(No Model.) 2 Sheets—Sheet 1.

J. C. FULTON.

MECHANICAL MOVEMENT.

No. 395,971. Patented Jan. 8, 1889.

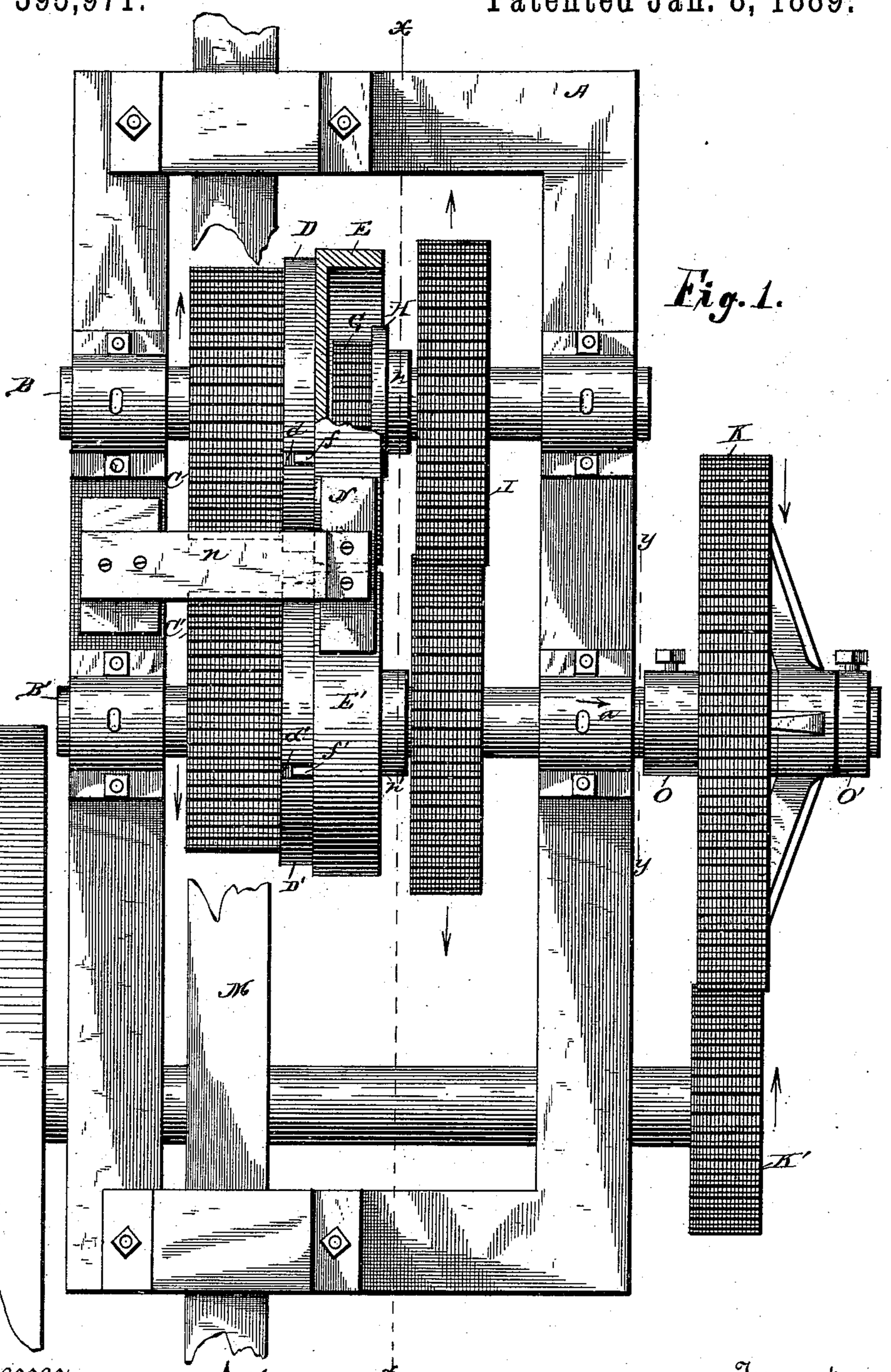

Fig. 1.

Witnesses.
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(No Model.) 2 Sheets—Sheet 2.

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Fig. 2.

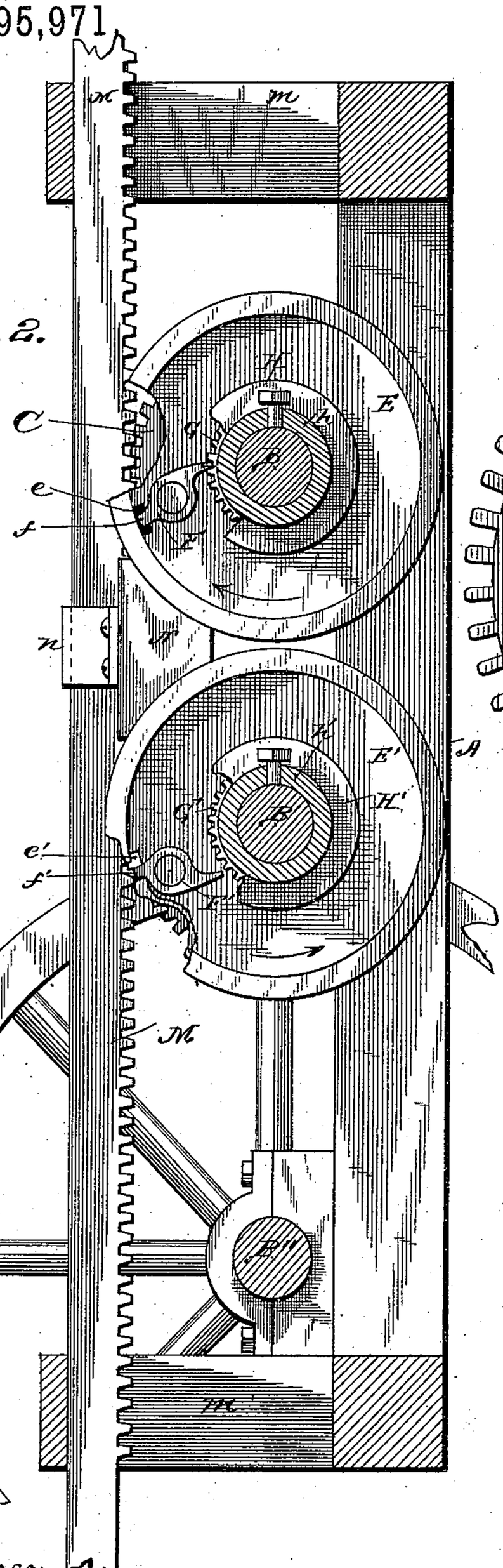


Fig. 3.

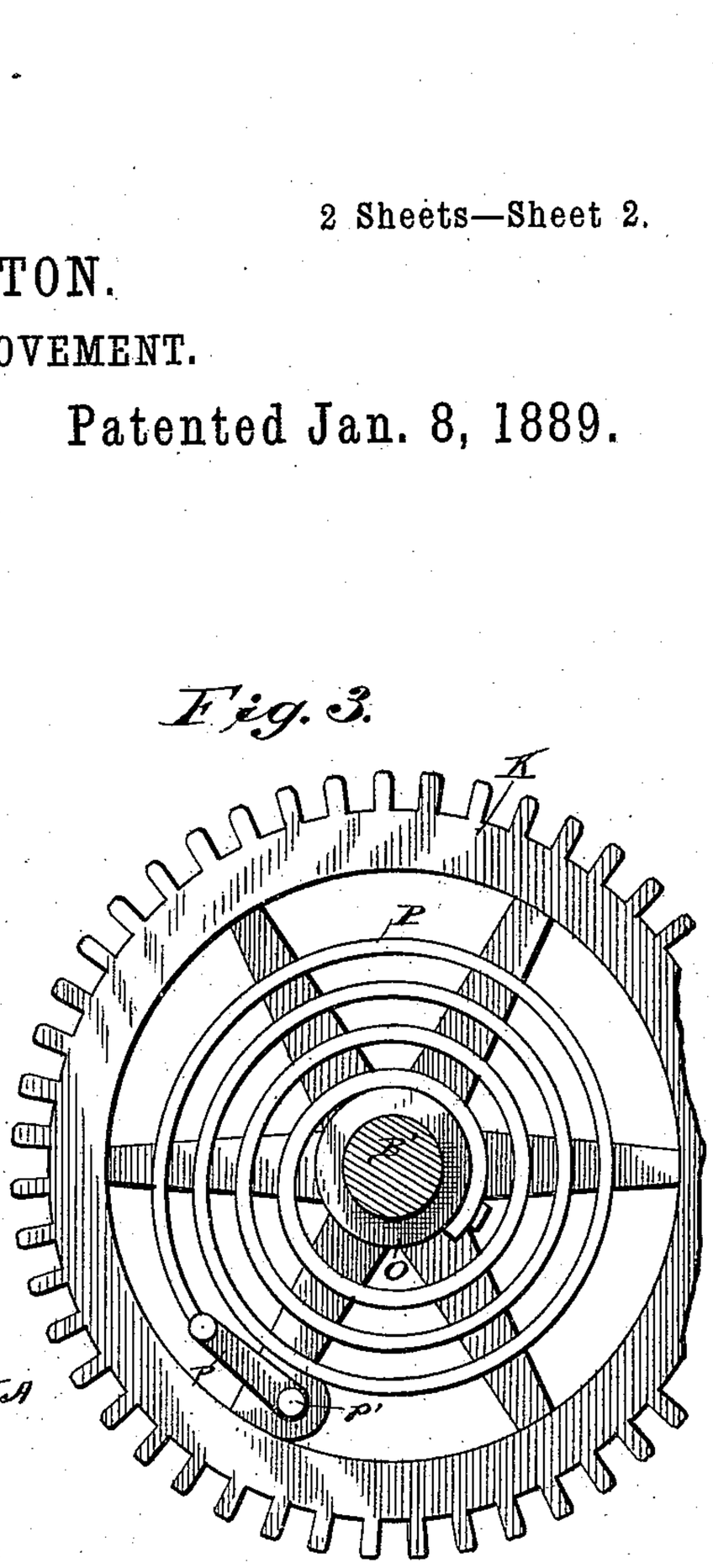
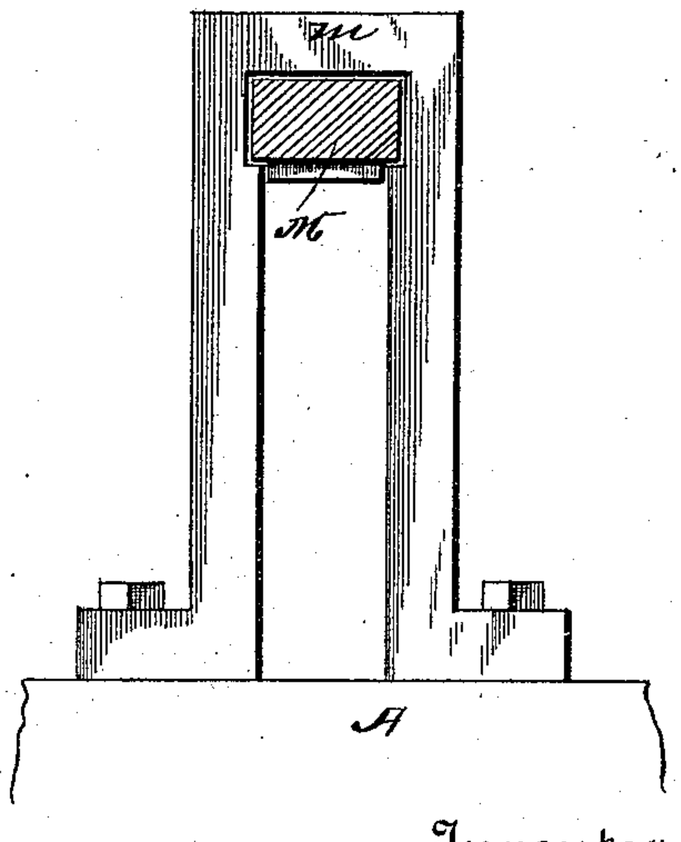


Fig. 4.



Witnesses.
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UNITED STATES PATENT OFFICE.

JAMES C. FULTON, OF ROCKPORT, TEXAS.

MECHANICAL MOVEMENT.

SPECIFICATION forming part of Letters Patent No. 395,971, dated January 8, 1889.

Application filed July 11, 1888. Serial No. 279,646. (No model.)

To all whom it may concern:

Be it known that I, JAMES C. FULTON, a resident of Rockport, in the county of Aransas and State of Texas, have invented certain new and useful Improvements in Mechanical Movements; 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 devices for converting reciprocal into rotary motion, and is more particularly adapted and intended for use with windmills in applying the reciprocal motion of the pump-rod to the operation of rotating machines.

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

Figure 1 is a front elevation of a device embodying my improvements. Fig. 2 is a vertical section thereof through the line X X, Fig. 1. Fig. 3 is a section through the line Y Y, Fig. 1, looking in the direction indicated by the arrow *a* in said Fig. 1. Fig. 4 is an end elevation of the frame of the machine, looking in the direction indicated by the arrow *a'*, Fig. 1, the pump-rod being shown in section.

In these views, A is a suitable frame, whose position will vary with the nature of the machinery with which the device is used, but will be vertical when used in connection with the pump-rod of a windmill, as illustrated in these drawings. A series of parallel horizontal shafts, B B' B'', are journaled in suitable bearings attached to the frame and support the working part of the machine. On the shafts B B', respectively, are loosely mounted two gears, C C', preferably provided with rims or flanges D D', and on the same shaft are also mounted two loose pulleys, E E', to which are pivoted, respectively, the oppositely-placed pawls F F', on whose outer ends are formed fingers *f f'*, extending through slots *e e'* in the pulleys E E' and into notches *d d'* in the rims D D' of the loose gears C C'. Pinions G G', formed, preferably, with flanges H H' and collars *h h'*, are rigidly fastened to the shafts B B', and each of the pawls F F' is of such shape and in such position that its inner end may be brought into engagement with the corresponding pinion, G or G', or disengaged therefrom by oscillating the pawl about its pivot. It is evident that if the loose gear C, with its rim D, be rotated about the shaft B in the direction indicated by the arrow adjacent to the gear in Fig. 1 the engagement of the finger *f* with the notch *d* in the rim D will oscillate the pawl F about its pivot and throw the inner end of the pawl into engagement with the pinion G, the slot *e* in the loose pulley E permitting a slight independent movement of the finger *f* with reference to the pinion G. As soon as the inner end of the pawl F engages the teeth of the pinion G further rotation of the loose gear C evidently rotates the pinion G in the same direction, carrying with it the shaft B, and also a gear-wheel, I, which is rigidly mounted on the shaft B. Reverse rotation of the loose gear C oscillates the pawl F in such a way as to lift its inner end out of engagement with the pinion G, and a continuance of such reverse rotation carries the pulley E and pawl F about the shaft without affecting in any way the pinion G, shaft B, or gear-wheel I. Rotation of the loose gear C' in the direction indicated by the arrow adjacent thereto in Fig. 1 throws the pawl F' into engagement with the pinion G' and rotates the shaft B' and a second gear-wheel, I', mounted on said shaft and engaging the gear-wheel I on the shaft B, and reverse rotation of the gear C' disengages the pawl F' and rotates the pulley E' and pawl F' about the shaft B', the pawl being wholly clear from the pinion G'. A vertically-reciprocating rack-bar, M, which may be a part of the pump-rod or may be suitably connected with it, slides in guides *m*, attached to the frame A, and is in engagement with both the loose gears C C', and from the foregoing explanation it is evident that the downstroke of the rack-bar, acting through the intermediate parts, rotates the gear I' in the direction indicated by the arrow adjacent thereto in Fig. 1, and the upstroke of the rack-bar rotates the gear I in the opposite direction. Since the gears I I' are in engagement, the rotation of the gear I communicates reverse rotation to the gear I', so that both strokes of the rack-bar rotate

the gear I′ in the same direction. Power may be taken directly from the shaft B′; but I prefer to increase the speed of my driving-wheel by mounting upon the shaft B′ a gear-wheel, K, engaging a pinion, K′, on the shaft B″, a balance-wheel or driving-pulley, L, being also mounted on the shaft B″ and serving as a means for communicating the motion of said shaft to other machinery to be driven.

Where the rack-bar M is attached to or forms part of the pump-rod of a windmill, its rate of motion varies considerably, and the rotation of the gear K is necessarily irregular if it be fastened rigidly to the shaft B′. In order to obviate this difficulty, I have found it advisable to use the device illustrated in Figs. 1 and 3, the gear-wheel K being loose on the shaft and held in place thereon by collars O O′, rigidly mounted on the shaft and lying in contact with the inner and outer ends, respectively, of the hub of the gear-wheel. A volute spring, P, has its inner end fastened to the collar O and its outer end connected with the gear K, either directly or by means of a link, *p*, one end of which is pivoted to the end of the spring and the other end to a pin, *p′*, set in the gear. The interposition of the spring between the shaft B′ and the gear K equalizes the motion of the gear-wheel by taking up a portion of the motion of the shaft when it is most rapid and giving off a portion of such motion when the shaft moves slowest. The motion of the gear thus becomes a mean between the slowest and quickest motions of the shaft, and I have found in practice that by the use of this device the motion of the gear-wheel K and balance-wheel L is rendered practically uniform.

In order that the loose pulleys E E′ may rotate only by the pressure of the gears C C′ upon the fingers *f f′* of the corresponding pawls, and not by accidental friction between the pulleys and the gears, a friction-brake, N, is pressed lightly upon the peripheries of the pulleys by a spring, *n*, fastened to a support attached to the frame A. This friction-brake may be of any desired form, the one shown in the drawings being simple and effective.

I do not intend to limit my invention to the combination of all the parts included in the machine shown and described, since it is evident that many of them may be dispensed with or varied without affecting the principle of the device. I prefer to combine with the reciprocating rack-bar two oppositely-operating clutches, such as are shown, the two clutches being so connected as to impart continuous motion to a single shaft; but it is evident that a single clutch may be used, if desired, without the other.

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

1. In a device of the class described, the combination, with a suitably-mounted shaft, of two gear-wheels, one mounted loosely and the other rigidly upon said shaft, a reciprocating rack-bar engaging said loose gear, a pulley mounted loosely on said shaft, and a pawl pivoted to said loose pulley and provided with a finger engaging said loose gear, said pawl having a limited oscillation upon its pivot, whereby it may be thrown out of or into engagement with said rigidly-mounted gear-wheel, substantially as and for the purpose set forth.

2. The combination, with the shaft B, of the loose gear C and rack-bar M, the rigidly-mounted pinion G, the loose pulley E, and the pawl F, pivoted to said loose pulley and provided with the finger *f*, passing through a slot, *e*, in the pulley E and engaging the loose gear C, whereby the movement of the rack-bar in one direction throws the pawl F into engagement with the pinion G and rotates said pinion and the shaft B, and the movement of the rack-bar in the opposite direction throws the pawl out of engagement with the pinion and rotates the pawl about the shaft B without affecting the shaft.

3. The combination, with the suitably-journaled parallel shafts B B′, of the loose gears C C′, mounted on said shafts respectively, the pinions G G′, rigidly mounted on said shafts, the pulleys E E′, loosely mounted on said shafts, and the oppositely-placed pawls F F′, pivoted to the pulleys E E′, respectively, and provided with fingers *f f″*, engaging the gears C C′, whereby the movement of the rack-bar in either direction throws one of said pawls into engagement with the corresponding pinion and throws the other of said pawls out of engagement with the other pinion, substantially as and for the purpose set forth.

4. The combination, with the shafts B B′, of the loose gears C C′ and fixed gears G G′, mounted on said shafts, the loose pulleys E E′, also mounted on said shafts respectively, the oppositely-placed pawls F F′, pivoted to the pulleys E E′ and provided with fingers engaging the loose gears C C′, the rack-bar M, engaging the loose gears C C′ and adapted when moved in one direction to rotate one of said shafts and when moved in the opposite direction to reversely rotate the other shaft, and the gears I I′, rigidly mounted on the shafts B B′ and engaging each other, whereby the reciprocal movement of the rack-bar rotates the shaft B′ constantly in one direction.

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

JAMES C. FULTON.

Witnesses:
MORGAN PERRENOT,
SAM J. SEYMOUR.