(No Model.)

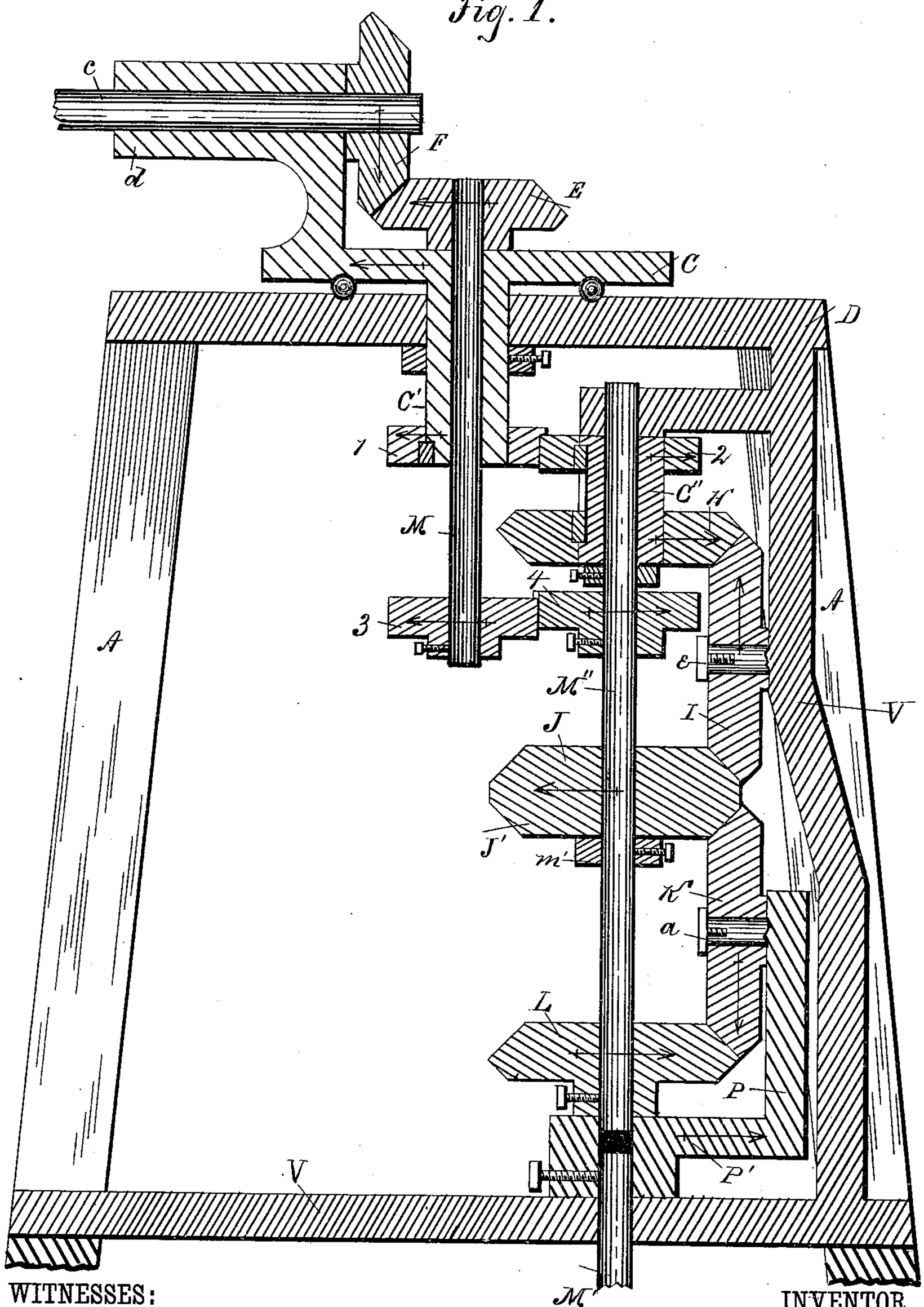
4 Sheets—Sheet 1.

G. H. PATTISON.

GEARING FOR WINDMILLS.

No. 329,769. Patented Nov. 3, 1885.

Fig. 1.



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(No Model.)

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Fig. 2.

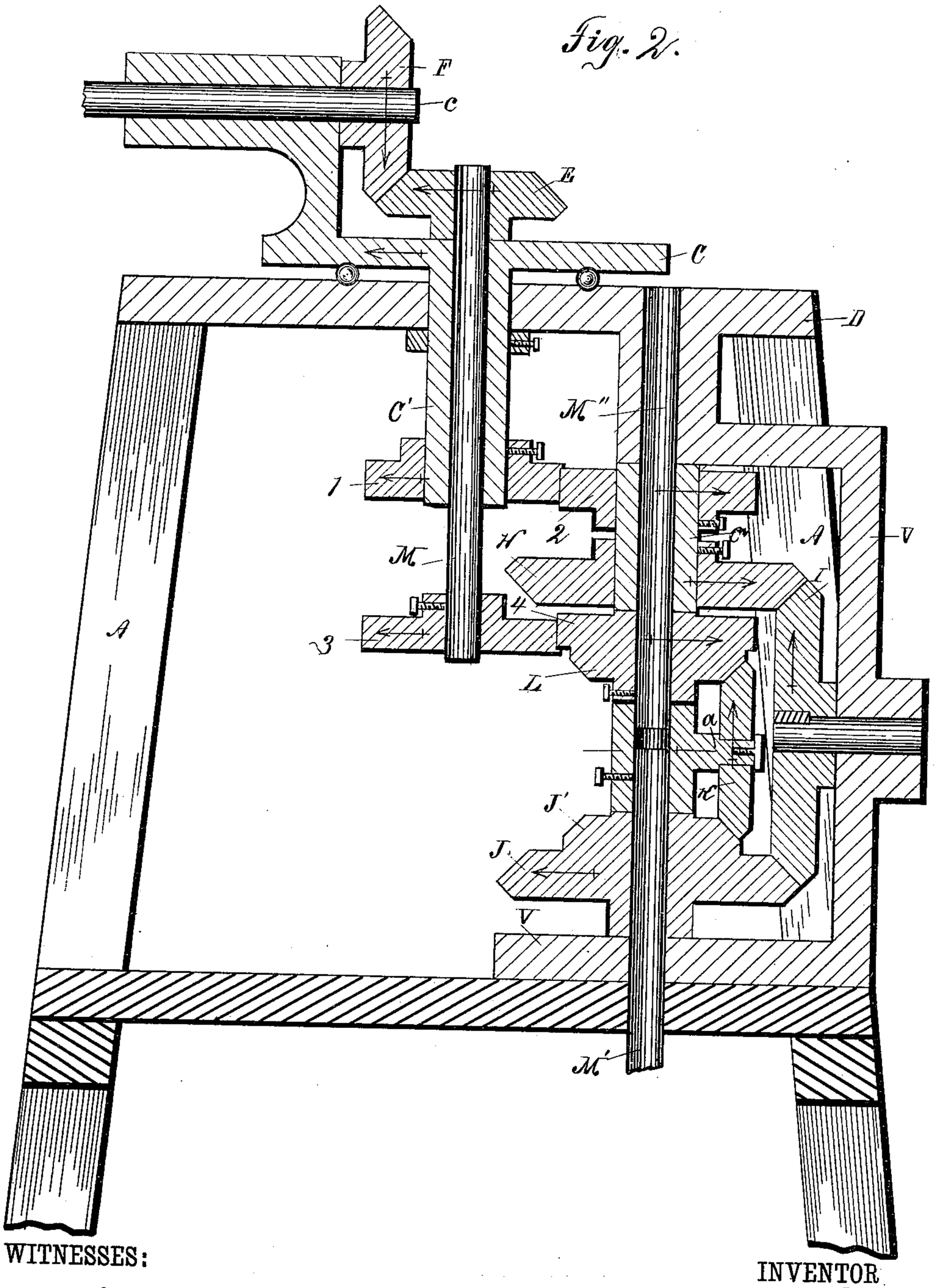

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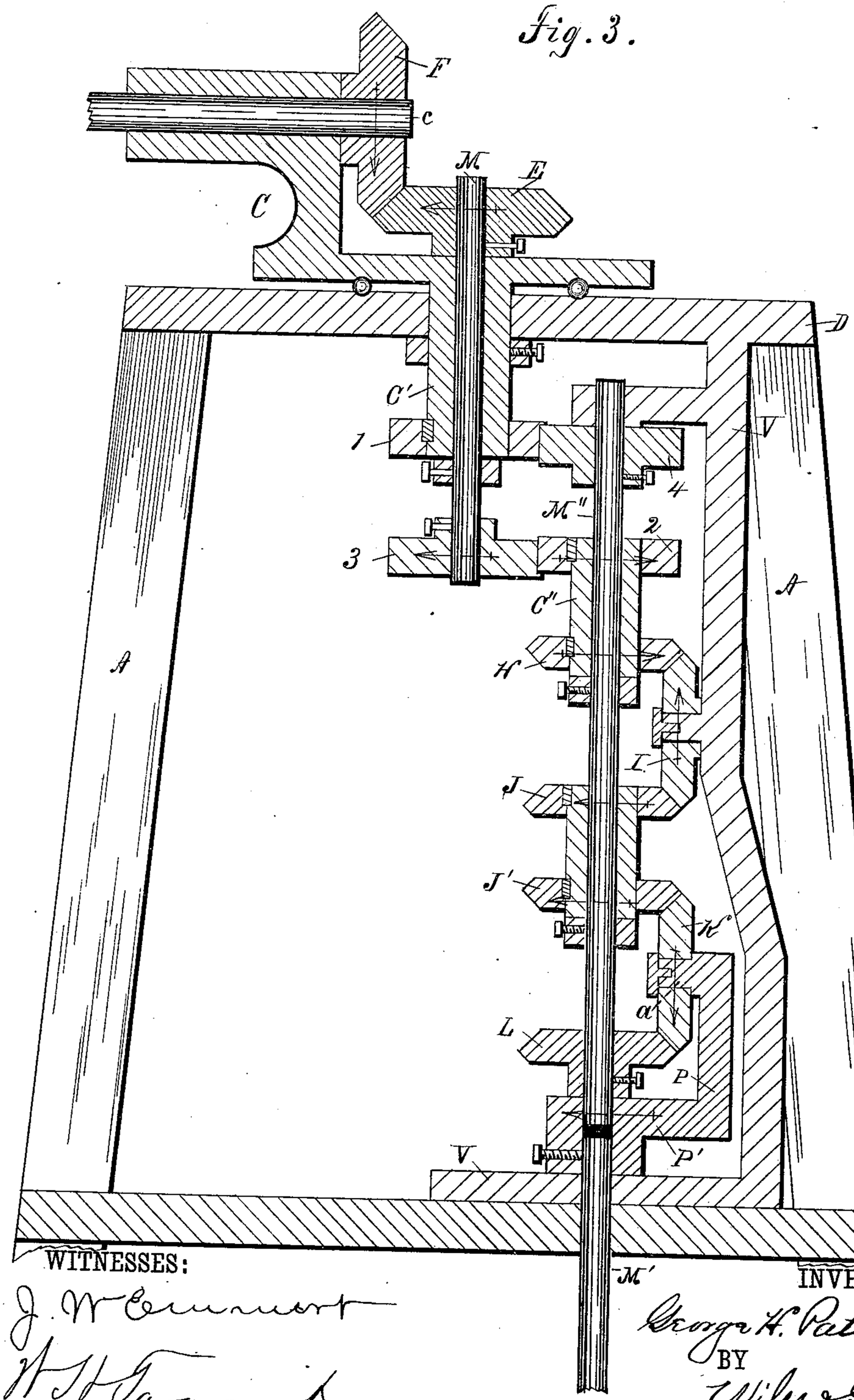
Fig. 3.



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GEARING FOR WINDMILLS.

No. 329,769. Patented Nov. 3, 1885.

Fig. 4.

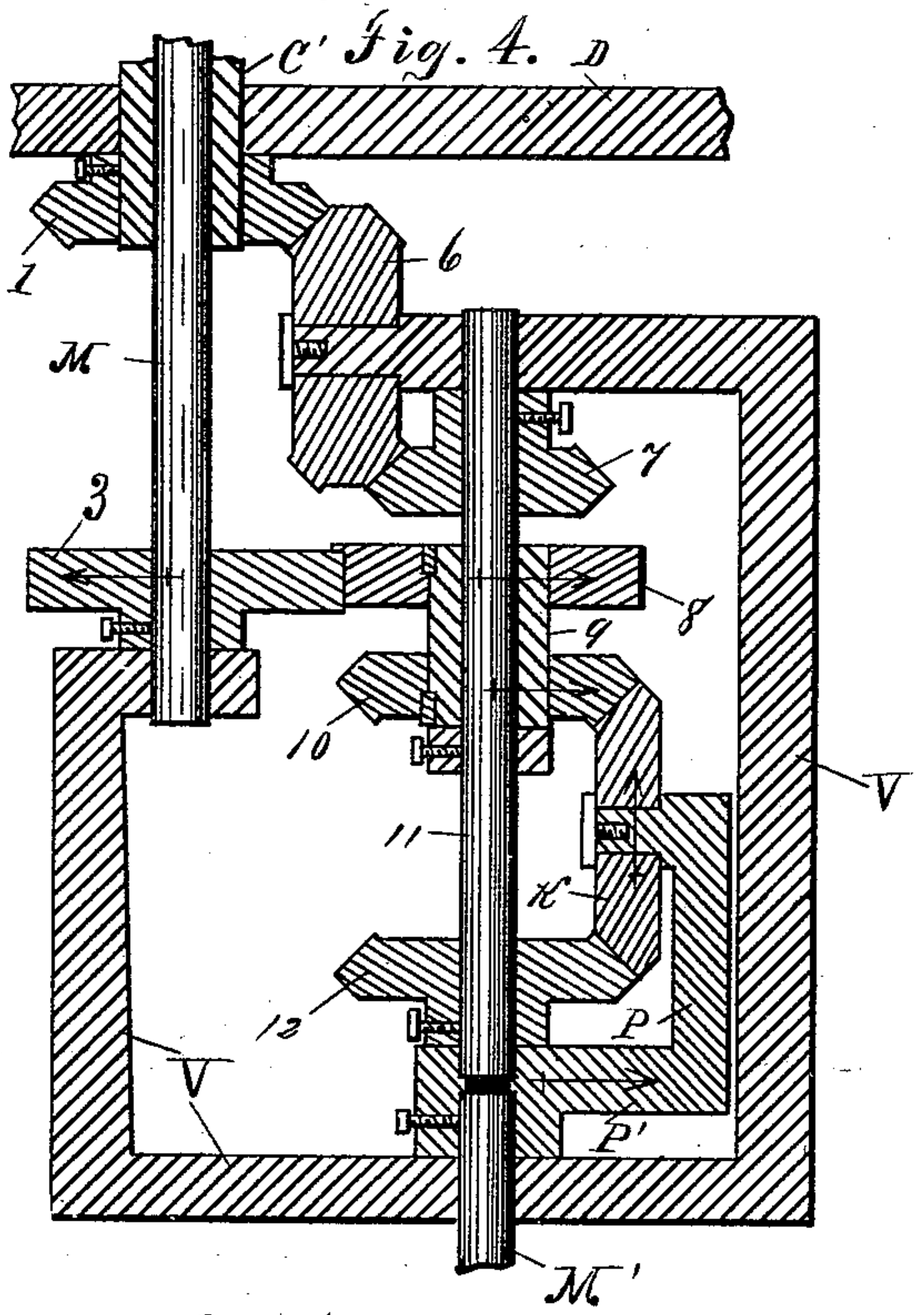


Fig. 5.

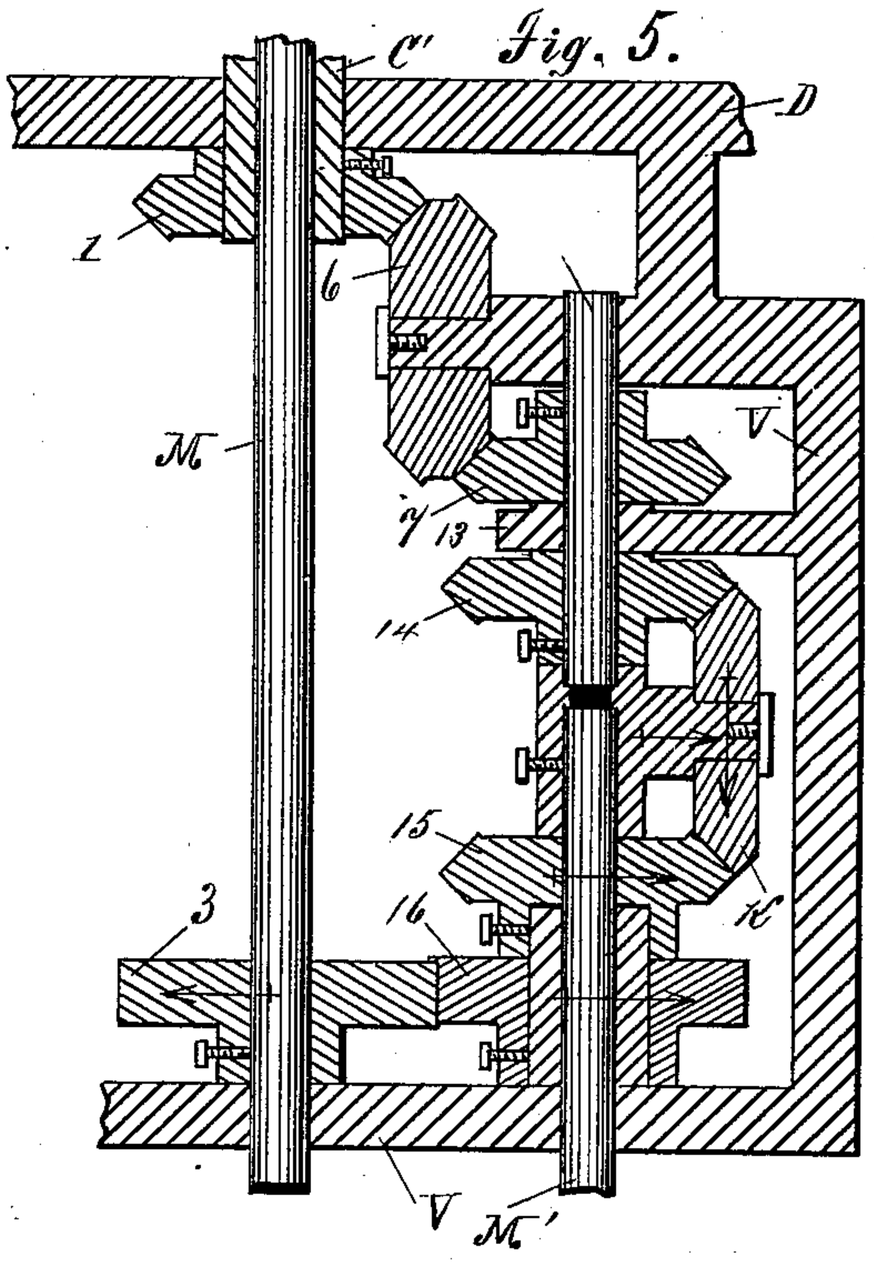


Fig. 6.

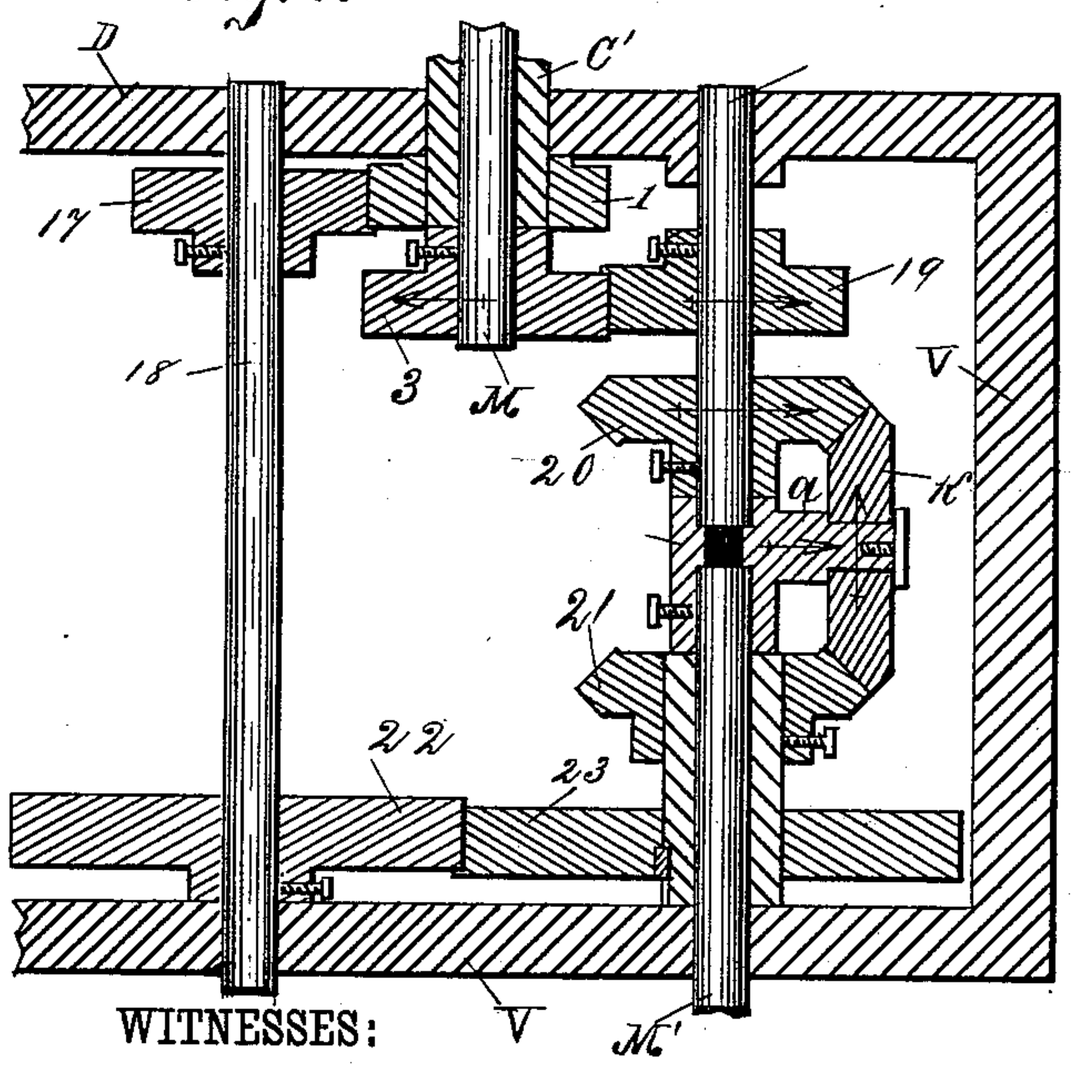
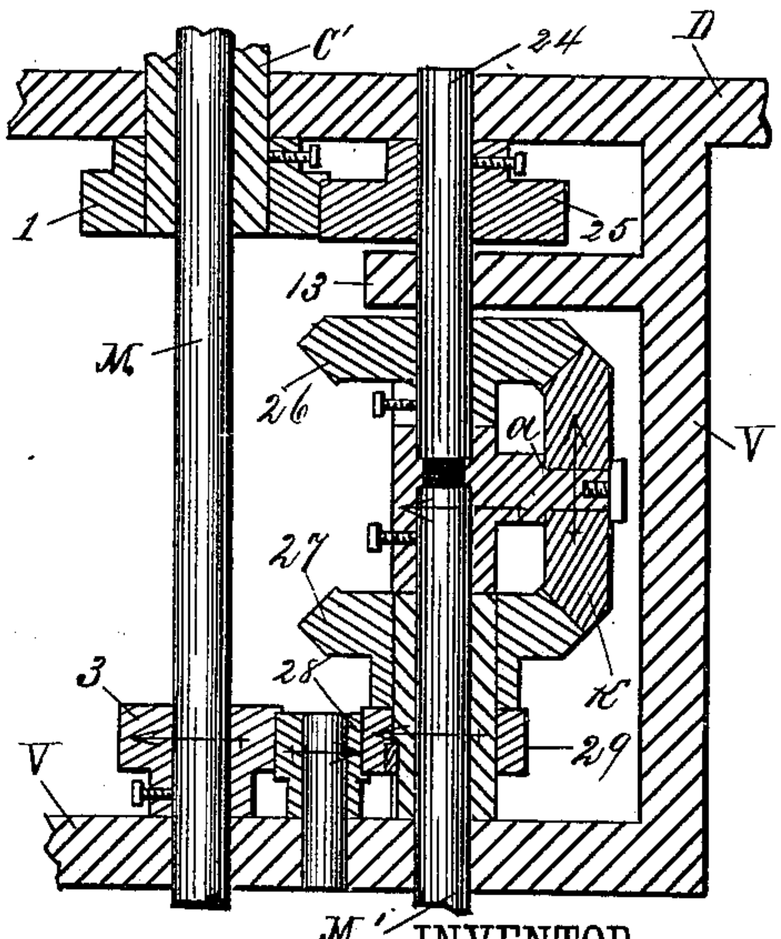


Fig. 7.



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UNITED STATES PATENT OFFICE.

GEORGE H. PATTISON, OF FREEPORT, ILLINOIS.

GEARING FOR WINDMILLS.

SPECIFICATION forming part of Letters Patent No. 329,769, dated November 3, 1885.

Application filed August 24, 1885. Serial No. 175,201. (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 fully described and explained in the following specification, and shown in the accompanying drawings, in which—

Figure 1 is a central vertical section of one form of my improved gearing mounted on a windmill-tower. Fig. 2 is a similar view of a second form. Fig. 3 is a similar view of a third form, and Figs. 4, 5, 6, 7 are central vertical sections of as many slightly-modified gearings shown without the tower.

In Fig. 1, A A are the posts, and D is the top plate, of an ordinary windmill-tower; and C is a turn-table, having a downwardly-projecting neck, C′, which is journaled in the plate D. A horizontal wind-wheel shaft, *c*, is journaled in the turn-table above the plate D, and a preferably hollow vertical shaft, M, is journaled in the neck C′ of the turn-table, and extends a short distance above the same. Miter-gears E F are mounted on the adjacent ends of the shafts M *c*, respectively, and by their engagement connect the two shafts, and spur-gears 1 3 are mounted one on the lower end of the turn-table neck C′ and the other on the lower end of the shaft M. The spur-gear 3 engages with a spur-gear, 4, mounted rigidly on a second vertical shaft, M″, which is journaled in suitable bearings at top and bottom, and a miter-gear, L, is mounted rigidly on the shaft M″, near its lower end. The spur-gear 1 of the turn-table engages with a similar gear, 2, rigidly mounted on a sleeve, C″, which turns freely on the shaft M″, and on the lower end of the sleeve C″ is rigidly mounted a miter-gear, H. The gear H engages with a miter-gear, I, mounted loosely on a stationary horizontal shaft fastened to the tower, and the gear I engages the upper face, J, of a double-faced miter-gear, J J′, which turns loosely on the shaft M″. Below the shaft M″ is a vertical shaft, M′, journaled in suitable bearings, and a horizontal arm, P′, is rigidly fastened to the upper end of the shaft M′ and turns with it. On the outer end of the arm P′ is a vertical standard, P, and near the top of the standard, and extending inward therefrom, is a horizontal gudgeon, *a*, on which is loosely mounted a miter-gear, K, which engages with the miter-gear L below it and with the face J′ of the double-faced gear J J′ above it.

The operation of this device is as follows: The turn-table being at rest, if the wind-wheel shaft be turned in the direction indicated by the arrow on the gear F, the gears E 3 4 L must turn in the directions indicated by the corresponding arrows. The rotation of the gear L rotates the gear K on its shaft or gudgeon *a*, and since the gear J J′ is stationary, (being connected with the turn-table by the gears I H 2 1.) the gear K must roll about the gear J′, and thus rotate the arm P′ and shaft M′ in the direction indicated by the arrow on the arm. On the other hand, if the shaft M′ be held stationary and the turn-table be rotated in the direction indicated by the arrow thereon, the gears 1 2 H I J J′ K must turn in the directions indicated by the corresponding arrows. The rotation of the gear K on the gudgeon *a* (the arm P′ being stationary) rotates the gear L in the direction indicated by the arrow thereon, and this rotation of the gear L is communicated through the shaft M″ and gears 4 3 to the shaft M and gear E, the direction of rotation of the gear E being indicated by the arrow thereon, and being the same as the direction of rotation of the turn-table, and since the gears 1 2 are equal and the gears 3 4 are also equal, and the remaining gears of the system are miter-gears, the shaft M turns at the same rate of speed as the turn-table, and since the shaft M and gear E turn in the same direction and at the same speed as the turn-table, the gear F and wind-wheel shaft *c* are not rotated by the rotation of the shaft M and gear E. In other words, the rotation of the turn-table (or the swiveling of the mill) has no effect on the wind-wheel shaft or on the power-transmitting shaft M′.

The form of gearing shown in Fig. 2 is sub-

stantially the same as that shown in Fig. 1, the only difference being that the gears J′ K L, instead of being below the gears H I J, are arranged within the quadrangle formed by said last-named gears.

The operation of the device is precisely the same as that of the gearing already described, the language descriptive of the operation of one mechanism being equally applicable to the other.

The two gearings above described correspond to the forms shown in Figs. 1 and 2 of my Patent No. 317,186, the difference between Fig. 1 of said patent and Fig. 1 of this application being exactly the same as the difference between Fig. 2 of the patent and Fig. 2 of the application. In either figure of the patent the gear H is shown attached to the neck of the turn-table and the gear L is shown attached to the lower end of the shaft M.

In the figures of this application an auxiliary shaft, M″, is introduced, together with a sleeve, C″, turning freely thereon. The motion of the shaft M is transmitted through the gears 3 4 and shaft M″ to the gear L, and the motion of the turn-table is communicated through the gears 1 2 and sleeve C″ to the gear H. The shaft M″ and sleeve C″ are in fact only parts of the shaft M and neck C′, respectively, the parts being set at one side of the axis of the mill and connected with the shaft M and neck C′ by suitable gears. The forms shown in Figs. 1 2 of this application are therefore somewhat different in arrangement and appearance from those shown in my patent above referred to; but in principle and operation they are the same.

The gearing shown in Fig. 3 is the same as that shown in Fig. 1, except that the rotation of the turn-table is transmitted through the gears 1 4 to the shaft M″ and the rotation of the shaft M is communicated through the gears 3 2 to the sleeve C″. The shaft M″, being connected directly with the turn-table, ceases to be one of the vertical working-shafts of the mill, and the two actual working-shafts M M′ turn in the same direction. It is not necessary to describe the operation of this gearing; but the arrows on the gears F E 3 2 H I J J′ K and the arm P′ indicate the motions of those parts when the wheel-shaft *c* is rotated, while the turn-table remains at rest.

Figs. 4, 5, 6, 7 illustrate modified forms of substantially the same gearings shown in Figs. 1, 2, 3. In all these figures the top plate, D, the turn-table neck C′, the shafts M M′, and the gears 1 3, mounted on the neck C′ and the shaft M, respectively, are the same and arranged in the same way as the similarly lettered or numbered parts in the views already described. The operation of these gearings is evident to any person familiar with the art, especially when taken in connection with the forms already described and explained, and I have not thought it advisable to give any detailed explanation of their action. I have, however, indicated by arrows on the working-gears their motions when the wheel-shaft of the mill is rotated and the turn-table held stationary.

It is evident that almost any number of gearings having the same general form as those described herein may be devised, and I have only shown the forms given in the drawings as being fairly representative of the class.

In all the forms intended to be covered by this application as constituting my present invention it will be observed that there are combined a turn-table, a gear rigidly fastened thereto, a wind-wheel shaft journaled in the turn-table, a vertical shaft geared to the wind-wheel shaft, and a gear rigidly mounted on the vertical shaft. In all the forms the gear on the turn-table and the gear on the vertical shaft are connected with gears whose axes are at one side of the vertical axis of the mill, and these side gears constitute parts of a train of gearing by which the power of the mill is transmitted to other machinery.

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, the combination of a rotating turn-table, a wind-wheel shaft journaled therein, a gear rigidly attached to the turn-table, and gearing connecting the wind-wheel shaft and the gear on the turn-table, one element of said train of gearing being a loosely-mounted gear free to rotate about its own axis, and to revolve about a vertical axis at one side of the vertical axis of the mill.

2. In a windmill of the class described, the combination of a geared turn-table, a wind-wheel shaft journaled therein, a vertical power-transmitting shaft at one side of the vertical axis of the mill, and a train of gearing connecting said wind-wheel shaft, said geared turn-table, and said power-transmitting shaft, one element of said train of gearing being a loosely-mounted gear free to rotate about its own axis and to revolve about the axis of rotation of its movable support.

3. In a windmill of the class described, the combination of a geared turn-table, a wind-wheel shaft journaled therein, a vertical shaft connected by a gear on its upper end with a gear on the wind-wheel shaft, a gear mounted on the lower end of said vertical shaft, and gears engaging, respectively, with the turn-table gear and the gear on the lower end of said vertical shaft, and mounted on shafts journaled in stationary bearings attached to the tower of the mill.

4. 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 adapted to transmit the power of the mill to other machinery, and located at one side of the vertical axis of the mill, a third vertical shaft coincident with the vertical axis of the mill and geared directly to the wind-wheel shaft, and

gearing connecting the wind-wheel shaft, the geared turn-table, and said three vertical shafts, one element of said gearing being a loosely-mounted gear free to rotate on its own axis, and to revolve about the axis of rotation of its movable support.

5. In a windmill of the class described, the combination of a rotating geared turn-table, a wind-wheel shaft journaled therein, a vertical shaft geared directly to the wind-wheel shaft at its upper end, and having a second gear rigidly mounted on its lower end, a gear engaging with the gear on the lower end of said vertical shaft and mounted on a shaft journaled in bearings attached to the tower, and a train of gearing connecting said last-mentioned gear with the gear on the turn-table.

6. In a windmill of the class described, the combination of a rotating geared turn-table, a wind-wheel shaft journaled therein, a vertical power-transmitting shaft at one side of the vertical axis of the mill, and a train of gearing connecting said wind-wheel shaft, said power-transmitting shaft, and said geared turn-table, one element of said train being a loosely-mounted gear free to rotate on its own axis and to revolve about the axis of the power-transmitting shaft, whereby during the simultaneous rotation of the wind-wheel shaft in its bearing and of the turn-table about the vertical axis of the mill the motion of the power-transmitting shaft bears a constant ratio to the motion of the wind-wheel shaft.

7. In a windmill of the class described, the combination of a rotating turn-table and a gear rigidly fastened thereto, a second gear engaging the turn-table gear and mounted on a shaft journaled in the tower, a loosely-mounted gear free to rotate on its own axis and to revolve about a vertical axis at one side of the vertical axis of the mill, and a train of gearing connecting said loosely-mounted gear with the gear which engages the turn-table gear.

8. In a windmill of the class described, the combination of a rotating geared turn-table and a wind-wheel shaft journaled therein, a vertical power-transmitting shaft at one side of the vertical axis of the mill, a loosely-mounted gear free to rotate on its own axis and to revolve about the axis of said power-transmitting shaft, and gearing, substantially as shown and described, connecting said loosely-mounted gear, said power-transmitting shaft, said wind-wheel shaft, and said geared turn-table, whereby the rotation of the wind-wheel shaft in its bearing rotates said loosely-mounted gear on its axis and revolves it about the axis of said power-transmitting shaft.

9. The combination of the turn-table C, wind-wheel shaft *c*, journaled therein, gear F on the wind-wheel shaft and gear 1 on the turn-table, the gear E, engaging the gear F, and the gear 3, turning with the gear E, the gears 2 and 4, engaging the gears 1 and 3, respectively, the power-transmitting shaft M′ at one side of the vertical axis of the mill, and gearing connecting the gears 2 and 4 with the shaft M′, 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 the shaft M′.

10. In a windmill of the class described, the combination of a rotating geared turn-table and a wind-wheel shaft journaled therein, two independently-journaled vertical power-transmitting shafts in the same straight line and at one side of the vertical axis of the mill, and gearing connecting said wind-wheel shaft, said turn-table gear, and said two vertical shafts, whereby the rotation of the turn-table rotates one of said vertical shafts, but not the other.

11. The combination of the vertical shaft M′ at one side of the vertical axis of the mill, the set of gears L J′ K, concentric with the vertical shaft, the rotating geared turn-table of the mill and the wind-wheel shaft journaled therein, and gearing, substantially as described, connecting said gears L J′ K with said geared turn-table and wind-wheel shaft.

12. The combination of the turn-table C and the gear 1, mounted thereon, the wind-wheel shaft *c* and the gear 3, connected therewith, and the gears 2 4 H I J J′ K L, substantially as shown and described, and for the purpose set forth.

13. The combination of the gears F E 1 3 2 4 H I J J′ K L, substantially as shown and described, and for the purpose set forth.

14. The combination of the turn-table C, wind-wheel shaft *c*, and gears F, E, 1, 2, 3, and 4, substantially as shown and 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,

WM. B. THOMAS.