(No Model.)

3 Sheets—Sheet 1.

G. R. PEARE.

MECHANICAL MOVEMENT.

No. 272,760. Patented Feb. 20, 1883.

Fig. 1.

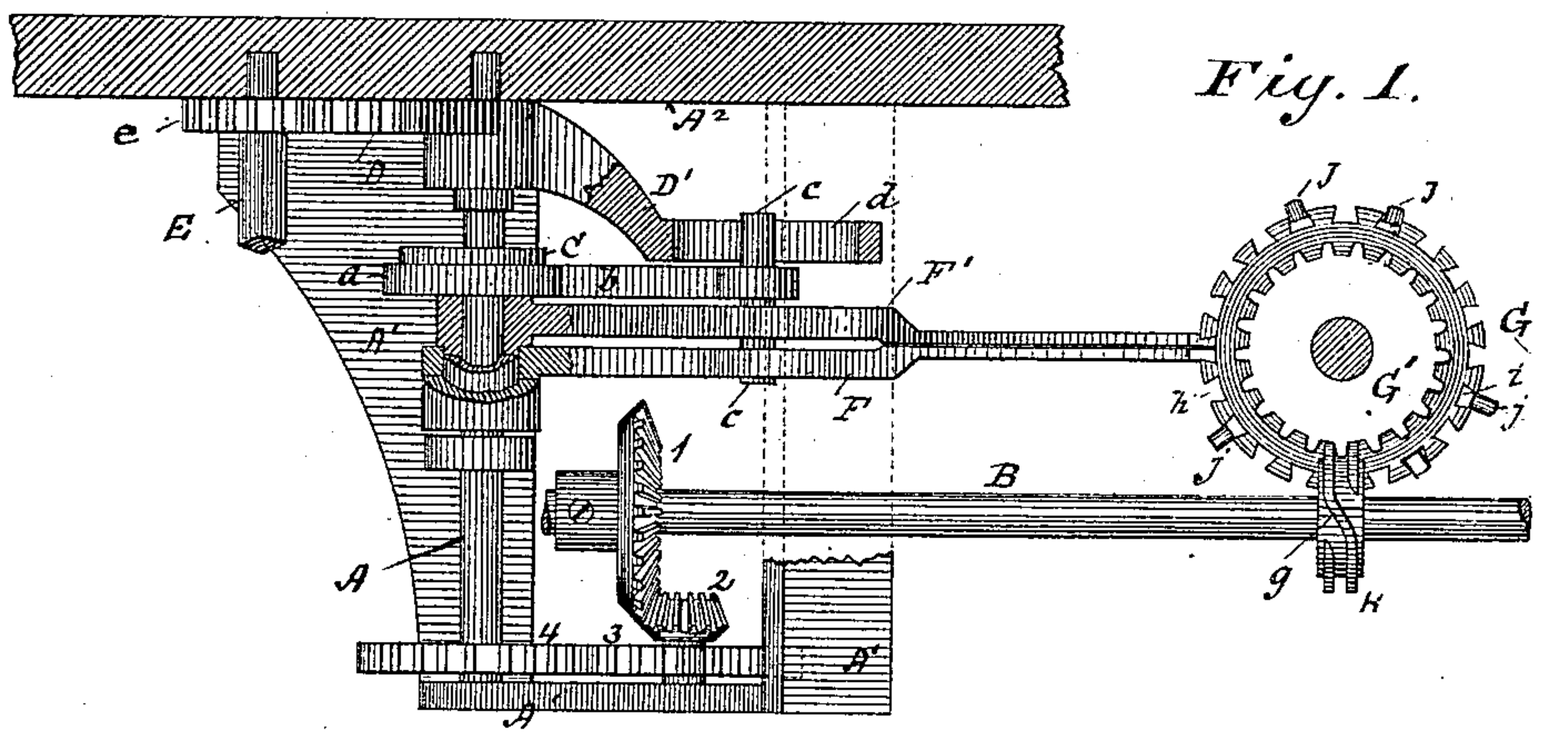


Fig. 2.

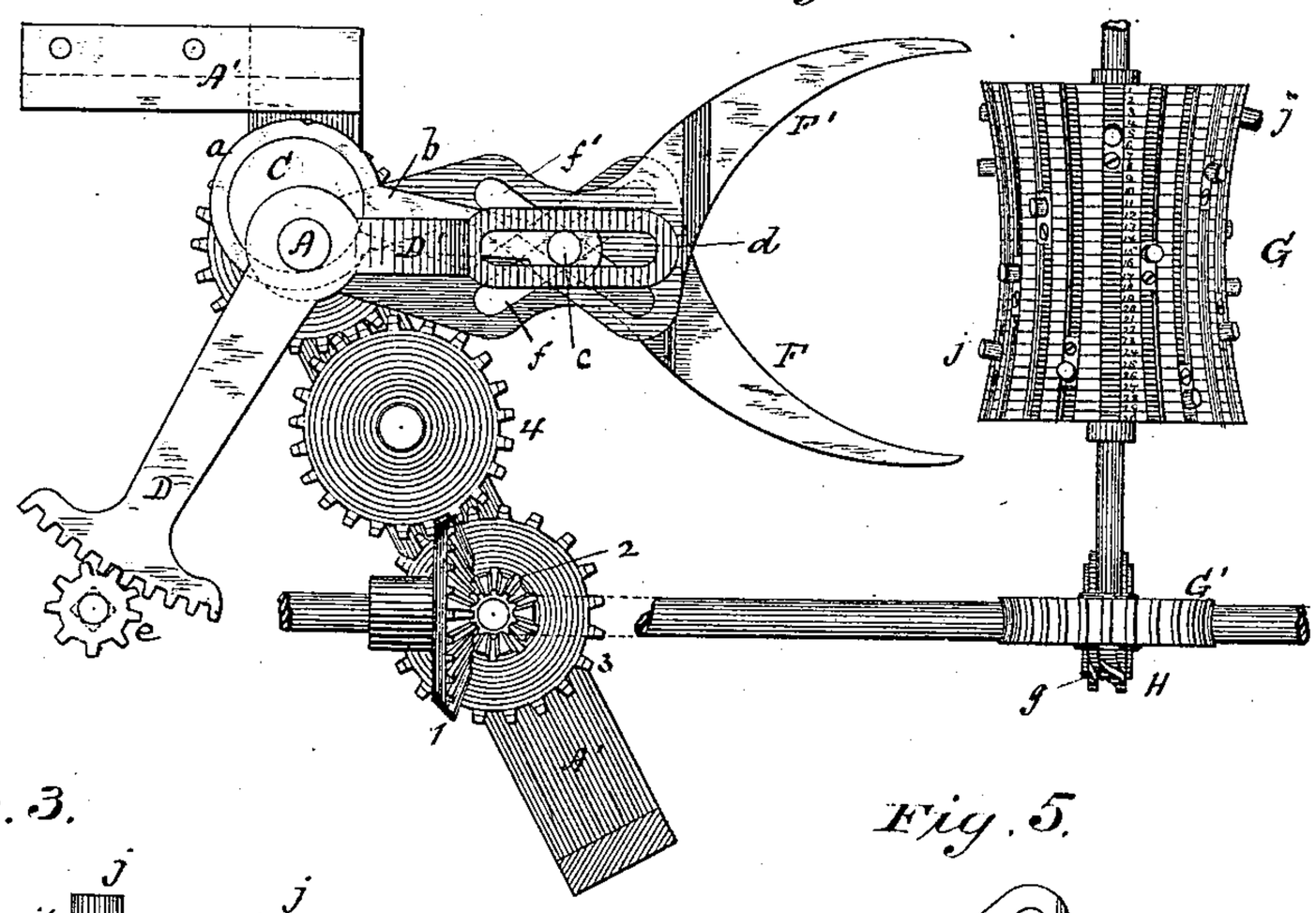


Fig. 3.

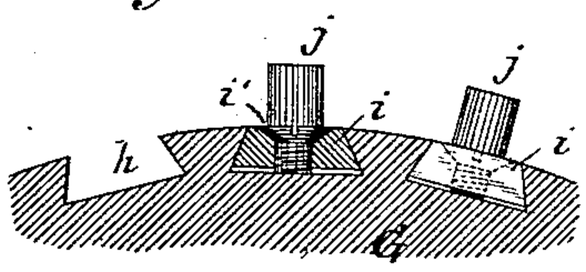


Fig. 4.

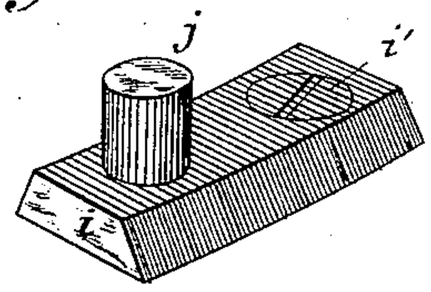


Fig. 5.

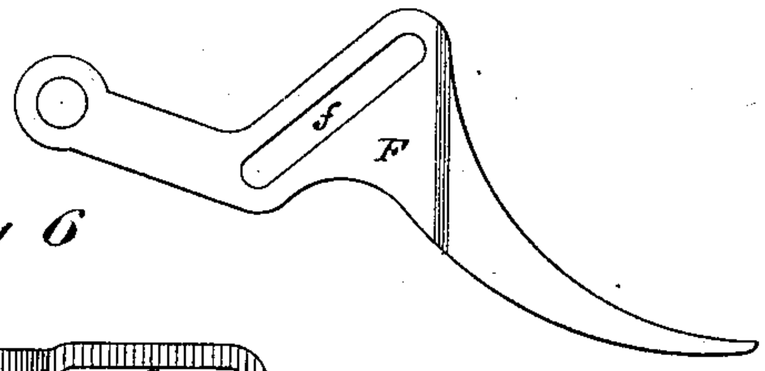
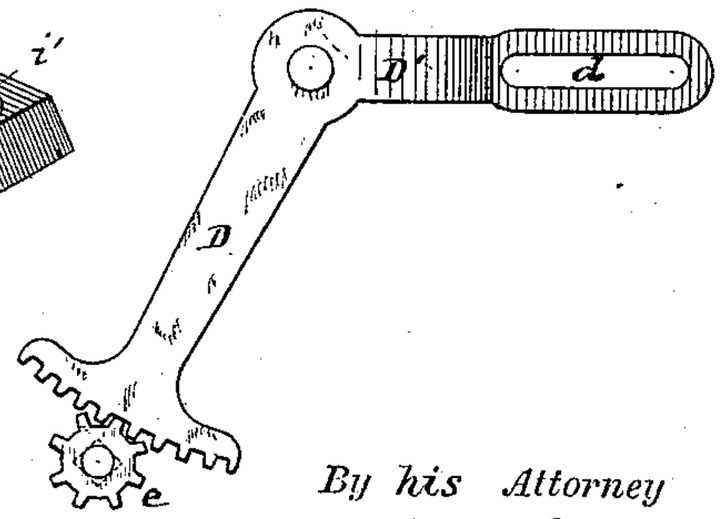


Fig 6



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(No Model.)

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Fig. 7.

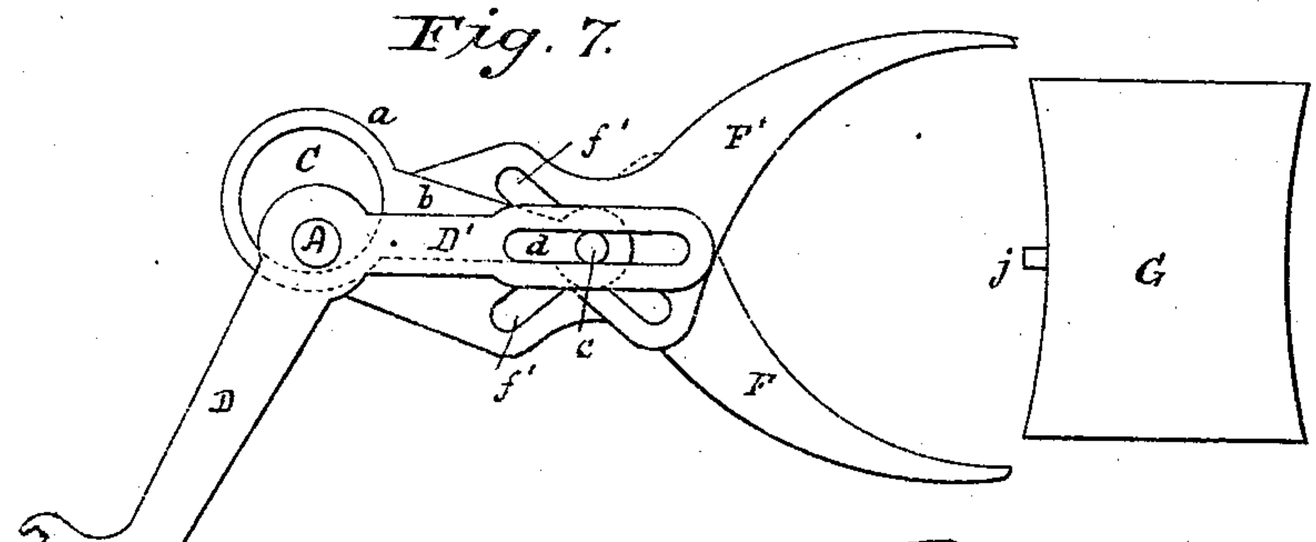


Fig. 8.

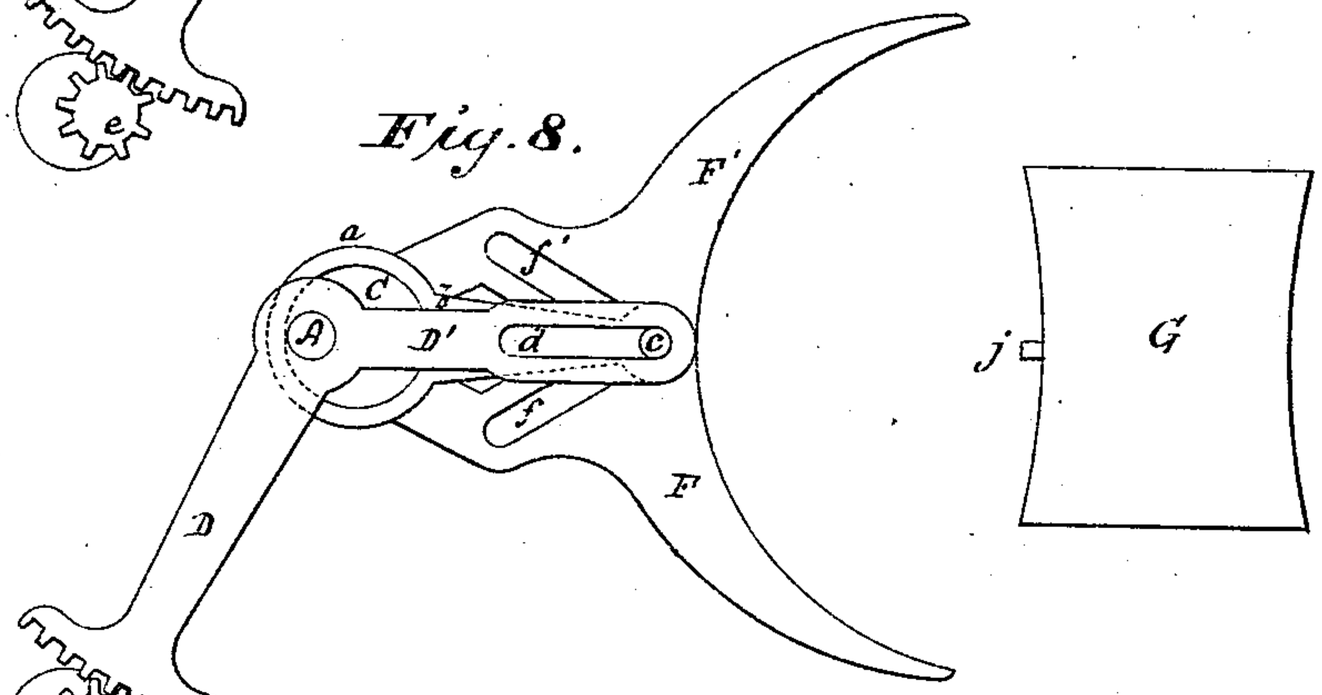


Fig. 9.

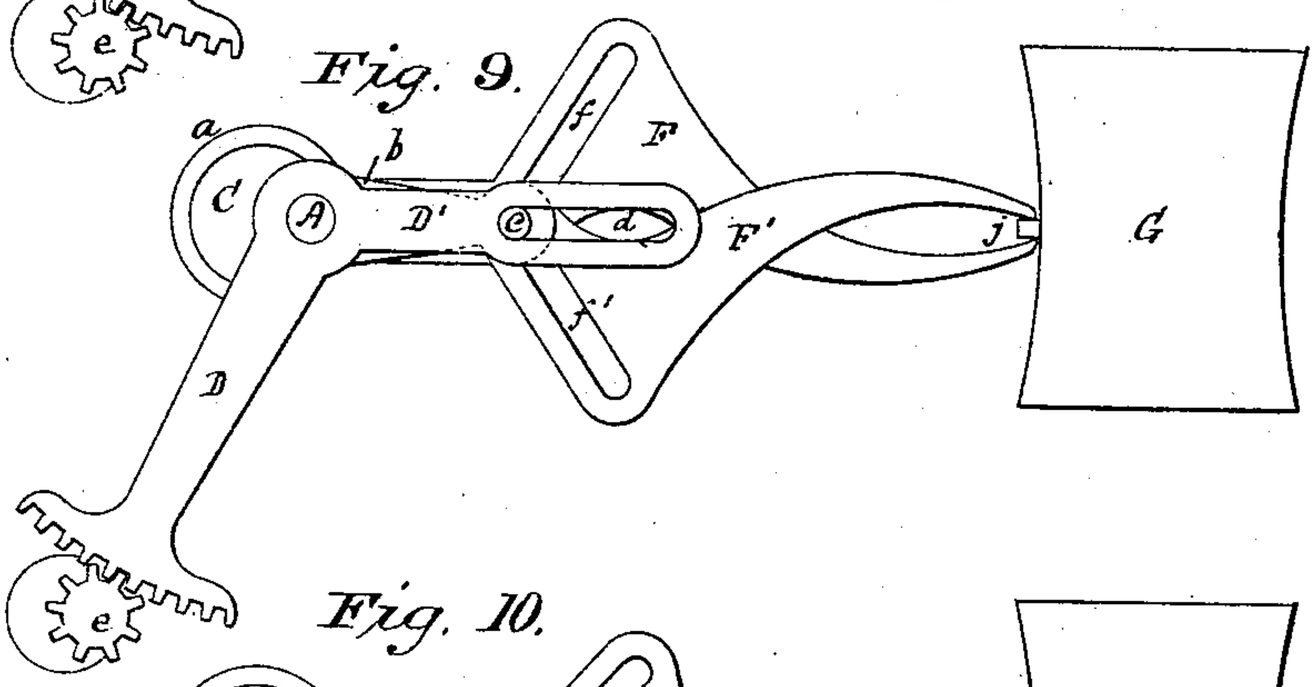
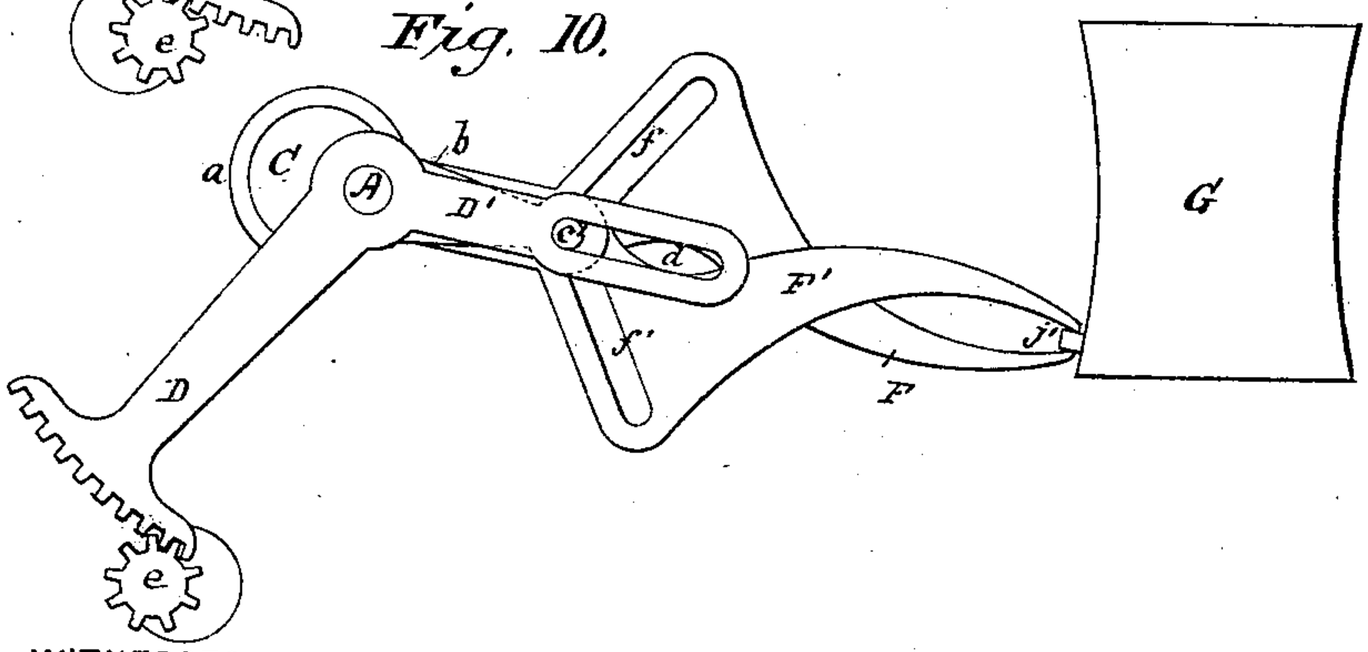


Fig. 10.



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(No Model.)

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MECHANICAL MOVEMENT.

No. 272,760. Patented Feb. 20, 1883.

Fig 11.

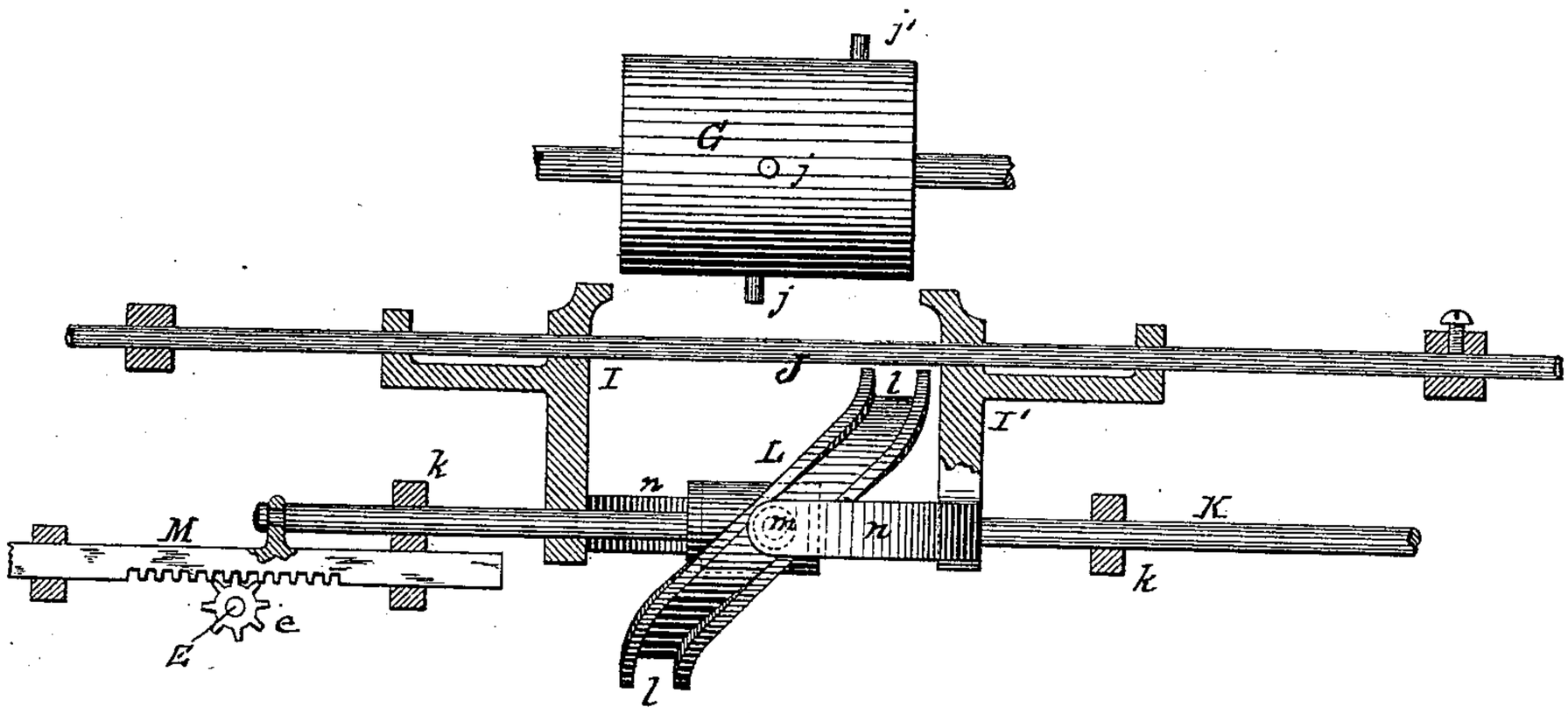
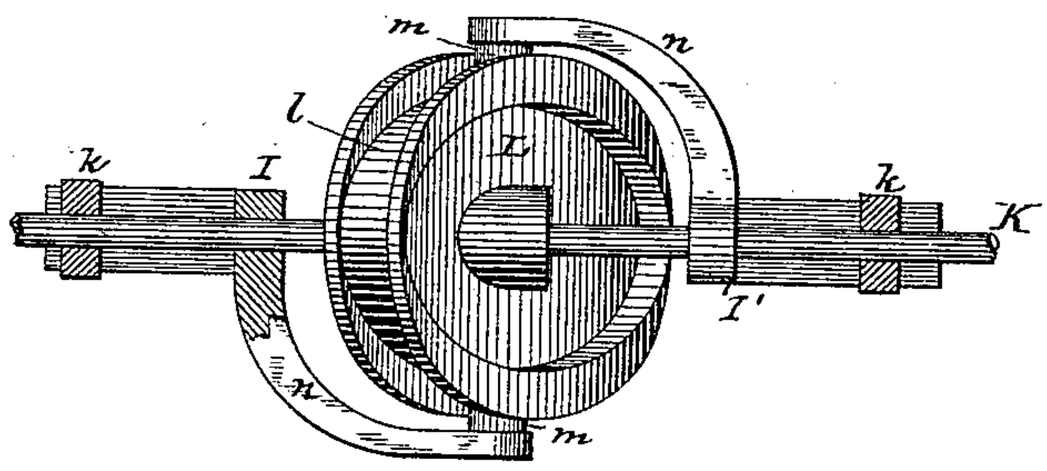


Fig. 12.



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UNITED STATES PATENT OFFICE.

GEORGE R. PEARE, OF LYNN, MASSACHUSETTS, ASSIGNOR OF ONE-HALF TO JOHN H. ALLEY, OF SAME PLACE.

MECHANICAL MOVEMENT.

SPECIFICATION forming part of Letters Patent No. 272,760, dated February 20, 1883.

Application filed January 20, 1883. (No model.)

To all whom it may concern:

Be it known that I, GEORGE R. PEARE, of Lynn, in the State of Massachusetts, have invented a certain new and useful Mechanical Movement, of which the following is a specification.

The mechanism in which my invention is embodied is designed with special reference to its employment as a pattern operating or regulating mechanism, and is adapted for use with a great variety of machines in which a pattern must be automatically followed. I do not, however, restrict myself to its employment in this connection, for the shaft controlled by said mechanism, which I term the "object-shaft," may be put to any use that is desirable or convenient.

My invention is characterized by the combination, with the object-shaft or other device whose movements are to be controlled, of a pattern-drum armed peripherally with pattern-pins, and rotatable so as to bring each pin successively into the path, and between the interior opposite faces of two pattern-regulating arms, which move to and from one another lengthwise of the drum. The sum of the distances traveled by the two arms is always the same. The differences between their respective lengths of movement, governed by the relative positions of the successive pattern-pins, which serve to arrest one or the other of the arms sooner or later in its movement, produce and determine the character or extent of the variations in the movement of the object-shaft. The varying movements of the object-shaft are thus dependent upon and may not improperly be considered the differential of the movements of the two opposed reciprocating pattern-regulating arms. By "reciprocation" I intend back-and-forth movement, whether in a right line or in an arc of a circle.

The nature of my invention and the manner in which the same is or may be carried into effect will be readily understood by reference to the accompanying drawings, in which—

Figure 1 represents in side elevation, partly in section, a mechanism embodying my invention, the pattern-regulating arms in this arrangement having a vibratory or oscillatory movement. Fig. 2 is a plan of the same with the top supporting-plate removed. Fig. 3 is an end elevation, on enlarged scale, of a portion of the pattern-drum, with one of the pattern-pin slides in section. Fig. 4 is an enlarged perspective view of one of the pattern-pin slides. Fig. 5 is a plan of one of the pattern-regulating arms. Fig. 6 is a plan of the slotted sector-arm, showing also the object-shaft geared thereto. Figs. 7, 8, 9, and 10 are plan views of the pattern-regulating arms and their adjuncts, representing diagrammatically the changes in the position of the parts during the back-and-forth movement of the arms. Fig. 11 is a plan view, partly in section, of a modified arrangement of mechanism, in which the pattern-regulating arms, instead of vibrating, move back and forth in a right line. Fig. 12 is a front elevation of the cam for driving the pattern-regulating arms, showing also the two arms engaged therewith.

I shall first describe the construction, arrangement, and mode of operation of the mechanism shown in Figs. 1 to 10, inclusive.

A vertical shaft or arbor, A, is mounted in proper bearings A′, secured to the plate or other proper support, A^2, and has imparted to it a movement of continuous rotation, obtained in this instance from the horizontal shaft B (which is driven by some suitable prime mover) through the gearing 1, 2, 3, and 4.

Upon the arbor A is fixed an eccentric, C, surrounded by a strap, *a*, from which projects the horizontal pitman *b*, carrying at its outer extremity the vertical cross-pin *c*, which extends above and below the pitman.

Upon arbor A, above the eccentric, is loosely mounted a toothed sector or gear, D, from the hub of which projects an arm, D′, having a longitudinal slot, *d*, which is entered by the upper end of the cross-pin *c*. The sector and its arm are capable of oscillating on the arbor A as an axis, and the sector engages the pinion *e* on the object-shaft E, which represents the device whose movement is to be controlled.

On the arbor A, below the eccentric C, are loosely mounted two arms, F F′, capable of oscillating on arbor A as an axis. These arms, which I have termed the "pattern-regulating arms," are formed and arranged and move very much like the legs of calipers. Their shanks are

formed so as to permit inclined slots *f f'* to be made in them, so placed that when the arms are put together the slots may cross one another. The lower end of the cross-pin *c* enters these two slots at their point of intersection, as indicated in Figs. 2, 7, 8, 9, and 10, so that the back-and-forth movement of the pin, derived from the rotating eccentric C, will cause the arms to oscillate to and from one another.

Opposite to the outer ends or points of the pattern-regulating arms is a horizontal drum, G, heretofore termed by me the "pattern-drum," supported in bearings in which it can revolve, and having an intermittent movement of rotation imparted to it from shaft B by means of a worm-cam, H, on said shaft, which engages a toothed wheel, G', on the drum, and at each revolution turns the same a distance equal to one tooth. The cam-rise by which this movement is effected is indicated at *g*, Fig. 1. The periphery of the drum is curved lengthwise in the arc of a circle of which the axis of oscillation of arms F F' is the center, and it is also formed in its periphery with longitudinal undercut or dovetail grooves *h*. Each groove contains a dovetail slide, *i*, from which projects a pin, *j*. The pins *j* are what I have hereinbefore termed "pattern-pins," and they are mounted on slides, so as to permit them to be adjusted to the various positions in the grooves required for the production of any given pattern. Each slide, when adjusted, can be held in place by set or tightening screw *i'*, Figs. 3 and 4. The pins project from the periphery of the drum, and the latter is intermittently rotated by H and G', so as to bring each pin in succession into the path and between the outer ends or points of the oscillating pattern-regulating arms.

The operation of the parts will be readily understood by reference to the diagrammatic figures 7, 8, 9, and 10. Suppose the eccentric to be at that extreme of its throw represented in Fig. 8, in which the cross-pin is moved forward to the front ends of the slots *f f'*, so as to open wide the arms F F', the axis A, pin *c*, and the pattern-pin *j* on drum G being in line. Under these conditions the eccentric, as it continues to rotate, will cause the pattern-regulating caliper-arms to close, as indicated in Fig. 7, where they are half closed, and in Fig. 9, where they are entirely closed, less the thickness of the pin *j'*, which they clasp. Each feed-regulating arm has moved the same distance, the points A *c j* have remained in line in the same position, and consequently the sector D has remained unmoved and at rest. If the next succeeding pattern-pin brought around by the intermittently-moving pattern-drum into the path of the arms F F' stands directly in rear of the pin *j* shown in the figures under consideration, then a repetition of the operation will leave the sector D unaffected, as before. But suppose that the next succeeding pin stands obliquely in rear of the pin *j*, so that when brought around it will occupy the position indicated at *j'*, Fig. 10. The effect will be to arrest the arm F before it has traveled its normal distance, and consequently the arm F' will travel a correspondingly increased distance, with the result of drawing or moving the pin *c* to a position indicated at *c'*, Fig. 10, thus bringing the cross-pin, the pattern-pin, and the axis A in line, as they must always be at the conclusion of the closing movement of the arms F F'. The effect of thus moving the pin *c* will be to correspondingly swing or turn the sector D, whose slotted arm D' is engaged by the pin, and this movement of the sector through the pinion *e* will correspondingly shift the object arbor or shaft E. Thus, according to the varying position of the successive pattern-pins, the object-shaft E will be shifted intermittently and at the proper times to produce any required pattern.

The combined range of movement of the two pattern-regulating caliper-arms is equal to about twice the length of the pattern-drum, (less, of course, the thickness or diameter of the pattern-pin,) this being necessary for the reason that for some patterns some of the pattern-pins require to be set at one or the other extreme end of the pattern-drum. One revolution of the drum completes one figure or element of the pattern.

Larger or smaller drums carrying the requisite number of pattern-pins may be employed, according to the requirements of the pattern element, and for this purpose the bearings which support the pattern-drum should be made adjustable, so as to permit them to be adjusted to and from the ends of the arms F F', according to the diameter of the particular drum that may be employed, and the drum should be so mounted as to permit it to be removed and replaced by another.

The mechanism illustrated in Figs. 11 and 12 involves the same principle and mode of operation as already described with reference to the preceding figures, but under a somewhat modified arrangement. The caliper-like pattern-regulating arms reciprocate in a right line, and consequently the pattern-drum (which in other respects is constructed and is also operated in substantially the same manner as the drum shown in the preceding figures) does not require to have its periphery curved in the direction of the length of the drum. The pattern-drum and pattern-pins are lettered as in the preceding figures.

The pattern-regulating arms are lettered I I'. They are supported on a guide-rod, J, on which they are free to slide back and forth, and their outer ends encircle and are adapted to slide on a shaft, K. This shaft is a rotary power-driven shaft, which is mounted in proper bearings *k*, and is arranged to have a sliding movement, for which purpose the gear on it, which meshes with the prime moving-gear, must be united to said shaft by a spline-and-groove connection, so that while imparting continuous rotary movement to said shaft it will not follow its longitudinal movement, but

will remain in gear with the prime mover. This arrangement, being one that is well known to mechanics, is not represented in the drawings.

Upon the shaft K, between the arms I I′, is fixed a scroll or curved cam, L, having a peripheral cam-groove, *l*. Into this groove extends a pin or roller-stud, *m*, attached to the end of a branch arm, *n*, projecting from each pattern-regulating arm. The two pins or studs are placed at points in the cam-groove diametrically opposite one another. The throw of the cam is equal to the length of the pattern-drum less the thickness of the pattern-pin, and it consequently acts at each revolution to move each pattern-regulating arm once back and forth toward and away from one another through this distance.

In the drawings the cam is shown in central position, in which position each arm is at a point opposite the adjoining end of the drum. In the central position of the pattern-pin *j* (shown in the drawings) the two arms will move up to the pin without effecting any change in the position of the parts; but suppose the drum were revolved to bring the pin *j′* between the arms. In that case the arm I′ would first bring up against the pin and would be arrested before traveling its normal distance, and the result would be to draw over toward it the other arm, I, and consequently the cam L and shaft K a corresponding distance. Thus a sliding movement would be imparted to the shaft K, which can be availed of in various ways for controlling purposes. In the arrangement shown in the drawings it is availed of by connecting the end of the shaft to a sliding rack-bar, M, which engages a pinion, *e*, on the object-shaft E.

It will be seen that the same result is attained in this case as is attained by the mechanism first above described, and that the same principle and mode of operation are involved in both cases, the only difference being in the construction and arrangement of the special instrumentalities employed.

I remark that the pattern-drum can be made longitudinally movable instead of the shaft K, in which case the rack M would be carried by the arbor of the drum, and the arbor would be connected by a spline-and-groove connection with its driving-gear, as hereinbefore provided with respect to shaft K. This obvious reversal of parts is also applicable to the arrangement represented in Figs. 1 to 10.

Other modifications might also be described, but the foregoing are sufficient to illustrate the nature of the invention. I do not restrict myself to the instrumentalities hereinbefore described, for it is manifest that the same can be considerably varied without departure from my invention, the characteristic feature of which is found in the combination of the pattern-drum and pins, and the reciprocating pattern-regulating arms, (whether moving in a right line or in a curved path,) connected to the object-shaft or other device to be controlled in such manner that the changes in the position of said device shall be determined by and dependent upon the relative extent of movement of said arms, or, in other words, by the difference between the distances traveled by said arms before they respectively meet the pattern-pin at each reciprocation.

What I therefore claim as new and of my invention is—

The combination of the reciprocating regulating-arms, the pattern-drum provided with projecting pattern-pins, which by the rotation of said drum are successively brought into the path of movement and between the ends or points of said arms, the object-shaft or device to be controlled, and connecting mechanism, substantially as described, whereby the shifting of said object-shaft or its equivalent is effected to an extent dependent upon and proportionate to the difference between the distances traveled by the said arms before they respectively meet the pattern-pin at each reciprocation, the combination being and acting substantially as hereinbefore set forth.

In testimony whereof I have hereunto set my hand this 17th day of January, 1883.

GEO. R. PEARE.

Witnesses:
EWELL A. DICK,
J. WALTER BLANDFORD.