(No Model.)

G. H. PATTISON.

GEARING FOR WINDMILLS.

No. 333,148. Patented Dec. 29, 1885.

Fig. 1.

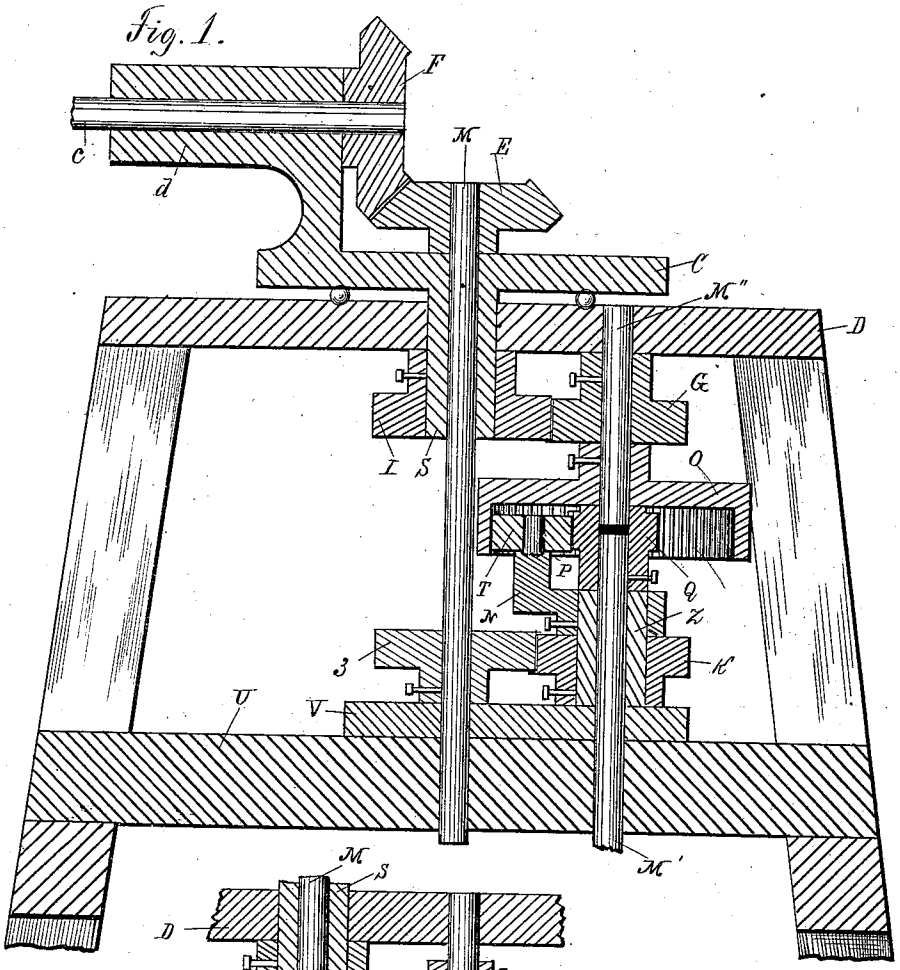
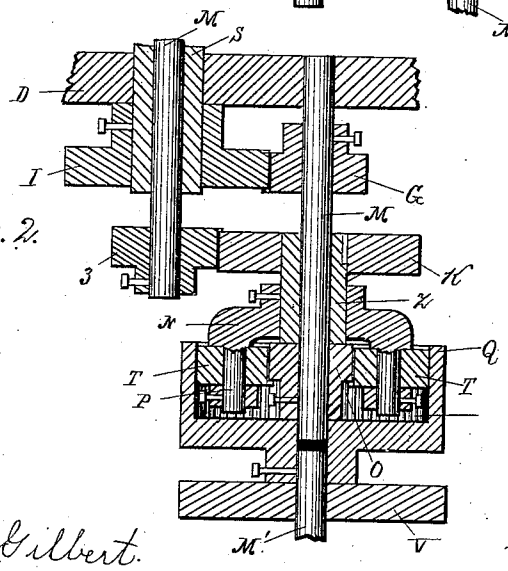


Fig. 2.



WITNESSES:

Chas. F. Gilbert.

J. W. Currier

INVENTOR

George H. Pattison

BY

Wilkes Greene,

ATTORNEY

N. PETERS, Photo-Lithographer, Washington, D. C.

UNITED STATES PATENT OFFICE.

GEORGE H. PATTISON, OF FREEPORT, ILLINOIS.

GEARING FOR WINDMILLS.

SPECIFICATION forming part of Letters Patent No. 333,148, dated December 29, 1885.

Application filed October 20, 1885. Serial No. 180,409. (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 windmill-gearings, and is fully shown and described in this specification and 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 of this application. Fig. 2 is a similar view of a modified form of the gearing.

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-power, and D is a top plate fastened to the posts.

C is a turn-table resting on the usual anti-friction balls, which roll in a groove in 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 1 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 vertical shafts, M′ Z, suitably journaled in the tower. The gear-wheel 1 engages with the gear G, rigidly mounted on the shaft M″, and the gear-wheel 3 engages with the spur-wheel K, rigidly mounted on the shaft Z. A horizontal arm, N, carrying a vertical gudgeon, P, is rigidly connected with the shaft Z and gear K, and on the gudgeon P is mounted loosely a planet-gear, T, engaging with an internal gear, O, fastened to the shaft M″, and also engaging with a spur-gear, Q, rigidly fastened to the shaft M′.

The operation of the gearing is as follows: If the turn-table, with its sleeve S and gear 1, be held stationary and the wind-wheel shaft 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 arrows on either of said gears, and consequently the gear K, shaft Z, gudgeon P, with the planet-gear T mounted thereon, must turn in the opposite direction, as indicated by the arrow on the gear K. The turn-table, the sleeve S, and the gear 1 being stationary, the gear G, shaft M″, and the internal gear, O, rigidly fastened thereto, are also stationary, and consequently the rotation of the gear K carries the planet-gear T about the axis of rotation of the gear K, and as the internal gear, O, is stationary the planet-gear T is rotated on the gudgeon P. The rotation of the planet-gear T about the axis of the gear K and on the gudgeon P rotates the spur-gear Q in the direction indicated by the arrow thereon—that is, in the same direction as the gear K—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 1 turn in the same direction, and the gear G, shaft M″, and gear O turn in the opposite direction. The shaft M′ and spur-gear Q being stationary, the rotation of the turn-table and gears 1 G O rotates the planet-gear T about the gear Q, and thus rotates the gudgeon P, shaft Z, and gear K in the direction indicated by the arrow on the gear K. This rotation of the gear K is communicated to the 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′ and gear Q are 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 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, and the gear K and shaft Z are journaled on the shaft M″, instead of on the shaft M′. The effect of the change is simply 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.

In my pending application, No. 179,875, 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^3, with the vertical shaft M, and revolves, therefore, with the rotation of the wind-wheel shaft, whereas in the application No. 179,875, referred to, the corresponding arm, N, is connected by suitable gears with the turn-table, and is therefore stationary, except when the turn-table rotates.

In my patent of May 5, 1885, I have shown and claimed certain features which are shown and described in this application, and without particularly specifying such features, previously 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:

I claim—

1. In a windmill of the class described, the combination of a wind-wheel shaft journaled in a rotating turn-table, a planet-gear free to rotate about its own axis, and also about a vertical axis at one side of the vertical axis of the turn-table, and gearing connecting the geared support of said planet-gear with the wind-wheel shaft.

2. In a windmill of the class described, the combination of a wind-wheel shaft journaled in a rotating turn-table, and a vertical shaft connected directly by gearing at its upper end with the wind-wheel shaft, and at its lower end with the gear-rotating support of a planet-gear capable of rotation on its own axis, and of bodily rotation about the axis of rotation of its support.

3. In a windmill of the class described, the combination of the gears G O T K Q, a gear connected with the turn-table of the mill and engaging with the gear G, and a gear connected with the wind-wheel shaft and engaging with the gear K, substantially as described.

4. In a windmill of the class described, the combination of the central gears, 1 and 3, shaft M′ at one side of the vertical axis of the mill, and gearing, substantially as described, connecting the shaft M′ with the gears 1 and 3.

5. The combination of the turn-table C, the gear 1, rigidly mounted on said turn-table, and the gears G O, engaging, respectively, with the gear 1 and with the planet-gear T, substantially as described.

6. The combination of the turn-table C, wind-wheel shaft *c* and gear F, vertical shaft M and gears E 3, the gear K, engaging with the gear 3, and the planet-gear T, supported, as described, by the gear K, and rotating bodily therewith.

7. In a windmill of the class described, the combination of a wind-wheel shaft journaled in a geared 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, both on its own axis and about the axis of its rotating support.

8. In a windmill of the class described, the combination of a wind-wheel shaft journaled in the turn-table, and a planet-gear whose rotating support is located at one side of the vertical axis of the mill, said support being connected with the wind-wheel shaft by gearing adapted to insure their simultaneous rotation.

9. In a windmill of the class described, the combination of a rotating geared 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 with said turn-table, whereby the rotation of the wind-wheel shaft in its bearing rotates said vertical shafts in the same direction at different rates of speed, one element of said train of gearing being the planet-gear T.

10. 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 wind-wheel shaft, gearing engaging said loosely-mounted gear on one side and connecting it with the turn-table, and gearing engaging it on the opposite side and connecting it with the power-transmitting gear.

11. In a windmill of the class described, the combination of the planet-gear whose rotating support is connected directly by gearing with a vertical shaft which is operated directly by the wind-wheel shaft.

12. The combination of the wind-wheel shaft and gear F, vertical shaft M and gears E 3, gear K, engaging with the gear 3, and gear T, supported by the gear K and engaging

with the gear O, which is connected with the turn-table of the mill by means adapted to insure their simultaneous rotation.

13. In a windmill of the class described, the combination of two central gears, 1 and 3, with the gears G O T K and power-transmitting gear Q.

14. The combination of the rotating geared turn-table of the mill, the wind-wheel shaft *c*, the gear Q, adapted to transmit the power of the mill to other mechanism, and the gears F E 3 G O T K, connecting the turn-table, the wind-wheel shaft, and the gear Q, whereby the reaction of the gear Q does not tend to rotate the turn-table.

15. In a windmill of the class described, the combination of the gears G O T K and the gear Q, rigidly mounted on the vertical power-transmitting shaft M′, combined substantially as described.

16. The combination of the wind-wheel shaft *c* and gear F, engaging with the gear E on the vertical shaft M, gear 3 on the shaft M, engaging with the gear K, which supports the planet-gear T, gearing engaging said planet-gear T on one side and connecting with the turn-table of the mill, and gearing engaging it on the opposite side and connecting it with the power-transmitting mechanism.

17. In a windmill of the class described, the combination of the gears O T Q, located at one side of the vertical axis of the mill, and gearing, substantially as described, connecting them with the wind-wheel shaft and turn-table, whereby the rotation of the wind-wheel shaft in its bearing rotates the gears O Q in the same direction at different rates of speed.

18. The combination of the turn-table C and a wind-wheel shaft, *c*, the gear 1, fastened rigidly to said turn-table, and the train of gearing F, E, 3, G, O, T, K, and Q, substantially as shown and described, and for the purpose set forth.

19. In a windmill of the class described, the combination of two central gears and the train of gears G, O, T, K, and Q, combined with the central gears, substantially as described.

20. The combination of the wind-wheel shaft *c*, gear F, turn-table C and gear 1, gears E 3 G O T K Q, and power-transmitting shaft M′, with the gear Q, rigidly attached thereto, all combined and operated substantially as set forth.

21. In a windmill of the class described, the combination of the geared turn-table, a wind-wheel shaft journaled therein, two independently-journaled vertical shafts at one side of the vertical axis of the mill, and a chain of gearing connecting said vertical shafts with the wind-wheel shaft and turn-table, one element of said train of gearing being a loosely-mounted planet-gear, whereby the rotation of the wind-wheel shaft in its bearing rotates said shafts in the same direction at different rates of speed, substantially as described.

22. In a windmill of the class described, the combination of the wind-wheel shaft journaled in a rotating turn-table, gearing connecting it with a vertical shaft, and a planet-gear free to rotate on its own axis and about the axis of rotation of its revolving support, said support being connected with said vertical shaft by means adapted to insure their simultaneous rotation.

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

GEORGE H. PATTISON.

Witnesses:
JAMES I. HEFF,
JAMES H. STEARNS.