

(No Model.)

5 Sheets—Sheet 1.

J. RANGE.

MACHINE FOR CLIPPING LACE AND OTHER FABRICS.

No. 353,586.

Patented Nov. 30, 1886.

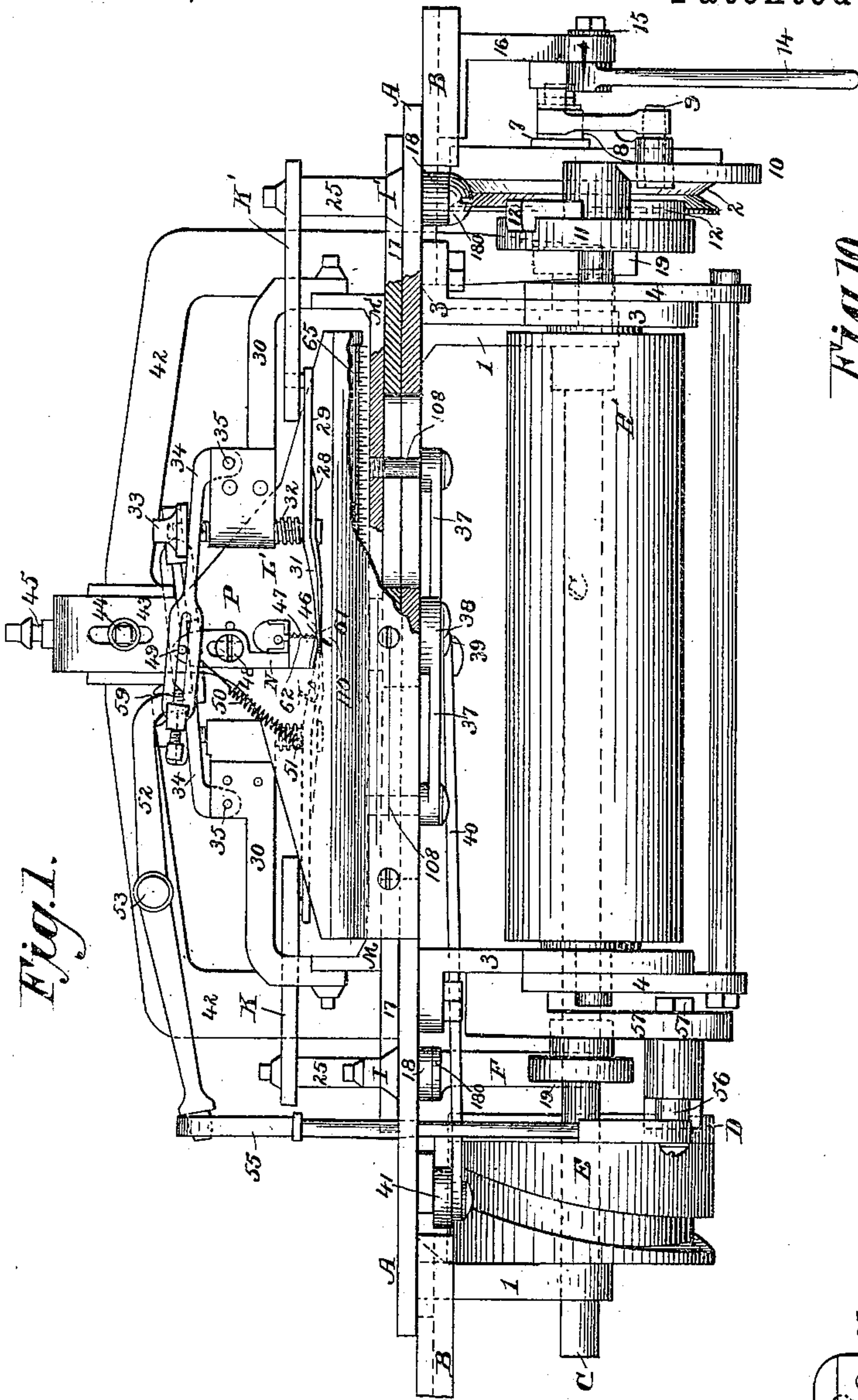


Fig. 1.

Fig. 10.

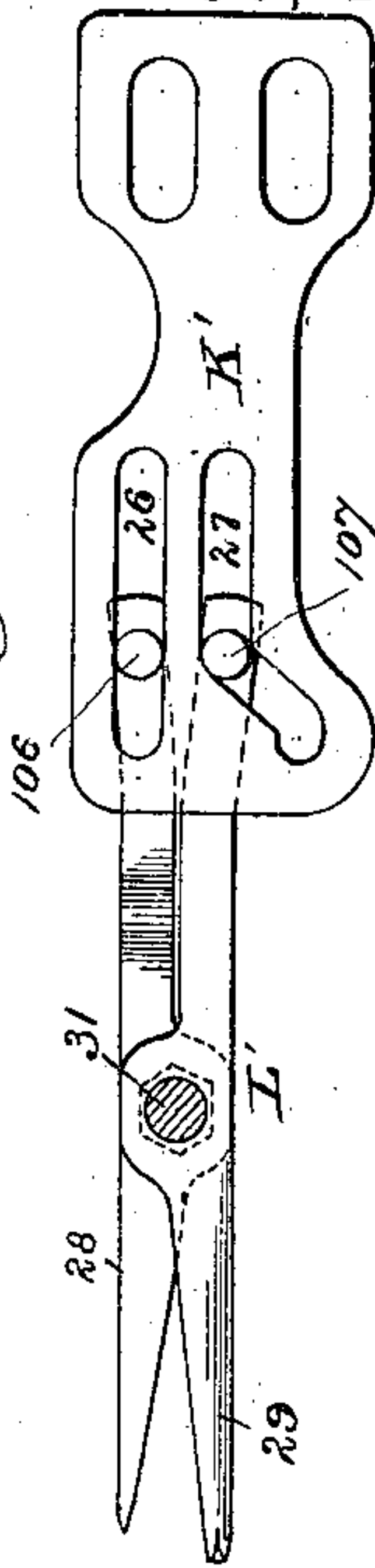
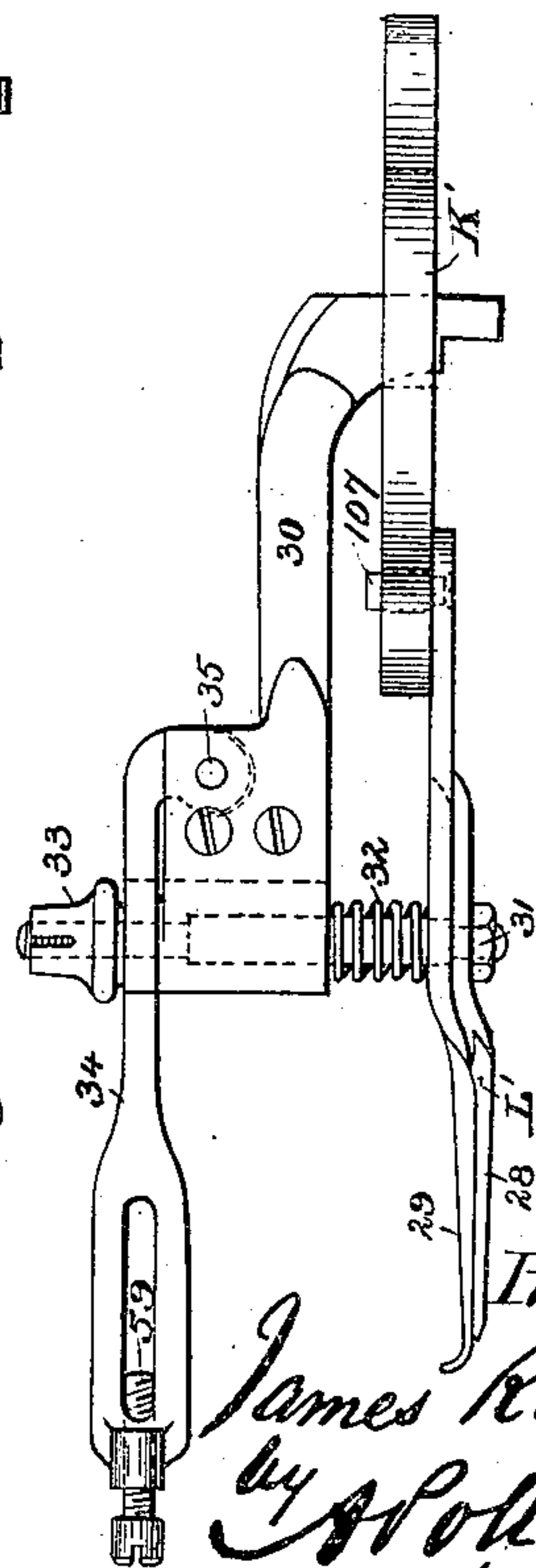


Fig. 9.



(No Model.)

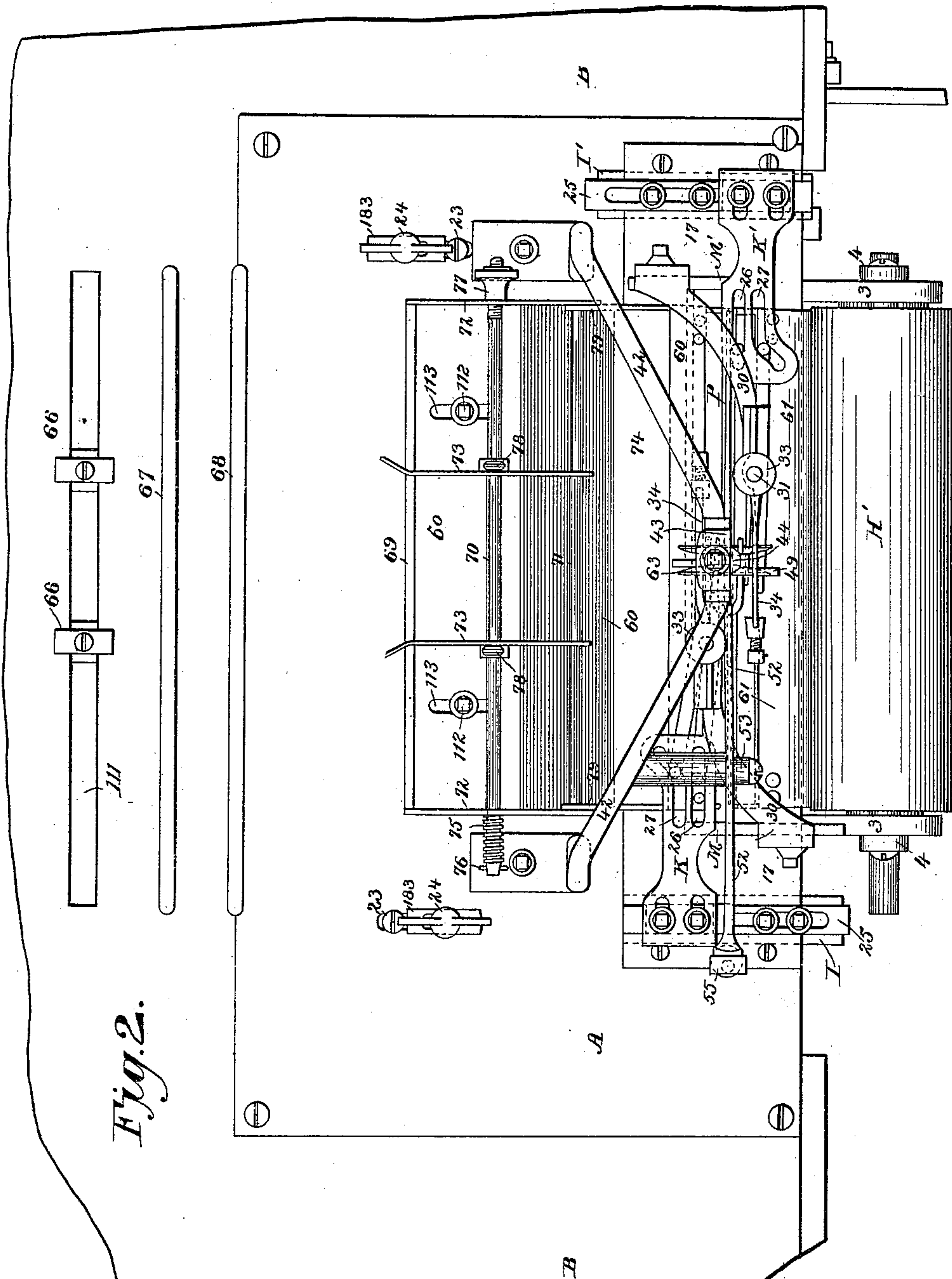
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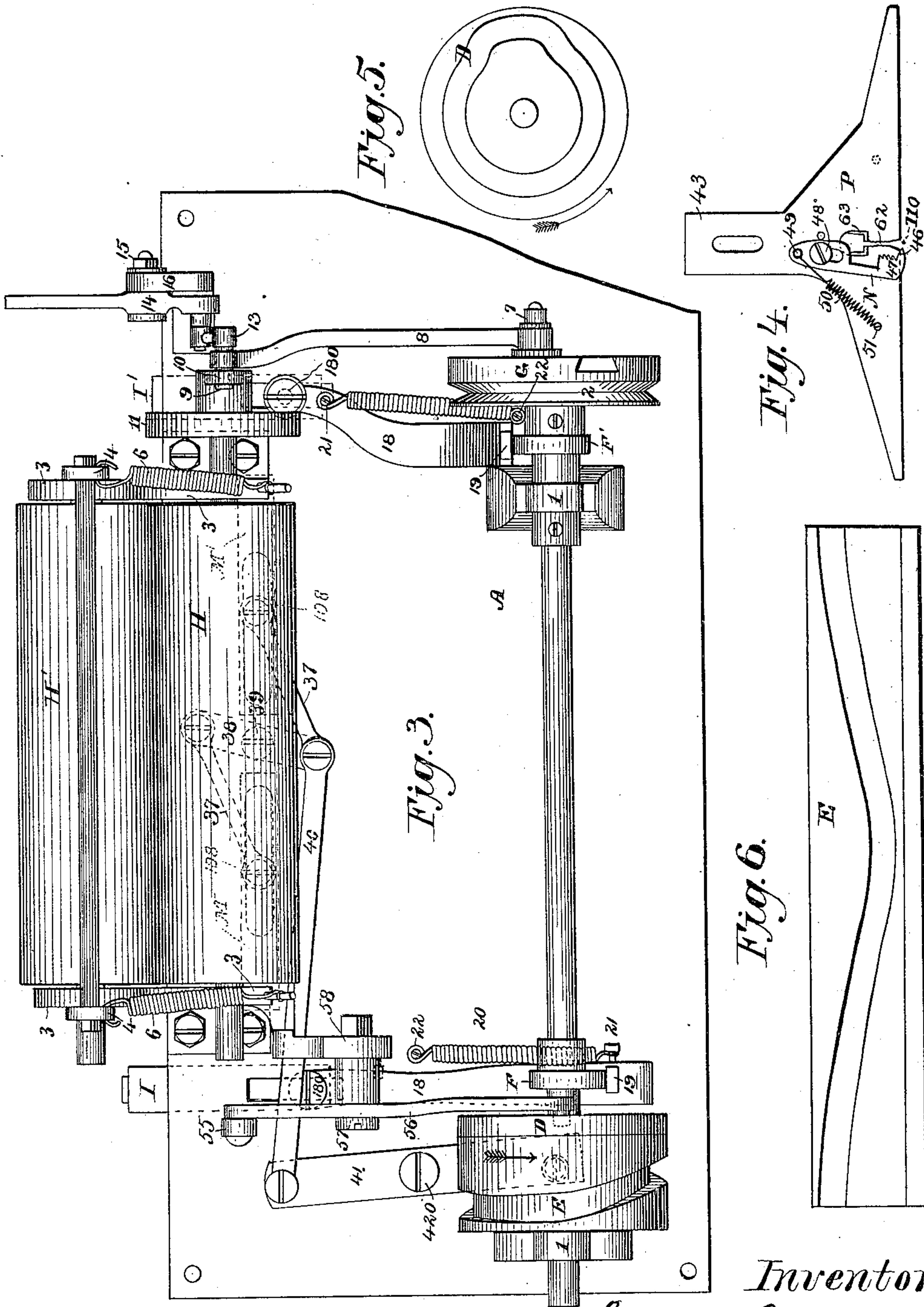
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5 Sheets—Sheet 4.

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Fig. 8.

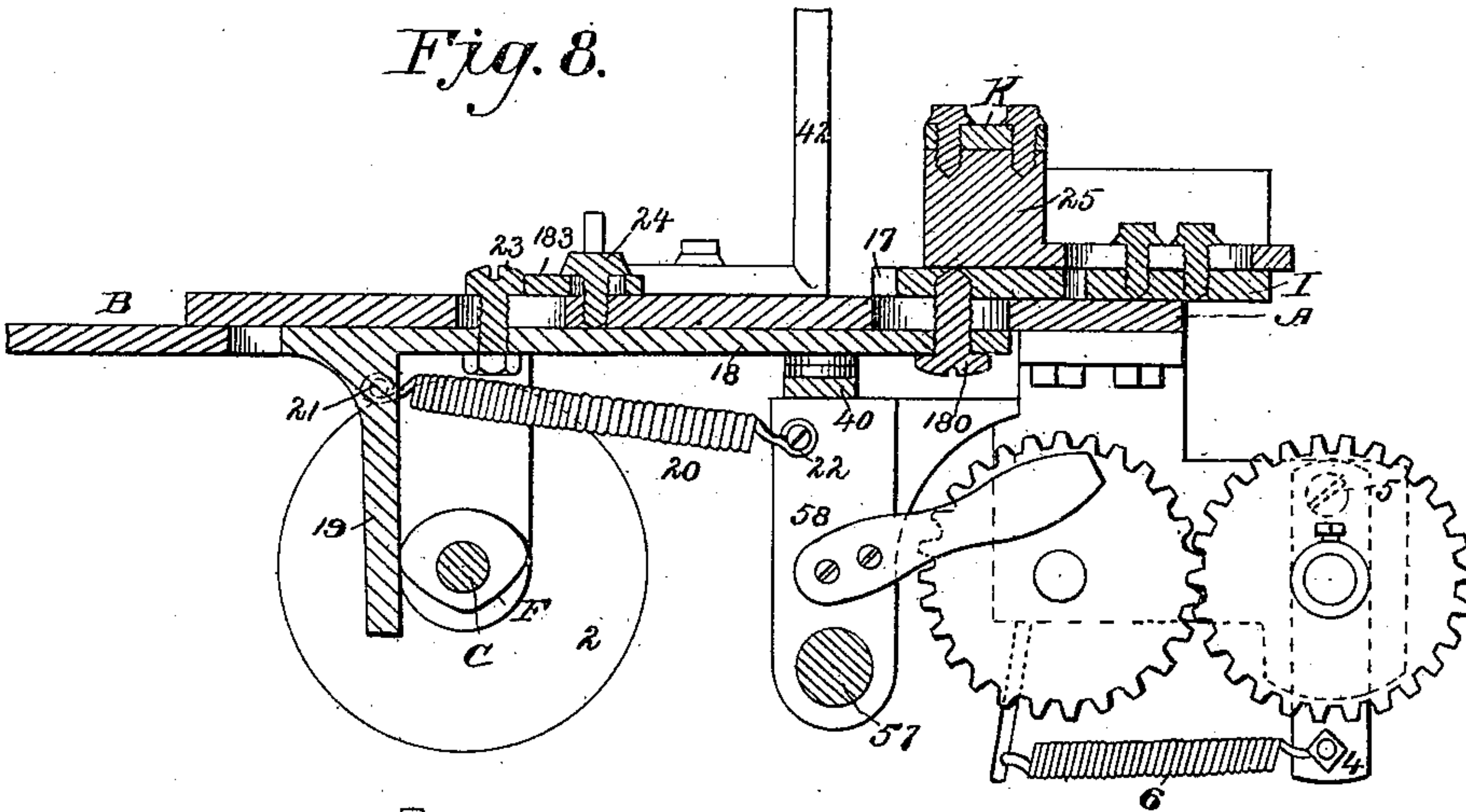


Fig. 7.

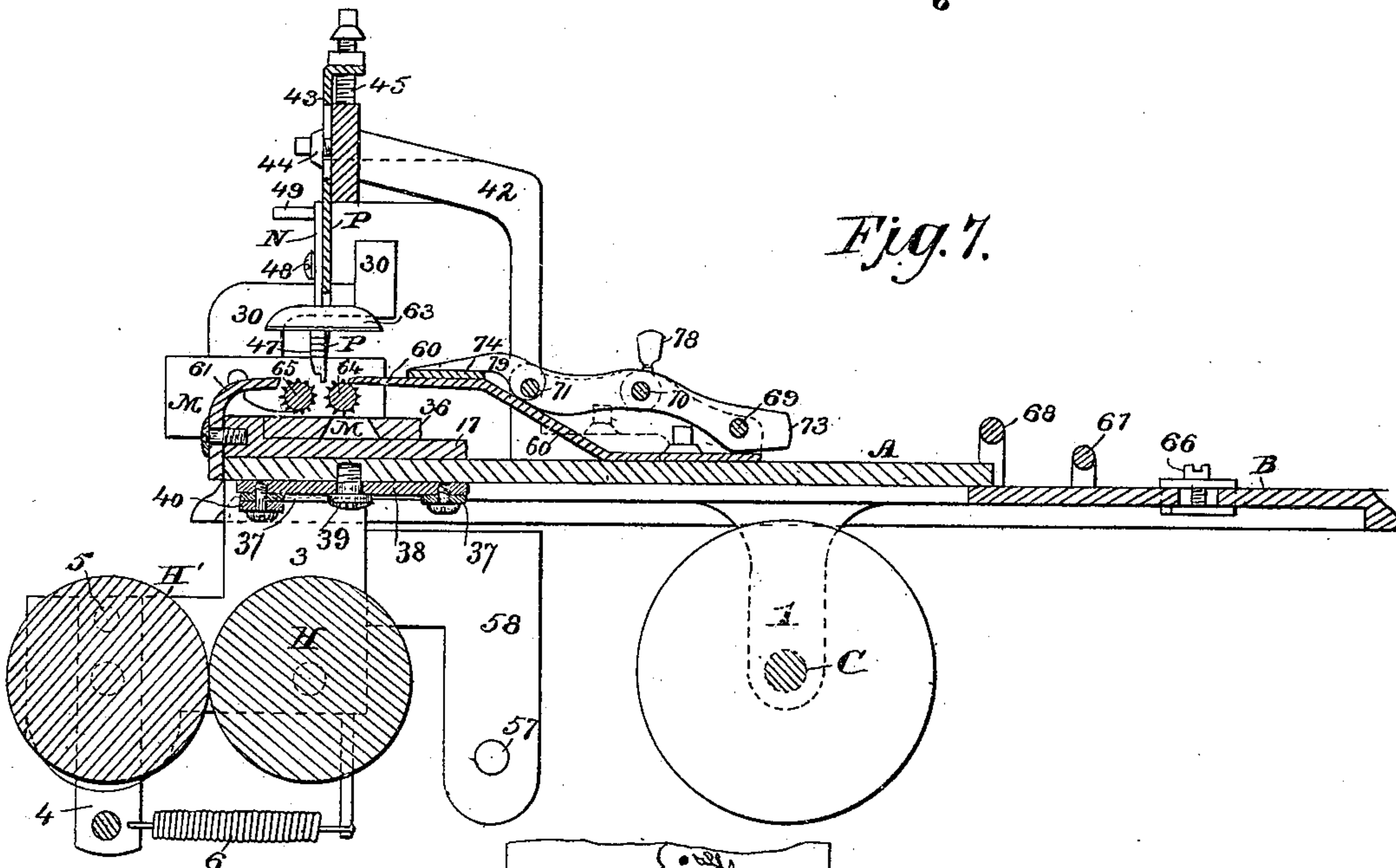
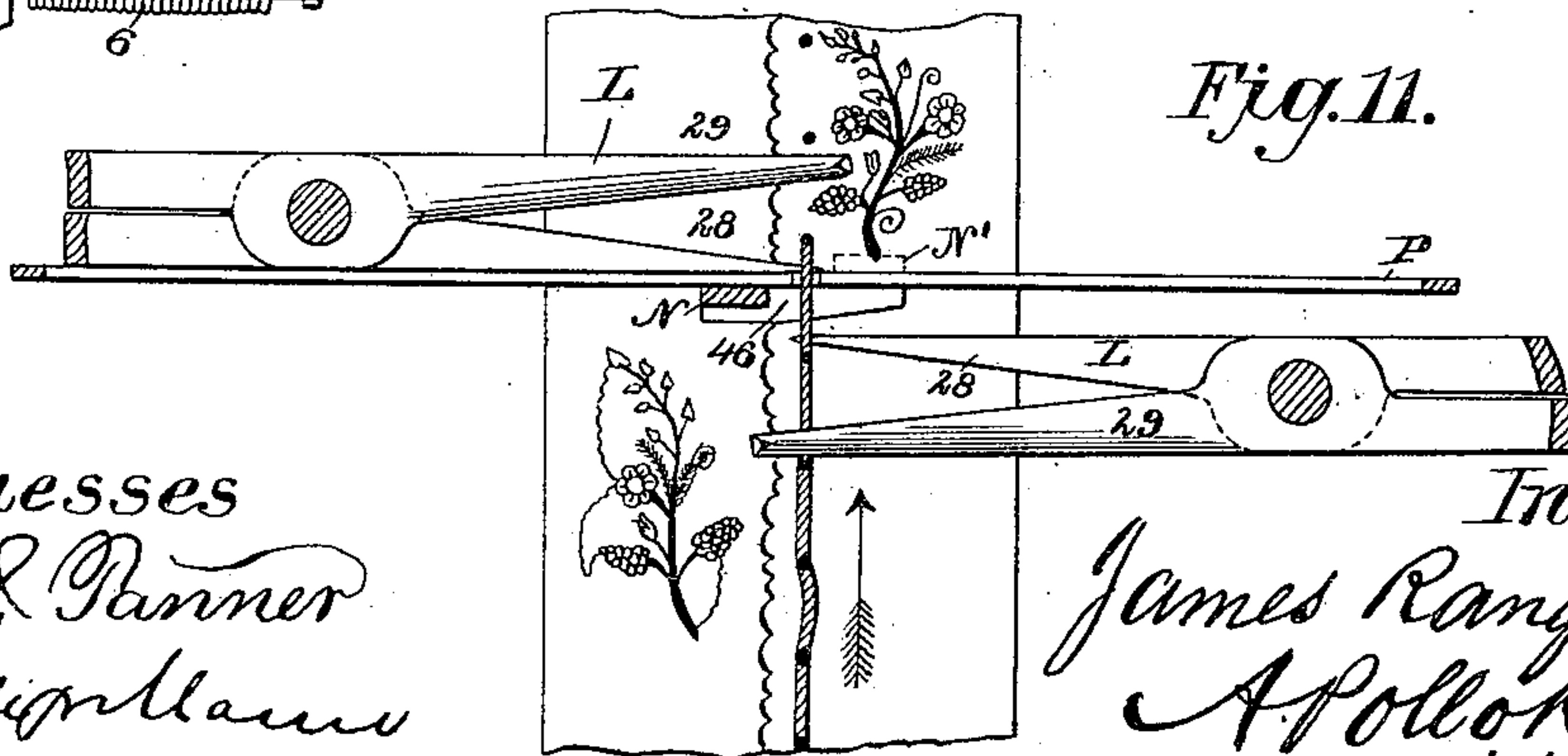


Fig. 11.



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(No Model.)

5 Sheets—Sheet 5.

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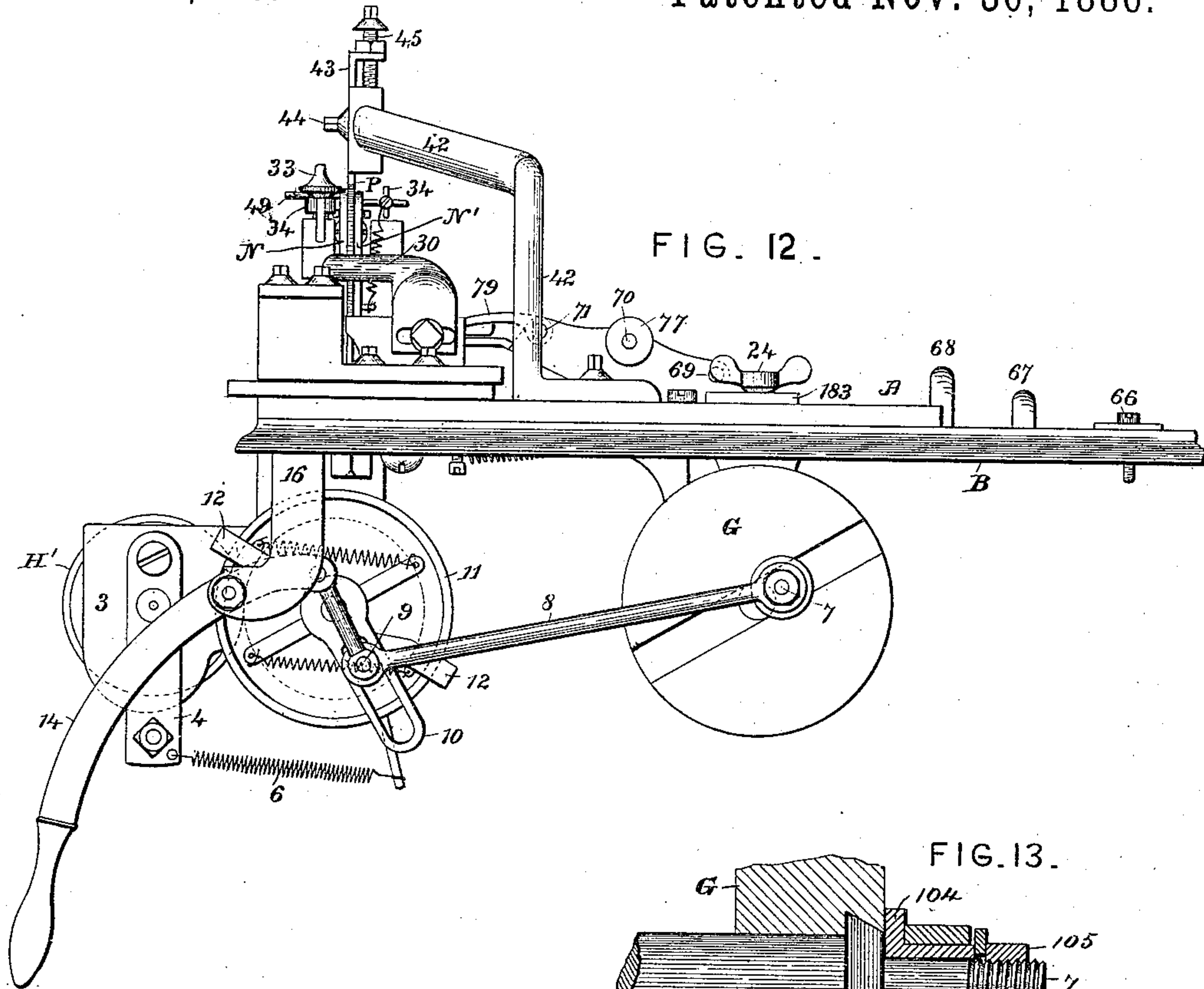


FIG. 12.

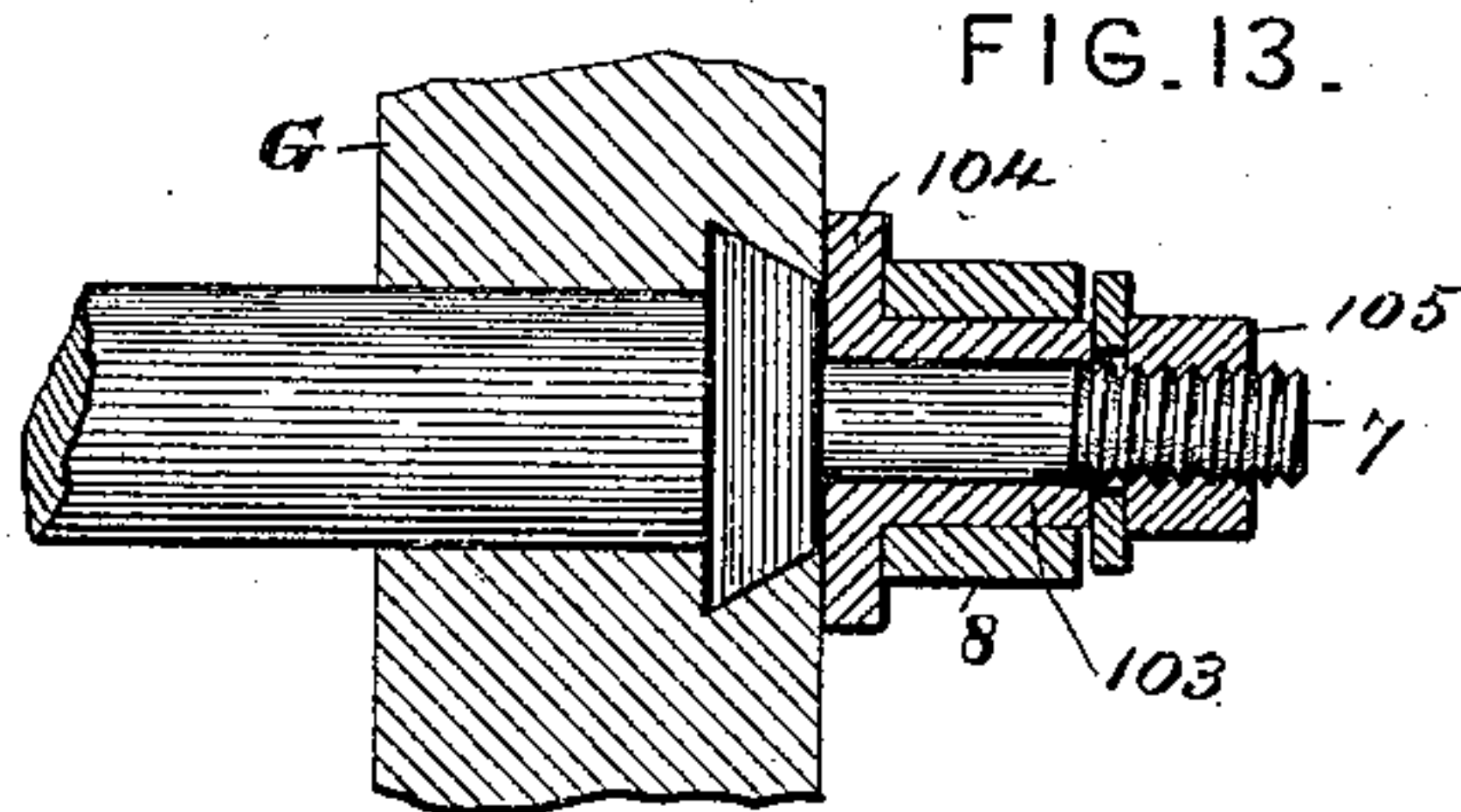


FIG. 13.

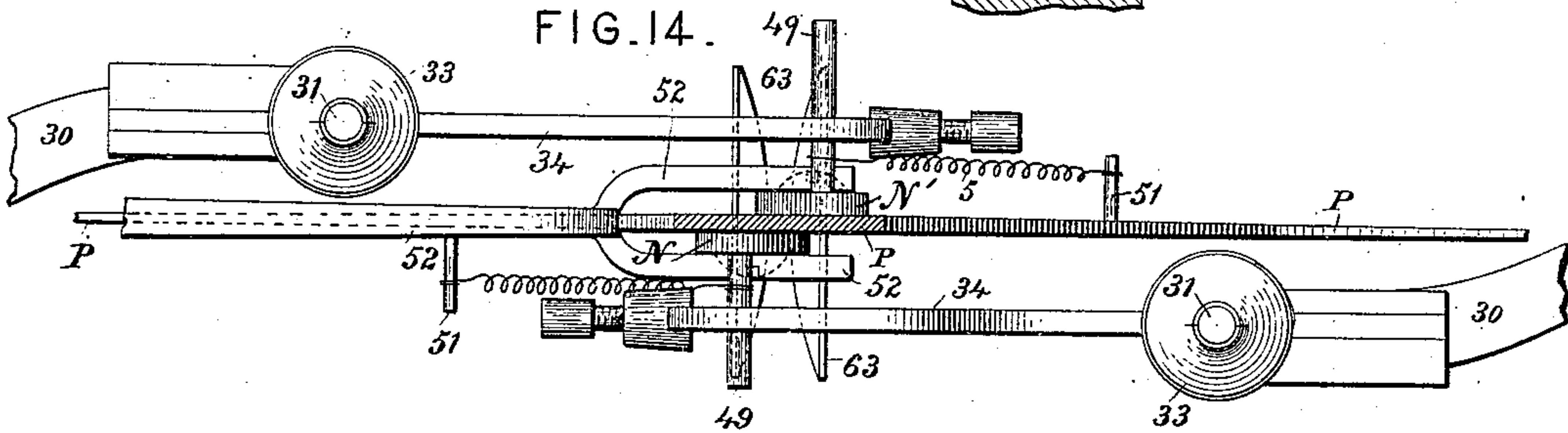


FIG. 14.

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UNITED STATES PATENT OFFICE.

JAMES RANGE, OF NOTTINGHAM, ENGLAND, ASSIGNOR TO THE WILLCOX & GIBBS SEWING MACHINE COMPANY, OF NEW YORK, N. Y.

MACHINE FOR CLIPPING LACE AND OTHER FABRICS.

SPECIFICATION forming part of Letters Patent No. 353,586, dated November 30, 1886.

Application filed April 26, 1884. Serial No. 129,459. (No model.) Patented in England March 7, 1883, No. 1,214; in France August 25, 1883, No. 157,227; in Germany September 9, 1883, No. 30,479, and in Austria-Hungary July 17, 1884, No. 14,765 and No. 31,735.

To all whom it may concern:

Be it known that I, JAMES RANGE, of Nottingham, England, have invented a new and useful Improvement in Machines for Clipping
5 Lace and other Fabrics, (for which I have received Letters Patent in Great Britain, No. 1,214, dated March 7, 1883; France, No. 157,227, dated August 25, 1883; Germany, No. 30,479, dated September 9, 1883, and Austria-Hun-
10 gary, No. 14,765 and No. 31,735, dated July 17, 1884,) which improvement is fully set forth in the following specification.

This invention has reference to machines for clipping or cutting off the threads which in
15 machine lace or bobbinet and in some other fabrics connect the figures therein. Such connecting-threads lie between the figures loosely upon the surface of the fabric without entering into the formation of the fabric. They
20 are commonly known as "floating threads" or "floats." In order to remove them without injuring the fabric, machinery has heretofore been devised for lifting them up from the lace or other fabric and cutting them on both sides
25 as close as may be to the fabric. Heretofore this has been done by means which it is deemed unnecessary to recite.

The present invention consists in new means for the purpose, and particularly in a picker
30 or pickers to which a back-and-forth movement, preferably in a curved path, is given, so that the picker enters under one of the floats or loose threads, and then, having lifted this from the fabric, returns back into position for
35 picking up a new thread.

Heretofore the pins which enter between the loose threads and the fabric have been stationary, and the fabric has been fed toward them, or they have been moved progressively
40 over the fabric.

In my improved machine, after the thread has been raised it is clipped or severed from the fabric and is removed. The fabric is fed through the machine as often as may be nec-
45 essary to remove all the floating threads. The action of the machine is automatic.

The accompanying drawings illustrate what is considered the best mode of carrying out the principle of the invention.

Figure 1 is a front elevation, partly broken 50 away and in section, of a lace-clipping machine constructed in accordance with the invention; Fig. 2, a plan of the same; Fig. 3, a bottom view of the same, and Figs. 4 to 14 detail views.

A is the bed-plate. It is supported at its 55 edges by the table B. Under it, in depending brackets 1, is journaled the main shaft C. This shaft is driven by a belt and grooved pulley, 2, or by other suitable means. The cams D E, 60 the cams F F', and the disk G are keyed or otherwise fixed on the shaft C.

The feed-rollers H H' are journaled under the bed-plate, one in the brackets 3, the other in arms 4, hinged at 5 to said brackets. Spiral 65 tension-springs 6 draw the rollers together, so that the lace or other fabric when inserted is held by them. An intermittent rotation is imparted to the rollers from a crank pin, 7, which is secured in a groove in the disk G, and 70 is adjustable therein toward and away from the axis. The groove in the disk is a dovetail, (see Fig. 13,) and the head of the pin 7 fits the dovetail. A sleeve, 103, having a flange, 104, at the inner end fits over the pin 75 and is confined by the nut 105 on the end of the pin 7. By loosening the nut 105 the pin 7 can be adjusted, and then be secured in its new position by tightening the nut. The move- 80 ment is communicated through the pitman or connecting rod 8, pin 9, arm 10, loosely mounted on the journal or shaft of roller H, disk 11, fixed on said journal or shaft, and the clutches or pawls 12. These pawls at their inner ends each rest in a notch in the hub of disk 11, and 85 near the outer ends have each a groove, into which the flange or the disk 11 at the periphery of said disk enters. As the arm 10 is swung forward the clutches or pawls 12 move idly over the edge of disk 11. When it is swung 90 back, they bind upon disk 11, carrying it with them and turning the roller H. The pin 9 is fixed in the lower end of the link 13, and, passing loosely through the end of the pitman or connecting rod 8, projects into a slot in arm 95 10. The link 13 is jointed to a hand-lever, 14, pivoted at 15 to the bracket 16. By turning the lever the pin 9 is raised or lowered in

the slot in arm 10, and thus the stroke of said arm and the rotation of the feed-roller are varied. The adjustment of the pin 7 on the face of disk G also serves to regulate the extent of the feed. The adjustment by lever 14 can, however, be effected while the machine is in operation. Friction retains the lever 14 in whatever position it may be placed.

The cams F F' actuate the slides I I', which are mounted on the bed-plate in ways formed in or by the plate 17. Each slide I or I' is connected by the screw 180, which passes through a slot in the bed-plate, with the toe-piece 18 under the bed-plate. The toe 19 is struck by the cam F or F', and the piece 18 and slide are thereby moved in one direction. A spiral tension-spring, 20, connected at 21 to the toe-piece and at 22 to the bed-plate, returns the said toe-piece and slide. The limit of this return movement is regulated by contact of the screw 23, tapped into the toe-piece 18, which plays in a slot in the bed-plate, (see Figs. 2 and 8,) with the adjustable stop 183 in the form of a slotted plate, which is adjustably secured by the screw 24 on the upper side of the bed-plate, and which projects over one end of the slot in the bed-plate. The points of cams F F' are set diametrically opposite on the shaft C, and the toes 19 are placed on opposite sides of the shaft. The cam F therefore moves the slide I back while the cam F' is moving the slide I' toward the front of the machine, and in returning them the springs in like manner move them in opposite directions. On each slide I or I' is bolted a bracket, 25, the bolts passing through a slot, so that the bracket can be adjusted lengthwise of the slide.

To each bracket is bolted a slotted plate, K or K', the bolts passing through slots, so that the plate can be adjusted across the bracket and slide. These plates K K' have each in the free end a straight slot, 26, and a curved slot, 27. The relative position of these slots is reversed in the two plates. (See Fig. 2.) Pins 106 and 107, attached to the tail ends of blades 28 and 29 of scissors L L', play in the slots 26 and 27, respectively. The pointed blade 28 enters between the fabric and the floating threads. It is shorter than the blade 29, which is turned up at the outer end, (see Figs. 9, 10, and 11,) so that it will ride over the thread.

The scissors L L' are carried each by a bracket, 30, bolted to a cross slide, M M', respectively. The blades are pivoted to and supported by a bolt, 31, which passes freely through a hole in the end of the bracket. A spiral compression spring, 32, surrounding the bolt, holds down the scissors, and a nut, 33, at the top of the bolt prevents the spring from drawing the bolt out of the bracket, and, also being adjustable, regulates the position of the scissors. This nut does not bear directly upon the top of the bracket, but upon a lever, 34, which is pivoted at 35 to the bracket.

The slides M M' rest on the top of plate 17, being guided in ways formed in or by the

plate 36. (See Fig. 7.) Each is connected by a link, 37, with the lever 38, which is pivoted at 39 to the under side of the bed-plate A. (See Figs. 3 and 7.) Each slide M or M' is connected with the corresponding link, 37, by a screw-pin, 108, which fits loosely in the end of the link, passes through a slot in the bed-plate A and the overlying plate 17, and is tapped into the slide. In Fig. 1 the front of the machine is partly broken away to show the slot. This lever 38 is vibrated through the link or connecting-rod 40, motion being imparted to said rod from the cam E through the lever 41. This is pivoted at 420 to the under side of the bed-plate.

The shape of the peripheral groove of the cam E is shown developed on a plane in Fig. 6. As this cam rotates it acts, through the levers and links referred to, upon the slides M M', and moves them, together with the scissors L L', in and out toward and away from the central line of the machine. The inward movement first inserts the pointed blade 28 between the floating threads and the fabric. By this movement the pins on the scissor-blades are drawn toward the free ends of plates K K'; but the slots, being parallel in that part, the relative position of the blades is not altered. On the further inward movement, however, owing to the divergence of the slot 27 from the slot 26, the tail ends of the blades are spread apart, and the front or cutting ends are brought together and sever the threads between them. During this latter half of the inward movement, or after the blade 28 has been inserted under the floating thread, the cams F F' begin to withdraw from the toes 19, and the springs thereupon return the toe-pieces 18 and slides I I'.

The plates K K' and the tail ends of the scissor-blades are of course moved with the slides I I'. As the slide I moves the tail ends of the scissor-blades toward the front of the machine the cutting ends of said blades are of course moved in the opposite direction. This movement brings the blade 28 of scissors L against the floating thread where it is attached to the fabric at the back end of said thread. As the slide I' moves toward the back of the machine the cutting end of scissors L' is of course moved to the front, and the blade 28 of said scissors is brought against the floating thread where it is attached to the fabric at the front. Afterward the blades of both scissors are closed, and the floating threads are therefore cut off close to the fabric at both ends. The scissors are afterward returned for a new cutting. The blades 28 are inserted under the floating threads near the middle of the same. In order to facilitate their insertion, the floating threads are at that time raised from the fabric by one or both the pickers, N N'. These pickers are fastened upon opposite sides of a pressing-plate, P, which is itself fastened at or near the top to the double bracket 42, the said bracket being bolted to the bed-plate A and spanning the space

through which the lace or other fabric is passed.

The pressing-plate has a slotted tag, 43, which fits in a groove in the face of the bracket, and is held therein by the bolt 44, passing through the slot. The top of the tag is bent back, (see Fig. 7,) and a bolt, 45, tapped therein, bears upon the top of the bracket. The bolts 44 and 45 permit the pressing-plate to be adjusted vertically.

The pickers consist each of a plate shaped preferably as shown, and provided with a lifting-finger, 46, at the bottom, and a serrated or toothed edge, 47, above the finger. They are each fastened to the pressing-plate by a screw, 48, which passes through a slot in the picker, but is not screwed in sufficiently to clamp the picker. The latter may therefore be vibrated on the screw as on a pivot-pin, and may have also an up and down motion the length of the slot.

At the top of each picker is a pin, 49. This passes through a slot in lever 34, and is also connected with a spiral tension-spring, 50, whose opposite end is connected with a pin, 51, fixed to the pressing-plate. The springs tend to draw the pickers downward, and also to turn them, so that the lifting-fingers 46 are moved inwardly—that is, toward the vertical line through the middle of the pressing-plate. The downward action of the springs is resisted by the lever 52, the forked inner end of which extends under the pins 49. The lever is pivoted at 53 to an arm of bracket 42. The outer end is connected by the vertical rod 55 with the front end of lever 56, which is pivoted at 57 to a bracket-arm, 58, under the bed-plate. The back end of said lever 56 carries a pin, which is acted upon by the cam D. The groove in the face of this cam, into which groove said pin projects, is shown in full in Fig. 5. The pickers are turned against the tension of the springs by the contact of the adjustable screw-stops 59 at the ends of the slots in the levers 34 with the pins 49 at the top of the pickers. This contact takes place when the slides M M' are moved outwardly by the cam E. By the action of the mechanism described the pickers are given an up-and-down as well as a back-and-forth movement, in virtue of which the lifting-fingers, after being withdrawn and depressed, as shown in Fig. 4, are advanced, raised, withdrawn, and depressed. The advance carries the fingers between the floating thread and the fabric, and the raising lifts the thread away from the fabric, which is held down by the pressing-plate P. Both movements take place while the scissors L L' are advancing with the slides M M', and before the blades 28 are in position to enter below the floating thread. There is therefore no danger of the blades 28 catching in the fabric, since the pickers provide a clear opening for them to enter. After the floating thread has been cut and upon the withdrawal of slides M M', the levers 34 draw back the lifting-fingers,

and the fork of the lever 52 being soon after depressed by the action of cam D the springs 50 depress the pickers, so that they are again in position for lifting a new thread.

To facilitate the action of the pickers, the lower edge of the pressing-plate P is notched at 110, Figs. 1 and 4, at the middle, and the fabric is supported on either side of said plate (see Fig. 7) by the plates 60 and 61 above the bottom of the pressing-plate. The fabric is therefore bent around the edge of the pressing-plate, and this causes the floating threads to buckle up. The notch 110 permits this buckling. The plate is slit at 62, and the edges of the slit are serrated. Above the slit is a hole, in which is set the split tube 63. When the pickers are raised, they carry the floats or floating threads into the slit, and when the thread is cut at the ends and the pickers retire the thread is left in the slit. The successive additions of threads at the bottom push the threads finally into the split tube. Between the plates 60 and 61 (on either side of the pressing-plate) are journaled the toothed rollers 64 and 65. These rollers are journaled in stationary bearings on the plate 36, and are rotated by the lace as it is drawn over them. These keep the fabric from moving sidewise.

For guiding and retaining in place the lace or other fabric there are, in addition to the plates 60 and 61 and the rollers 64 and 65, edge-guides 66, which are adjustably secured in a slot, 111, in table B, guide-rods 67 and 68, supported on the table B, guide-rods 69, 70, and 71, supported on a frame, 72, which is bolted to the bed-plate A, the guide-plates 73, supported on the rods 69, 70, and 71, and the weighted smoothing-plate 74.

The frame 72 is adjustable on the bed-plate A, the bolts 112 passing through slots 113 in the frame. The plate 60 is made in one piece with the frame 72, being a continuation of the bottom plate thereof. (See Fig. 7.) The three rods 69, 70, and 71 are supported in the sides of the frame 72. The central rod, 70, is adjustable across the same. For giving this adjustment the ends project. On one end is a spiral compression spring, 75, between the side of the frame and a pin, 76, in the end of the rod. On the opposite end is a thumb-nut, 77. By turning the thumb-nut in the proper direction the rod can be moved right or left, as may be desired. The guide-plates 73 are fastened to the rod 70 by set-screws 78, which are tapped through bosses on the plates.

By loosening the set-screws 78 the guide-plates 73 can be set at different distances apart and at different positions between the sides of the frame 72. The adjustment of the rod 70 adjusts also the guide-plates 73, and its object is to secure a nicer regulation than can be effected by shifting the plates 73 directly by hand. The weighted plate 74 is fastened to arms 79, which fit loosely on the rod 71, so that they are capable of turning on said rod as an axle.

The general operation of the machine is as

follows: The lace or other fabric to be clipped is wound upon a weighted roller at the back of the machine, or is piled loose in a suitable receptacle. The end is led between the edge-guides 66 under rod 67, over rod 68, under rod 69, over rod 70, and under rod 71, between the smoothing-plate 74 and the plate 60, over the back toothed roller, 64, under the edge of pressing-plate P, over the front toothed roller, over the plate 61, and between the feed-rollers H H'. While these rollers are stationary, the pickers N N' are advanced and raised, so that the lifting-fingers 46 enter below one of the floating threads and lift the same away from the lace or other fabric. The scissors L L' being advanced, their blades 28 are thrust through the opening between the floating thread and the fabric. The blades 29 pass over the floating thread, and are then closed upon the blades 28, so as to sever the threads. Before severance, however, the plates K K' have been moved by the springs 20, and have carried the blades 28 to the end of the loop formed by the floating thread, so that the latter is cut close to the fabric. After the floating thread is thus clipped off the feed-rollers advance the fabric a suitable distance to bring a new floating thread under the picker.

The machine shown is supposed to operate upon lace or other fabric in which the figuring-threads run lengthwise of the fabric and the figures are equal distances apart; but it is obvious that substantially the same mechanism could be employed in other forms of machinery. It is evident, also, that modifications could be made in details without departing from the spirit of the invention, and that parts of the invention could be used separately.

Two pickers have been described as being used; but it will be understood that this number is not essential, as one only, or more than one, could be employed, if desired, they being operated by suitable mechanism.

Having now fully described my said invention and the manner of carrying the same into effect, what I claim is—

1. One or more pickers having a back-and-forth and also a rising-and-falling motion, in combination with operating mechanism for advancing said pickers when depressed, so as to insert their lifting-fingers between the floats or loose threads and the body of the fabric, and for then raising the same, substantially as described.

2. The combination, with pickers having a back-and-forth and also a rising-and-falling

motion, of mechanism for advancing the said pickers when depressed, so as to insert their lifting-fingers between the floats or loose threads and the body of the fabric, and for then raising the same, and cutters for severing the lifted floats, substantially as described.

3. The combination, with one or more pickers having a back-and-forth and also a rising-and-falling motion, and mechanism for advancing the said pickers when depressed, and for then raising the same, of shears or scissors for cutting the floats when lifted from the body of the fabric by said pickers, substantially as described.

4. A cutter or blade, a co-operating cutter or blade, mechanism for thrusting the former cutter or blade across the fabric between the float or loose thread, and the fabric mechanism for closing the blades by a movement transverse to the movement in thrusting the blade or cutter under the float or loose thread to cut the threads, and mechanism for returning the parts into position for acting upon a new float or thread, substantially as described.

5. The combination, with mechanism for supporting and feeding lace or other fabric through the machine, of pickers and cutters, movable back and forth across the line of feed for raising and clipping successively the floats or loose threads, and mechanism for operating said pickers and cutters, substantially as described.

6. The combination, with a pair of scissors, of a sliding support, the cam and connections for reciprocating said support, the slotted plate, and pins on the ends of the scissor-blades projecting into the slots in said plate, substantially as described.

7. The combination of the pressing-plate, the picker or pickers, mechanism for operating the pickers, and means for cutting the floats or loose threads, substantially as described.

8. The combination, with a picker or pickers and means for cutting the floats or loose threads raised by said pickers, of a plate provided with a slit or receptacle into which the severed threads are forced by said pickers, substantially as described.

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

JAMES RANGE.

Witnesses:

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HENRY B. ROSE.