transmitting gear, a loosely-mounted gear free to rotate on its own axis and about an axis parallel to the vertical axis of the mill, gearing connecting the rotating support of said loosely-mounted gear with the turn-table gear, gearing engaging said loosely-mounted gear on one side and connecting it with the wind-wheel shaft, and gearing engaging it on the opposite side and connecting it with the power-transmitting gear.

7. In a windmill of the class described, the combination of a planet-gear whose rotating support is connected directly by gearing with the turn-table of the mill.

8. The combination of the turn-table C and its gear I, the wind-wheel shaft *c* and gear F, vertical shaft M and gears E 3, gear G, engaging with the gear 3, and gear O, mounted on the same shaft with the gear G and engaging with and rotating the planet-gear T on its gudgeon P, connected with shaft Z and gear K, substantially as described.

9. In a windmill of the class described, the combination of a wind-wheel shaft journaled in a rotating turn-table, gears F and E, shaft M, and gear 3 at its lower end, and a train of gearing connecting the gear 3 with a power-transmitting gear and with a central gear whose axis of rotation is coincident with the vertical axis of the mill, one element of said train of gearing being a planet-gear having a geared rotating support and capable of bodily rotation about an axis at one side of the vertical axis of the mill, whereby the reaction of the work to be performed tends to rotate said central gear and the gear 3 in opposite directions.

10. The combination of a geared turn-table, a wind-wheel shaft journaled therein, a power-transmitting gear, a planet-gear capable of bodily rotation about a vertical axis at one side of the vertical axis of the mill and having a gear rigidly attached to its rotating support, said wind-wheel shaft, turn-table, power-transmitting gear, and said planet-gear with its geared support being connected by gearing whereby the rotation of the turn-table has no tendency to rotate either the wind-wheel shaft or the power-transmitting gear.

11. The combination of the geared turn-table engaging directly with the gear K, and a planet-gear, T, whose support is rigidly connected with and rotated by said gear K, gearing engaging the gear T on one side and connecting it with power-transmitting mechanism, and gearing engaging said gear T on the opposite side and connecting it with the wind-wheel shaft.

12. In a windmill of the class described, a train of gearing connecting the wind-wheel shaft, turn-table, and a power-transmitting gear at one side of the vertical axis of the mill, one feature of said train of gearing being a planet-gear engaging with the power-transmitting gear and having a geared rotating support, substantially as described.

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

GEORGE H. PATTISON.

Witnesses:

JAMES J. NEFF,

JAMES H. STEARNS.