

(No Model.)

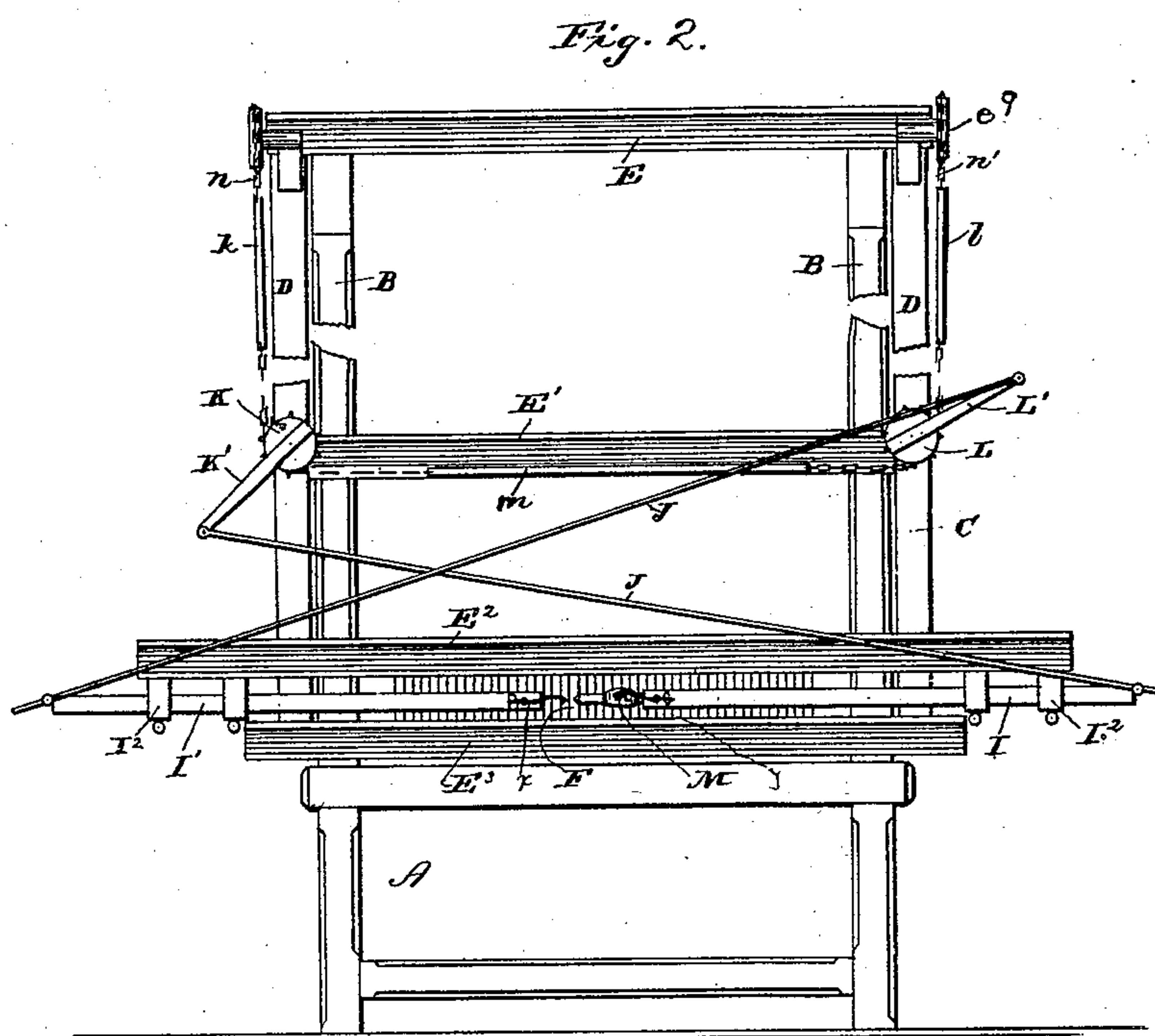
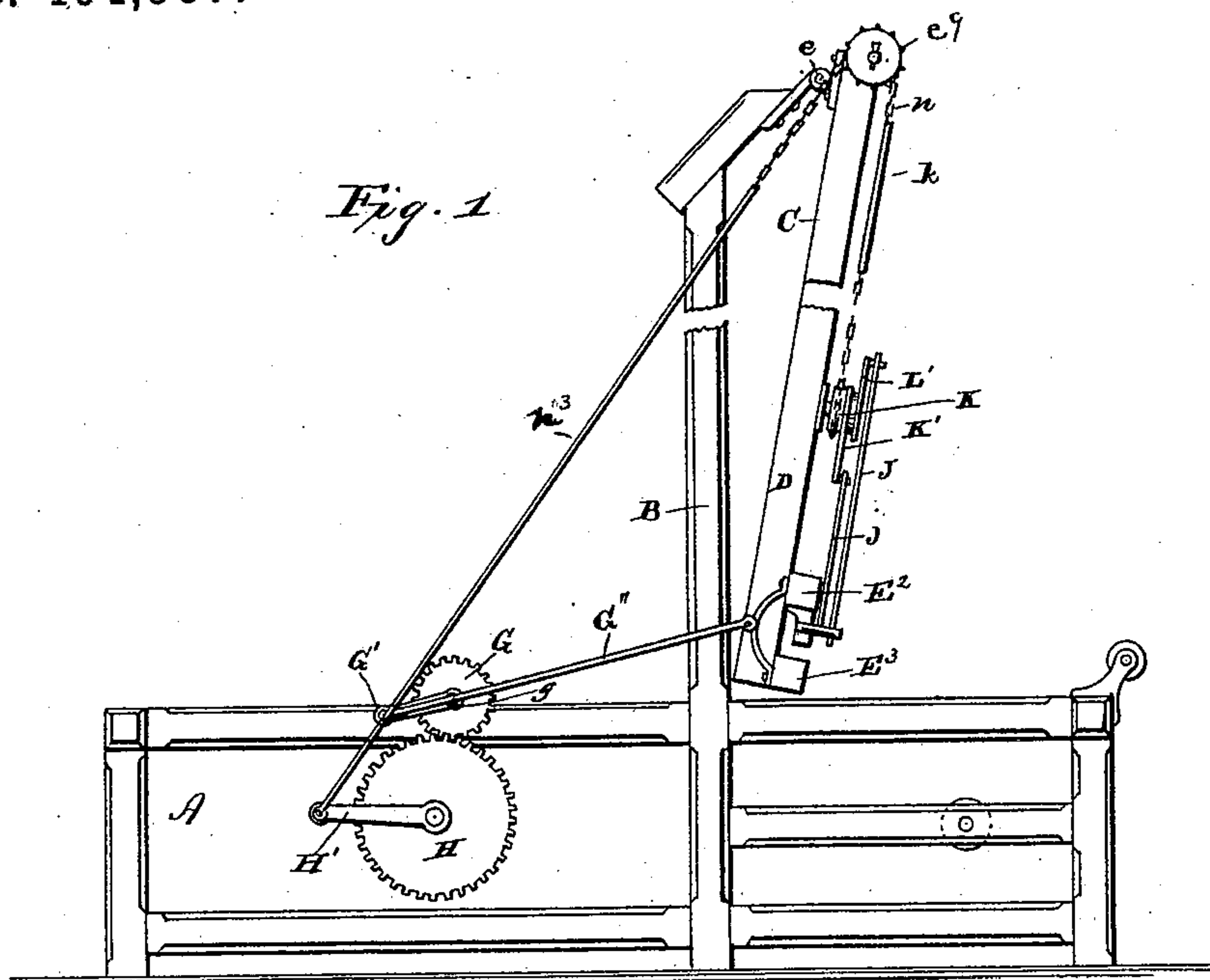
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C. B. RUMSEY.

POSITIVE SHUTTLE MOTION FOR LOOMS.

No. 404,987.

Patented June 11, 1889.



Witnesses.

Chas. R. Burr.
Fred J. Church

Inventor.

Charles B. Rumsey,
by Church & Church,
his Attorneys.

(No Model.)

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Fig. 3.

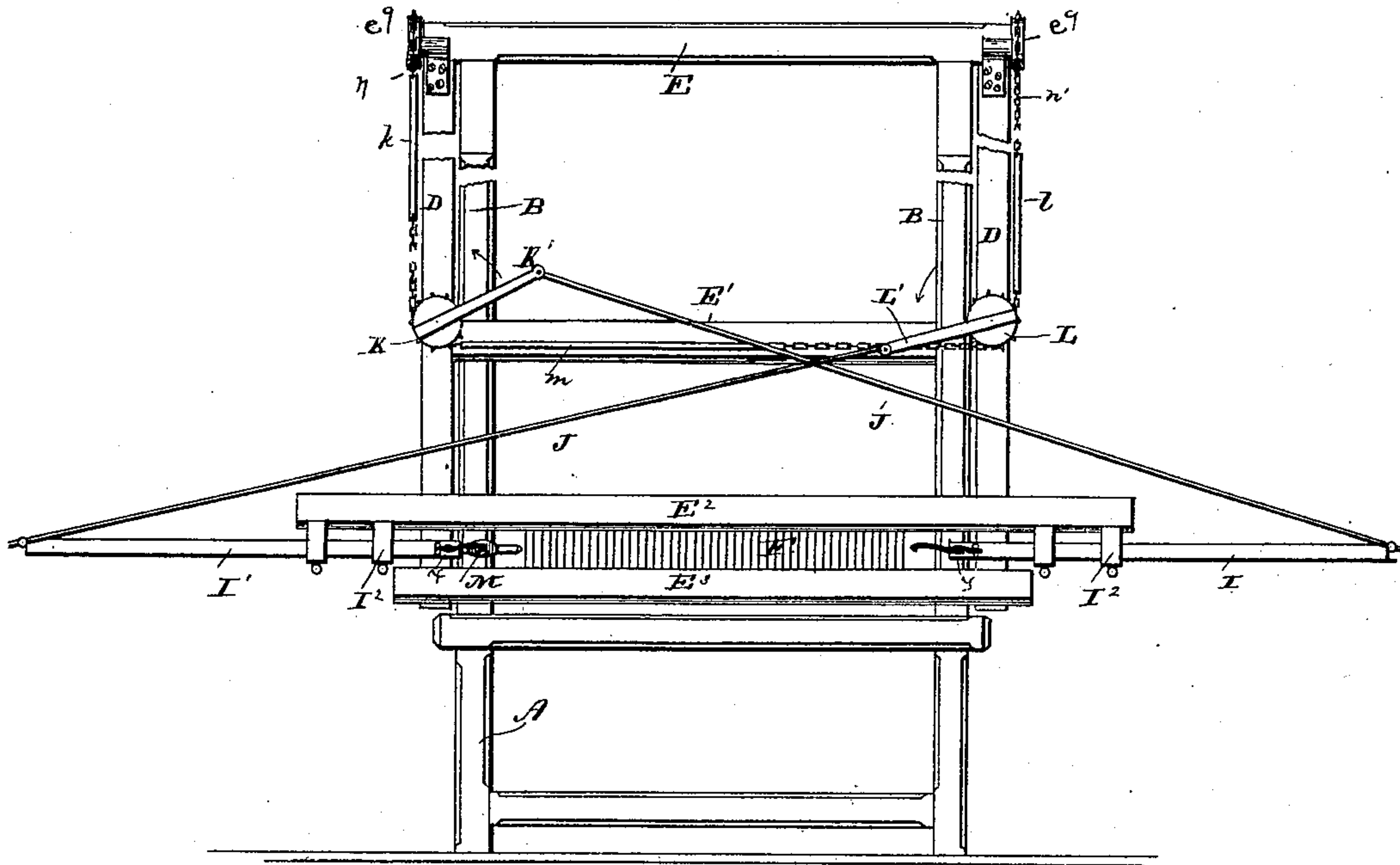
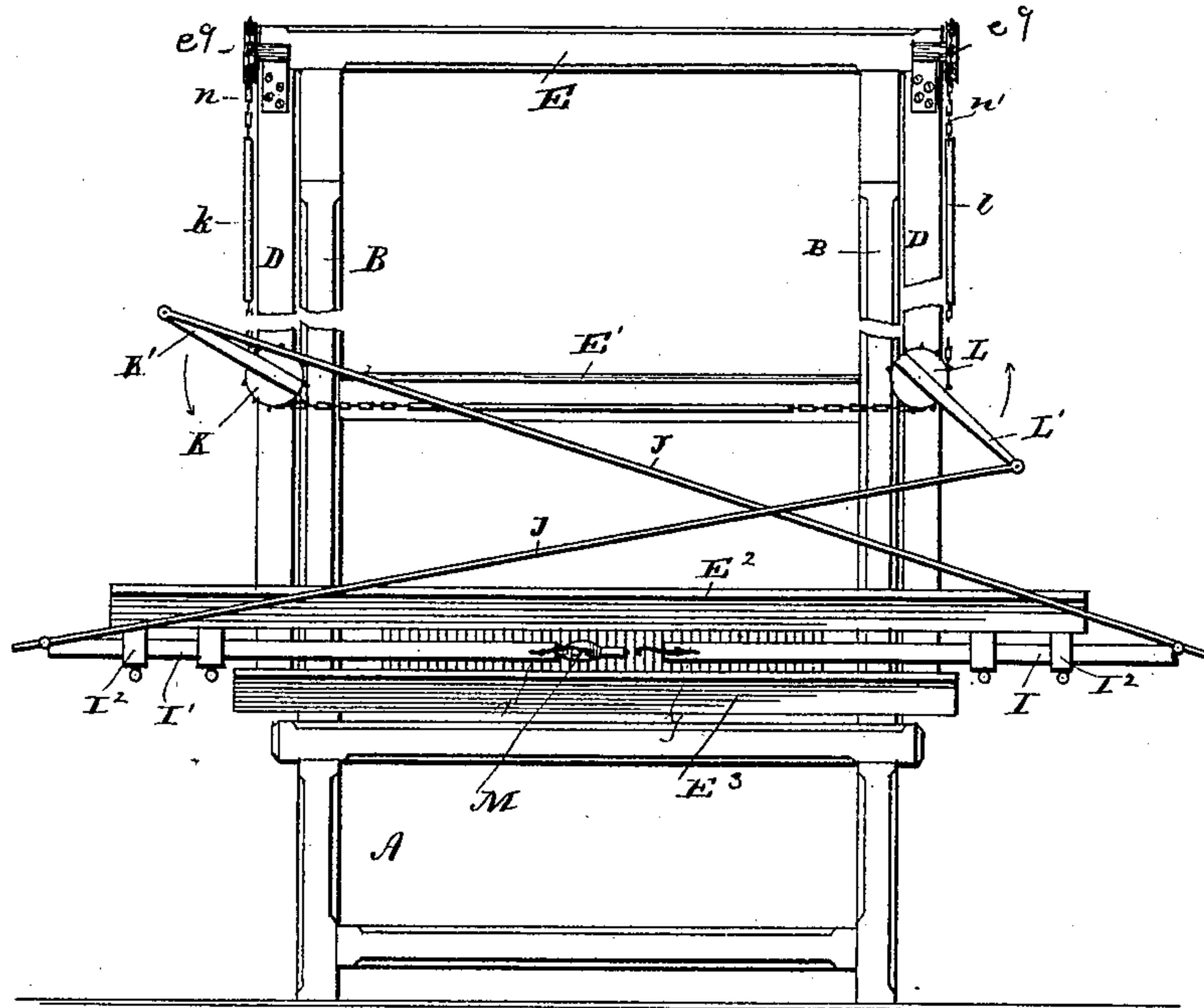


Fig. 4.



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Fred J. Church

Inventor.
Charles B. Rumsey
by Church & Church
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Fig. 5.

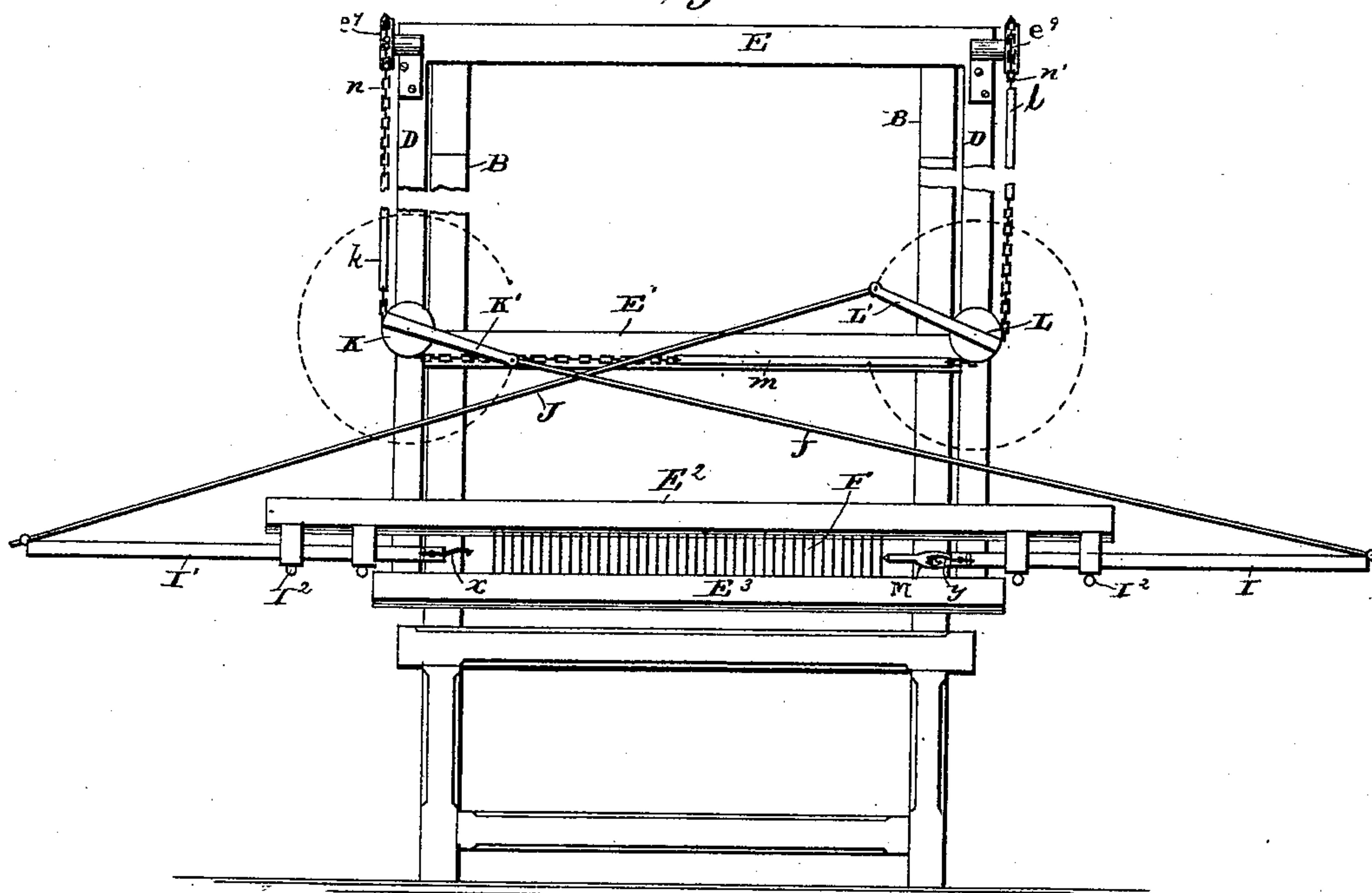


Fig. 6.

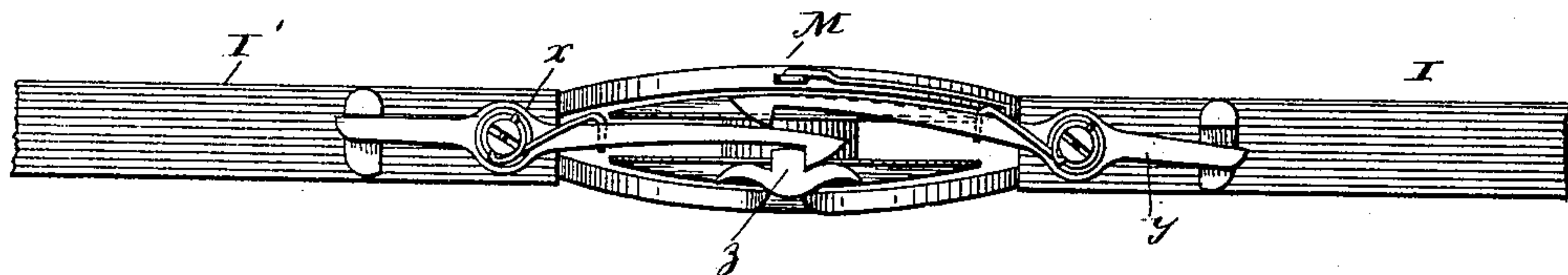
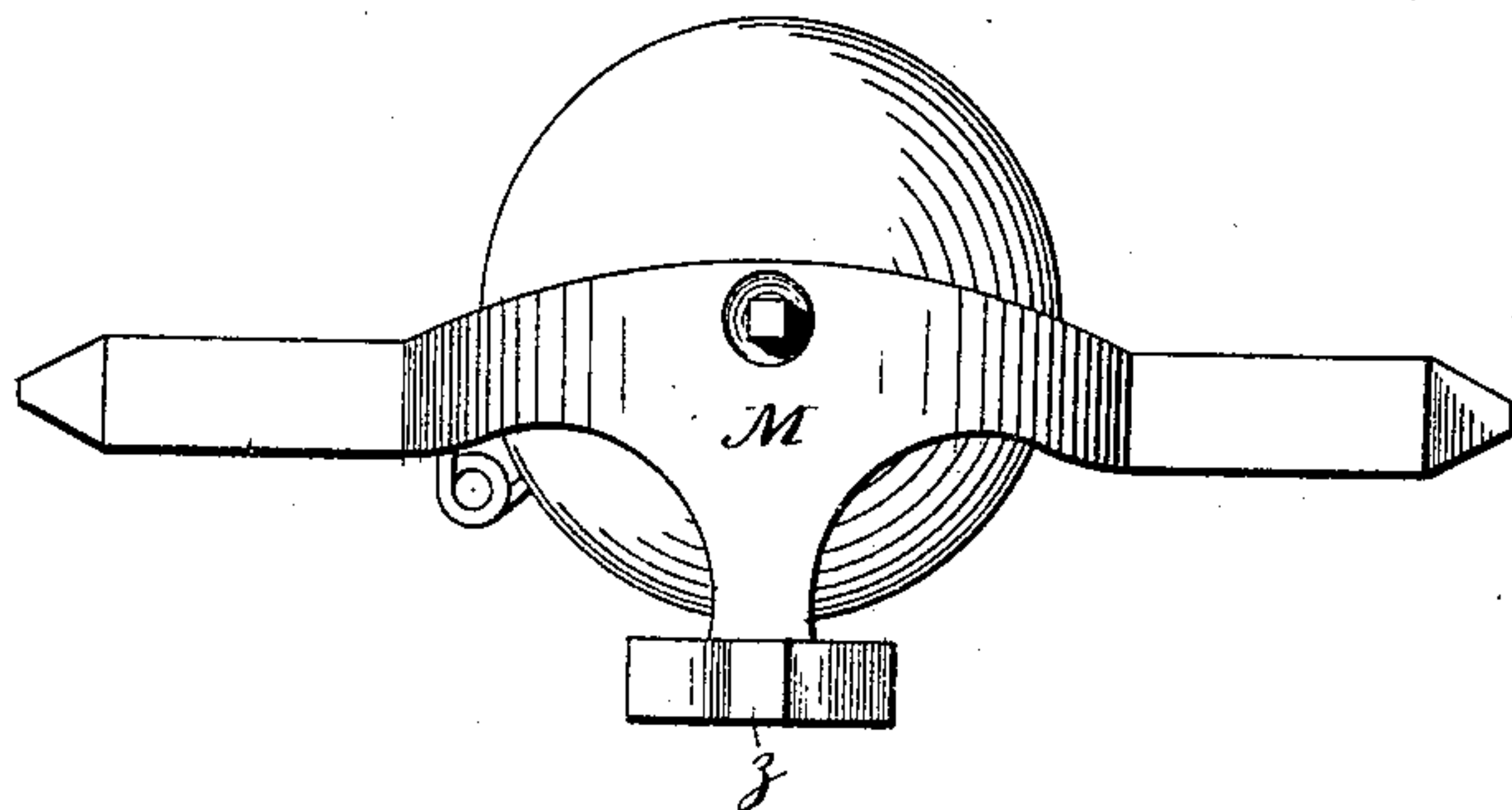


Fig. 7.



Witnesses.
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Fred J. Church.

Inventor.
Charles B. Rumsey
by Church & Church
his Attorneys.

UNITED STATES PATENT OFFICE.

CHARLES B. RUMSEY, OF HOMER, NEW YORK, ASSIGNOR TO THE WIRE FABRIC COMPANY, OF SAME PLACE.

POSITIVE SHUTTLE-MOTION FOR LOOMS.

SPECIFICATION forming part of Letters Patent No. 404,987, dated June 11, 1889.

Application filed August 5, 1887. Serial No. 246,206. (No model.)

To all whom it may concern:

Be it known that I, CHARLES B. RUMSEY, of Homer, in the county of Cortland and State of New York, have invented a certain
5 new and useful Positive Shuttle-Motion for Looms; and I do hereby declare the following to be a full, clear, and exact description of the same; reference being had to the accompanying drawings, forming a part of this
10 specification, and to the figures and letters of reference marked thereon.

My present invention relates to positive shuttle-motions for looms, particularly to that class employed for weaving wire fabrics,
15 though capable of being employed equally as well in connection with looms for weaving other fabrics, and has for its object to improve the construction of the devices for operating the shuttle-carriers; and it consists
20 in certain novelties of construction and combinations of parts, all as I will now proceed to describe.

In the drawings, Figure 1 is a side elevation of a loom-frame, showing the application
25 of my invention thereto; Fig. 2, a front view of the same, showing the lay swung in, with the shuttle being transferred from the arm on the right to that on the left; Fig. 3, a similar view with the lay moved forward and the
30 shuttle transferred; Fig. 4, a view with the shuttle on the left-hand carrier and the lay moved forward. Fig. 5 is a view showing the carrier in a position opposite to that in Fig. 3, the arc described by the crank-arms
35 moving the shuttle-carriers being indicated. Figs 6 and 7 are views showing the construction of the shuttle, the carriers, and the devices for causing their transfer from one to the other.

40 Similar letters of reference in the several figures indicate the same parts.

One difficulty with the positive shuttle-motions heretofore in use has been that the devices necessary to cause a certain and rapid
45 transfer of the shuttle from one side to the other of the lay have been more or less complicated and easy to get out of order, and have had to depend more or less upon the operation of cams or cam-tracks, the accurate construction of which requires the ex-

penditure of much time and money, besides which the necessary accuracy of adjustment and maintenance in adjusted position of the parts has been a constant source of annoyance to the loom-operators, and a practical
55 operation of looms has enabled me to devise the hereinafter - described improvement, which after a careful test of some months I have found to be very cheaply made, easily operated, very simple in construction, and
60 capable of performing its functions in an admirable manner. One other objection to devices of this class has resulted from the fact that the carriers have been caused to meet in the center of the shed for the transfer of the
65 shuttle when they are both at the extreme of their movement, so that they come together with a jerk, and unless the parts were accurately adjusted there would be a liability to break or jar some portion of the mechanism;
70 but I propose to obviate this by so disposing the devices that the transfer will take place while the receiving-carrier is moving out of the shed, the operations being so timed that the shuttle is always passed while in motion
75 and preferably beyond the center of the shed, all as hereinafter described and claimed.

A represents the frame of the loom in which the warp-beam, shedding, and fabric-winding mechanisms are mounted, but all these being
80 of the ordinary construction and operating in the usual way I do not deem it necessary to either show or specifically describe them. On the sides of the frame are provided vertical standards B, having the short inclined arms at
85 the top, to the upper end of which the swinging lay C is pivoted, as shown in Fig. 1, said lay consisting of the frame constructed of side timbers D D and cross-timbers E E' E² E³, the first being at the top, and to which the pivot-
90 brackets e are secured, and the two last being located near the bottom, and between these are secured the reed-dents F in any suitable manner, the upper one E² of the pair also carrying brackets on its lower side, in which the
95 shuttle-carrying arms reciprocate. The lower portion of the lay and the reed-dents are so situated relatively to the top of the frame A and the warp and fabric holding devices as that the warp will pass through the reed, and 100

when the lay is swung forward the lay will beat up the weft after it is laid in the ordinary manner.

As a means for swinging the lay back and forth I provide a shaft *g*, on the opposite ends of which are mounted gears *G*, provided with crank-arms *G'*, connected by pitmen *G''* to brackets secured to the rear of the lay, as shown, so that by the rotation of this shaft and gears the lay will be operated back and forth, as will be readily understood.

Mounted in bearings just below the gears *G* are gears *H*, of twice the diameter of the former, and connected by suitable gearing with the main operating-shaft of the loom, and these are further provided with cranks *H'*, those on opposite ends being placed on opposite sides of the center, and the two being connected, as hereinafter described.

I I' represent the shuttle-carrier arms, constructed, preferably, of square tubular rods arranged to slide in bearings *I² I²*, secured to the lower side of the timber *E²*, substantially in line with the center of the reed, and adapted to be reciprocated back and forth toward the center of the lay by suitable pitmen *J J*, pivoted to the outer ends of the carriers *I I'* and at their inner ends secured to the cranks *K' L'*, formed upon or secured to sprocket-wheels *K L*, mounted on stud-bearings on the face of the lay, so as to be capable of rotation or oscillation thereon.

It will be noted that the cranks *K'* and *L'* are secured on opposite sides of the center of oscillation of their carrying-wheels—that is, when the crank *K'* is above a line drawn between the centers the crank *L'* is below it, and vice versa, and by reason of their connection for simultaneous operation this relative position will be maintained at all times.

The ends of the shuttle-carrying arms are provided with the recesses, and at the sides are provided spring-operated pawls, the former adapted to co-operate with the ends of the shuttle *M* and the latter with a rib formed on an extension of the shuttle, said projections and recesses being for the purpose of holding and supporting the shuttle and the spring-catches for holding them in engagement, all arranged as shown in Letters Patent No. 340,523, granted me April 20, 1886, for improvements in positive shuttle-motions for looms, whereby as the arms are brought together with the shuttle fastened in one it will be automatically transferred from one arm to the other, the latch *x* on one disengaging the other latch *y y* from the rib *z* on the shuttle and becoming itself engaged, as described in said patent and shown in Fig. 6. Of course any well-known form of shuttle engaging and disengaging devices can be employed, as the present invention has only to do with the mechanism for operating the shuttle-carriers.

At the upper corners of the swinging lay are provided guide sprocket-pulleys *e'*, secured on stud-bearings and capable of free

rotation thereon, and over these pass sprocket-chain sections *n n'*, connected on the side toward the front of the lay with rods *k l*, these being connected to other chains passing beneath the gears *K L*, and the ends of these chain-sections are connected by a rod or link *m*, as shown, the ends of sections *n n'* being connected by suitable rods or links *n³* with the crank-arms *H'* on the gears *H*, mounted on opposite ends of the same shaft, so that as the latter is rotated the chains and connecting-links will be pulled first to one side and then to the other, rotating the gears *K L* in opposite directions alternately.

The provision of connecting rods and links *k, l*, and *m* is simply on the ground of economy, as of course the chain could be completed, if desired, but would be much more expensive, while the portions formed by the rods only serve to transmit motion and can just as well be constructed as described. The chain might be dispensed with entirely and a belt employed instead, using, of course, instead of the sprocket-wheels *K* and *L*, plain wheels not provided with teeth and relying upon the friction to move them, and this arrangement might be used for light yarn or silk weaving looms; but I prefer the sprocket-chain for wire-weaving looms, as the action is much more positive.

It will be of course understood that the shuttle is only transferred and the arms brought together while the lay is swung back and the shed is open, and that the mechanism described for moving the lay is so timed with reference to the devices moving the shuttle-arms that the movements will be caused only when nearly in this position.

From the above general description of the devices their operation will be apparent.

Starting with the lay swung back, as in Fig. 1, the cranks *G'* will be about on the center, the cranks *H'* also nearly level, that toward the front of the drawings being on the rear side of its center and descending, thus pulling the sprocket-chain toward the left, causing the wheels *K L*, carrying the cranks *K' L'*, to rotate from the position shown in Fig. 2, with the shuttle-carriers nearly together, that on the right side carrying the shuttle, and the one on the left about to receive it. Now, the continuous rotation of the cranks *H'* in the direction indicated causes the sprocket-chain to be pulled to the left of Fig. 2, causing an upward motion of wheel *K* and crank *K'* and a downward movement of *L* and *L'*, which will cause the ends of the shuttle-carriers to be brought together in the shed; but from the relative position of cranks *K'* and *L'* it will be seen that crank *K'* is a greater distance from its center than *L'* and is passing upward, and hence will cause its carrier to move the faster; but the crank *L'* will cross the center first and carrier *I'* begin to move outward slowly, and then the carrier *I* will overtake it and, by reason of the automatic engaging and disen-

gaging devices described, transfer the shuttle to it at this point, passing the center and moving outward again. Then the continued rotation of gears H will, rotating gears K and L, further cause the carriers to withdraw from the shed, and the cranks G', moving toward their forward position, cause the swinging of the lay forward to beat up the weft laid, the crank H' on the side toward the front of Fig. 1 occupying nearly its lowest position, and the one on the opposite side nearly its highest, being the dead-center, and its movement causing a very slight movement of the chain.

The position the parts occupy just after the transfer has been made and the carriers withdrawn from the shed is shown in Fig. 3, the crank L' being substantially in line with its center of movement, and its carrier, holding the shuttle and crank K', being a little above its center. Now, the cranks G have caused the lay to move forward and beat up the weft, and the latter is returning to first position, so that the shuttle may be again passed. The cranks H' rotating, the one on the side not shown in Fig. 1 begins to pull on the chain, causing the rotation of cranks K' L' in a direction opposite to that just described, the carrier I' holding the shuttle, as in Fig. 3. Crank K', being nearer its center, reaches it first, and has its carrier I at the center of the shed first, and begins to move back when the carrier I' with the shuttle comes to this point, and the crank, being farther from the center, causes its more rapid movement, so that it will overtake carrier I and transfer the shuttle to it while it is receding from the center of the lay, and the chain being still moved by the crank H' the carriers will move to the position shown in Fig. 5, the shuttle being now held by carrier I, and at this point the lay is again moved forward, while the cranks H' are nearly on their centers, thus failing to operate to any appreciable extent the chain moving the carriers.

It will be noted that the wheels K and L oscillate in corresponding arcs the extremities of which are on opposite sides of a line passing through their centers, and also that the ends of the arcs on the side toward the carriers are nearer this line than the upper ones. Consequently the crank which travels from the end of the arc above the line and whose carrier is about to receive the shuttle reaches a point where its center, crank-pin, and connection with the carrier are in line before the crank carrying the other carrier does, and then moves out slowly, while the crank to which the shuttle is attached reaches this point later, and being farther from the center its accelerated movement causes its carrier to catch the other carrier and transfer the shuttle to it, as before described. This arrangement of arcs is clearly shown in Fig. 6.

The operations of the shuttle-carriers and the swinging movements of the lay are of

course carried on together—that is, there is no abrupt movement of the former while the lay is in swung-in position; but while the lay is moving backward the carriers start in, and while moving forward the carriers start outward again, and the parts are so timed that the lay makes two swinging movements to each complete rotation of cranks H', the extreme forward position being reached while the cranks H' are passing their centers, so that the minimum motion of the chain is produced.

It might be noted that the crank on the sprocket-wheel connected to the carrier holding the shuttle always moves under its center while the crank operating the carrier receiving it always moves over its center, and also that the connecting-rod connected to the carrier holding the shuttle is in line with the crank and center when in extreme outward position, as shown in Fig. 3. These features are incident to the present embodiment of the invention, but are probably not essential to the operation when slightly different though equivalent devices are employed instead of the ones shown.

The shuttle carrying and transferring devices might be employed in a stationary frame, if desired, and supplemental devices employed to beat up the weft; but I prefer to employ them in connection with a swinging lay, as described.

It will of course be understood that the ordinary shedding devices are to be employed, and are operated every time the lay is moved forward; but the construction and operations of these devices are so well understood by those skilled in the art that I do not deem it necessary to enter into a detailed description of them.

I do not desire to be understood as confining myself to precisely the arrangements of mechanism herein shown nor their application to wire-weaving looms exclusively, as it is evident that others could be employed or the devices applied to looms for weaving yarn or silk fabrics; but from its practical application to wire-weaving looms I have found it to be admirably adapted to the purpose and to possess many advantages over other forms of shuttle-motions known to me.

Instead of positively pulling the chain operating the shuttle-carriers in both directions, a single crank could be used to pull it one way and a weight or spring employed to operate it in the opposite direction, as will be readily understood.

The peculiar feature of transferring the shuttle while moving in a direction to pass out of the shed, thus doing away with the jerk attendant upon transferring it at the center while the carriers are stationary, is a valuable and important one.

The shuttle-carriers and automatic transferring devices can, as before stated, be of any approved construction that will operate to disengage the shuttle from one and engage

it with the other when the two are brought together substantially in the manner described.

I claim as my invention—

5 1. The combination, with the shuttle, shuttle-carriers, and devices for transferring the shuttle from one carrier to the other when the carriers are brought together, of oscillating wheels having crank-pins connected with
10 the carriers, and means for oscillating said wheels in corresponding arcs, one extremity of each of which is nearer a line drawn through their centers than the other, substantially as described.

15 2. The combination, with the shuttle, shuttle-carriers, and devices for transferring the shuttle from one carrier to the other when the carriers are brought together, of oscillating wheels having crank-pins, each of which
20 is connected to the carrier on the side of the reed opposite it, and means for oscillating

said wheels in corresponding arcs, one extremity of each of which is nearer a line drawn through their centers than the other, substantially as described.

25 3. The combination, with the shuttle, shuttle-carriers, and devices for causing the transfer of the shuttle from one carrier to the other when the carriers are brought together, of oscillating wheels connected with the carriers
30 and adapted to oscillate in opposite directions alternately in corresponding arcs, one extremity of each of which is nearer a line drawn through the centers than the other, a chain engaging said wheels, and means, substantially as described, for pulling said chain
35 in opposite directions alternately, as set forth.

CHARLES B. RUMSEY.

Witnesses:

W. H. CRANE,

W. S. SANTUS.