

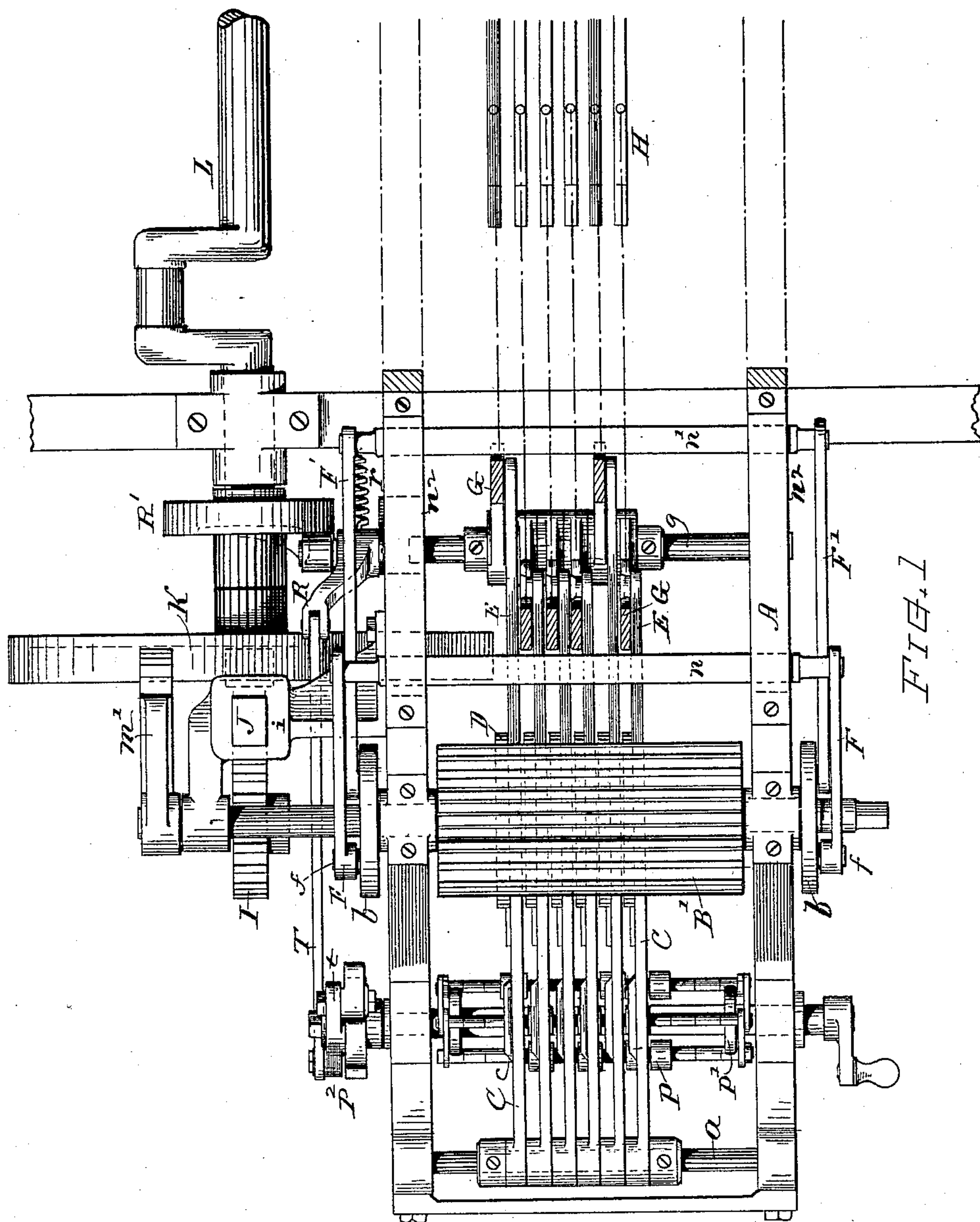
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4 Sheets—Sheet 1.

J. H. STONE.
SHEDDING MECHANISM FOR LOOMS.

No. 452,396.

Patented May 19, 1891.



Witnesses

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Simon E. King

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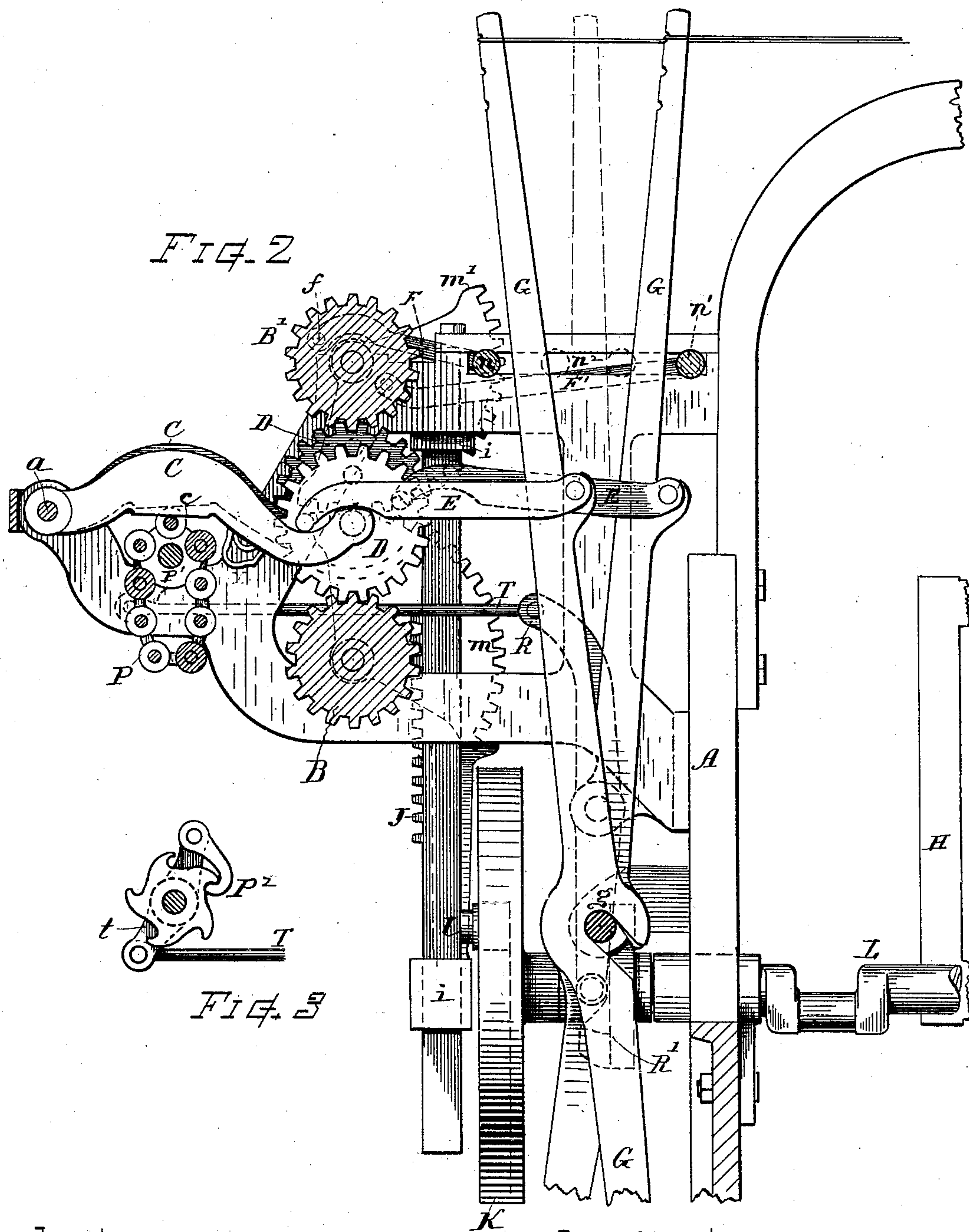
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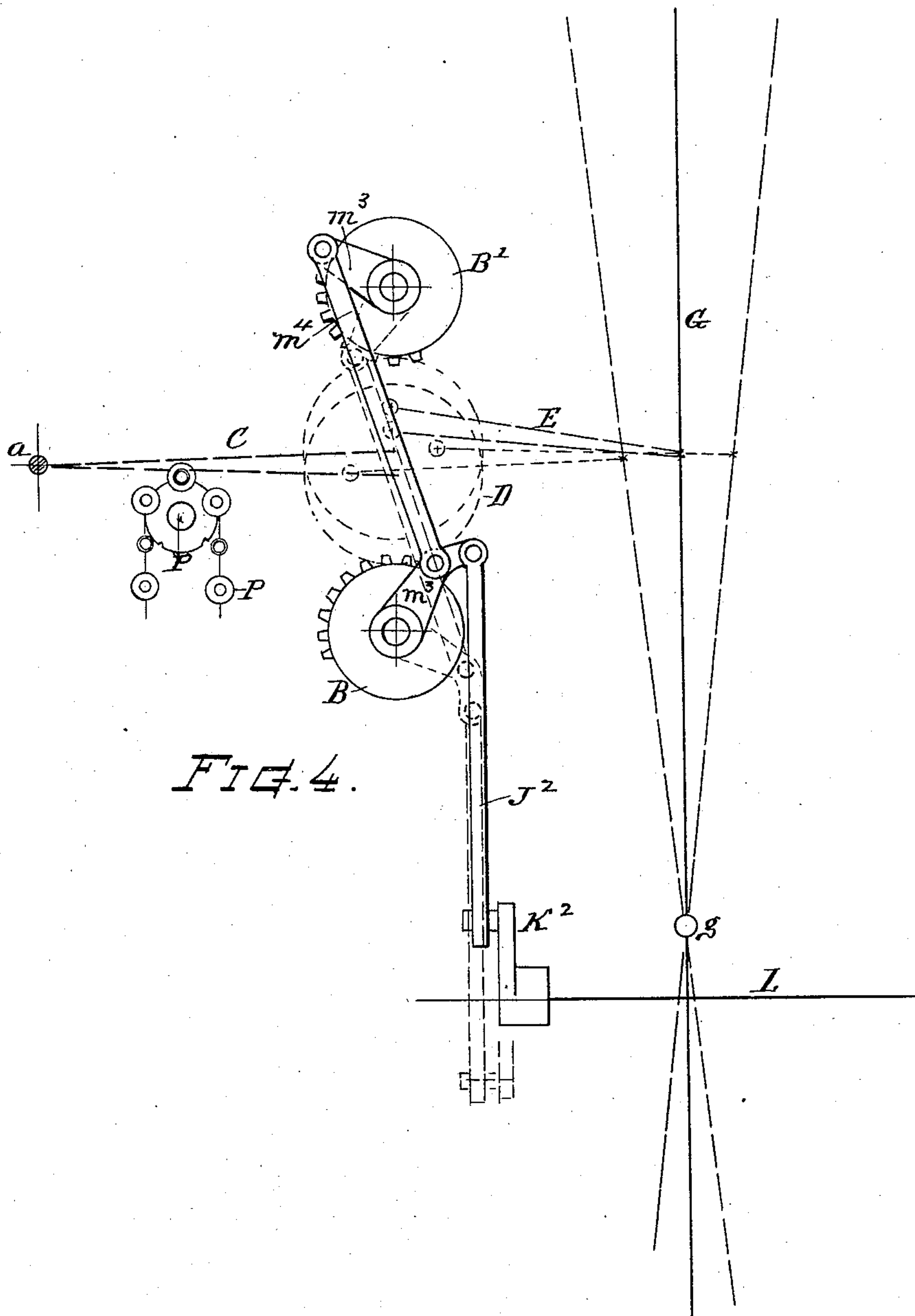
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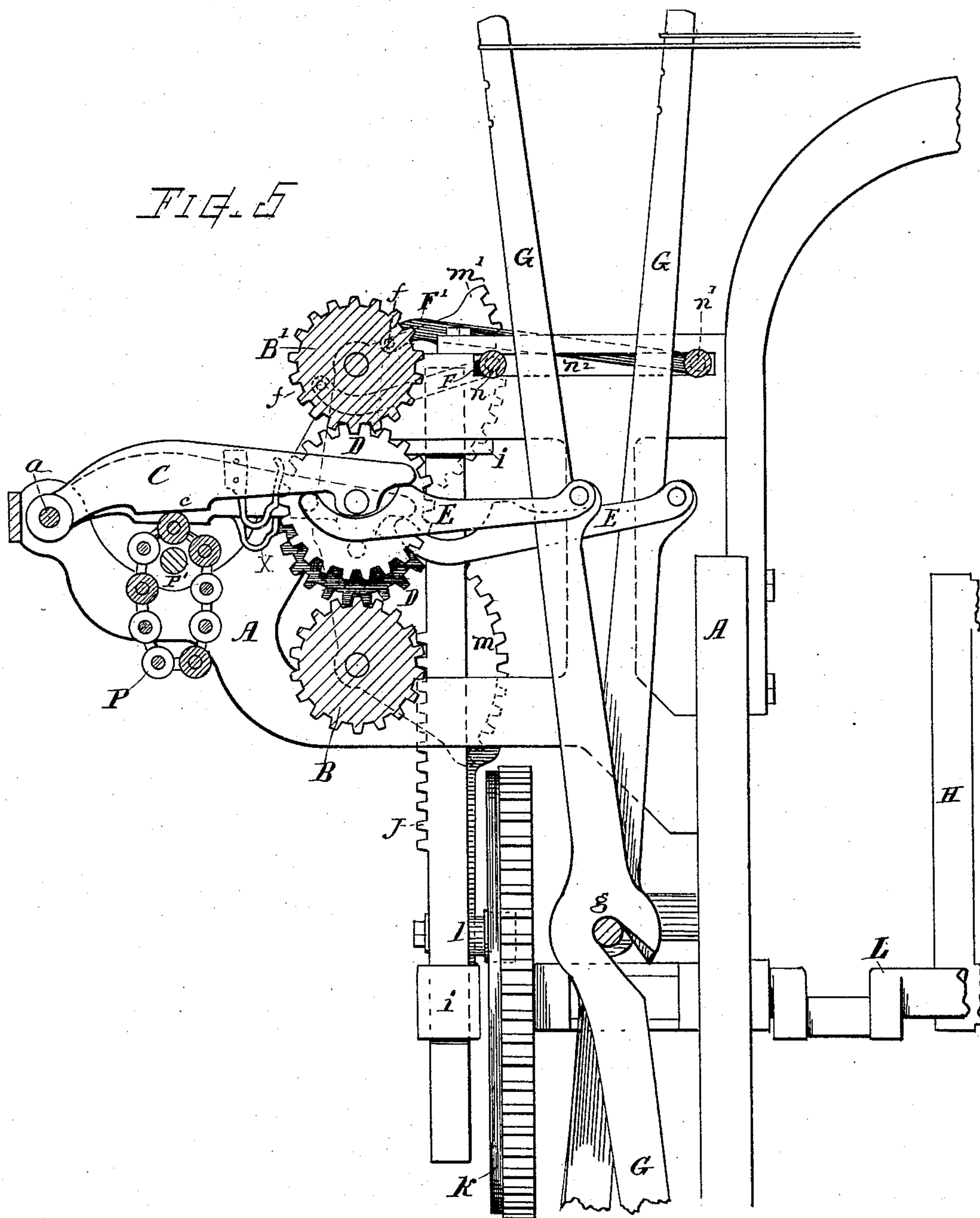
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UNITED STATES PATENT OFFICE.

JOSEPH HENRY STONE, OF NORTH ANDOVER, MASSACHUSETTS.

SHEDDING MECHANISM FOR LOOMS.

SPECIFICATION forming part of Letters Patent No. 452,396, dated May 19, 1891.

Application filed November 26, 1890. Serial No. 372,654. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH HENRY STONE, a citizen of the United States, residing at North Andover, in the county of Essex and State of Massachusetts, have invented a new and useful Shedding Mechanism for Looms, of which the following, together with the accompanying drawings, is a specification sufficiently full, clear, and exact to enable persons skilled in the art to which this invention appertains to make and use the same.

This invention relates to shedding mechanism or harness-operating devices for a "closed-shed" loom; and it consists in an improved construction and arrangement of mechanism wherein the parts are disposed, combined, and organized for operation substantially as illustrated and explained, the particular subject-matter claimed being hereinafter definitely specified.

In the drawings, Figure 1 is a plan view of such parts of a loom as will show the nature of my invention. Fig. 2 is a vertical sectional view of the same. Fig. 3 is a detail view showing the ratchet for operating the pattern-chain. Fig. 4 is a diagram showing a modification in the connections for oscillating the cylinder-gears. Fig. 5 is a vertical sectional view showing the mechanism as arranged with the connecting-bars below the ends of the vibrator-bars and with friction-springs for preventing rotation of the vibrator-gears when changing from one cylinder-gear to the other.

Referring to parts, A denotes the frame, of suitable form for supporting the operating parts.

B and B' indicate two cylinder-gears, the shafts or journals of which are respectively mounted to turn in bearings fixed on the frame A.

C indicates the change-levers or vibrator-bars respectively fulcrumed at their outer ends upon the frame or support bar *a* and provided with crank-gears D, axially journaled to their inner ends and disposed at a position for convenient engagement with either of the two cylinder-gears B and B', the latter being arranged at such distance apart as will accommodate said crank-gears D between them with sufficient clearance-space to allow said crank-gears, when in mesh with

either of said cylinder-gears, to stand entirely free from the other cylinder-gear, and so that they can vibrate from one to the other without shifting teeth in their order of inter-meshing therewith.

E denotes the links or connecting-bars, joined at one end by a suitable wrist or crank pivot with the gears on the ends of the vibrator-bars and extending from the crank-gears D to the jacks G, to which latter their opposite ends are pivoted. The jacks G are centrally fulcrumed, as at *g*, and connected with the harness-frames H in the usual well-known manner.

The axle or shaft of one of the cylinder-gears has a pinion or gear I, fixed thereon, that engages with a reciprocating rack J, that moves in suitable guides *i*, supported on the frame. A cam K, fixed on the end of the crank-shaft L of the loom, imparts motion to said rack, the parts engaging by a stud and roll, as at *l*, or in any suitable and efficient manner for transmitting the power and motion to the cylinder-gears. The groove or face of cam K, it will be understood, is of such shape as to impart the required quality and quantity of motion at the proper interval of time, so that the shedding mechanism will operate with the required intervals of action and dwell. The cam K and rack J impart an oscillative action to the gear I and cylinder-gear B, and the upper and lower cylinder-gears or their shafts *b*² are connected by a pair of segment-gears *m m'*, that intermesh with each other in a manner to cause the two cylinder-gears to have oscillative action in unison, but in opposite direction to each other, and to an extent of about one-third of a revolution, more or less, so that the vibrator-gears in mesh with one cylinder-gear will be given a quarter-revolution toward the right, while those vibrator-gears in mesh with the other cylinder-gear will be given a quarter-revolution to the left and both back to first position with the backward and forward oscillation of the cylinders or at each revolution of the loom-shaft.

Evener-bars *n n'* are preferably arranged at either side of the jacks G to move in suitable guideways *n*² on the frame. Said eveners are joined by rods or connections F and F' with cranks or studs *f*, supported in disks *b*,

fixed to the oscillating cylinder-gear axle at the ends of the cylinder-gear, or, if in any instance preferred, directly to the cylinder-gear end, whereby the evener-bars are caused to move back and forth synchronously with the jacks and to confine the jacks from movement when at central position, as in dotted lines, Fig. 2, during the time the vibrator-gears are passing from the lower to the upper cylinder-gear, or vice versa. For holding the crank-gears in mesh with the cylinder-gear the well-known "knife-lock" can be employed.

Curved springs α are preferably attached to the vibrator-bars and arranged to press upon the gears D to prevent them from jarring or turning out of place while shifting from one cylinder-gear to the other. Said springs are best fastened to the vibrator-bar by two screws, one of which will allow adjustment for varying the pressure of the spring upon the gear.

The pattern-chain P is mounted upon the roll or drum P' and disposed beneath the vibrator-bars in such manner that the balls, risers, or indicators of the chain will, as they are successively brought into position, lift the respective vibrator-bars accordingly as the indicators are disposed. The vibrator-bars are fitted with suitable bearing-surface c where they rest upon the pattern-indicators. The pattern-chain roll can, if desired, be operated by means of the well-known "Geneva-stop" mechanism heretofore employed for such purposes or by other suitable mechanism, whereby intermittent motion is imparted for changing the links of indicators beneath the row of vibrators. In the present instance the pattern-roll shaft is provided for its operation with the well-known form of ratchet and pawl, as at P², said pawl being pivoted to a swing-lever t , mounted on the shaft and having its arm connected by a rod T with a lever R, that works in conjunction with a cam R', fixed on the loom-shaft L, for imparting movement to the pattern-chain mechanism. The lever R is best provided with a spring r , for holding its end or engaging-roll against the face of the cam.

The cylinder-gears can, as desired, be made with teeth about their entire circumference, or with teeth only on one side or so much as engages with the vibrator-gears at their oscillation. The full-toothed cylinder admits of changing its position upon its shaft when one set of teeth become worn, so as to bring another set of teeth to the work.

It will be understood that the parts of the loom that are not herein shown or described can be of any well-known or suitable construction and arrangement.

In the operation the cylinder-gears B B' move with a backward and forward oscillative action with a slight stop or dwell at their extremes of movement. The vibrators C, controlled by the indicators of the pattern-chain, carry the crank-gears into mesh with one or the other of the cylinder-gears, the change in

position of the vibrators being effected at the instant when all of the jacks G are at central position, (see dotted lines, Fig. 2,) and being then held by the evener-bars $n n'$, at which time the crank-pivots in gears D are at the half-way position, either directly above or below the gear-center, accordingly as the construction is with the connections above the vibrator-bars, as in Fig. 2, or below the vibrator-bars, as in Fig. 3. As the two cylinder-gears are oscillated, all these vibrators or crank-gears in engagement with one cylinder-gear throw their jacks and connections to the left and all those in engagement with the other cylinder-gear throw their jacks and connections to the right, the connections and jacks moving to the positions indicated in full lines, Figs. 2 or 5, and then back again to a central position at each beat of the loom or rotation of the loom-shaft L.

In the diagram Fig. 4 I have illustrated a way in which the oscillating cylinder-gears can be connected in lieu of the segment-gears $m m'$. In this the cylinder-gears are each provided with an arm or crank m^3 , projecting at opposite positions, and the two cranks connected to each other by a diagram-bar m^4 ; also, if in any instance desired, a crank K² and rod J² can be employed in lieu of the cam for imparting the oscillative action to the cylinder-gears in unison with the beat of the loom. I prefer, however, to employ the cam, as the timing of the movements and dwells can be more accurately attained thereby.

By the use of the oscillating cylinder-gears in combination with vibrator-bars carrying crank-gears with the jack-connections pivoted thereto an easy and efficient action is produced and the change of position in the intermesh of the gearing is effected when the several gears are not in rotative motion.

I claim as my invention herein to be secured by Letters Patent—

1. A cylinder-gear having backward and forward oscillative action, in combination with vibrator-bars carrying rotatable crank-gears, the jacks and connections between the jacks and crank-gears for operating the jacks in the shedding mechanism of a loom, and means, substantially as described, for imparting motion to said cylinder and for moving the vibrators to shift said crank-gears into and out of engagement with said cylinder-gear, for the purpose set forth.

2. The two oppositely-acting oscillating cylinder-gears, in combination with the vibrator-bars having the vibrator-gears supported thereon, the crank-gears, the jacks, connections between the jacks and crank-gears for moving the jacks, and means for imparting motion to said cylinder-gears, for the purpose set forth.

3. The combination of the upper and lower oscillative cylinder-gears, the vibrator-bar having the crank-gear supported thereon, the jack and the connection between the crank-gear and jack, the pattern-chain, the recipro-

eating rack, and means, substantially as described, for imparting motion to said rack, all substantially as set forth.

4. The combination of the crank-shaft L, the cam K on said shaft, the reciprocating rack J, operated by said cam, the cylinder-gear provided with a gear I, that engages said rack, the vibrator-bars, the crank-gears, and jack-connections, substantially as and for the purpose set forth.

5. The combination, substantially as described, with the jacks, jack-operating connection, crank-gears, and vibrator-bars carrying said crank-gears, of the backwardly and forwardly oscillating cylinder-gear B', the

crank-studs *f*, supported in disks fixed to the oscillating cylinder-gear axle at the ends of said cylinder-gear, the evener-bars *n n'*, mounted at opposite sides of said jacks in guideways on the frame, and the connections *F F'* between said evener-bars and said crank-studs, all as shown, and for the purpose set forth.

Witness my hand this 20th day of November, A. D. 1890.

JOSEPH HENRY STONE.

Witnesses:

CHAS. E. STILLINGS,
OSCAR M. GODFREY.