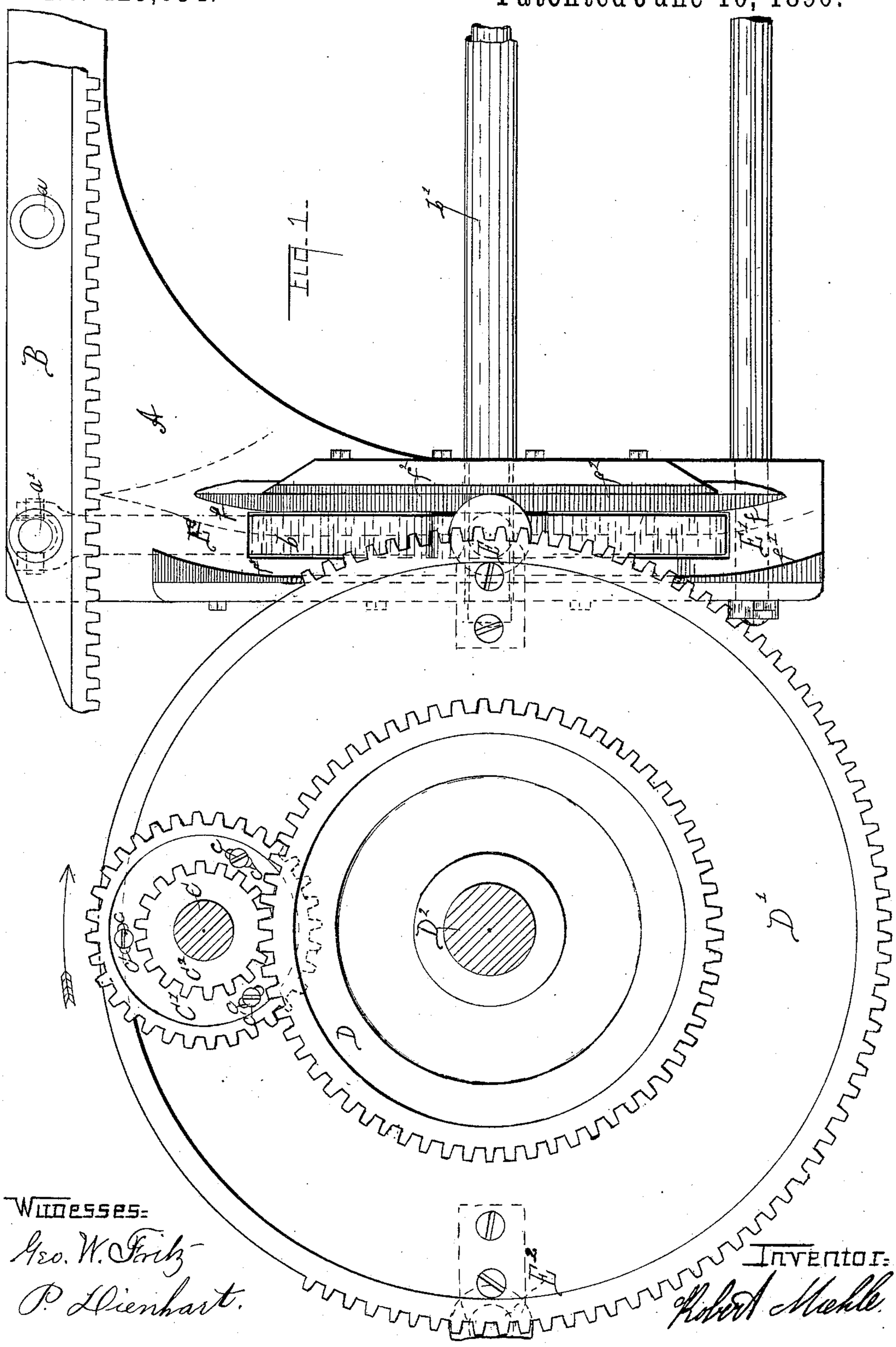
(No Model.)

5 Sheets—Sheet 1.

R. MIEHLE.

MECHANICAL MOVEMENT.

No. 429,694. Patented June 10, 1890.



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(No Model.) 5 Sheets—Sheet 2.

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MECHANICAL MOVEMENT.

No. 429,694. Patented June 10, 1890.

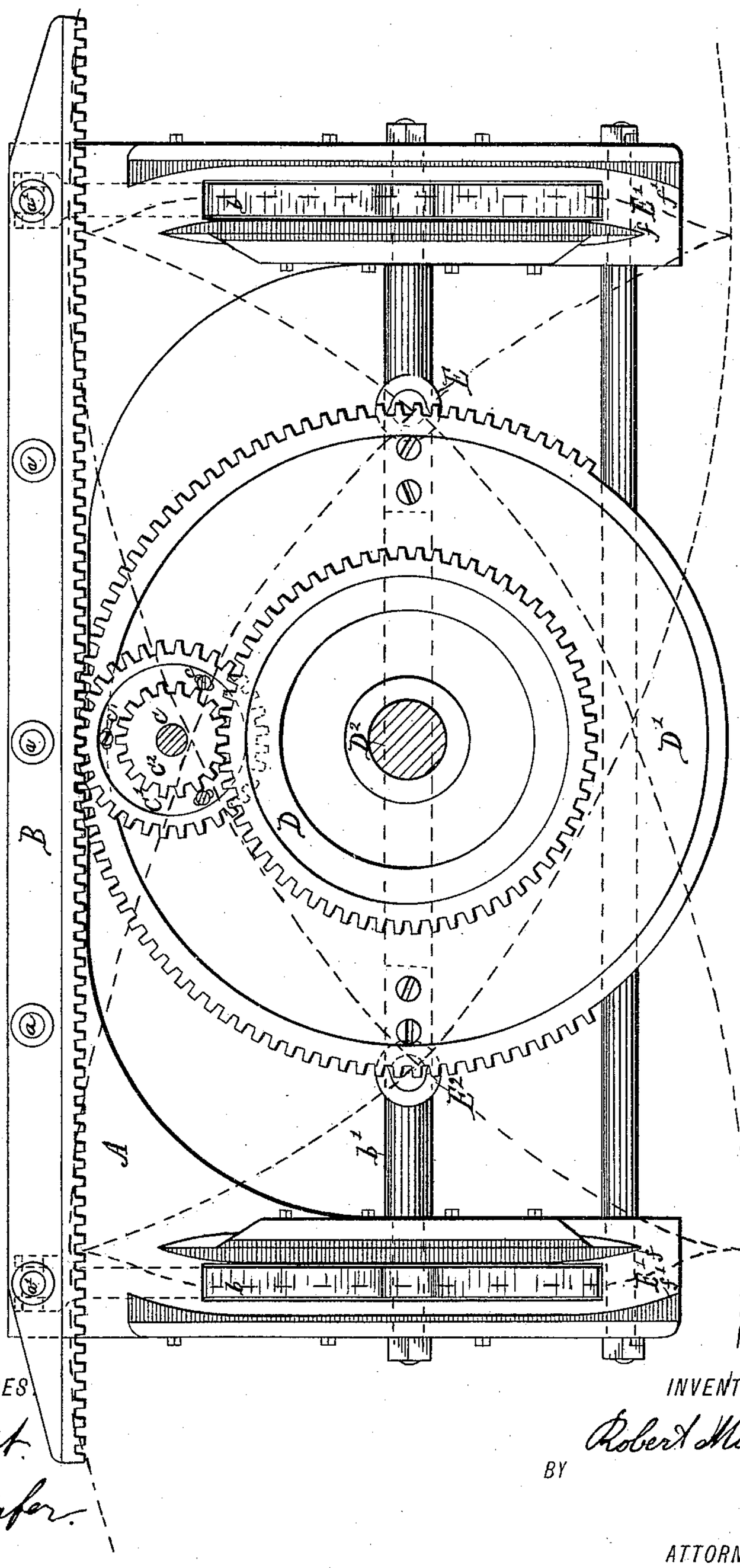

FIG. 1. A.

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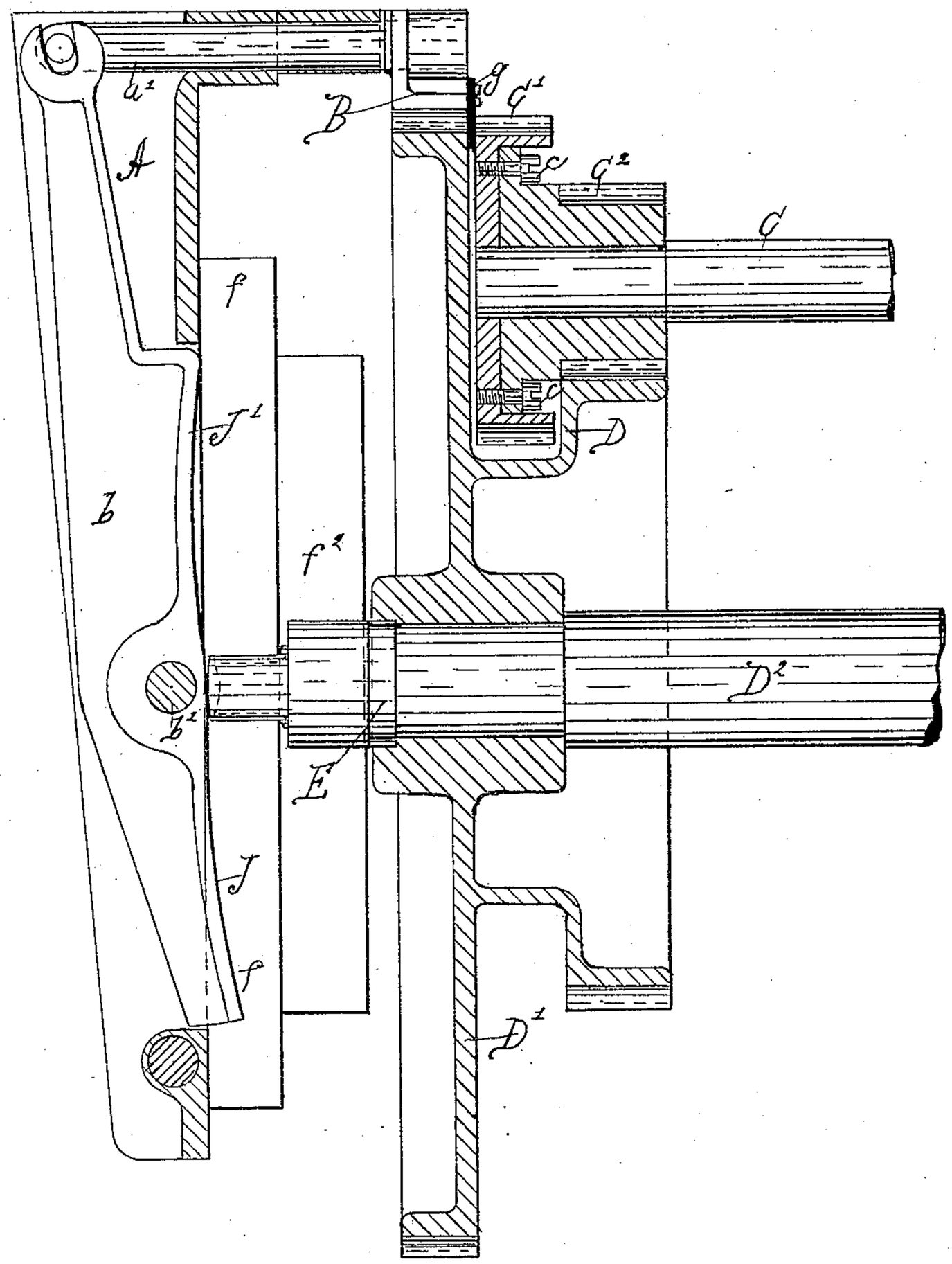
No. 429,694. Patented June 10, 1890.

Fig. 2.



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(No Model.) 5 Sheets—Sheet 4.

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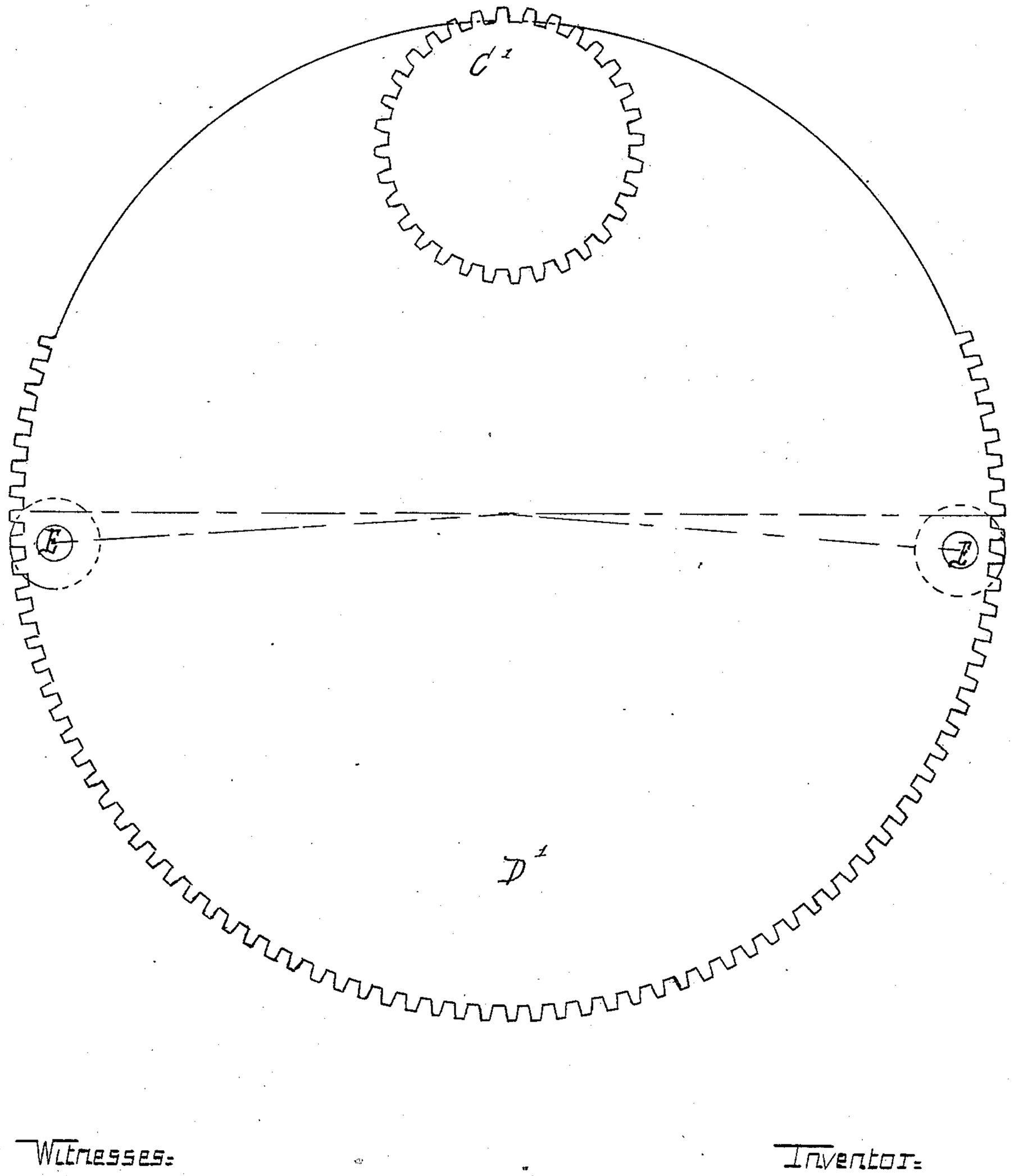
No. 429,694. Patented June 10, 1890.

Fig. 3.



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(No Model.) 5 Sheets—Sheet 5.

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MECHANICAL MOVEMENT.

No. 429,694. Patented June 10, 1890.

Fig. 4.

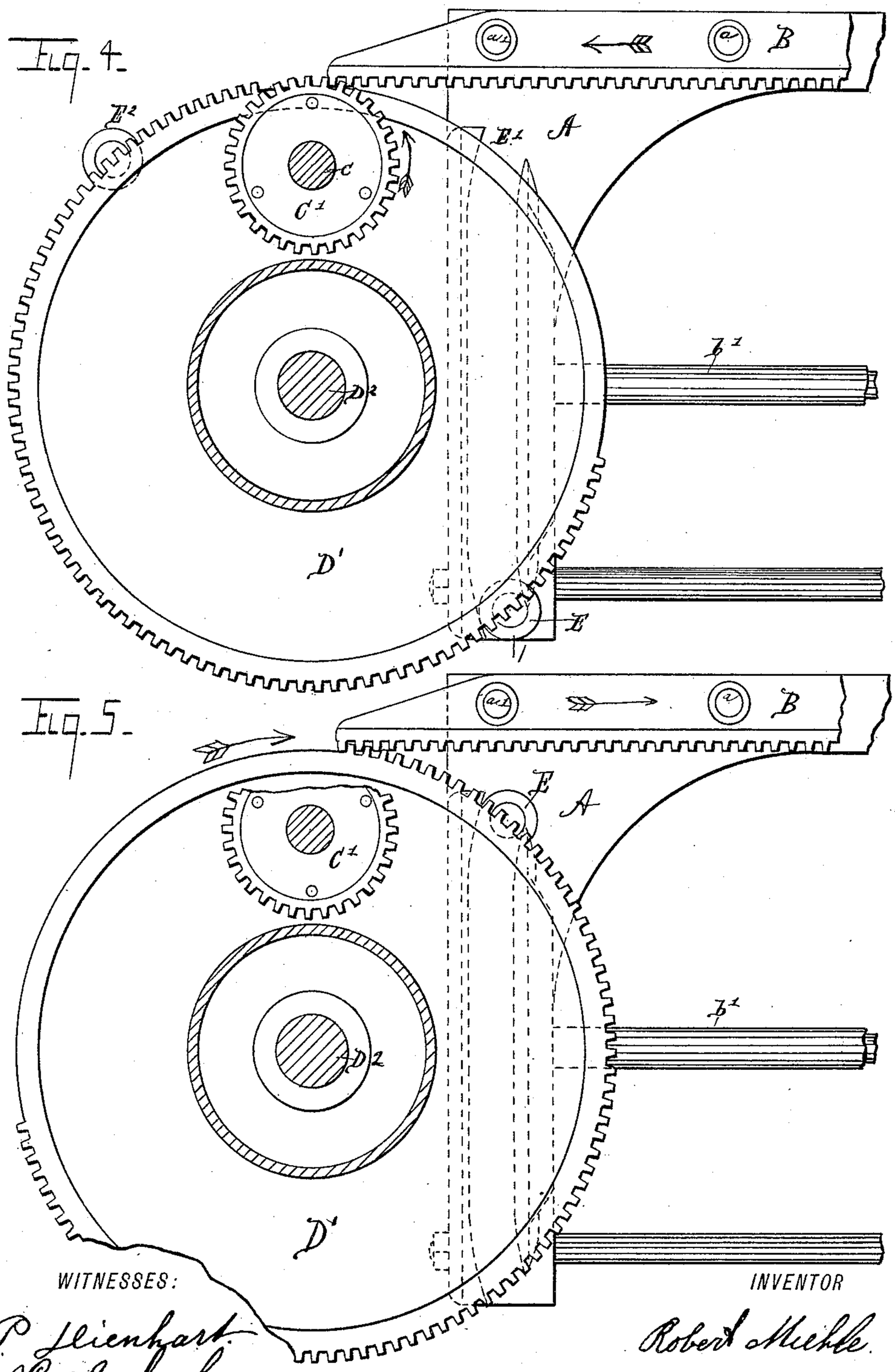

Fig. 5.

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UNITED STATES PATENT OFFICE.

ROBERT MIEHLE, OF CHICAGO, ILLINOIS.

MECHANICAL MOVEMENT.

SPECIFICATION forming part of Letters Patent No. 429,694, dated June 10, 1890.

Application filed July 1, 1887. Serial No. 243,191. (No model.)

To all whom it may concern:

Be it known that I, ROBERT MIEHLE, a citizen of the United States, and a resident of the city of Chicago, county of Cook, and State of Illinois, have invented a new and Improved Mechanical Movement for Converting Rotary into Reciprocating Motion, of which the following is a specification.

My invention relates to that class of devices in which reciprocating motion is obtained by means of a laterally-shifting rack and parallel pinions.

In the drawings, Figure 1 is a side view in elevation of the operating-gears and one end of a rack, such as may be attached to a rack-frame on the bottom of a printing-press bed-plate. Fig. 1^A is a side view in elevation, showing the rack and frame in full and the guideways at each end, with the small pinion C′ engaging the rack. Fig. 2 shows a sectional end view of Fig. 1, cut by two planes, one cutting the gears through their centers and the other by a plane parallel to the first through the center of the guideway E′. Fig. 3 shows a construction proportioned to make a faster movement in one direction. Fig. 4 shows the gears and a portion of one end of the rack B and rack-frame A in side elevation, wherein is shown the pinion C′ at the point of engaging with the rack B at the moment the crank-pin E passes out of the lower end of the guideway. Fig. 5 shows Fig. 4 with the rack B at the point of disengaging with the wheel D′ and the crank-pin E at the point of entering the guideway E′.

A is a rack-frame, in which pins *a* are secured, upon which rack B slides laterally. At each of the outer ends of the rack-frame and rack are pins *a*′, which are secured at one end to said rack and slide through the rack-frame, and at their opposite ends said pins are connected to forked rocking levers *b*, which are secured on rod *b*′, which is supported and turns in the rack-frame.

Upon the shaft C is a gear-wheel C′, which is secured to the pinion C^2 by screws *c* through slots *c*′. By means of this construction proper adjustment between the gearing and rack is made. The pinion C^2 communicates motion to the gear-wheel D, which forms a part of the larger gear-wheel D′, which is secured to the shaft D^2. On the inner side of the gear-wheel D′ are secured crank-pins E E^2, provided with friction-rollers, which operate in guideways E′, situated at each end of the rack-frame, during the times that the gears C′ and D′ are disengaging from the rack B. A portion of the large gear D′ is left blank, for reasons which will appear, as follows: By engaging the large gear D′ with the rack and turning it, as indicated by the arrow, Fig. 5, so that the rack is moved away from the gearing, the wrist-pin E enters the guideway E′ at its upper end. After the crank-pin has entered the slot the teeth of the gear-wheel D′ disengage with the rack, and as the said wheel continues to revolve the crank-pin passes through the guideway and engages with its end the cam-face J, which forms a part of the rocking lever *b*, and through said motion and contact forces the lower end of the said lever outward and around its fulcrum *b*′, whereby the upper end of said lever, provided with a cam-face J′, is thrown inward, and its outer end, being attached to the sliding pin *a*′, throws it, and the rack with it, sidewise, so as to engage with the gear-wheel C′ at the time during which the crank-pin E is passing out at the lower end of the guideway, as shown in Figs. 2 and 4. The disengagement of the gear-wheel C′ with the rack B occurs when the crank-pin E^2 (referring now to Fig. 4) enters the lower end of the other guideway at the other end of the rack-frame. The end of the crank-pin comes in contact with the cam-face J′ after it has risen beyond the shaft *b*′, and before it leaves the upper end of that guideway E′ it has thrown the lever *b* back into the position it is now shown to be in in Fig. 2, and then the rack B is again engaged with the wheel D′. When the lever, or, rather, levers *b* (as there are two of them attached to the shaft *b*′ and each connected to one end of the rack B) are thrown into the position opposite to that shown in Fig. 2, they throw the rack B out, so as to engage with the gear-wheel C′. There is a small and a large friction-roller on each crank-pin, the outer and smaller one serving to both act on the levers *b*, as just shown, and also to enter the guideways soon enough and act there, so that the rack may be disengaged from its gear-wheel and be moved at the proper time.

When an increased rate of speed in one di-

rection of the rack is desired with a fixed size of one of the gears, as C′, then the diameter of the gear D′ must be increased in proportion to attain such desired relative speed—as, for instance, by such an arrangement as is shown in Fig. 3.

The strip *g*, Fig. 2, on entire side of rack prevents it from shifting before the rack has run out.

I do not mean to limit the scope of my claims to the construction herein shown and described, as it is obvious that this is only one particular illustration of a general principle of using a compound arrangement of parallel gear-wheels revolving in opposite directions with a laterally-shifting rack to obtain either uniform or variant reciprocating motion.

It is obvious that by arranging the wheel D′ so that it may have an odd number of revolutions for a double stroke of the racks only one crank-pin will be required; but if said motion of the rack is produced by an even number of revolutions of said wheel D′, then two crank-pins will be required.

What I claim is—

1. In a mechanical movement, two parallel and oppositely-revolving gear-wheels and one or more crank-pins, in combination with guideways, and levers for said crank-pins to operate a rack, substantially as specified.

2. In a mechanical movement, two gear-wheels in parallel planes connected by intermediate mechanism, giving them opposite rotary motion, and one or more crank-pins, in combination with laterally-shifting rack, oscillating levers to actuate said rack, and guideways for said crank-pins, substantially as specified.

3. In a mechanical movement, two different-sized parallel and oppositely-revolving gear-wheels and crank-pins, in combination with guideways, and levers for said one or more crank-pins to operate a rack, substantially as specified.

In testimony whereof I affix my signature in presence of two witnesses.

ROBERT MIEHLE.

Witnesses:
GEO. W. FRITZ,
P. DIENHART.