(No Model.) 2 Sheets—Sheet 1.

G. H. PATTISON.

GEARING FOR WINDMILLS.

No. 345,317. Patented July 13, 1886.

Fig. 1.

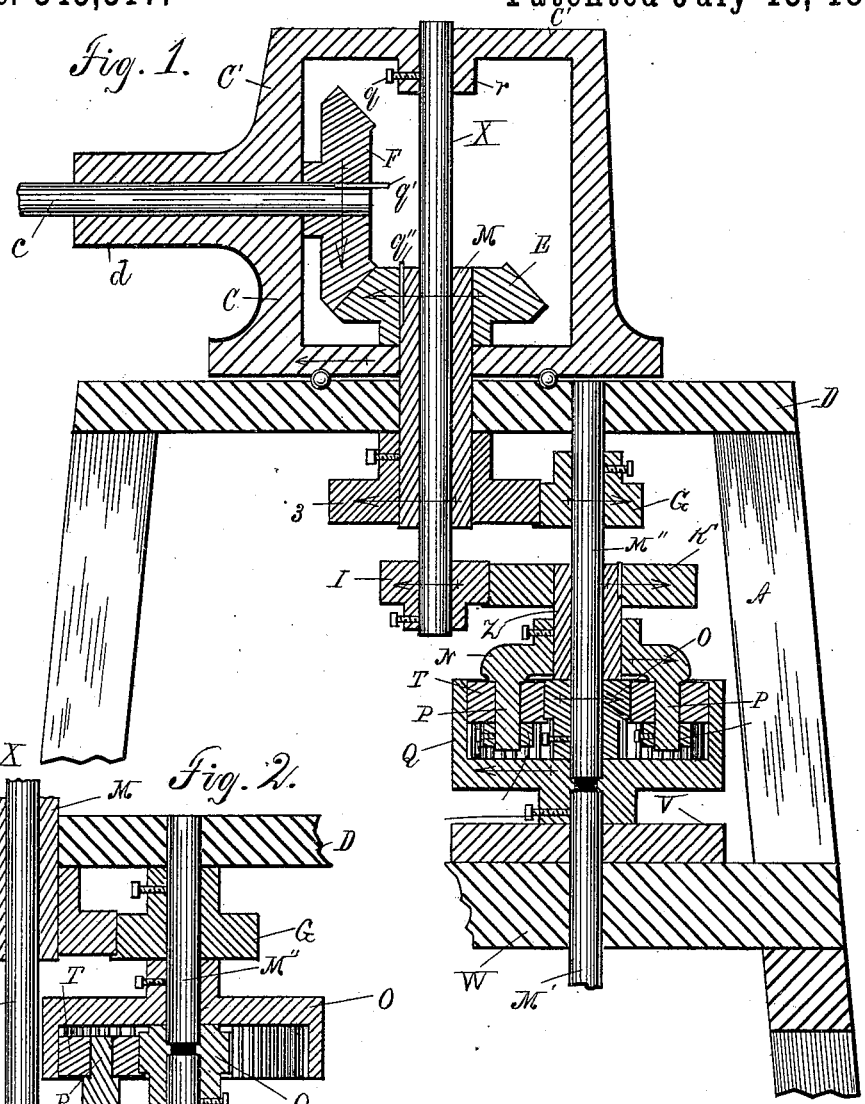
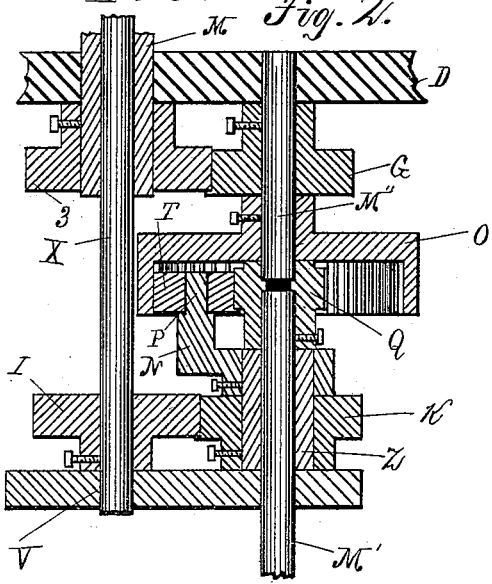


Fig. 2.



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(No Model.) 2 Sheets—Sheet 2.

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Fig. 3.

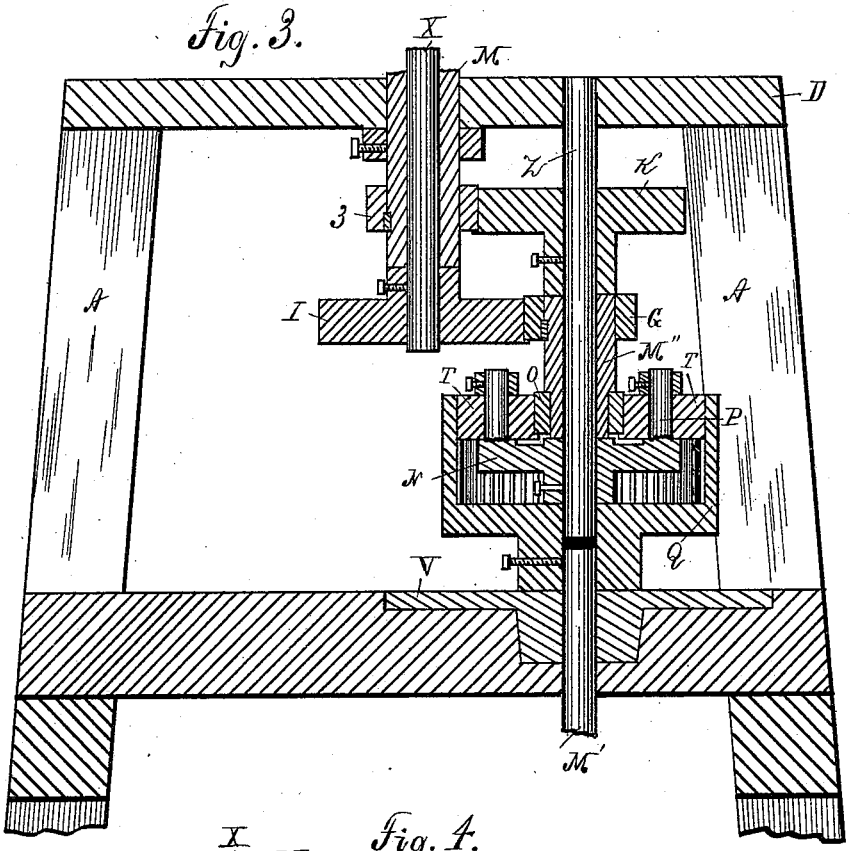
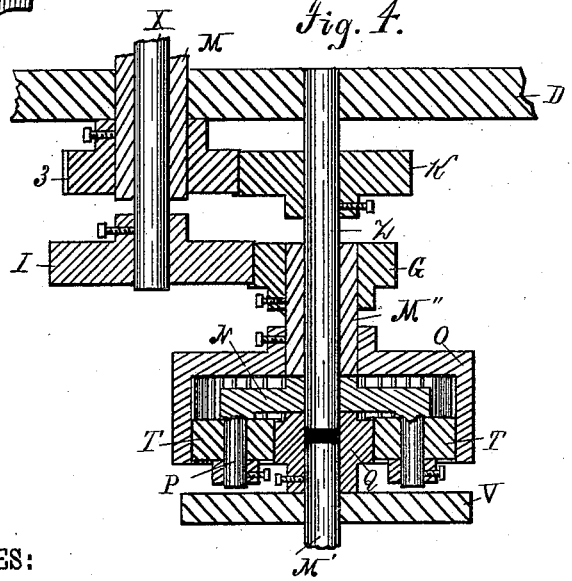


Fig. 4.



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UNITED STATES PATENT OFFICE.

GEORGE H. PATTISON, OF FREEPORT, ILLINOIS.

GEARING FOR WINDMILLS.

SPECIFICATION forming part of Letters Patent No. 345,317, dated July 13, 1886.

Application filed December 7, 1885. Serial No. 184,985. (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 the 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; Fig. 3, a central vertical section of a tower provided with a third form of the gearing, and Fig. 4 a similar view of a fourth form of the gearing.

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. A hollow shaft, M, is journaled in suitable openings in the turn-table and top plate, 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.

To the upper part or bridge-arm, C′, of the turn-table C is fastened the upper end of a preferably hollow vertical shaft, X, which passes down through and extends a short distance below the hollow shaft M, already mentioned, and on the lower end of the shaft X is rigidly mounted a spur-gear, I.

At one side of the vertical axis of the mill are two vertical shafts, M″ M′, one above the other, and both journaled in suitable bearings attached to 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, loosely mounted on the same shaft. A horizontal arm, N, carrying two vertical gudgeons, P, is rigidly connected with the gear K, and on each of the gudgeons P is mounted loosely a planet-gear, T, engaging with the spur-gear O, fastened to the shaft M″, and also engaging with an internal gear, Q, rigidly fastened to the shaft M′.

The operation of this system of gearing is as follows: If the turn-table, with its shaft X and gear I, 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, together 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 arrows on the gears. The turn-table, the shaft X, and gear I being stationary, the gear K, arm N, and gudgeons 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 shaft M″ or about the axis of the gear O. The rotation of the planet-gears T rotates the internal 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 shaft X and gear I turn in the same direction, and the gear K, arm N, and gudgeons P turn in the opposite direction. The shaft M′ and internal gear, Q, being stationary, the rotation of the arm N rolls the planet-gears T about the internal gear, 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.

The gearing shown in Fig. 2 is the same as that shown in Fig. 1, except that the planet-gear T is connected with the shaft M′ through the spur-gear Q, which is fastened to the shaft, instead of through the internal gear, Q, as in the form shown in Fig. 1, and the gear O is an internal gear instead of a spur-gear. The only effect of this change is to vary the ratio of the speed of the shaft M′ to that of the shaft *c*, the operation of the gearings in all other respects being the same.

In the form shown in Fig. 3 the gear K engages with the gear 3, and the gear G engages with the gear I, which is a reversal of the order of connection of these gears in the form shown in Fig. 1. Otherwise the forms shown in Figs. 1 and 3 are idenitcal.

The difference between Figs. 3 and 4 is the same as that between Figs. 1 and 2—that is, the gear O in Fig. 3 is spur, and in Fig. 4 it is internal; and the gear Q is an internal gear in Fig. 3 while it is a spur-gear in Fig. 4. With this exception, Figs. 3 and 4 are alike.

The bearing *r* may evidently be supported from one side only, instead of on both, as shown.

In view of my patent May 5, 1885, I hereby disclaim for this invention any novelty, except such as is set forth in this specification and the following claims.

Having now described and explained my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a windmill of the class described, a turn-table having a base and a top or bridge arm, in combination with a gear-wheel rigidly connected with the bridge-arm of the turn-table, said turn-table being free to rotate about the vertical axis of the mill.

2. In a windmill of the class described, the combination of a rotating turn-table having a base and a top or bridge arm, a central vertical shaft rigidly fastened to the bridge-arm of the turn-table, a wind-wheel shaft journaled in the turn-table, a power-transmitting shaft, and gearing connecting said turn-table shaft, wind-wheel shaft, and power-transmitting shaft, whereby the reaction of the work performed by the mill is transmitted to said turn-table shaft and turn-table.

3. The combination, in a windmill of the class described, of the gears K T Q O G, a gear connected rigidly with the top or bridge arm C′ of the turn-table, and engaging with the gear K, and a gear connected with the wind-wheel shaft and engaging with the gear G.

4. In a windmill of the class described, the combination of the central gears, I and 3, connected with the turn-table bridge-arm C′ and wind-wheel shaft, as described, with the gears G K T O Q, whereby the rotation of the central gears, I and 3, in the same direction and at the same rate of speed does not rotate the gear Q.

5. In a windmill of the class described, the combination of a rotating turn-table having a base and a top or bridge arm, a wind-wheel shaft journaled in the turn-table and a gear mounted on said wind-wheel shaft, a vertical hollow shaft and a gear mounted thereon and engaging with the gear on the wind-wheel shaft, a central vertical shaft fastened to the bridge-arm of the turn-table and extending downward through said hollow shaft, and gearing connecting said hollow shaft and gear mounted thereon with the central shaft fastened to the bridge-arm of the turn-table.

6. In a windmill of the class described, the combination of a rotating turn-table having a base and a top or bridge arm, a wind-wheel shaft journaled in said turn-table, a central vertical shaft fastened rigidly to the bridge-arm of the turn-table, a power-transmitting gear, and a train of gearing connecting the wind-wheel shaft, the central shaft attached to the turn-table, and the 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 its support.

7. In a windmill of the class described, the combination of a rotating turn-table having a base and a top or bridge arm, a central vertical shaft rigidly fastened to the bridge-arm of the turn-table and extending downward through the base thereof, and gearing whereby the reaction of the work performed by the mill is transmitted to said central shaft, and through it to the turn-table.

8. In a windmill of the class described, the combination of a rotating turn-table having a base and a top or bridge arm, a central vertical shaft rigidly fastened to the bridge-arm of said turn-table and projecting downward therefrom, and a gear-wheel mounted on the lower end of said vertical shaft.

9. In a windmill of the class described, the combination of a turn-table rotating about the vertical axis of the mill, and having a base and a top or bridge arm, a central vertical shaft fastened to said bridge-arm and extending downward therefrom, a gear-wheel rigidly attached to the lower end of said vertical shaft, and a gear-wheel mounted loosely on said vertical shaft between the turn-table bridge-arm and the gear rigidly fastened to said vertical shaft.

10. The combination of the turn-table C, the central shaft, X, rigidly fastened to the bridge-arm C′ of said turn-table, the gear I, mounted rigidly on the shaft X, the gear K, engaging with the gear I, and the planet-gear T, supported by the gear K and rotating bodily therewith.

11. In a windmill of the class described, the combination of a rotating turn-table, a wind-wheel shaft journaled therein, and a gear mounted rigidly on the wind-wheel shaft, a central vertical shaft fastened rigidly to the turn-table and extending downward therefrom, a gear rigidly mounted on said vertical

shaft, a gear loosely mounted on the vertical shaft between said rigidly-mounted gear and the turn-table, and engaging with the gear on the wind-wheel shaft, and gearing connecting said turn-table-shaft gear with the gear mounted loosely on the central shaft.

12. In a windmill of the class described, the combination of a rotating turn-table, a wind-wheel shaft journaled therein, and a gear mounted on the wind-wheel shaft, a central vertical shaft fastened to the turn-table, a gear mounted loosely on said vertical shaft and engaging with the gear on the wind-wheel shaft, a power-transmitting gear, and a train of gearing connecting the turn-table shaft, the wind-wheel shaft, and the power-transmitting gear, one element of said train being a loosely-mounted gear free to rotate on its own axis and to revolve about the axis of rotation of its support.

13. In a windmill of the class described, the combination of a rotating turn-table and a gear-wheel rigidly fastened to the top or bridge arm thereof, 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, said 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.

14. In a windmill of the class described, the combination of the wind-wheel shaft *c*, and the gear F, journaled in a rotating turn-table, C, the bridge-arm C′, to which is rigidly attached the central shaft, X, the gear I, rigidly mounted on said shaft X, the gear E, engaging with the gear F, the gear 3, rigidly connected with the gear E, a power-transmitting shaft, M′, at one side of the vertical axis of the mill, and a train of gearing connecting the gears I and 3 with the shaft M′, one element of said train of gearing being a loosely-mounted gear free to rotate on its own axis and about the axis of rotation of its movable support.

15. In a windmill of the class described, the combination of the turn-table C, bridge-arm C′, shaft X, and gear I.

16. In a windmill of the class described, the combination of the wind-wheel shaft *c*, turn-table C, gears F E I 3 K G T Q O, and power-transmitting shaft M′, substantially as described, and for the purpose set forth.

17. In a windmill of the class described, the combination of a rotating turn-table, a wind-wheel shaft, *c*, and gear F, gears E and 3, the gear E engaging with the gear F, the gear I, below the gear 3 and connected with the turn-table by means adapted to insure their simultaneous rotation, and a train of gearing connecting the gears I and 3.

18. In a windmill of the class described, the combination of the turn-table C, bridge-arm C′, shaft X, gear I, shaft *c*, gear F, and gears E 3, loosely journaled on the shaft X, substantially as described.

19. In a windmill of the class described, the combination of the wind-wheel shaft *c* and gear F, turn-table C, bridge-arm C′, shaft X, gears E 3, engaging with the gear F, and gears I and 3, connected with the shaft X and gear E, respectively, and engaging with gear-wheels journaled in the tower at one side of the vertical axis of the mill.

20. In a windmill of the class described, the combination of a turn-table having a top or bridge arm, C′, and a central shaft, X, formed integrally with or attached thereto and adapted to receive and transmit the side draft of the mill to and from the turn-table.

21. In a windmill of the class described, the combination of the gearing F, E, I, 3, K, T, Q, O, and G, combined, arranged, and operated substantially as shown and described.

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

GEORGE H. PATTISON.

Witnesses:
JAMES H. STEARNS,
WM. B. THOMAS.