

G. CROMPTON & H. WYMAN.

Loom.

No. 238,575.

Patented March 8, 1881.

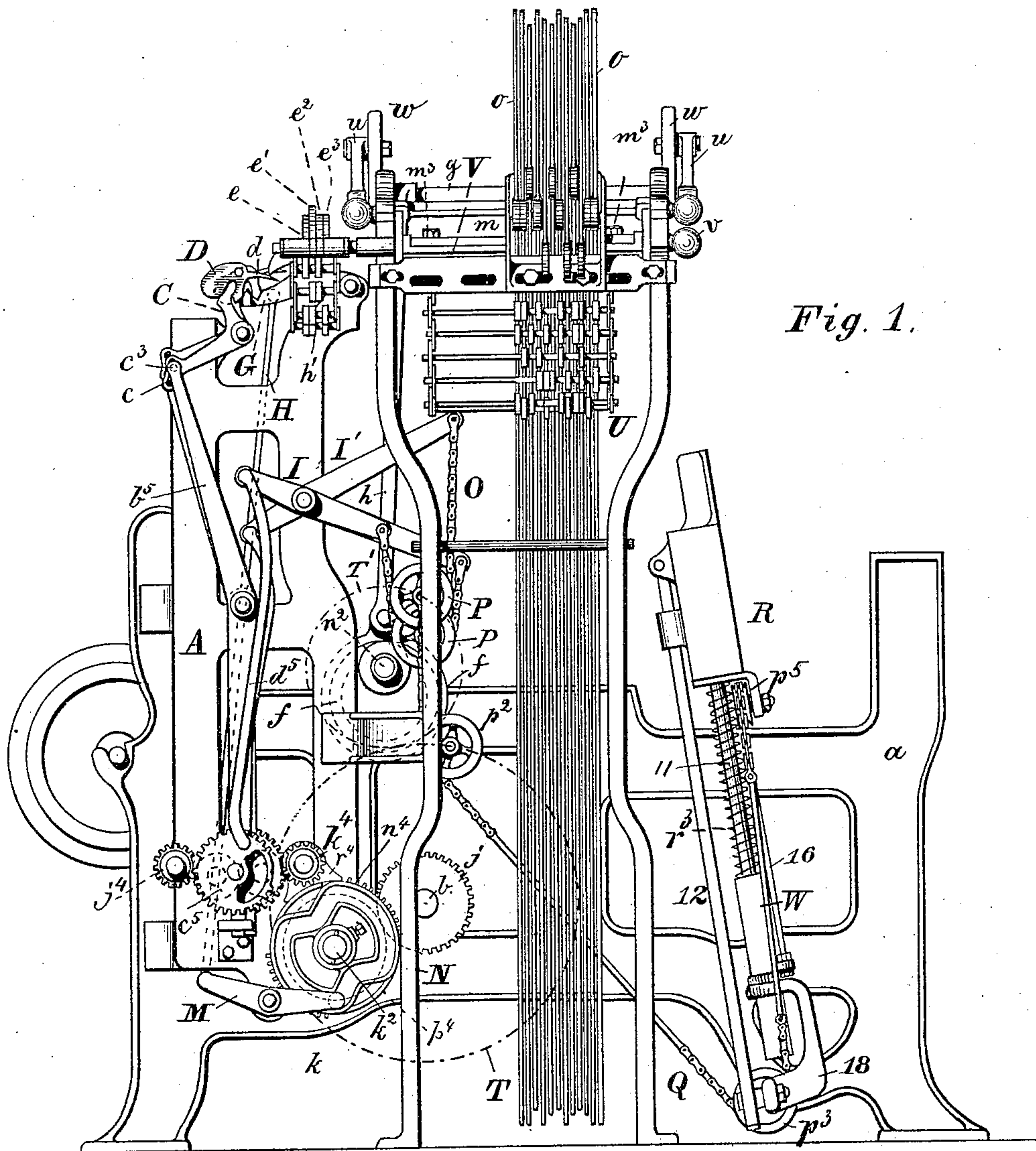
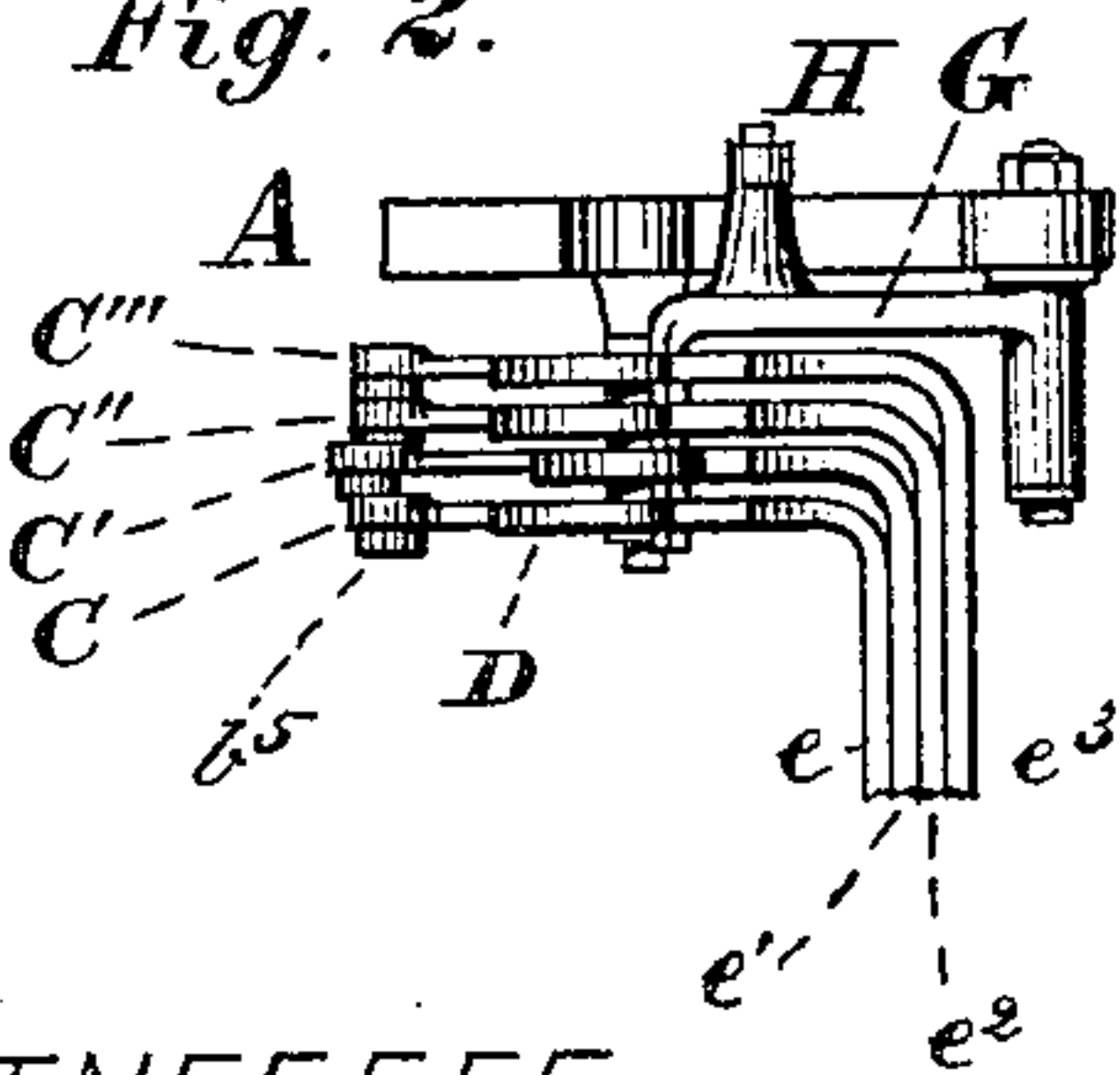


Fig. 1.

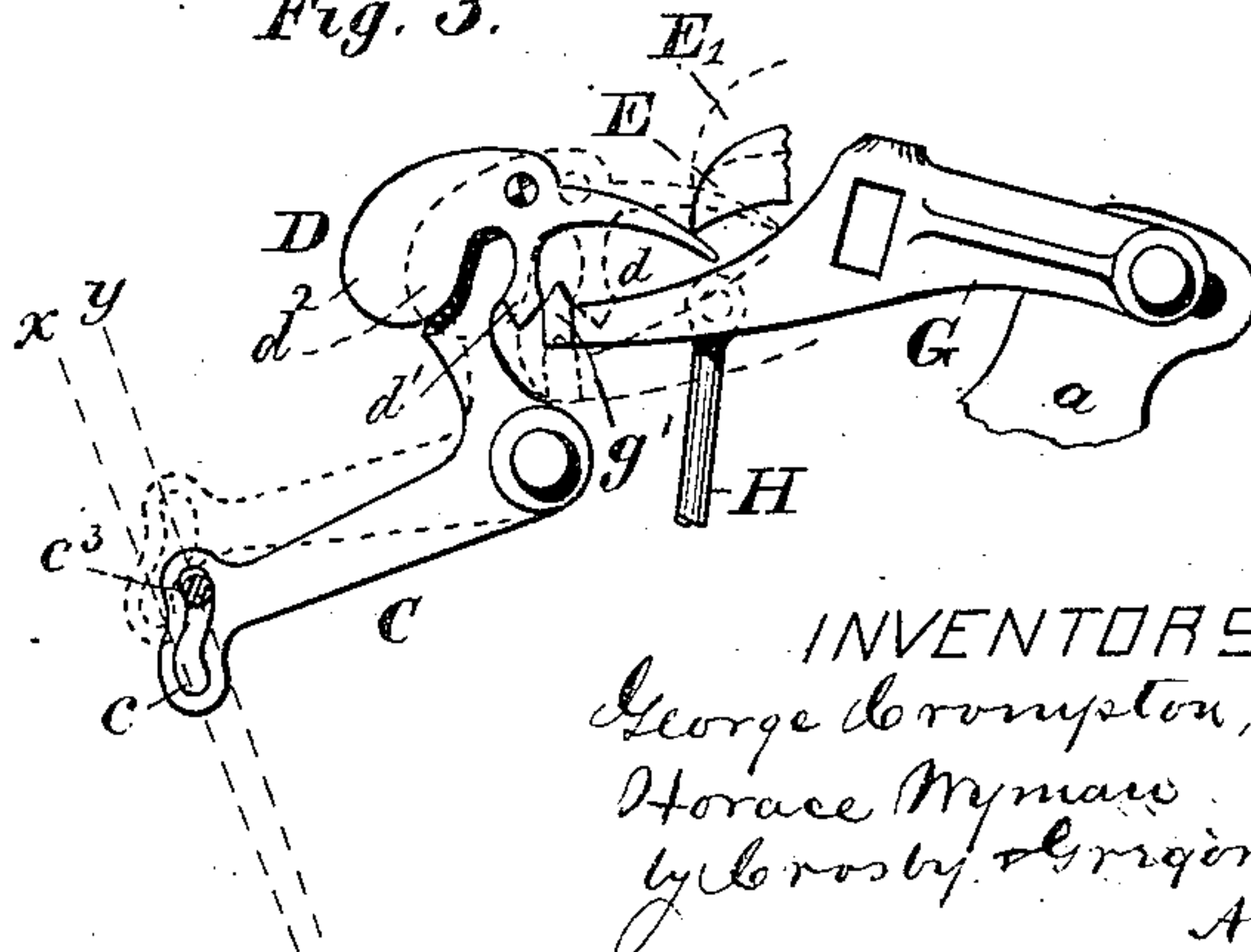
Fig. 2.



WITNESSES;

Edward H. Hill.  
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Fig. 3.



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(No Model.)

4 Sheets—Sheet 2.

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Fig. 4.

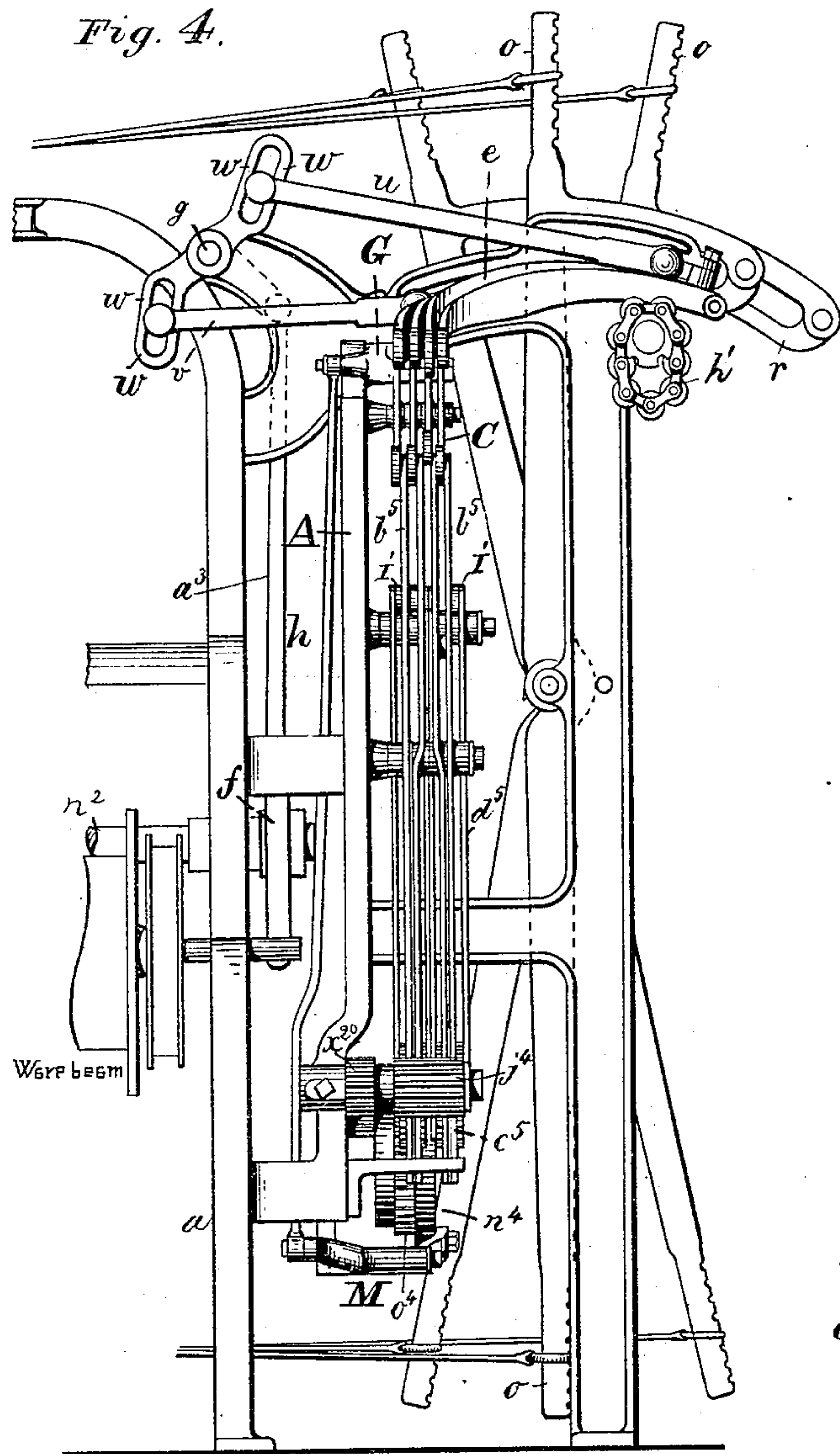


Fig. 5.

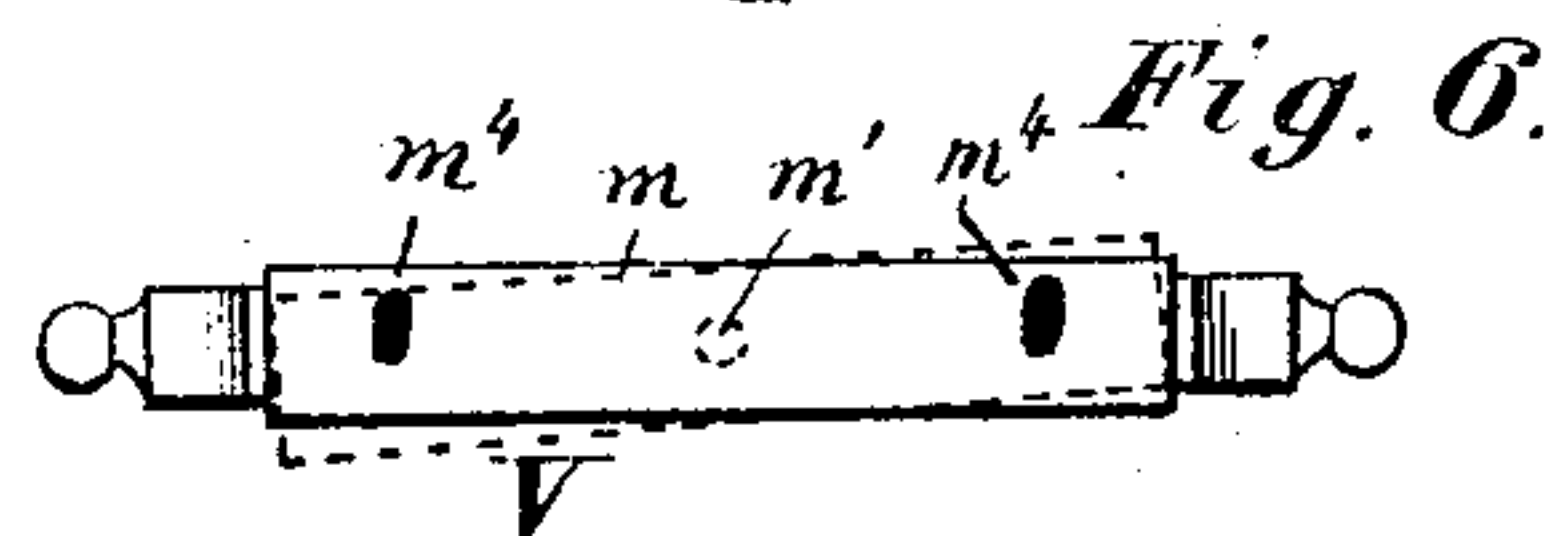
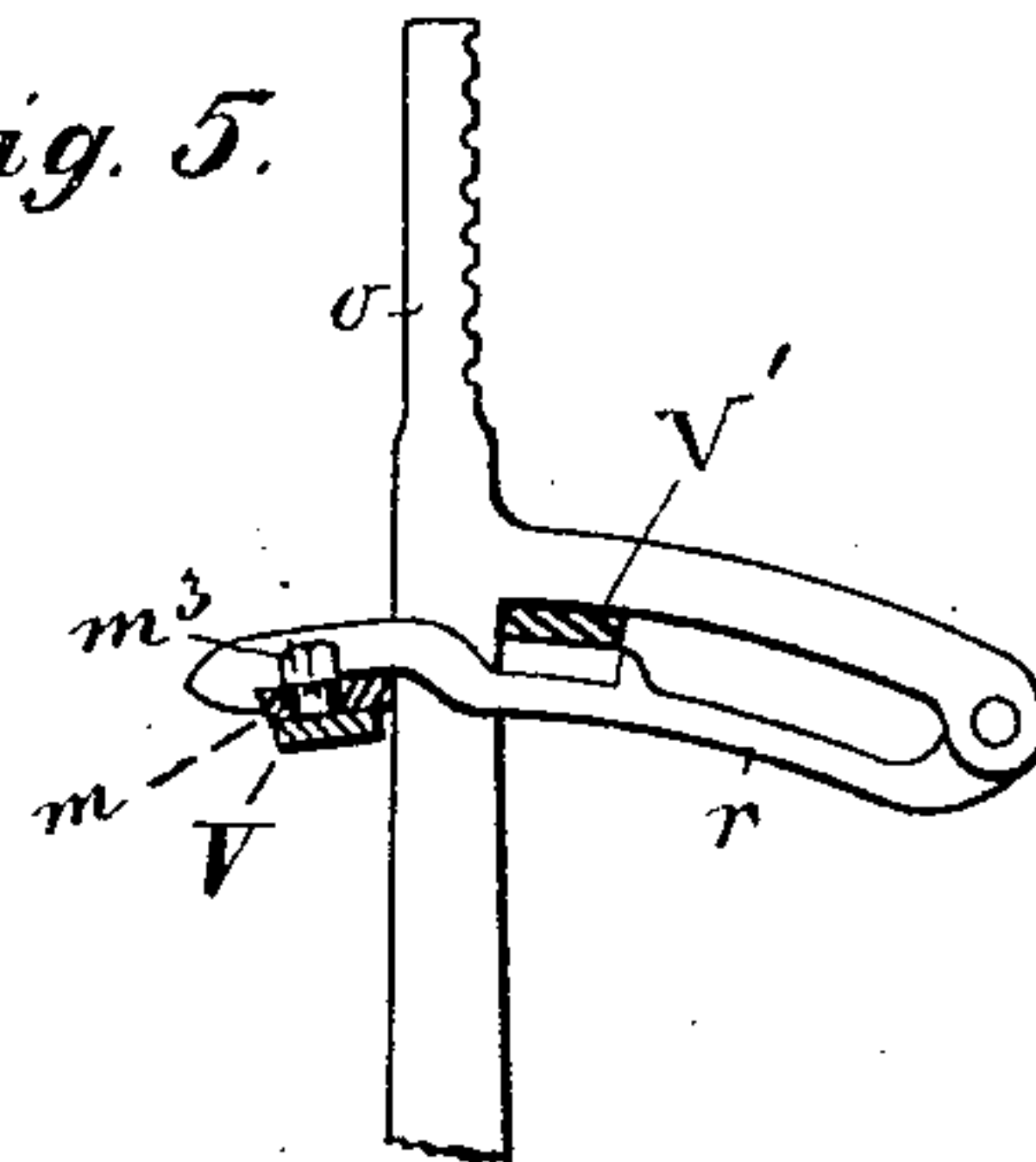


Fig. 7.

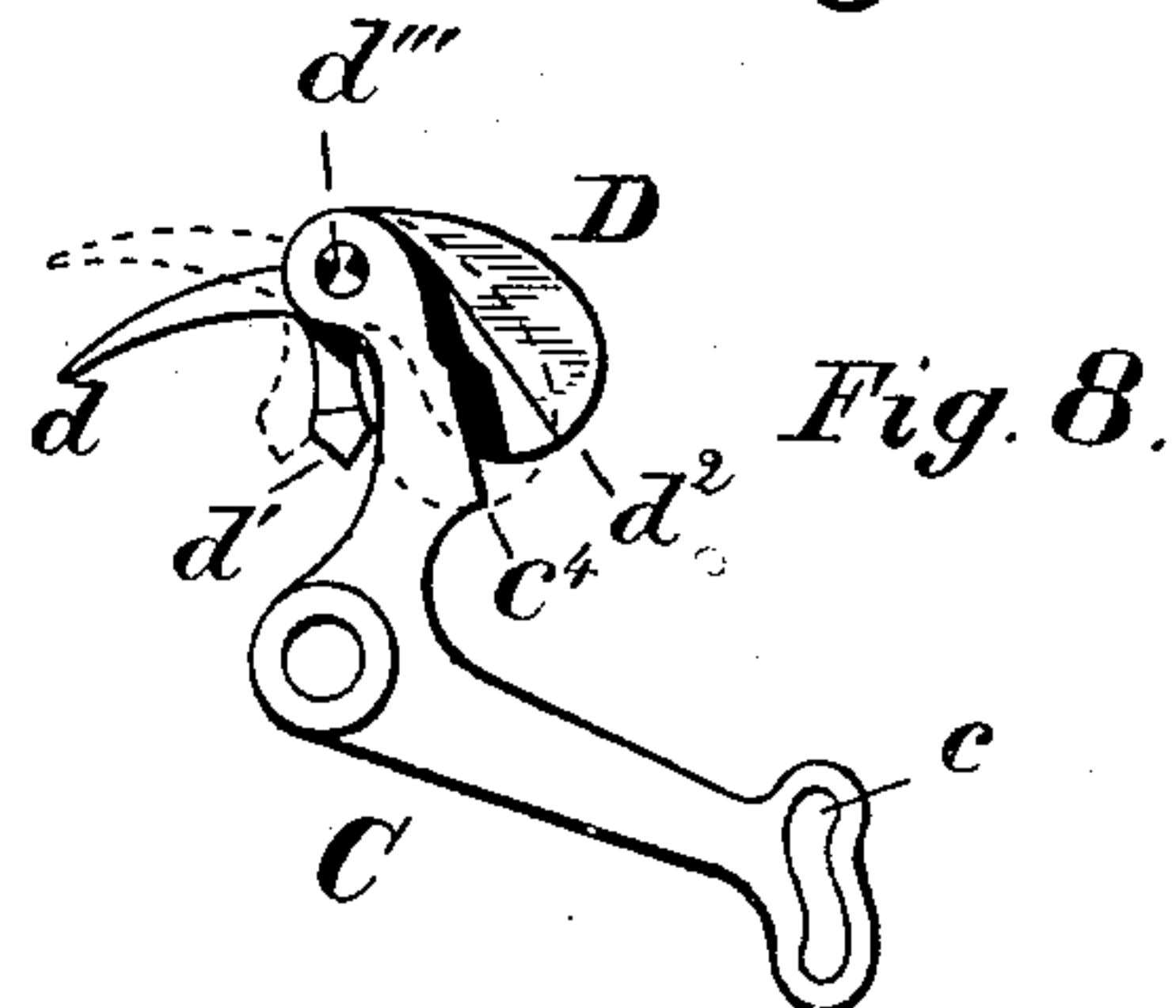
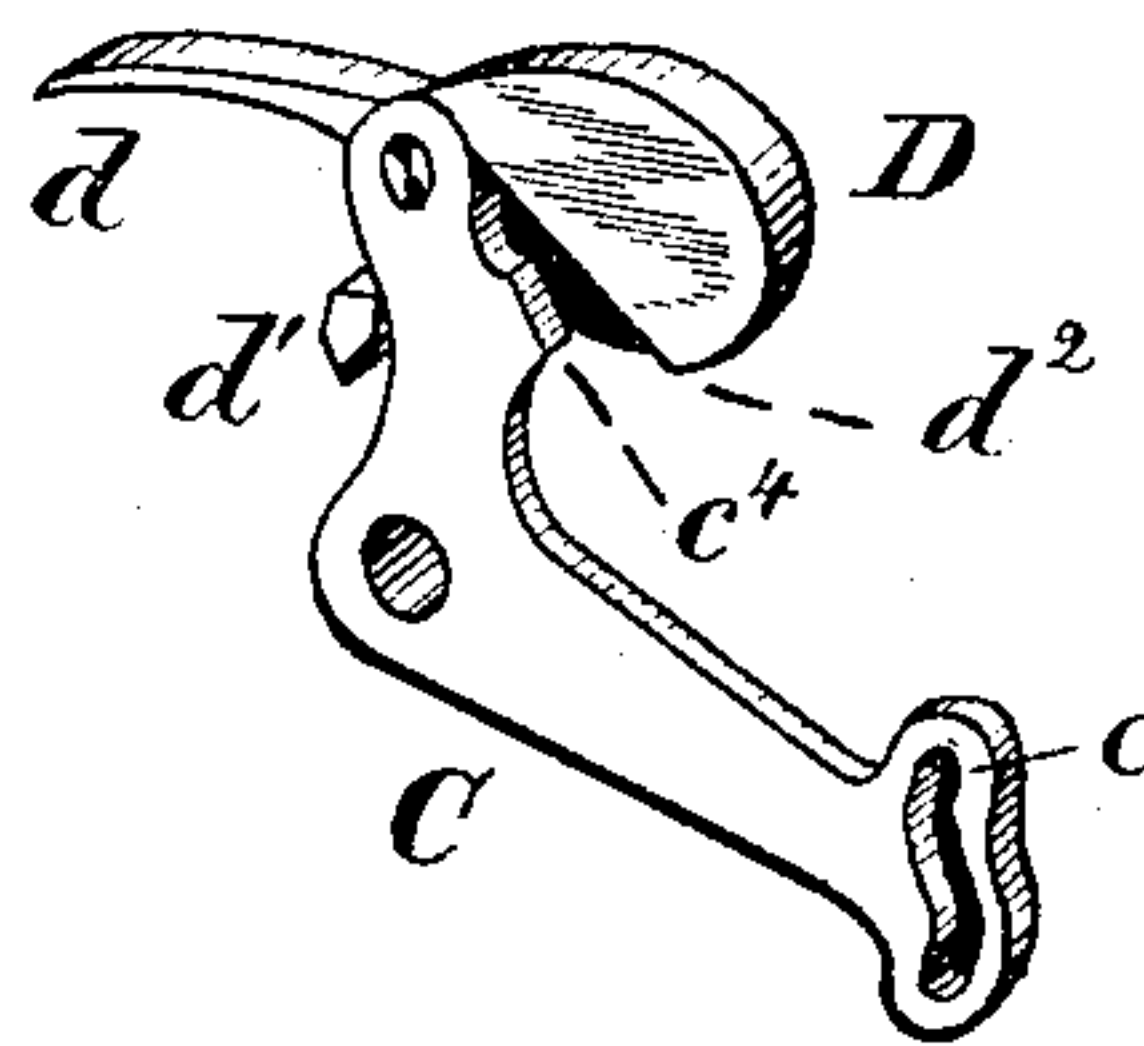
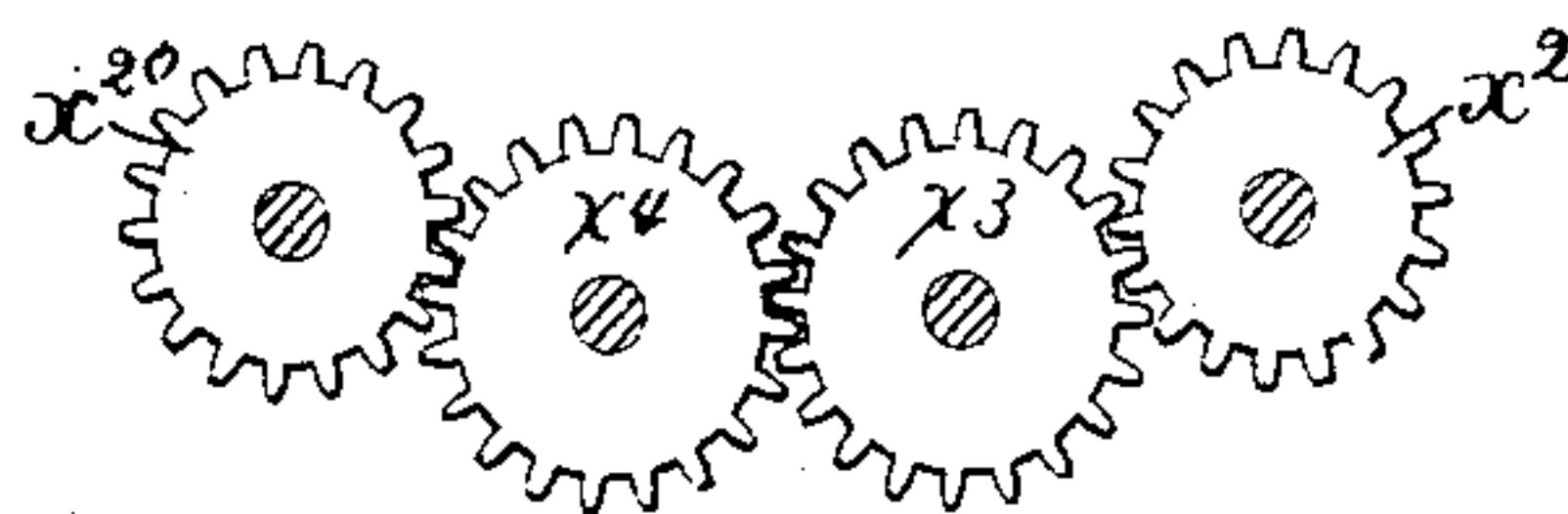


Fig 16.



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(No Model.)

4 Sheets—Sheet 3.

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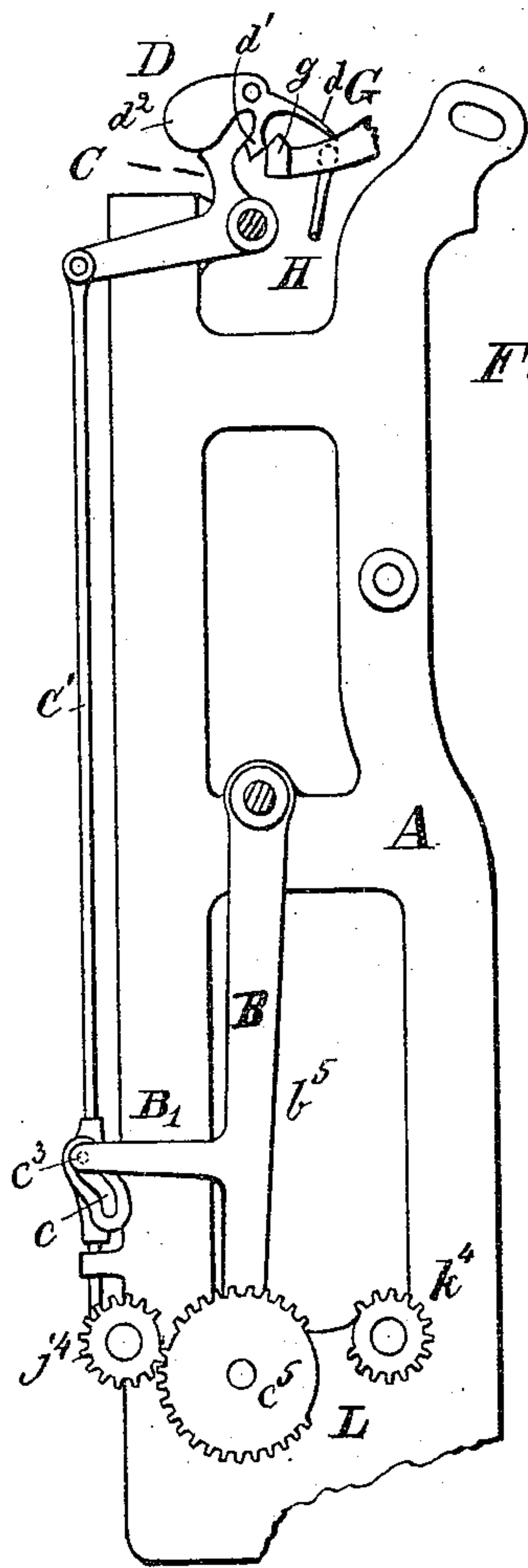


Fig. 9.

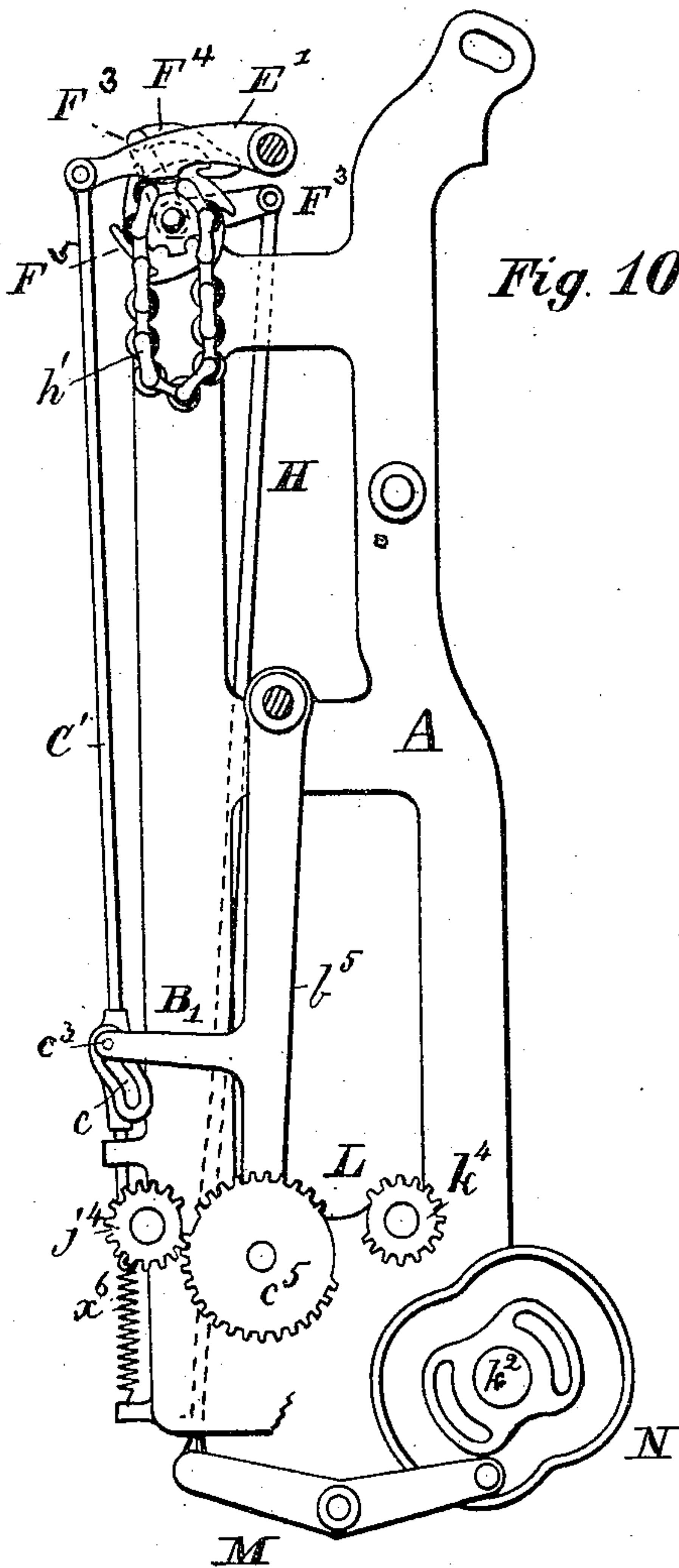


Fig. 10.

Fig. 12.

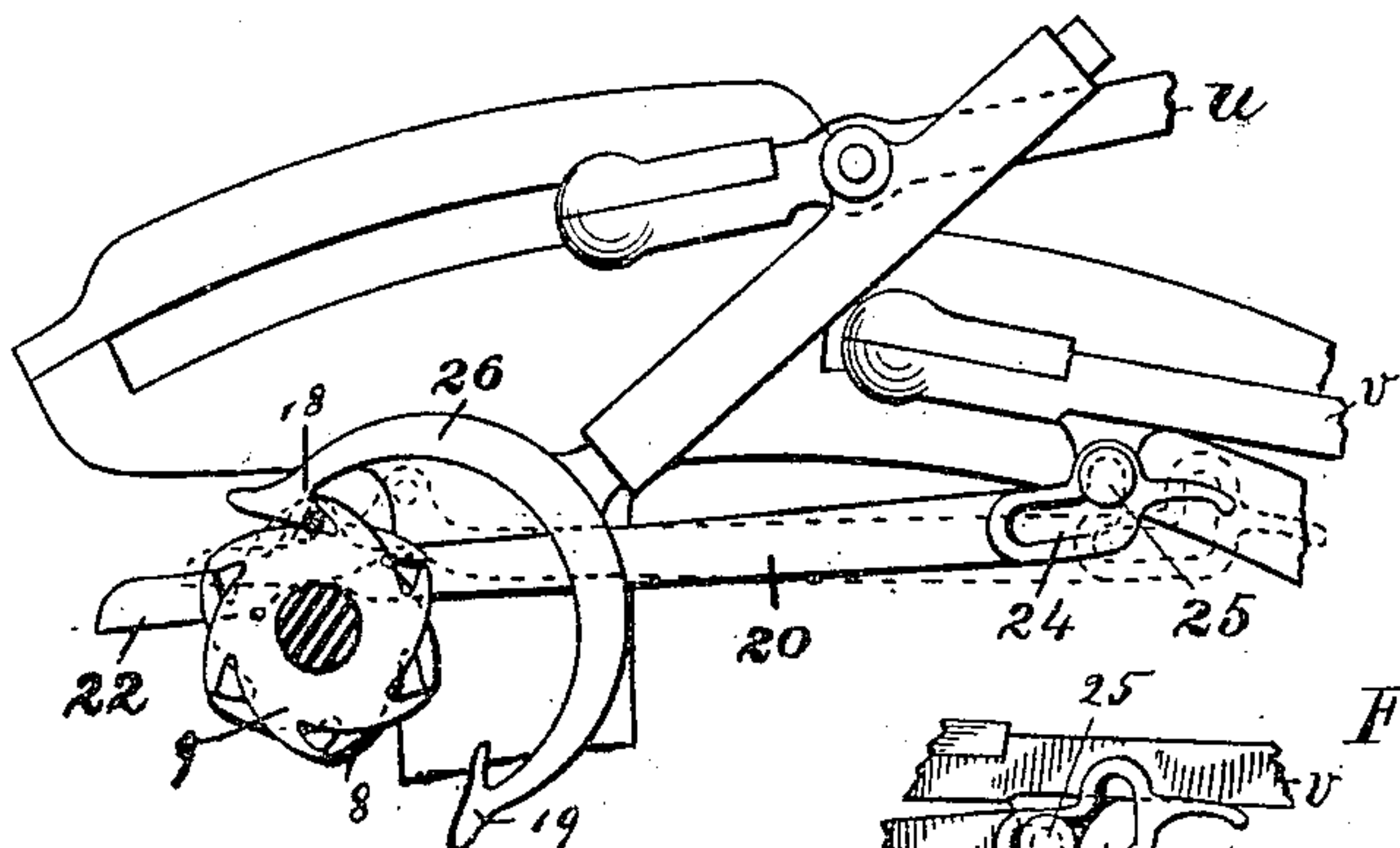


Fig. 13.

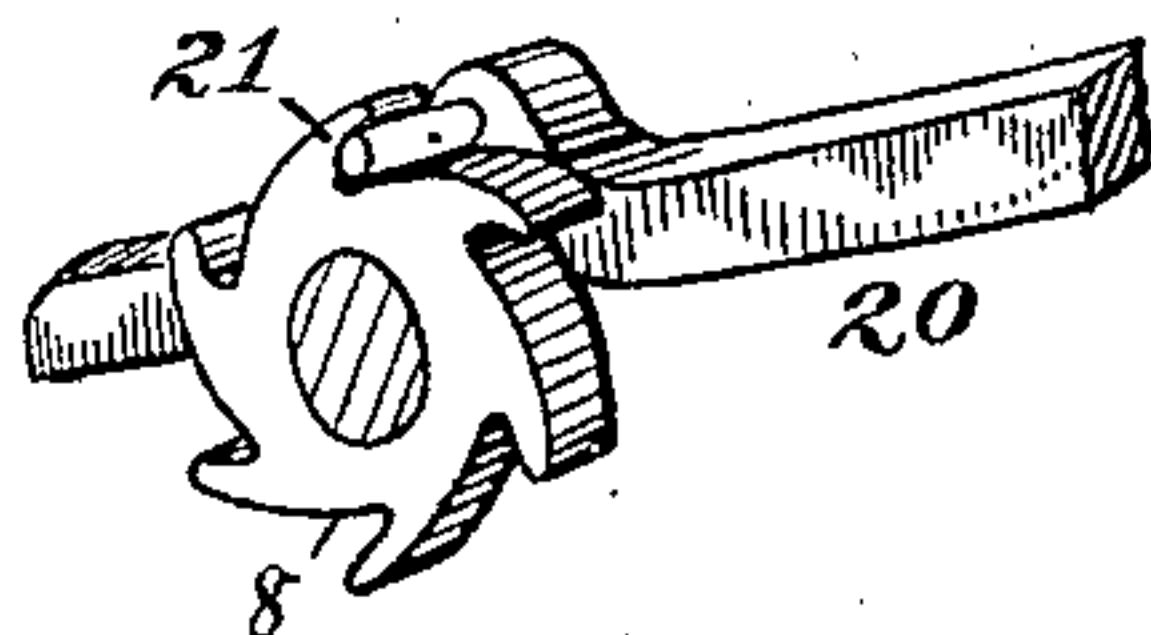


Fig. 14.

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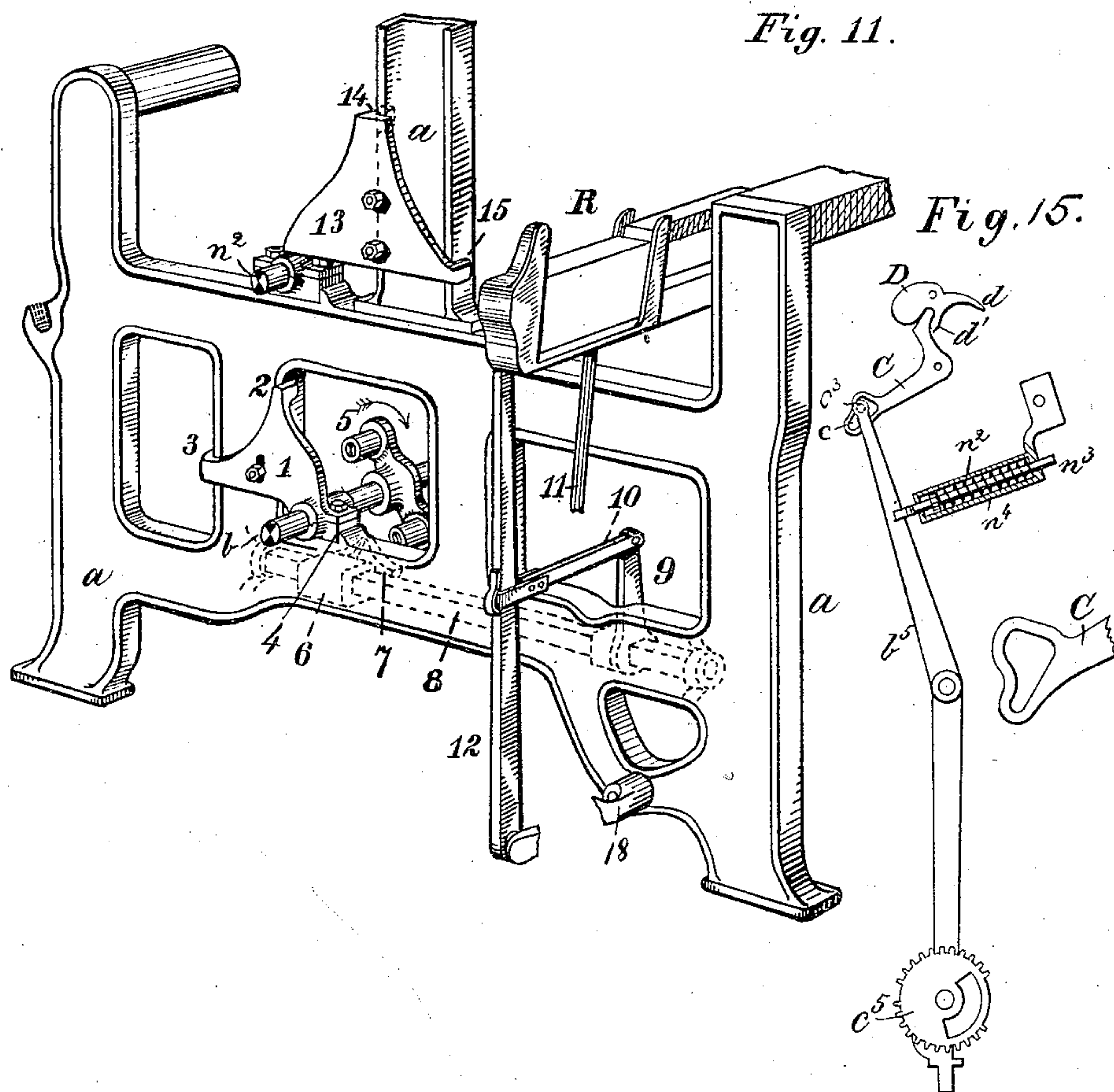
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WITNESSES;

Edward H. Hill.

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INVENTORS.

George Crompton and  
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# UNITED STATES PATENT OFFICE.

GEORGE CROMPTON AND HORACE WYMAN, OF WORCESTER, MASSACHUSETTS, ASSIGNORS TO SAID CROMPTON.

## LOOM.

SPECIFICATION forming part of Letters Patent No. 238,575, dated March 8, 1881.

Application filed June 9, 1880. (No model.)

*To all whom it may concern:*

Be it known that we, GEORGE CROMPTON and HORACE WYMAN, both of the city and county of Worcester, in the State of Massachusetts, have invented certain Improvements in Looms, of which the following description, in connection with the accompanying drawings, is a specification.

This invention relates to looms, and has more especial reference to improvements in the pattern-operating devices, the shuttle-box-operating mechanism, and the bearings for the cam-shaft.

This present invention is an improvement upon that class of looms represented in United States Patent No. 230,243, July 20, 1880, to which reference may be had.

In this present invention the movements of the shifting-levers, upon which are mounted the toothed cranks that operate the shuttle-box levers, are produced through or by means of a slotted shifting-lever-moving device, which is actuated at the proper times in accordance with the requirements of the pattern-surface of the shuttle-boxes. The cam-slot in this shifting-lever-moving device will preferably be so shaped as to move the said shifting-levers positively in both directions, to hold the teeth of the toothed cranks in contact with one or the other of the long gears which move them to shift the shuttle-boxes.

When using a long pattern-chain it frequently happens that one part of the chain at one side of the cylinder or shaft holding the chain is heavier than its other half. When this occurs, and the heavier half of the chain falls on the farthest side of the cylinder in the direction of its motion, the cylinder and chain have a tendency to overrun, or move over a distance equal to two bars of the chain instead of one bar, when being turned forward by the usual hook and catch. To obviate this we have provided for the pattern cylinder or chain mechanism a locking device, herein shown as a slotted sliding bar connected with one of the links for moving the depressor, so that the said slide-bar is moved in an opposite direction to the hook that turns the pattern cylinder or chain. This sliding bar is provided at its outer end with a pin, which, as the said bar is moved forward, meets one of the teeth

of that one of the ratchet-wheels of the pattern-cylinder which is employed to reverse the movement of the pattern surface or chain just as the pattern surface or chain has finished its forward movement for one step, the said pin then acting to lock the pattern surface or cylinder on one of the teeth of the reversely-placed ratchet-wheel. To enable the cylinder and chain so held to be turned by hand after the loom is stopped, we have provided the sliding bar at its rear end with a notched slot that engages a pin on the moving arm of the depressor, and by lifting the notched end of the sliding bar from the said pin the sliding arm is left free, so that the pattern-surface may be turned in either direction by hand.

Figure 1 is an end elevation of a loom illustrating part of our present improvements; Fig. 2, a detail plan view, representing the selectors and the upper ends of the fingers operated by the pattern-surface. Fig. 3 represents, in full lines, an enlarged detail of one of the selectors, and means for operating it, and one of the slotted shifting-lever-moving devices, in one position, and in dotted lines the position the said devices occupy when moved. Fig. 4 is a rear elevation of the parts shown in Fig. 1. Figs. 5 and 6 are details, showing the elevator and depressor and an upright lever, the depressor being provided with a movable evenner-plate to operate upon the upright levers to even the warps. Fig. 7 is a perspective view, and Fig. 8 a side elevation, of a selector and connected slotted shifting-lever-moving device. Figs. 9 and 10 are modifications, showing different forms of slotted shifting-lever-moving devices. Fig. 11 is a detail illustrating the end of the loom-frame, (partially covered or hid from view by the parts shown in Fig. 1,) the said figure showing a novel plan for holding the boxes of the cam and crank-shafts in place upon the loom-frame; Fig. 12, an enlarged detail of the reversely-placed ratchet-wheels of the pattern-cylinder, their moving pawl or hook device, and the locking device for the said cylinder, to prevent its moving more than one step at a time. Figs. 13 and 14 are details to be referred to explanatory of the mechanism shown in Fig. 13. Fig. 15 is yet another modification, on a smaller



scale, of a slotted shifting-lever-moving device; and Fig. 16, a detail of the gearing to connect the long gears.

In the said drawings, the frame-work *a*, the crank-shaft *n*<sup>2</sup>, the lower shaft, *b*, its gear *j*, the gear *n*<sup>4</sup>, having toothed and flanged parts, the holding device *r*<sup>4</sup>, carried by the shaft of the long gear *k*<sup>4</sup> and operating on the flanged part of gear *n*<sup>4</sup>, the upright levers, the notched jacks *r*, the rocker-shaft *g*, the arms *w*, the lifter and depressor connecting rods *u v*, attached, respectively, to the depressor *V* and the lifter *V'*, the pattern-surface *h'*, the reverse ratchets *S 9*, the double-hooked device *18 19*, the two reversely-rotating long gears *j*<sup>4</sup> *k*<sup>4</sup>, the shifting-levers *b*<sup>5</sup>, the toothed crank *c*<sup>5</sup>, and the connecting-rods *d*<sup>5</sup> for the shuttle-box levers, two of which will be employed for the series of shuttle-boxes at each end of the loom, are common to the said Crompton and Wyman's patent, hereinbefore referred to; and to avoid confusion the parts so far described are in this case designated by the same letters used in that patent. The long gears are rotated from the gear *j* on the lower shaft, *b*, of the loom, it engaging a gear, *o*<sup>4</sup>, (shown in dotted lines, Fig. 1,) at the rear of gear *n*<sup>4</sup> on the stud *k*<sup>2</sup>. The toothed part of the gear *n*<sup>4</sup> engages intermittently the long gear *k*<sup>4</sup>. The long gear *k*<sup>4</sup> has connected with it, at its rear end, a pinion, *x*<sup>2</sup>, of a diameter substantially that of the said long gear, such a pinion, *x*<sup>20</sup>, being also placed on the fellow long gear *j*<sup>4</sup>, Fig. 4, and the said pinions on these long gears are connected by two intermediate pinions, *x*<sup>3</sup> *x*<sup>4</sup>, (shown in detail, Fig. 16, and by dotted lines, Fig. 1,) at the rear of the toothed cranks. The long gear *k*<sup>4</sup>, and its pinion, is, by the intermediates, made the mover of the long gear *j*<sup>4</sup>. The gear *n*<sup>4</sup> has connected with its face or side the two-throw cam-disk *N*, that vibrates the lever *M*, connected by link *H* with the vibrating lever *G*. The lever *G* has a wedge-shaped cross-bar, *g'*, or plunger, and the said lever is vibrated once for every movement of the pattern-chain.

Resting above the pattern-chain *h'* is a series of fingers, *e e' e*<sup>2</sup> *e*<sup>3</sup>, which are raised at the proper times by the usual rolls of the pattern surface or chain, and are permitted to fall by their own gravity when not held up by a roll or a bar of the chain. The ends of these fingers, when permitted to descend by gravity, rest upon the forwardly-projecting parts *d* of the selectors *D*. Each selector has three arms or parts—viz., the forward parts, *d*, the wedge-faced parts *d'*, and the weighted parts *d*<sup>2</sup>. Each selector, when employed as we prefer, is pivoted upon one of the slotted shifting-lever-moving devices at *d*<sup>3</sup>, and is directly acted upon by the said wedge or plunger *g'*. When the fingers *e e'*, &c., descend upon the ends *d* of the selectors, the selectors so operated upon are thrown in the position represented in Figs. 3, 7, and 8 in full lines, so that the lever *G*, when it is elevated by the link *H* and lever

*M*, causes its wedge-faced bar *g'* or plunger to act upon the wedge-faced parts *d'* of the said selectors (see Fig. 1) and move them and all of the slotted shifting-lever-moving devices, (shown in Figs. 1, 3, 7, 8 as elbow-levers,) upon which the said selectors are mounted, and in such direction as to cause their slotted parts *c* to travel downward over the pins *c*<sup>3</sup> of the shifting-levers, one of which pins is shown in section in Fig. 3. Each shifting-lever will be provided with a pin, such as *c*<sup>3</sup>, to enter a slot, *c*. In Fig. 1 the first and second shifting-lever-moving devices are shown in opposite positions, and the first shifting-lever is shown as so held as to engage its toothed crank with the long gear *j*<sup>4</sup>, while the toothed crank of the second shifting-lever is held engaged with the long gear *k*<sup>4</sup>. The selectors not acted upon by the fingers, as described, will be left in the condition designated in the dotted lines, Fig. 3, and by the second selector from the front, Fig. 1.

In Figs. 1, 3, 7, 8 we have shown the slotted shifting-lever-moving devices made in a single piece, and as an elbow-lever, *C*, a pin at the upper end of each shifting-lever entering the slot *c* of that lever which is to move it; but instead of making the said slot *c* directly in the elbow-lever, or that lever which is turned on its fulcrum according to the requirements of the pattern-surface, we find it sometimes desirable to make the said slot in a guide rod or bar, *C'*, joined with and depending from the lever *C*, as in Fig. 9. In this modification we dispense with the upper end of the shifting-levers, leaving them as designated by *B*, Fig. 9, one arm, *B'*, projecting therefrom, being supplied with the pin to enter the slot *c*, the arm *B'* taking the place of the upper part of the lever, Fig. 1.

We prefer to employ the selectors and lever *G g'* as the most desirable means for actuating the slotted shifting-lever-moving devices; yet it will be obvious that we may use the more simple, yet not as quick and certain, contrivance shown in Fig. 10. In the said figure the lever designated by *E'* rests directly upon, and is raised and lowered by, the pattern surface or chain, causing the rod *C'*, with the cam-slot *c*, to be elevated, a spring, *x*<sup>6</sup>, depressing it and operating its connected shifting-lever, as described of Fig. 9.

In Fig. 10 the rod *H* will connect with one arm of the usual pawl mechanism *F*<sup>3</sup>, and cause the pawl *F*<sup>4</sup> to turn the pattern-surface step by step, as common in looms. In Fig. 15 we have shown the slot in the elbow-lever of a different shape from that shown in Figs. 1 and 3, and have applied to the shifting-lever *b*<sup>5</sup> a spring, *n*<sup>2</sup>, and rod *n*<sup>3</sup> in a tube, *n*<sup>4</sup>, to keep the pin *c*<sup>3</sup> at the upper end of the lever *b*<sup>5</sup> against the cam-shaped or outer face of the slot in the lever *C*.

The shuttle-box levers *I I'*—two levers for each set of four boxes at each side of the loom—are connected at their front ends by a chain,



O, and each of the said chains is extended over a running pulley or sheave, P, attached to a chain, Q, and each chain Q is extended over suitable guide-pulleys, such as  $p^2$   $p^3$   $p^5$ , and then it is connected with a rod, 16, attached to a sleeve or tube, W, on the shuttle-box rod 11. These shuttle-box levers, pulleys P, and chains are the same as represented in an application for United States patent filed  
 10 December 26, 1879, by George Crompton, to which reference may be had.

In Fig. 9 we have shown the slotted shifting-lever-moving device as composed of two parts; and instead of making the slot  $c$  directly in the elbow-like lever, we have made it in a part of a slide-rod, C', connected with the elbow part C, and moved with it. In that figure the upper end of the shifting-lever  $b^5$  is omitted, and instead it has a side projection, 20 B', which has a pin,  $c^3$ , to enter the slot  $c$  and move the lever  $b^5$ , as hereinbefore described.

In Fig. 10 we have shown a plan to do away with the selectors D. In said figure we have arranged to permit the rolls of the pattern-chain to act directly upon the arms E', equivalent to the long arm of the elbow-lever C. The pattern-chain in that figure is shown as moved by the usual pawl-and-ratchet mechanism  $F^3$   $F^4$   $F^5$ , as commonly prevalent in looms  
 30 of the Crompton class.

In some cases it may be desirable to cut away one side of this angular slot  $c$ , so as to allow a spiral spring,  $n^2$ , on a rod,  $n^3$ , in a guide-box,  $n^4$ , to move the shifting-lever  $b^5$  in one direction, as shown in Fig. 15. It will be evident, in this case, that the lever  $b^5$  will have a positive movement in one direction, and that the spring  $n^2$  will carry it in the other direction and hold it. In place of the spring and  
 40 rod, a weight might be substituted.

Sometimes, when using a long pattern-chain, or when a portion of the chain containing a large number of rolls is succeeded by a portion of chain containing but few rolls, the chain, 45 by means of its greater weight, as described, at one side the cylinder or shaft moving the chain, has a tendency to overrun, or move two bars of chain instead of one, when being turned by the usual hooks, 18 19, and catch-wheels 8 9. To obviate this we have provided the pattern cylinder or chain with a locking device, (shown as a sliding bar, 20,) carried by the rod  $v$ , that actuates the depressor, it moving in an opposite direction to the hooks 18 19. On this  
 55 bar is a pin, 21, (see Figs. 12 and 14,) which comes forward and meets the reverse catch-wheel 8 just as it has finished turning, thus locking the pattern-surface against further movement by the hook 18, which turns it over. In order to turn the cylinder by hand when in this position, and when the loom is stopped, the sliding bar 20 has a slot, 24, with a notch at its upper end, which fits over a pin, 25, on the bar  $v$ . By lifting the notched end of the  
 65 sliding bar from this pin which actuates it the slide-bar may be moved backward, the pin 25

then resting in the long horizontal part of the slot, thus releasing the cylinder. We denominate this slide-bar as the locking device for the pattern-surface. 70

When a number of cells are used in a tier of shuttle-boxes it sometimes happens that the spring surrounding the box-rod requires to be compressed the whole distance of the tier, and the spring must be of considerable length to allow of such compression. This is provided for by extending the tube or sleeve W down through the guide 18 and allowing the spring  $r^3$  to pass inside of the sleeve down nearly to the lower part of the shuttle-box rod. 80

Great trouble has been experienced in looms by the displacement of the cam-shaft  $b$  during the time the loom is picking the shuttle across, by reason of the picking-rolls 5, as they are moved in the direction of the arrow, striking the shoe 7 on the picking-shaft 8, (see Fig. 11,) the said shaft  $b$ , owing to the strain thus thrown upon it, having a tendency to raise and draw up or loosen the boxes 4, placed on the loom-frame. To obviate this difficulty the cap of the box is provided with a projecting ear or brace, that extends, as shown in Fig. 11, to an upright part of the frame  $a$ , and the ear has one or more lugs, preferably two, one numbered 2 resting against one edge of the frame up some distance from the cap, and the other lug, 3, bearing on the opposite edge of the frame lower down. This effectually locks the bearing on the frame, making it impossible for it to rise. This ear might be bolted to the  
 90 frame  $a$ , if desired. 100

Instead of making the ear a part of the cap, it may be made separate from the cap and merely rest upon it, as shown by the ear 13, that holds down the cap of the crank-shaft  $n^2$ . It will answer the same purpose. 105

We have provided an ear, 13, to hold down the cap of the crank-shaft. The said ear has lugs 14 15 to embrace a rigid part of the main frame  $a$ . 110

The pattern surface or chain U lifts the notched jacks  $r$  of the harness mechanism in the usual way.

The rocker-shaft  $g$  is actuated by the link  $h$ , having a connected eccentric-strap,  $f$ , that embraces an eccentric (shown in dotted lines, Fig. 1) on the crank-shaft  $n^2$ . 115

The two dotted circles T T' represent the usual connecting-gear of the cam and crank shafts. 120

The shoulders  $c^4$  support the selectors when their weighted ends  $d^2$  are permitted to descend.

We have herein shown a tube, W, to receive the shuttle-box rod and its surrounding spring; but no claim is herein made thereto, as they form the subject-matter of another application, filed February 2, 1881. 125

We claim—

1. In a loom, a series of toothed cranks, and means to partially rotate them in one or the other direction, a series of connecting-rods, 130



shuttle-box levers, and a tier of shuttle-boxes, with which they are connected, combined with a series of shifting-levers, a pattern mechanism for the shuttle-boxes, and a slotted shifting-lever-moving device intermediate between the shifting-levers and pattern-surface, and mechanism to actuate the same to operate the shifting-levers at the proper times, substantially as described.

2. The shaft of the pattern cylinder or chain and its ratchet-wheels, and means to move said ratchet-wheels, combined with the locking device for the said pattern cylinder or chain, the depressor-moving rod *v*, and with means to actuate the depressor-moving rod, substantially as described.

3. In a loom, the loom-frame, the shaft *b*, and means to actuate it, its picking-rolls *5*,

shoe 7, and picking-shaft 8, combined with the shaft-bearing mounted on the loom-frame, and with the bearing-cap provided with ears, as described, and connected with a part of the stationary loom-frame, to hold the cap of the bearing, and the bearing with the shaft therein, down firmly during the rotation of the said shaft, substantially as and for the purpose set forth.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

GEORGE CROMPTON.  
HORACE WYMAN.

Witnesses:

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J. A. WARE.