

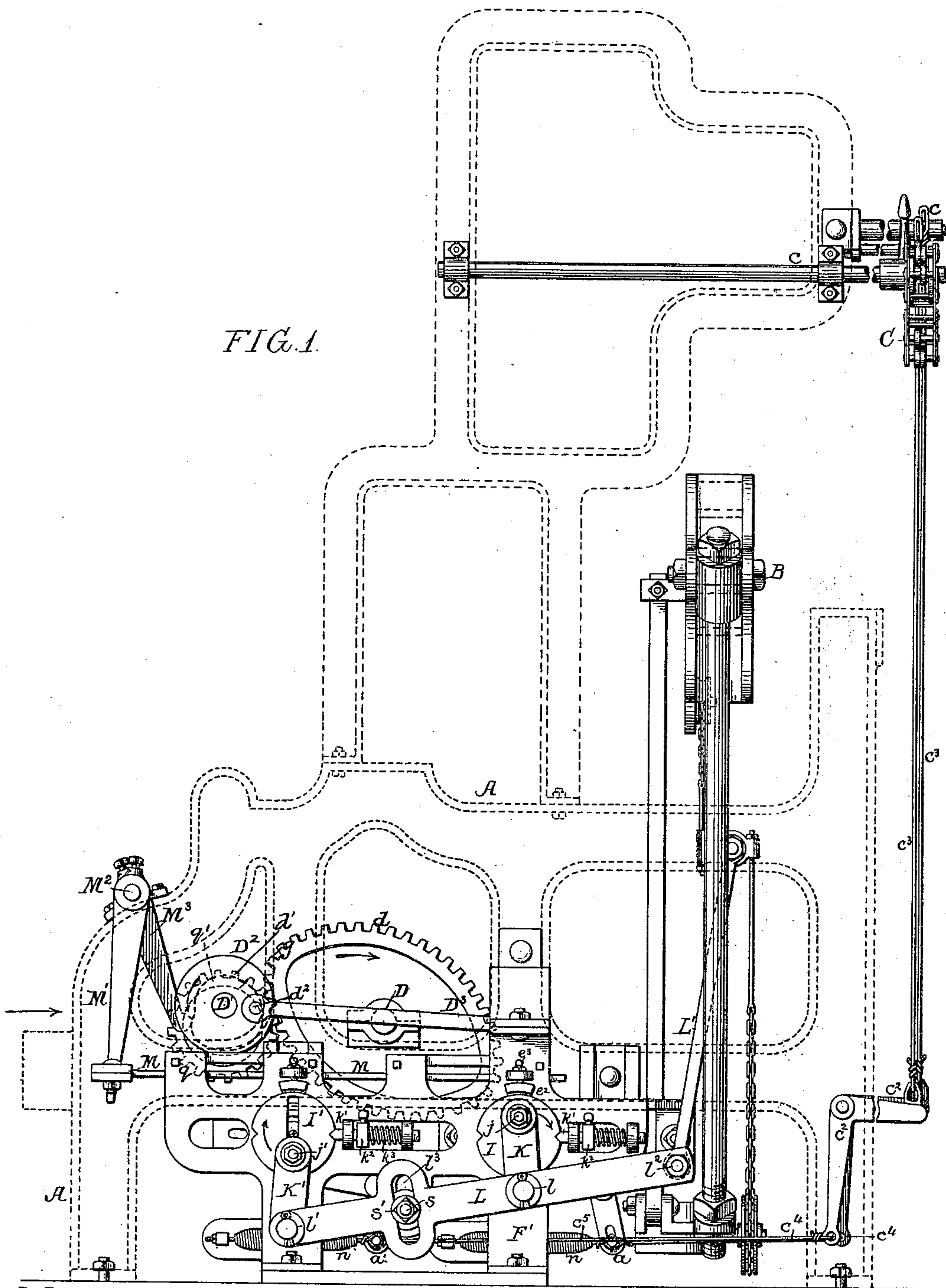
(No Model.)

4 Sheets—Sheet 1.

H. P. MALLISON.  
DROP BOX MECHANISM FOR LOOMS.

No. 478,621.

Patented July 12, 1892.



Witnesses:  
William R. Bonner.  
A. V. G.roupe.

Inventor:  
Harvey P. Mallison  
By his Attorneys  
Howe & Howe

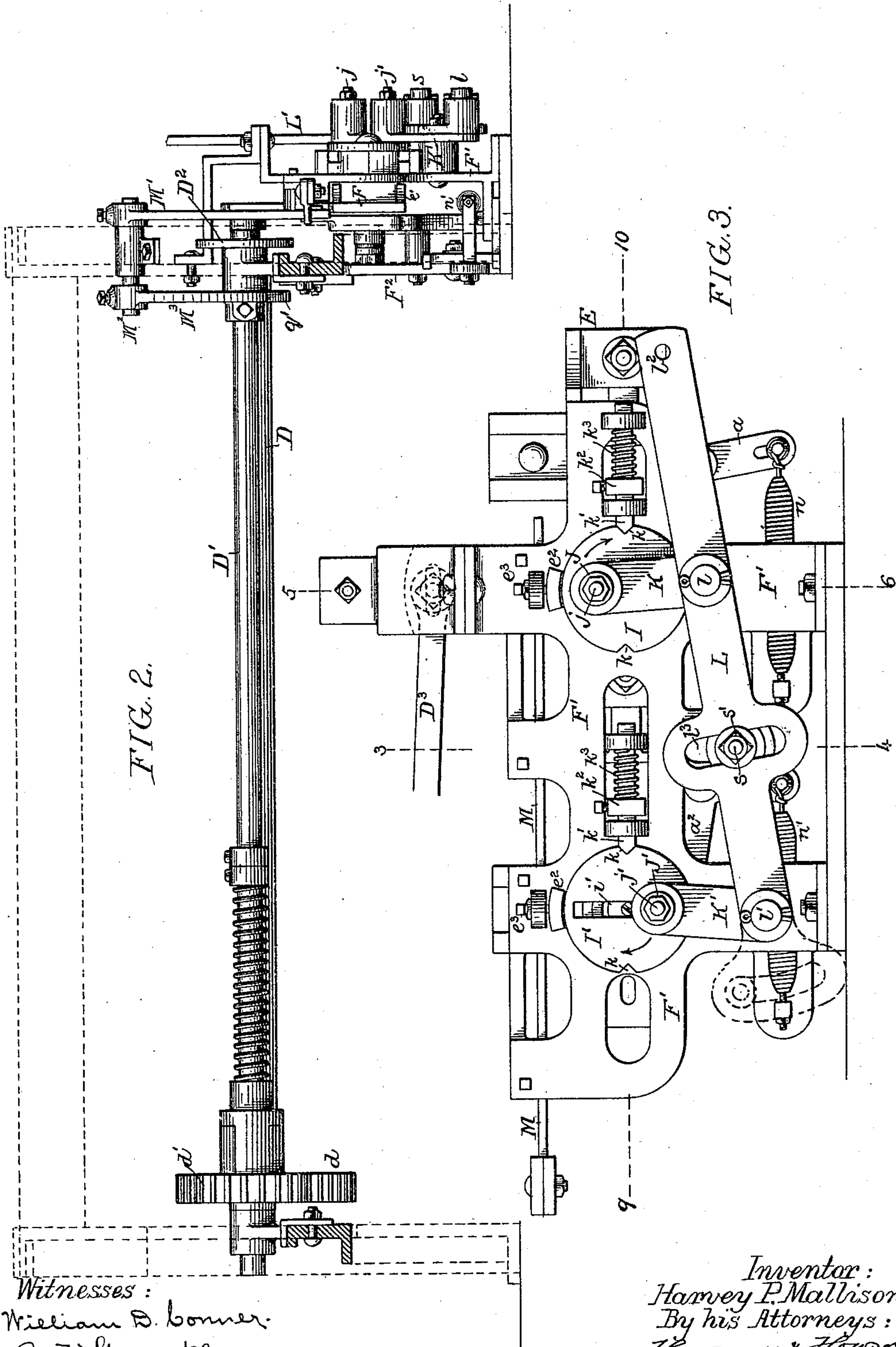
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4 Sheets—Sheet 2.

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4 Sheets—Sheet 4.

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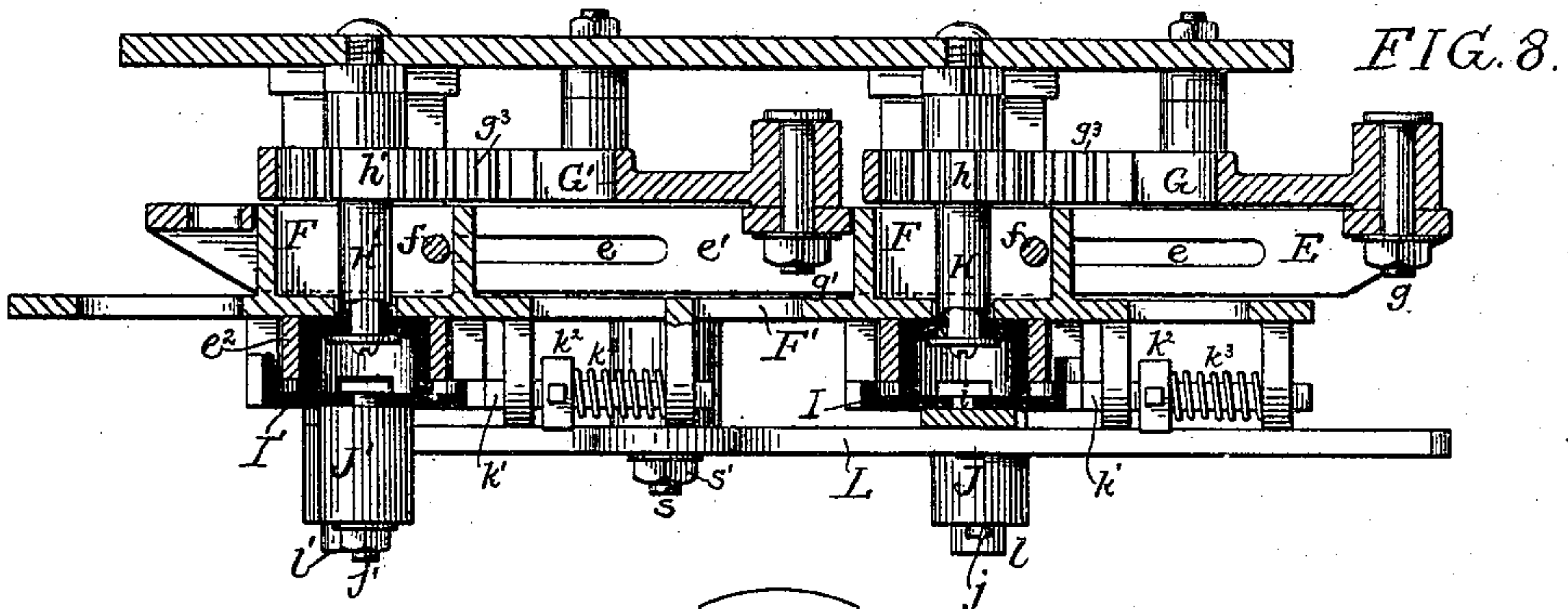


FIG. 9.

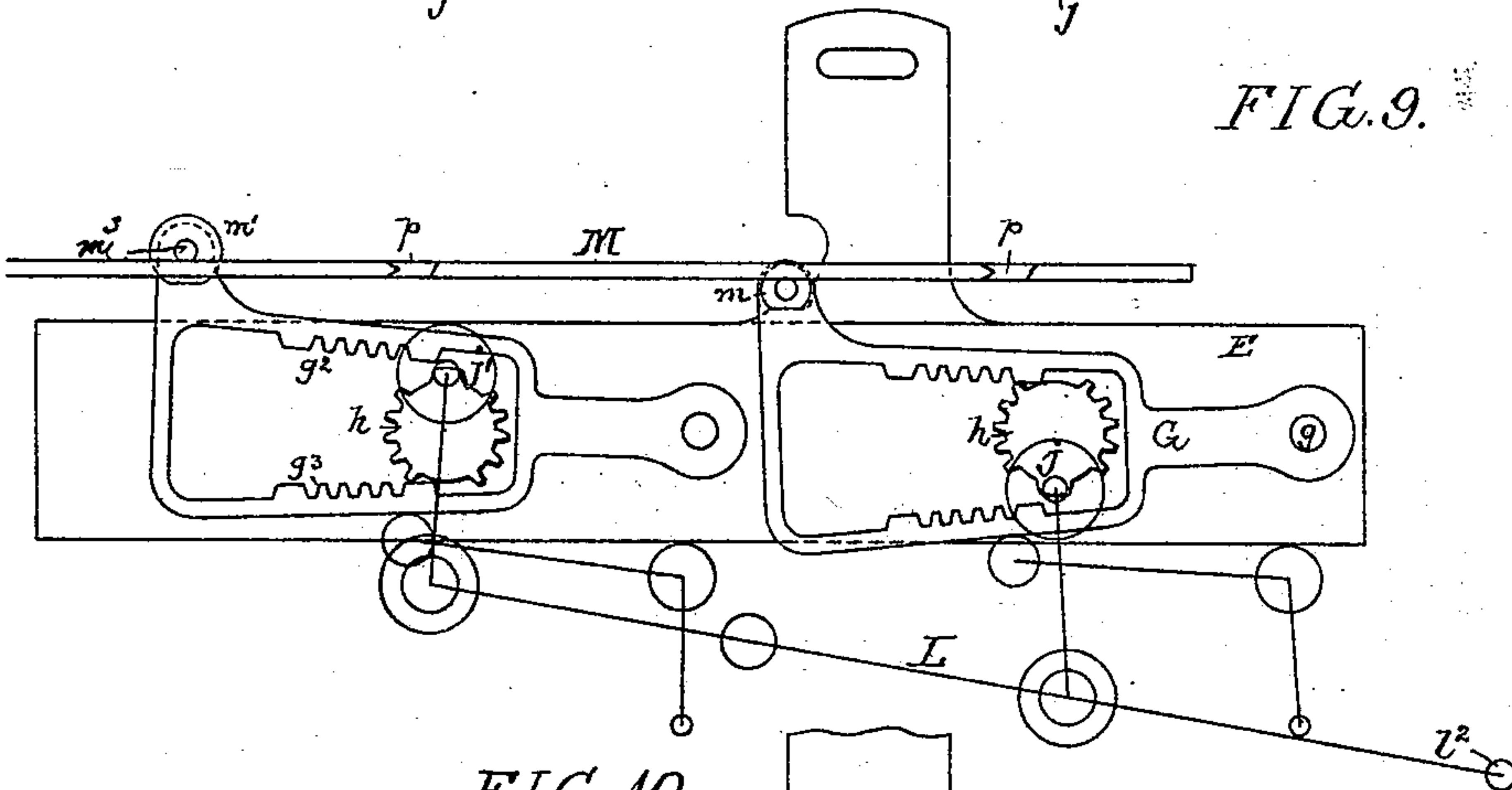


FIG. 10.

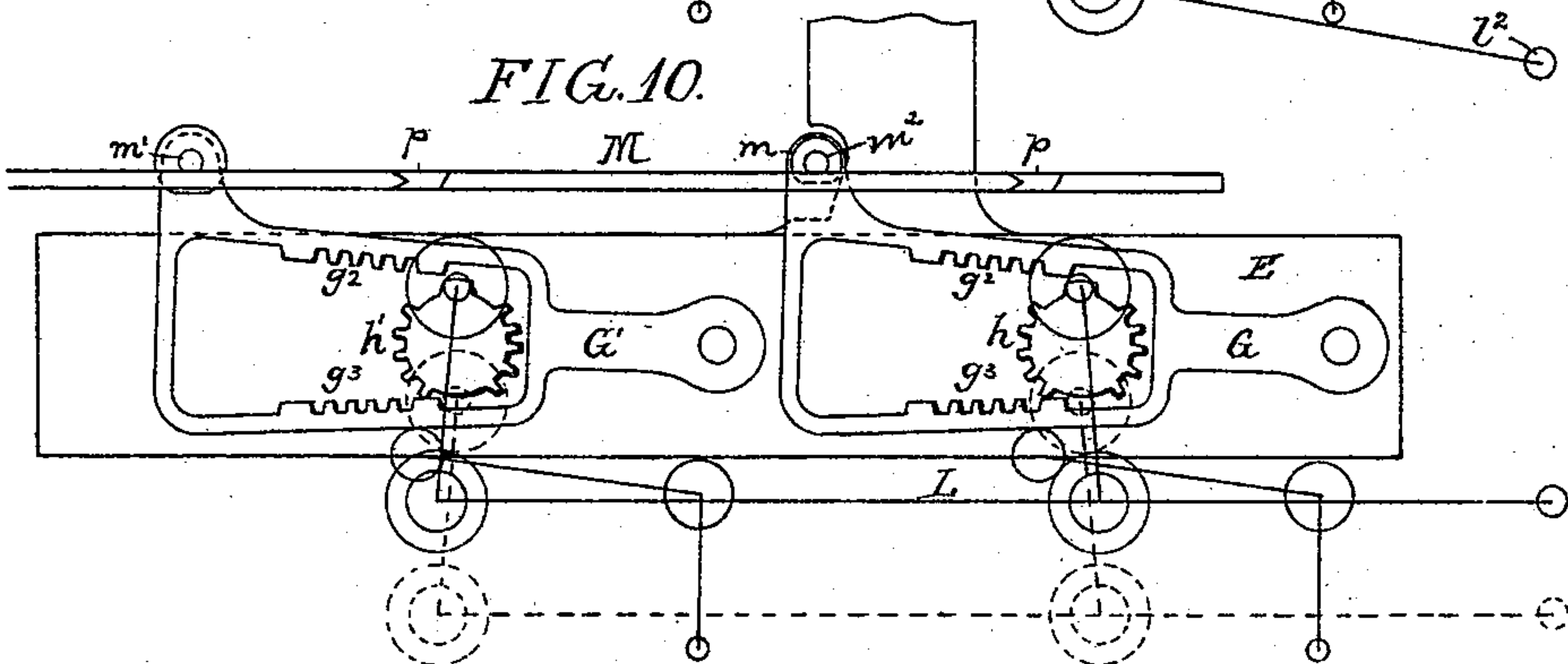
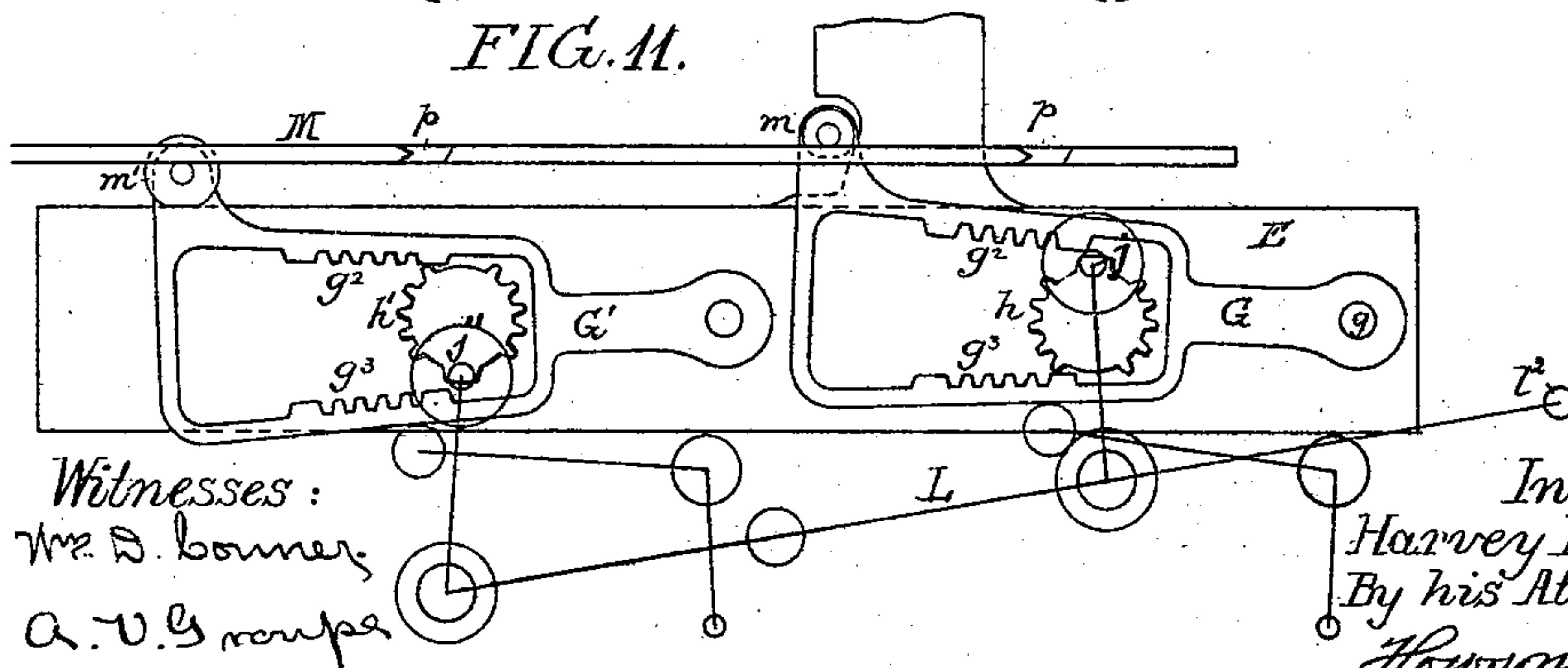


FIG. 11.



Witnesses:  
Wm. D. Bonner  
A. V. G. nours

Inventor:  
Harvey P. Mallison  
By his Attorneys:  
Howson & Howson



# UNITED STATES PATENT OFFICE.

HARVEY P. MALLISON, OF PHILADELPHIA, PENNSYLVANIA.

## DROP-BOX MECHANISM FOR LOOMS.

SPECIFICATION forming part of Letters Patent No. 478,621, dated July 12, 1892.

Application filed July 15, 1891. Serial No. 399,592. (No model.)

*To all whom it may concern:*

Be it known that I, HARVEY P. MALLISON, a citizen of the United States, and a resident of Philadelphia, Pennsylvania, have invented certain Improvements in Drop-Box Mechanisms for Looms, of which the following is a specification.

The object of my invention is to construct a positive and effective drop-box mechanism for looms; and this object I attain in the following manner, reference being had to the accompanying drawings, in which—

Figure 1 is a side view of my improved drop-box mechanism, showing the side frame of the loom by dotted lines. Fig. 2 is an end view looking in the direction of the arrow, Fig. 1, the frame of the loom being shown partly in section and partly in dotted lines. Fig. 3 is a side view of a portion of the mechanism, drawn to a larger scale than Fig. 1. Fig. 4 is a vertical section on the line 1 2, Fig. 5. Fig. 5 is a transverse section on the line 3 4, Fig. 3. Fig. 6 is a transverse section on the line 5 6, Fig. 3. Fig. 7 is a sectional plan view on the line 7 8, Fig. 5. Fig. 8 is a sectional plan view on the line 9 10, Fig. 3; and Figs. 9, 10, and 11 are diagrams illustrating the mechanism in the different positions.

A is the frame of the loom, and B is the lathe, hung in any suitable manner to said frame.

C is the pattern-chain on the pattern-shaft  $c$ , which is adapted to bearings on the loom-frame, and acted on by this pattern-chain are levers  $c'$ , connected to bell-crank levers  $c^2$  by cords  $c^3$ . The bell-crank levers  $c^2$  are in turn connected, respectively, to bell-crank levers  $a'$  by cords  $c^4$   $c^5$ , Figs. 1 and 4.

The pattern mechanism is that commonly used on the class of looms to which my invention relates, and therefore need not be described in detail. I may say, however, that the bell-crank levers  $a$   $a'$  govern the shift of the drop-boxes through the medium of the mechanism described hereinafter in accordance with the dictation of the drop-box pattern-chain C.

D is the main cam-shaft of the loom, geared to a shaft  $D'$  by an elliptic gear  $d$  and an eccentric gear  $d'$ , and on the end of the shaft  $D'$  is a crank  $D^2$ , in the present instance in the form of a disk, having a crank-pin  $d^2$ ,

which is connected to a projection  $E'$  on a slide E by a rod  $D^3$ , so that the slide E reciprocates in proper time as the shaft  $D'$  rotates. The slide E is constructed in the manner shown in Figs. 4 and 5 and is guided on bearings F, which project from a frame  $F'$ , having standards secured to the base of the loom. Pins  $f$  in the bearings F pass through slots  $e$  in the flanges  $e'$  on the slide E, so as to prevent the slide from moving sidewise from the bearings.

Pivoted at  $g$  to the slide E is a rack-frame G, which engages with a pinion  $h$  on a hollow shaft H, mounted upon a stud  $H^2$ , secured to the back frame  $F^2$ . The shaft H is held in proper position on the stud by a screw and washer, the screw passing into the stud. The hollow shaft H has a head I, in which is a slot  $i$ , and adapted to this slot is the securing-bolt  $j$  for the pivot or crank pin J. A nut on the bolt confines the crank J to the head I. I preferably make the hollow shaft H, the pinion  $h$ , and the head I in one piece, a core being used to form the hollow head. The head I is adapted to an adjustable bearing  $e^2$ , which can be raised or lowered by set-screws  $e^3$ , which pass through lugs on the front frame  $F'$  of the machine. The bearing  $e^2$  is made adjustable simply for convenience in aligning the several parts in the first instance, and in some cases the bearing may form part of or be rigidly secured to the front frame  $F'$ .

Pivoted at  $g'$  to the slide E is a second rack-frame  $G'$ , similar to the rack-frame G, and adapted to be geared to a pinion  $h'$  on a shaft  $H'$ , which has a head  $I'$ , this head being adapted to a bearing  $e^2$ , adjustable by means of set-screws  $e^3$ , similar to that described in reference to the head I. The head  $I'$  has a slot  $i'$ , to which is adapted the securing-bolt  $j'$  for the pivot  $J'$ . Hung to the pivot J is a link K, and hung to the pivot  $J'$  is a link  $K'$ , these links being pivoted to the drop-box-operating bar L at  $l$   $l'$ . The end  $l^2$  of the bar L is connected to the drop-box-lifting rod by a connecting-rod  $L'$ , Fig. 1.

It will be understood that the mechanism may either operate one set of drop-boxes on one side of the loom or may operate both sets of drop-boxes, one set on one side of the loom and the other set on the opposite side of the loom, by simply connecting the lifting-rods of



the two drop-box mechanisms in any suitable manner. Each head  $I I'$  is notched at  $k$  and receives a spring-bolt  $k'$ , which thus serves to lock the pivots  $J J'$  in their raised or lowered positions, but permit them to be moved when sufficient force is applied. Each bolt  $k'$  has a sleeve  $k^2$ , between which and the bearing for the bolt is a spring  $k^3$ , Fig. 3. Other appliances may be used for this purpose, however, without departing from my invention, inasmuch as this arrangement forms no part of my invention.

As before remarked, the lifting-levers  $a a'$  are connected to the pattern-chain levers by cords  $c^4 c^5$ , and the arm  $a^2$  of each lever rests against the under side of its rack-frame  $G$  or  $G'$ , as shown in Fig. 4, when the frames are in their forward position. When either of these levers is actuated, as dictated by the pattern-chain, so as to be raised by its respective springs  $n$  or  $n'$ , it lifts the rack-frame, so that the rack  $g^3$  on the lower portion of said frame will engage with the pinion; but when the arm  $a^2$  of the lever is drawn down by the action of the pattern-chain the upper rack  $g^2$  of the rack-frame falls into gear with the pinion by its own weight; but a spring may be used, if found necessary.

In order to lock the rack-frames in either their raised or lowered positions, a lug  $m$  is formed on the rack-frame  $G$  and a like lug  $m'$  on the rack-frame  $G'$ . These lugs have pins or projections which are either below or above a bar  $M$ , the bar being in such a position as to hold the lower rack of the rack-frames in engagement when the pins are above the bar, and when the pins are below the bar the upper racks of the rack-frames are held in engagement with the pinions. The bar  $M$  has openings  $p p'$ , through which the pins can pass, and this bar  $M$  is reciprocated in its slideways  $q$  by a lever  $M'$ , secured to a rock-shaft  $M^2$ , to which is secured an arm  $M^3$ , which is held against the cam  $q'$  on the shaft  $D'$  by a spring or other well-known means. (See dotted lines, Fig. 1.) The parts are so timed with respect to each other that when the rack-frames are to be raised or lowered their pins are opposite the openings  $p p'$ . Thus the bar  $M$  will not interfere with the free vertical movement of the rack-frames except when the latter are traveling forward or backward. The bar  $L$  in the present instance is slotted at  $l^3$ , and adapted to this slot is a pin  $s$ , projecting from the frame  $F'$  and having a nut  $s'$ . This pin and nut confine the bar against lateral motion and prevent it from swaying longitudinally, but at the same time, owing to the slot, permit free vertical motion of the bar. It will be evident that other devices for steadying the bar  $L$  may be used, and the steadying-pin need not necessarily be at the center of the bar, as shown, as the slot can be at either end of the bar, as shown by dotted lines in Fig. 3; but for convenience I prefer to mount the bar in the manner shown in the drawings.

Referring to the diagrams Figs. 9, 10, and 11, the full lines in Fig. 9 show the end  $l^2$  of the bar  $L$  in its lowest position, the crank-pin  $j$  being down and the pin  $j'$  up. In Fig. 11 the end  $l^2$  of the bar  $L$  is at its highest position, the crank-pin  $j$  being up and the pin  $j'$  down. In Fig. 10 the full lines show both crank-pins  $j j'$  up and the bar  $L$  in the higher intermediate position, the dotted lines in said figure illustrating both crank-pins  $j j'$  down and the bar  $L$  in the lower intermediate position. Thus it will be seen that by the two sets of racks and pinions the boxes can be moved to four positions.

By increasing the number of rack-frames and pinions a greater number of boxes can be used and the lifts increased.

I claim as my invention—

1. The combination, in drop-box mechanism for looms, of the drop-box bar, shafts, cranked pins on said shafts, connections between said cranked pins and the bar, pinions on the shafts, a slide, mechanism for reciprocating the same, a rack-frame engaging with the pinion on each shaft, said rack-frames being pivoted to the slide, and mechanism for throwing said rack-frames into engagement with the pinions, substantially as described.

2. The combination, in drop-box mechanism for looms, of the drop-box bar, cranked shafts, connections between the cranked shafts and the bar, pinions on said shafts, a slide, mechanism for reciprocating the same, rack-frames on said slide adapted to engage with the pinions, mechanism for raising and lowering said rack-frames, and the bar for holding the rack-frames in either the raised or lowered positions, substantially as described.

3. The combination, in drop-box mechanism for looms, of the slide, mechanism for reciprocating said slide, rack-frames on the slide, having upper and lower sets of teeth, shafts, pinions on said shafts, with which the teeth of the said rack-frames engage, with mechanism for raising and lowering said rack-frames, and connections between said shafts and the drop-boxes, whereby when the shafts are revolved they will raise or lower the drop-boxes, substantially as described.

4. The combination, in drop-boxes, of a bar connected thereto, shafts having cranked pins, links connecting the said pins to the bar, pinions on said shafts, a slide, mechanism for reciprocating the same, rack-frames pivoted to said slide and having teeth which engage with the pinions, a lever adapted to be operated by the pattern-chains bell-crank levers which act upon the said rack-frames at the dictation of the pattern-chain, and connections between the two sets of levers, substantially as described.

5. The combination of the drop-boxes, the bar connected thereto, cranked shafts, connections between the cranked shafts and the bar, pinions on said shafts, a slide, mechanism for reciprocating the same, rack-frames pivoted to said slide and having upper and lower



teeth which engage with the pinions, a locking-bar, mechanism for reciprocating the same, and pins on the rack-frames bearing upon said bar, substantially as described.

5 6. The combination of the drop-boxes, the bar connected thereto, cranked shafts, connections between the cranked shafts and the bar, pinions on said shafts, a slide, mechanism for reciprocating the same, rack-frames  
10 pivoted to said slide, mechanism for raising and lowering said pivoted rack-frames, pins on the rack-frames, and a locking-bar having openings for the passage of the pins with mechanism for reciprocating said bar, sub-  
15 stantially as described.

7. The combination of the drop-boxes, the bar connected thereto, cranked shafts, connections between the cranked shafts and the bar, pinions on said shafts, a slide, pivoted  
20 rack-frames on said slide, having upper and lower sets of teeth engaging with the pinions, mechanism for raising and lowering the rack-frames, a driving-shaft, a crank thereon, a connecting-rod connecting the crank to the  
25 slide, a locking-bar for locking the rack-

frames in either the raised or lowered positions, a rock-shaft having an arm engaging with the locking-bar and having a second arm, and a driving-cam engaging with said arm, substantially as and for the purpose set forth. 30

8. The combination, in drop-boxes, of a bar connected thereto, shafts having cranked portions and pinions, links connecting the cranked portions to the bar, a slide, mechanism for reciprocating the same, rack-bars on  
35 said slide, having upper and lower sets of teeth engaging with the pinions, bell-crank levers, springs connected to said levers and tending to raise the rack-bars, pattern-chain, and levers connected to said bell-crank levers and  
40 adapted to be operated by the pattern-chain, substantially as described.

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

HARVEY P. MALLISON.

Witnesses:

WILLIAM D. CONNER,  
HARRY SMITH.