

No. 647,037.

Patented Apr. 10, 1900.

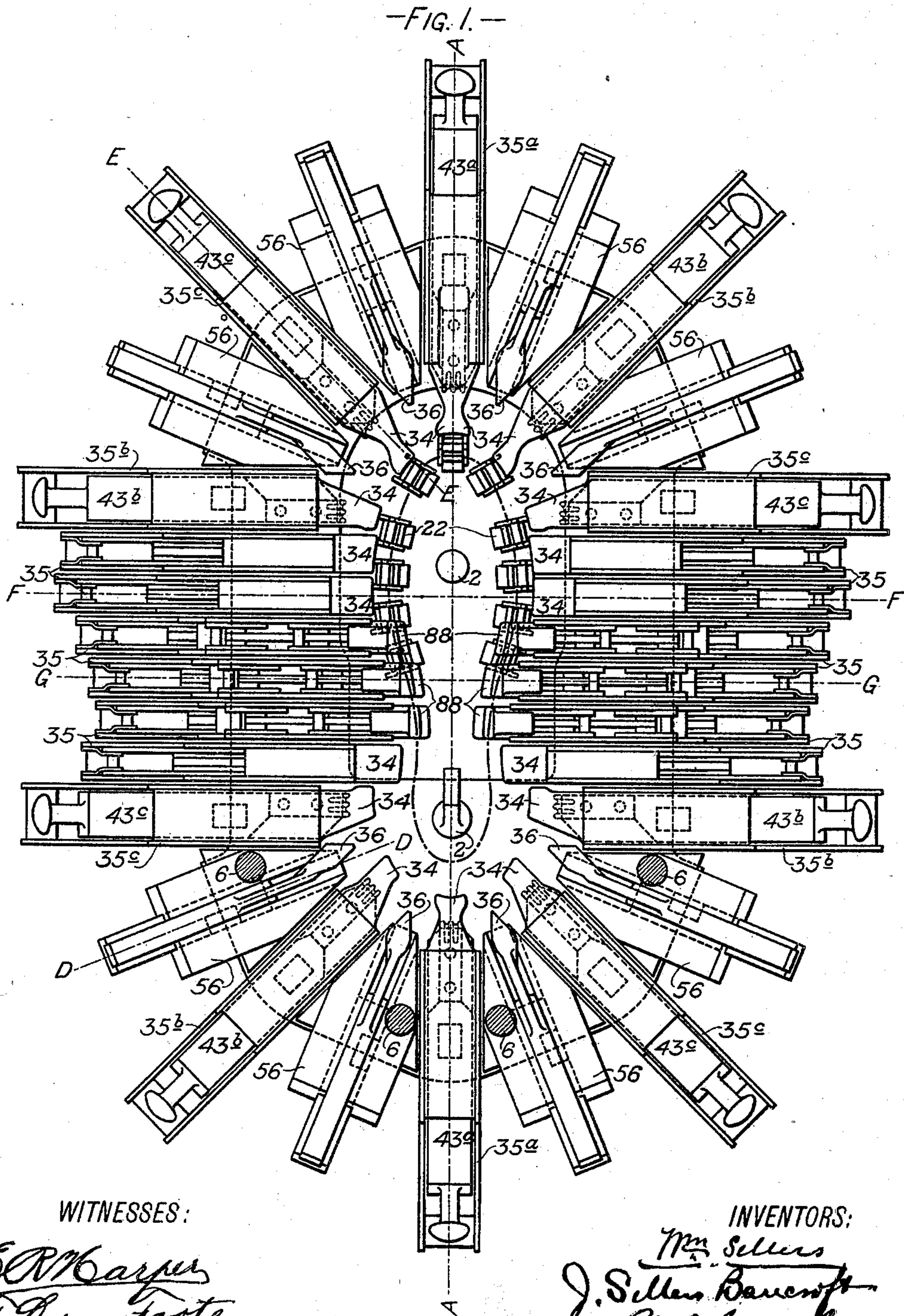
W. SELLERS, J. S. BANCROFT & M. C. INDAHL.

LASTING MACHINE.

(No Model.)

(Application filed June 10, 1897.)

5 Sheets—Sheet 1.



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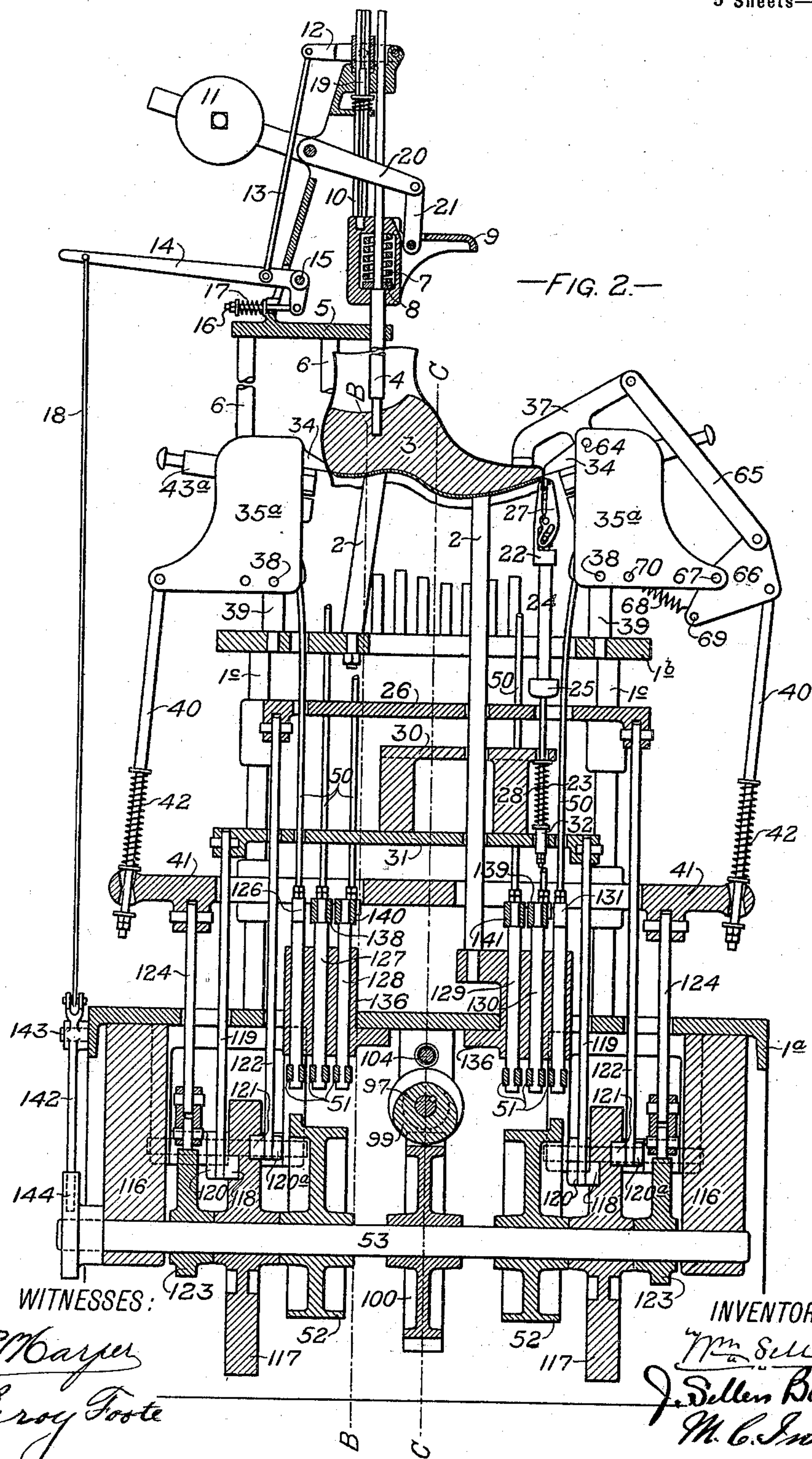
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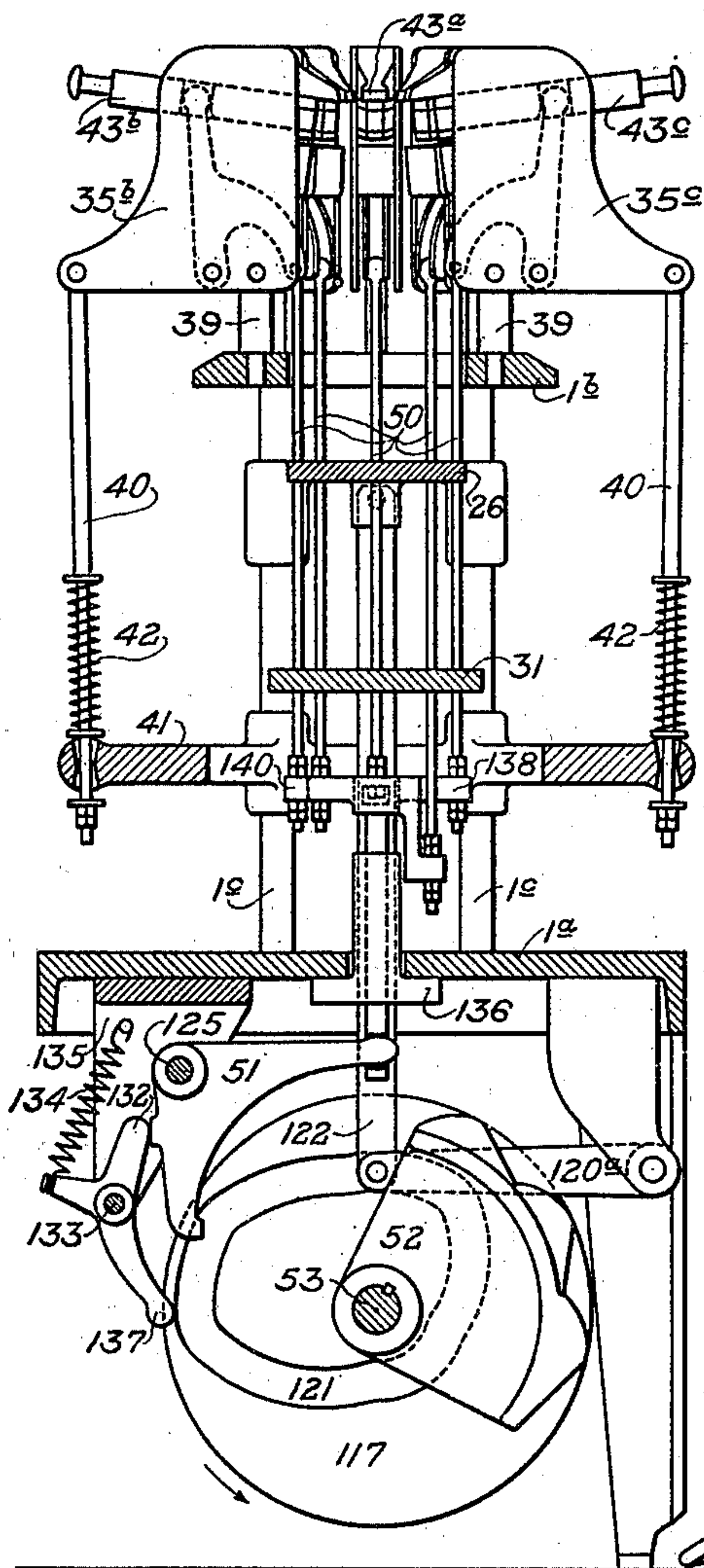
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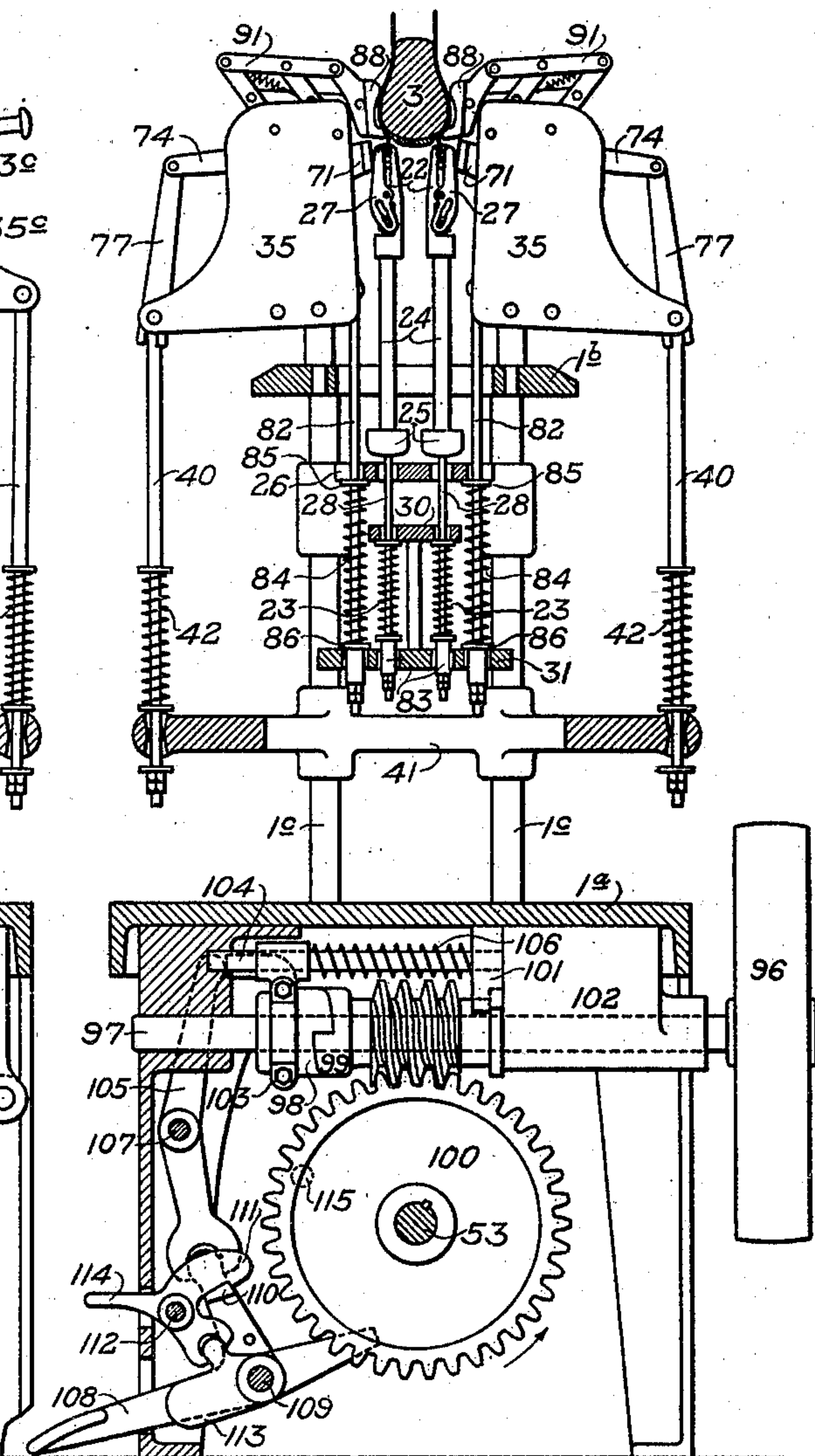
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—FIG. 3.—



—FIG. 4.—



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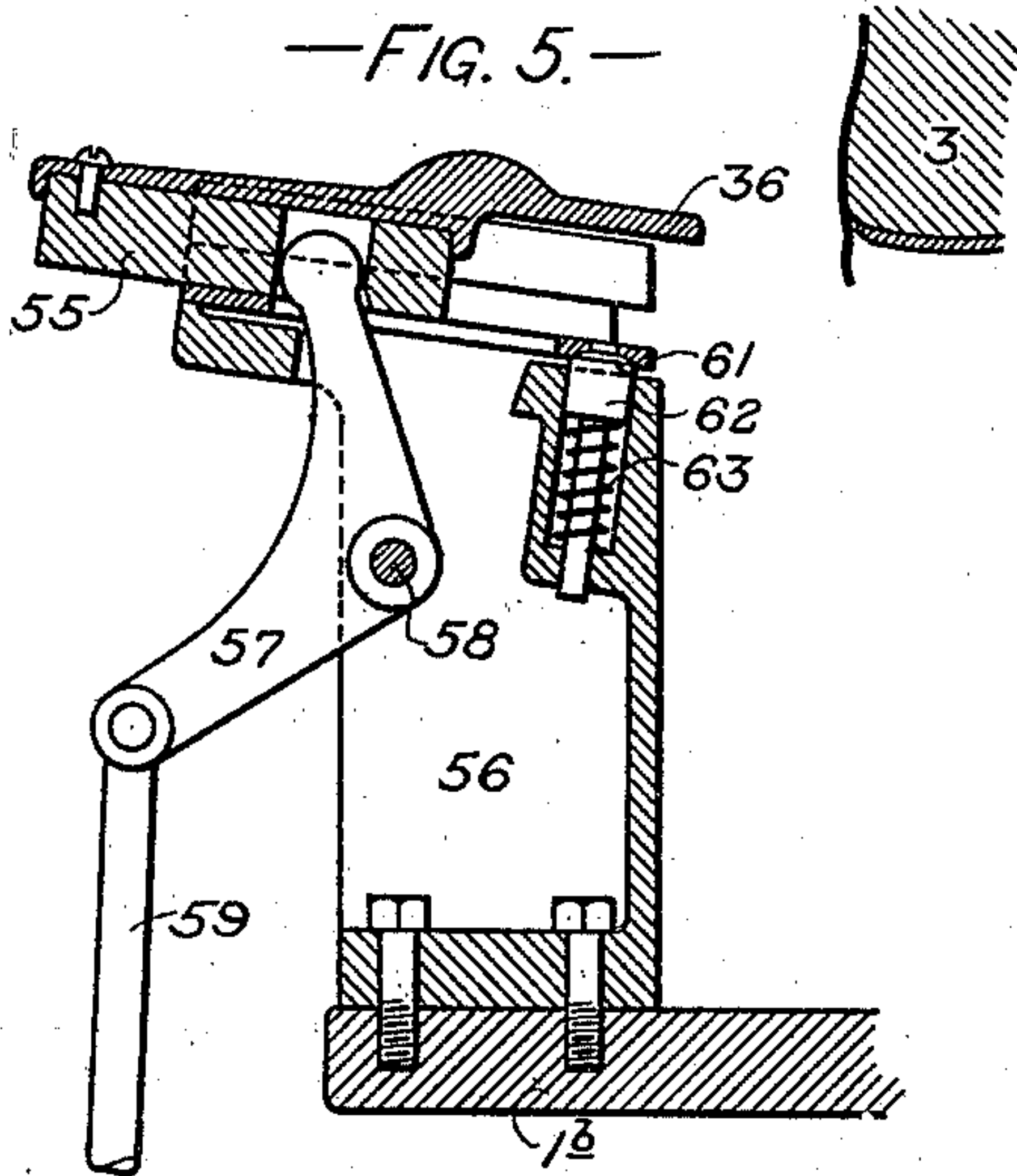
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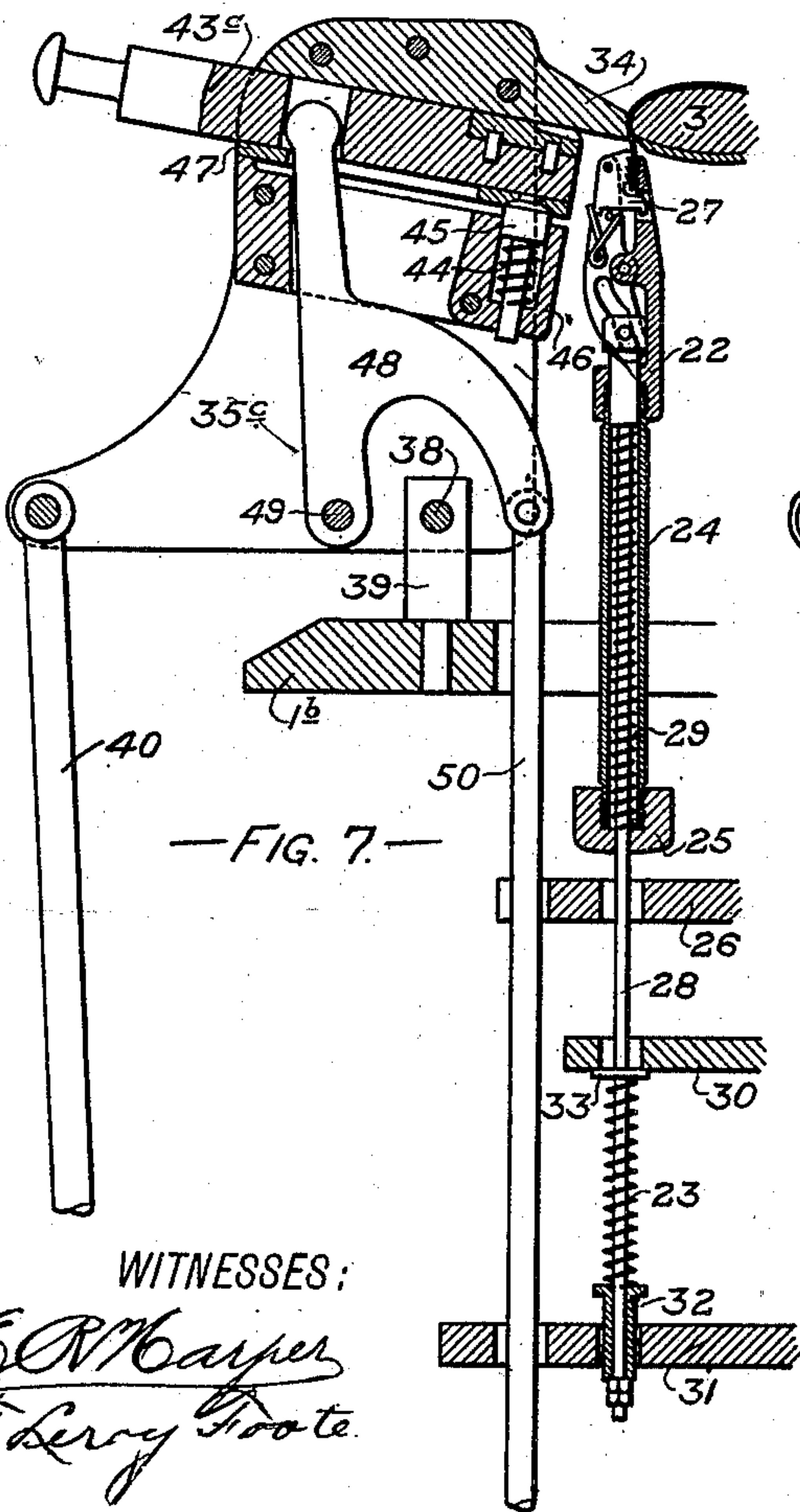
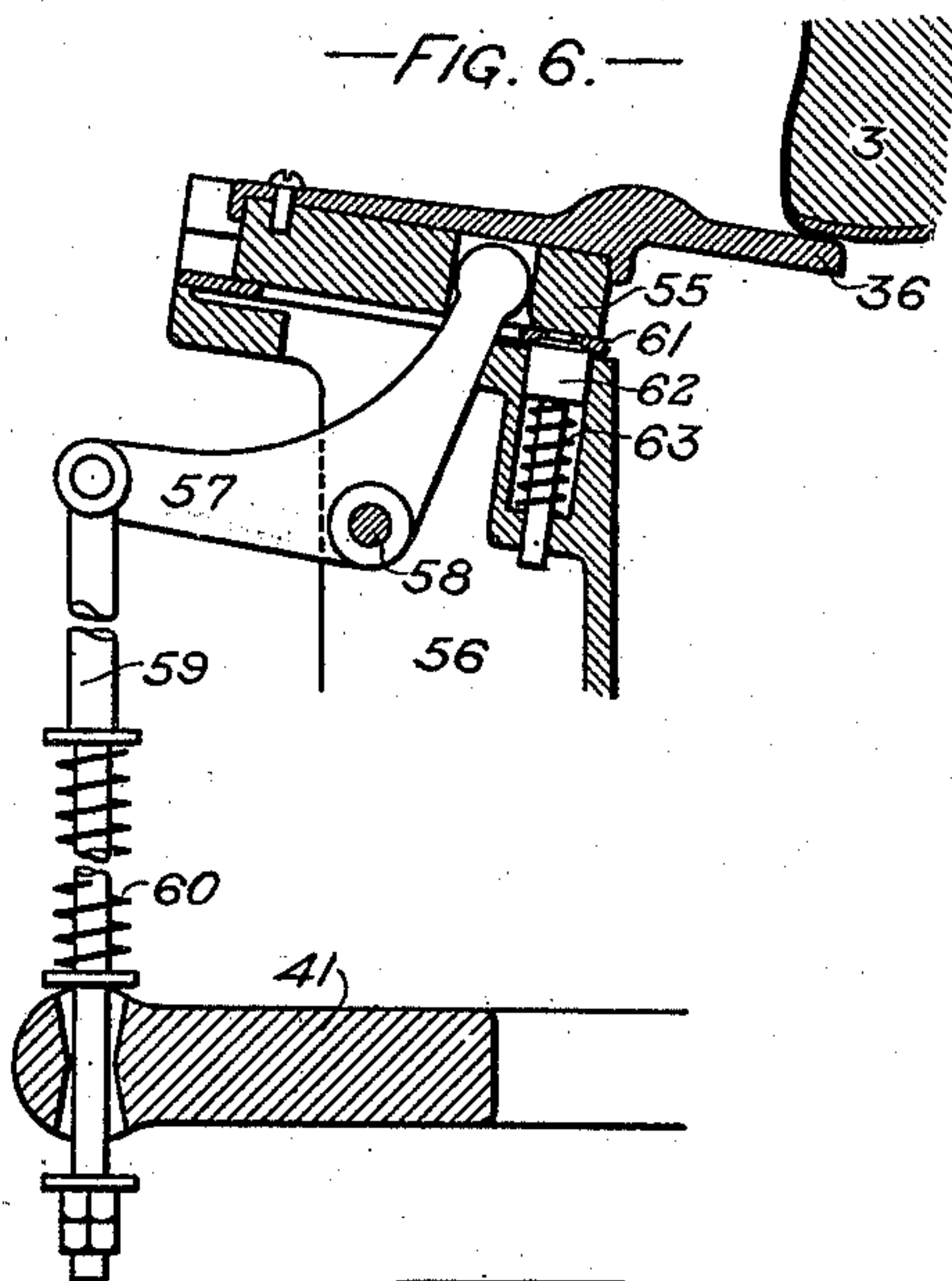
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—FIG. 5.—

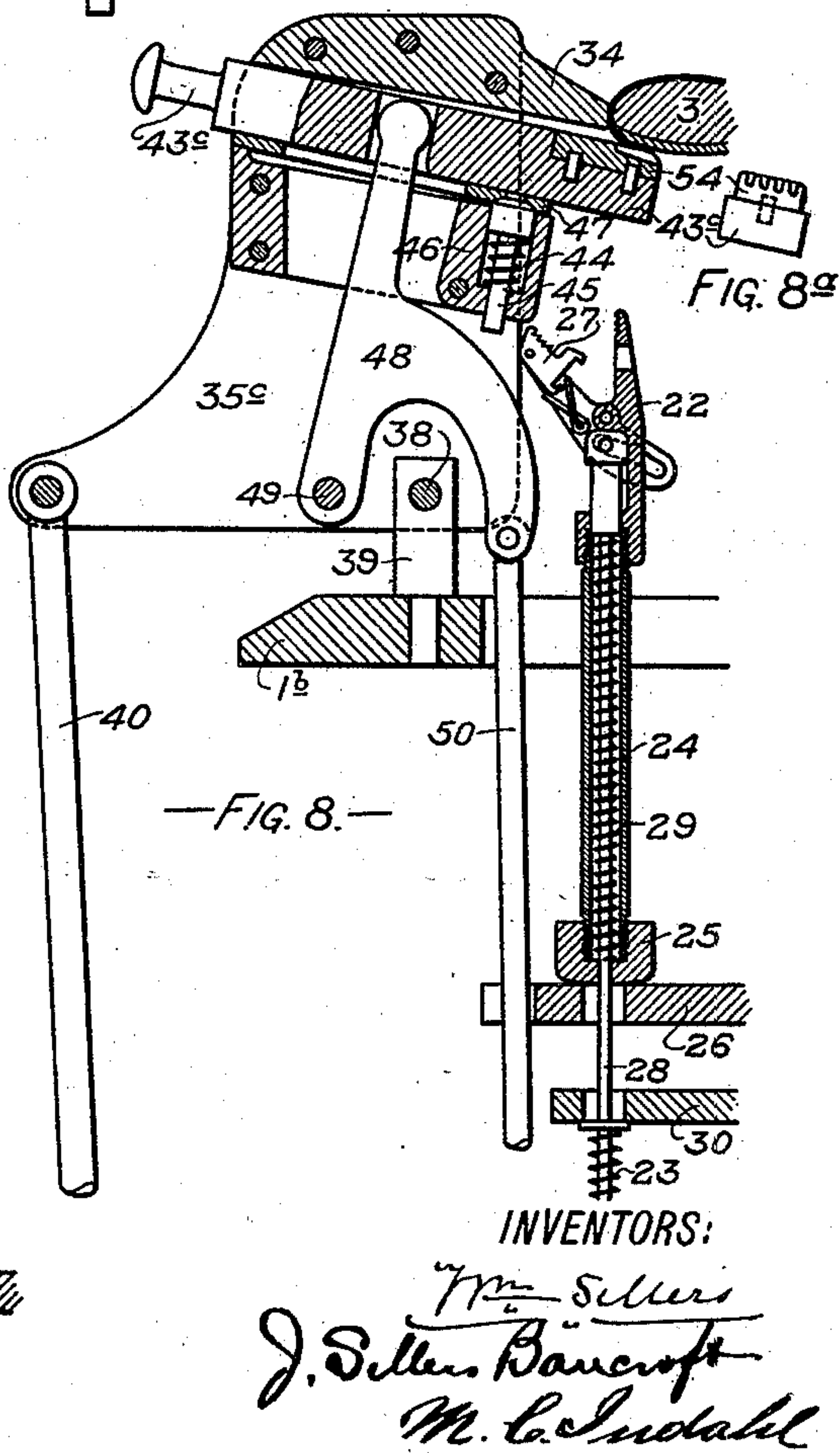


—FIG. 6.—



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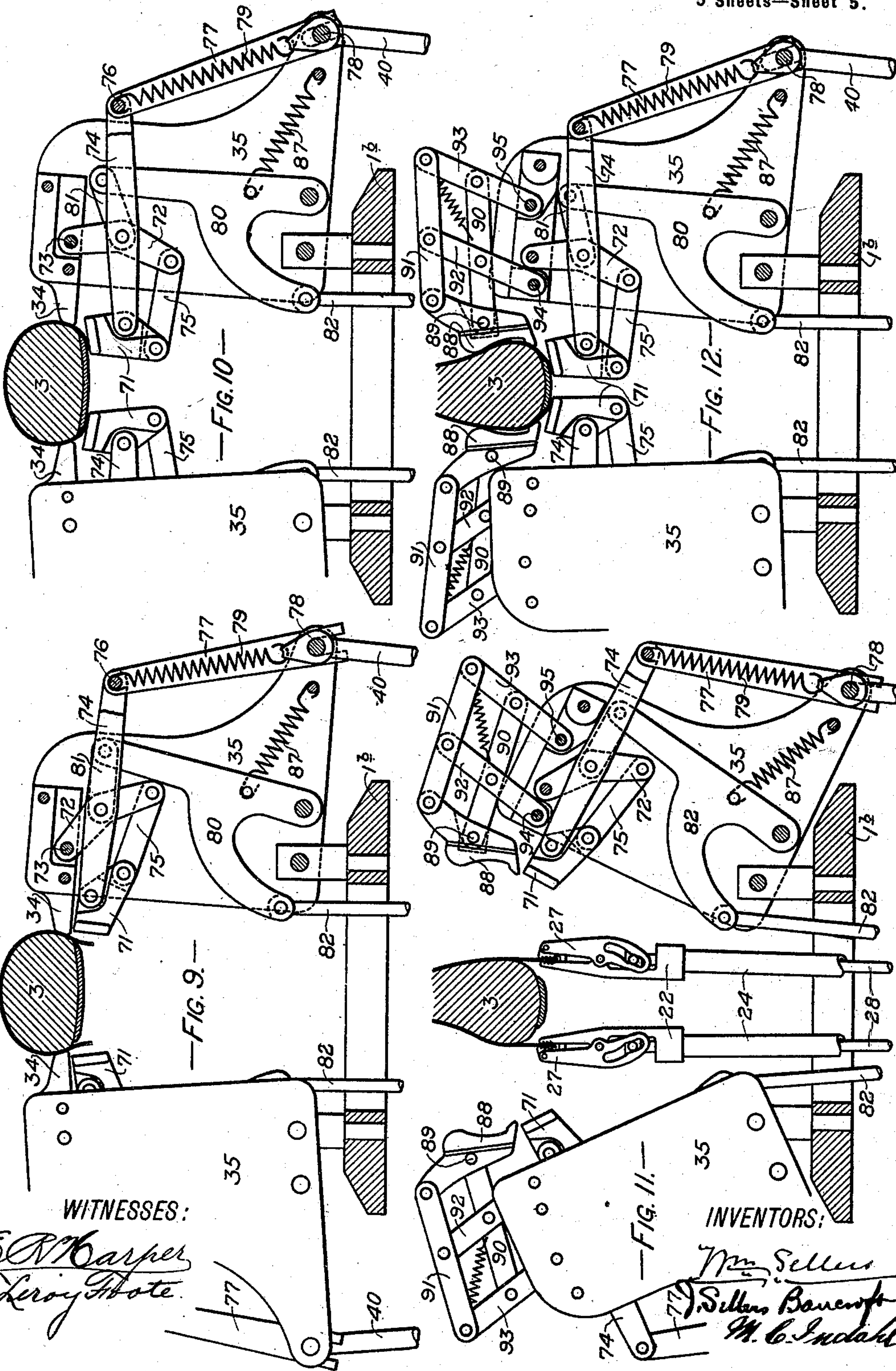
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(No Model.)

(Application filed June 10, 1897.)

5 Sheets—Sheet 5.



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UNITED STATES PATENT OFFICE.

WILLIAM SELLERS, JOHN SELLERS BANCROFT, AND MAURITZ C. INDAHL, OF
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LASTING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 647,037, dated April 10, 1900.

Application filed June 10, 1897. Serial No. 640,133. (No model.)

To all whom it may concern:

Be it known that we, WILLIAM SELLERS, JOHN SELLERS BANCROFT, and MAURITZ C. INDAHL, of the city and county of Philadelphia, in the State of Pennsylvania, have invented certain new and useful Improvements in Shoe-Machines, of which improvements the following is a specification.

Our invention relates to that class of shoe-machines which stretch the upper over the last and secure it to the insole by glue or cement; and the object of our invention is to construct a machine that will perform automatically and *seriatim* all of the operations required for that purpose more efficiently and in less time than the same can be performed by hand.

To these ends our invention consists in certain improved mechanism whereby the last, with the upper to be lasted, is secured in position upon the machine during lasting and upon the completion of the operation the lasted shoe is automatically released from the machine.

It further consists in certain improved mechanism whereby the toe of the last is pressed upon the last-support during the operation of lasting and automatically released when the lasting operation is completed.

It further consists in a plurality of movable frames so disposed on each side of the position for the last as to permit the last, with the upper to be lasted, to be readily placed in position, a clamping-pad supported by each of said movable frames, which automatically adjusts itself to the shank of a right or left shoe, so as to pinch the shank of the upper against either form of last, and means for folding the lower edge of this part of the upper against the insole on the last.

It further consists in a plurality of movable frames disposed radially around one end of the last position, so as to permit the last, with the upper to be lasted, to be readily placed in position, a plurality of fixed frames alternating with the said movable frames, a bar carried by each of said fixed frames movable in a vertical plane therein, and means for effecting said movements.

It further consists in the details of construction and the combination of elements hereinafter set forth and specifically designated by the claims.

Figure 1 is a plan of our improvement, showing a shoe in position to be operated upon by the several mechanisms of the machine; Fig. 2, a section on the line A A of Fig. 1; Fig. 3, a section on the line B B of Fig. 2, showing the operating-cams; Fig. 4, a section on the line C C of Fig. 2, showing the pulley-shaft and the worm-wheel on cam-shaft, with the clutch mechanism for starting and stopping the machine. Fig. 5 is a partial section on the line D D of Fig. 1, showing one of the binders in readiness to act upon the leather at the heel of the last. Fig. 6 is a section at the same place, showing the leather pressed against the insole by the action of the binder. Fig. 7 is a partial section on the line E E of Fig. 1, showing one of the clamp-bars pressed against the leather, with the lasting-nippers gripping the depending portion and a folder in readiness to act. Fig. 8 is a section at the same place, showing the clamp-bar pinching the leather against the last, the lasting-nippers released, and the folder in action pressing the leather against the insole. Fig. 8^a is an end view of the folder and parallel ribs on the nose thereof. Fig. 9 is a section on the line F F of Fig. 1, showing the clamp-bars pinching the leather against the last by a pair of movable frames, with the folding mechanism in readiness to act upon the depending edges of the leather. Fig. 10 is a section at the same place, showing the clamp-bars pinching the leather against the last, the leather folded against the insole by the action of the folding mechanism. Fig. 11 is a section at the line G G of Fig. 1, showing a pair of clamp-pads supported in movable frames by parallel links and with folding-clamps in readiness to act upon the leather at the shank of the last. Fig. 12 is a section at the same place, showing the clamp-pads pinching the leather against the last, the folding-clamps in action on the leather.

Referring to the drawings in detail, the frame of the machine, Fig. 2, consists of the

parts 1^a and 1^b, united by the uprights 1^c, which may be of any suitable construction, to support the operating mechanism, and projecting upward from this frame are two supports 2, arranged to receive the last 3, as shown in Figs. 1 and 2. The last 3, with its insole attached, is clamped in position upon these posts by the presser-rod 4, which is guided within the stand 5, said stand being supported on the frame of the machine by the rods 6. The presser-rod has coiled about it the spring 7, the lower end of which bears upon a collar 8, secured tightly on the presser-rod, and this collar in turn bears upon the handhold 9, against which the upper end of the spring 7 reacts, the object being to enable the operator to depress the rod 4 by the handhold 9 and exert pressure to hold the last 3 through the elastic medium of the spring 7. The catch-rod 10 is attached to the handhold 9 for the purpose of catching and holding the handhold when depressed against the reaction of the spring 7, and the connection between this rod and the stand 5 will be clearly understood by reference to a former patent, No. 512,198, granted to W. Lewis January 2, 1894.

It is sufficient here to explain that the catch-rod 10 when drawn down by the handhold 9 is held positively against the action of the spring 7 and the counterweight 11 until released by the lever 12, pivoted to the stand 5. This lever is connected by the rod 13 with the bell-crank lever 14, pivoted at 15 to the stand 5, and held up in the position shown by the rod 16 and spring 17. When the lever 14 is depressed by hand or by the action of the machinery, as hereinafter set forth, through the rod 18, the lever 12 acts to release the wedges 19, which engage and hold the catch-rod 10, and the presser-rod 4 is withdrawn from the last by the counterweight 11 through its lever 20 and link 21, connected to the handhold 9.

The first operation in lasting a shoe by our improvement is to secure the insole upon the bottom of the last 3, which is done by temporary nails or pegs. Then the upper, which has been previously formed by stitching together the various parts, is drawn down over the last, the depending edges having been previously prepared with glue to adhere quickly to the insole, which is similarly prepared to insure adhesion when contact is made by the process to be described. The last thus covered is placed upon the supports 2 and clamped in position by drawing down upon the handhold 9 and compressing the spring 7 against the presser-rod 4, which is then held securely by the holdfast on the catch-rod 10, as before explained. The next operations are to stretch, clamp, and fold the upper in position, and these are accomplished by the following mechanisms: The operation of stretching is accomplished by means of the lasting-nippers 22, Figs. 7 and 8, which seize the depending edges of the upper around the toe of the last and draw it down with a force measured by the

strength of the springs 23. These nippers are the same as shown and described in Patent No. 473,015, granted to J. F. O'Neill April 19, 1892, and only a general description of their action is here required in connection with their actuating parts. In our improvement the stationary jaw 22 is connected to the pipe 24, upon the opposite end of which is the washer 25, designed to be raised by the movable table 26, operated by mechanism hereinafter described. The movable jaw 27 is operated by the rod 28, extending through the pipe 24 and having formed upon its upper end a collar to receive the spring 29, which when free to act raises the rod 28 and opens the nippers, as shown in Fig. 8. This rod 28 is carried down through clearance-holes in the tables 30 and 31, which are bolted together to move and act as one. The bushing 32 is adjusted on the rod 28 against the spring 23, which abuts against the washer 33 upon the table 30. This bushing 32 has a collar formed at its upper end to act as a stop against the table 31 when the latter rises to permit the opening of the nippers, as shown in Fig. 8. This process of stretching draws the upper down closely over the instep and toe of the last and induces through the shape of the last a certain amount of horizontal tension around the heel, while around the toe and heel the depending edges of the upper are unavoidably more or less in folds. Before the nippers can be released it is necessary to secure the upper thus stretched against retraction upon the last, and this is done in part by the clamp-bars 34, Fig. 1, at the end of the movable frames 35, 35^a, 35^b, and 35^c, while at the critical points around the toe and heel of the last where the tendency to retract is strongest and where the fullness of the material increases the difficulty of attaching the upper securely and evenly to the insole we have provided additional clamps (called "binders") 36, Figs. 1, 5, and 6, which come forward to the position shown in Fig. 6 before the nippers are released. These binders are shaped on their ends, as shown in Fig. 1, to avoid interference with the action of the folders between them, and they press the depending edges of the upper to which glue has previously been applied firmly against the insole and hold it there until the subsequent operations of the machine are completed. At the same time the toe of the last is held down against its support 2 and against the pressure of the binders 36 by the clamping-lever 37, Fig. 2. While these operations are in progress around the toe and heel of the last, the intervening upper around the shank of the last and the ball thereof is molded into shape by the mechanism detailed in Figs. 9, 10, 11, and 12, and the depending edges all around are finally secured to the insole by the folders detailed in Figs. 7, 8, 9, 10, 11, and 12. The mechanism which acts upon the heel and toe will first be described. This consists of a series of frames 35^a, 35^b, and 35^c, movable to and from the last, as detailed in Figs. 7 and 8, in which

each frame is shown pivoted at 38 to lugs 39 on the frame 1^b. These movable frames are arranged radially about the heel and toe of the last and are operated by the rods 40 in connection with the movable table 41, Fig. 2, the springs 42 being introduced to allow for irregularities and maintain a sufficient contact-pressure between the clamp-bar 34 and the upper upon the last. Within each frame 35^a, 35^b, and 35^c, Fig. 1, are the folders 43^a, 43^b, and 43^c, guided laterally by the sides of the frame and held against an upper guide-bearing on 34, Figs. 7 and 8, by a spring 44 on the plunger 45 in the support 46, acting against the shoe-plate 47. The folder 43^c is actuated by the lever 48, pivoted at 49 in the frame 35^c and connected by the rod 50 with the bell-crank lever 51, Fig. 3, operated by the cam-segment 52 on the cam-shaft 53. When moved forward, as shown in Fig. 8, the inserted nose 54 of the folder 43^c meets the upper and may be pressed down, compressing the supporting-spring 44, which thus serves to limit the pressure applied in folding. This nose 54 is removable and may be shaped to the surface opposed. As much fullness of leather occurs at these points, that portion of the nose 54 which comes into contact with the upper should be provided with parallel ribs, as shown in Fig. 8^a, so that while the ribs press the cemented surfaces strongly in contact the spaces between provide room for the surplus leather. On account of the limited space in which these folders act their ends would have to be very narrow if all worked together, and their ability to fold smoothly would thereby be impaired. Instead of operating in unison like the movable frames 35 and the binders 36 they are therefore arranged to move in sequence, as hereinafter set forth.

The binders 36 (detailed in Figs. 5 and 6) are similar in construction and operation to the folders just described. Each binder 36 is mounted on a slide 55, which is guided in the stand 56, bolted to the frame 1^b. The slide 55 is operated by the bell-crank lever 57, pivoted at 58 and connected by the rod 59 with the table 41, the operating pressure being applied through the spring 60 to cushion its action. The slide 55 is supported by the shoe-plate 61, resting upon the plunger 62, in turn supported by the spring 63, forming a yielding abutment for the pressure exerted by the binders 36 upon the upper when acting as shown in Fig. 6. The clamp-bars 34 and the binders 36 hold the upper around the heel and toe of the last, while the folders 43^a, 43^b, and 43^c complete the work of pressing the edges of the upper against the insole, where it is held by the glue previously applied upon the contact-surfaces.

To hold the toe of the last firmly against the action of the folders and binders, one of the movable frames 35^a at the toe of the last is provided with an outside clamping-lever 37, as shown in Fig. 2, which presses down upon the toe of the last. One of the rods 40

which operates the movable frame also operates the clamping-lever 37, which is pivoted at 64 to the movable frame 35^a, and is connected by the link 65 and lever 66, also pivoted to 35^a at 67. 68 is a tension-spring between the pin 69 on the lever 66 and the pin 70 in the movable frame 35^a, designed to release the clamping-lever 37 and hold it back in a fixed relation to the movable frame 35^a, while both are moved as a whole system by the rod 40. By the mechanisms described the upper is stretched upon the last and secured to the insole around the toe and heel. The intervening portion of the upper around the shank of the last and the ball thereof is pressed and rolled into shape by the mechanisms detailed in Figs. 9, 10, 11, and 12, which are attached to the movable frames 35, such as are used around the heel and toe.

In Figs. 9 and 10 the upper is pinched against the last by the clamp-bars 34 and folded by the folding-clamp 71, forming part of a quadrilateral swing-frame designed to wrap the leather closely around the corner of the last. In addition to the folding-clamp 71, which, like the other contact-pieces, is shaped to suit the surface against which it acts, the swing-frame consists of the lever 72, pivoted to 35 at the point 73, which is connected to clamp 71 by the lever 74 and link 75, as shown. The lever 74 is extended to the point 76, at which a link 77 is attached, connecting with the pin 78 in the movable frame 35. This link 77 is slotted at its lower end to act only in compression, while tension between 76 and 78 is transmitted by the spring 79. The swing-frame thus described is actuated by the bell-crank lever 80 through the link 81, and as it advances from the position shown in Fig. 9 to that shown in Fig. 10 the folding-clamp 71 meets the leather to be folded against the insole and the folding is accomplished by the rolling action of this clamp 71, which the linkage effects. It will be seen from the construction of this swing-frame that the folding-clamp 71 must rotate with the lever 72 while it is carried forward and that the opposing upper met with in its progress depresses the forward end of the lever 74, thereby raising its back end and stretching the spring 79, which serves to maintain an approximately-uniform rolling pressure. The bell-crank levers 80 operating these folding-clamps are actuated by a group of rods 82, carried down through clearance-holes in the table 26 and provided with collars 83, guided by the table 31, as shown in Fig. 4. Around each rod 82 and between the tables 26 and 31 is a long compression-spring 84, bearing on the washer 85 at one end and on the washer 86 at the other end, which covers the collar 83 and extends out upon the table 31. This spring 84 limits the force applied to the bell-crank lever 80 and causes the folding-clamp 71 to act only under the combined movements of the tables 26 and 31, when its compression overcomes the force of the tension-

spring 87, Figs. 9 and 10, intended to return the folding-clamp 71 to its original position, as shown in Fig. 9. Table 26 has thus two functions to perform to operate the jaws of the lasting-nippers 22 and to move the folding-clamps 71, while table 31 coöperates with table 26 to operate the jaws of the lasting-nippers and then acts independently to stretch the upper when seized. It will be seen from the disposition of the spring 84 between the tables 26 and 31, Fig. 4, that a downward movement of either alone can have no effect upon the rods 82, and that only when the lasting-nippers are released and withdrawn by their combined movements can the folding-clamps 71 come forward to roll the depending edges of the upper against the insole of the shoe.

In Figs. 11 and 12 the folding or rolling mechanism is similar to that just described and is operated by the tables 26 and 31 in the same manner; but these figures represent the shank of the last, the shape of which is reversed with a change of last from right to left, so that the clamping device must be capable of effecting a similar change to enable the same machine to last both right and left shoes. The clamp-bar 34 is therefore superseded by the clamping-pad 88, supported in advance of the movable frame 35 by the pivot 89, near the center of the pad and in the end of the parallel link 90. A projection from the pad 88 is carried up to and pivoted to the end of the parallel link 91. The parallel links 90 and 91 are horizontal and are supported by and pivoted to the vertical parallel links 92 and 93, which in turn are pivoted, respectively, at 94 and 95 to the movable frame 35. The lower end of the pad 88 and the pivots 94 and 95 are arranged in a straight line, so that the movement of the parallel links will not alter the distance from the lower end of the pad 88 to the movable frame 35, while the combined movements of the two sets of parallel links will cause the top of the pad to move toward and from the last as if revolving about an axis in the lower end of the pad. The movement of the frame 35 toward the last will cause the pad 88 to come in contact with the upper on the last, the pressure upon which will so adjust the angle of the pad that both ends of it will press upon the upper and pinch it between the pad 88 and the last until the pressure arrests the movement of the frame 35. The lower end of the pad 88 and the pivots 94 and 95 being in the same line, the height of the lower end of the pad with reference to the last-support will be very nearly constant at whatever inclination the pad itself may assume, so that this height may easily be so adjusted that the pressure of the pad upon the upper will be close to the insole and the stretched upper will have the shortest possible room to retract after the nippers have released preparatory to the operation of the folding-clamps 71. Having now detailed the several mechanisms which operate upon the upper to stretch it and mold it and secure it

in shape, the driving mechanism which controls and times these operations remains to be described.

Power is transmitted to the machine through the pulley 96 and pulley-shaft 97, Fig. 4, to the clutch 98, which is keyed firmly on the shaft 97. To drive the machine, this clutch is engaged with the worm 99, as shown, which drives the worm-wheel 100 on the cam-shaft 53, from which all the operating movements are derived. The worm 99 is held longitudinally in position by the clip 101, attached to the bearing 102 and engaging a recess turned in the worm to receive it, while the shaft 97 has a limited end travel to engage or disengage its clutch with or from the worm and start or stop the machine. To effect this movement of the pulley-shaft 97, the clutch 98 is grooved to receive the yoke 103, arranged to slide on the rod 104 and engaging in one direction with the lever 105 and in the other direction with the compression-spring 106. The lever 105 is pivoted at 107 and notched at its lower end to engage with the treadle 108, bell-cranked and pivoted at 109. The treadle 108 carries a lug 110, which in the position shown is caught and held by the latch 111, pivoted at 112. This latch is also bell-cranked, and at its lower end it is notched to receive a toe on the lever 113, pivoted at one side of 108 on the same pin 109. A tailpiece 114 projects from the latch 111, by which it may be tripped at the pleasure of the operator; but in the regular performance of the machine it is tripped by the lever 113 when the latter is struck by the pin 115 in the worm-wheel 100 on the completion of one revolution, as indicated by the arrow. Upon the disengagement of the latch 111 from the lug 110 on the treadle 108 the spring 106, being then unrestrained, exerts its pressure to disengage the driving-clutch from the worm 99, and the worm-wheel, being thereby cut off from the source of power, quickly comes to rest. To start again, the treadle 108 is depressed, engaging in the manner described the clutch 98, while to stop at any stage of progress the tailpiece 114 of the latch 111 is employed, disengaging the same clutch. Upon the cam-shaft 53, which is carried, as shown in Fig. 2, between the bearings 116, are mounted the actuating cam-wheels. Tables 30 and 31, which are bolted together to actuate the lasting-nippers, are operated by the cam-wheels 117 in the grooves 118 through the bars 119 and radius-bars 120, connecting the table 31 with the said cam-wheels. The radius-bars 120 are pivoted in the same axial line as the radius-bars 120^a. They are both operated by the same cam-wheels 117, but on opposite sides thereof. Table 26, which serves to open the nippers in readiness to seize the depending edges of the upper when placed in position, is operated by the grooves 121, connected through the bars 122 and radius-bars 120^a, Fig. 3. Table 41, by which the movable frames and binders are brought to bear

against the upper on the last, is moved by the cams 123 through the bars 124, and it will be observed that all these tables are actuated by cams working in pairs to give parallel movements to the tables.

The folders around the heel and toe of the last cannot operate in unison on account of interference with each other, and they are accordingly actuated by the cam-segments 52. (Shown more clearly in Fig. 3.) Each of these cam-segments has three stops or cam-faces, which act successively upon the bell-crank levers 51, pivoted at 125, severally engaging the plungers 126, 127, 128, 129, 130, and 131, Fig. 2, to which the connecting-rods 50 are attached. Each of the bell-cranks 51, Fig. 3, is pressed upon by a lever 132, pivoted at 133 and urged by the spring 134, acting between the fulcrum-stand 135 and the lever 132 to return the bell-crank 51 to the position shown after being moved by the cam-faces on 52. As a precaution against the failure of this spring 134 to act as intended, whether from undue friction in the guides 136 or from any other cause, the lever 132 is extended, the nose 137 of which will engage, if necessary, with its cam-face on 52 and positively force the bell-crank 51 back to place. Two of the folders 43^a, one at the middle of the heel and one at the middle of the toe, (marked 43^a in Fig. 1,) may be made to operate together by the movement of the plungers 126 and 131, Fig. 2. These are followed by two at the toe and two at the heel, (marked 43^b,) a pair of rods 50 being connected by a cross-head 138 to the plunger 127 and another pair 50 being connected by another cross-head 139 to the plunger 130. Then these are followed by two more at the toe and two more at the heel, (marked 43^c,) a pair of rods 50 being connected by a cross-head 140 to the plunger 128 and another pair by the cross-head 141 to the plunger 129. Thus a sequence of movements (indicated by the letters *a b c*) is established. To disengage the presser-rod 4 at the completion of the operation of lasting, the rod 18 is connected to a bell-crank lever 142, pivoted at 143 and actuated by the cam-segment 144 on cam-shaft 53. Just before the latch 111, Fig. 4, is tripped to stop the machine the cam-segment 144 engages the depending arm of bell-crank lever 142, drawing down on the rod 18 and the rod 13 to release the wedges 19 holding the catch-rod 10. When these wedges 19 are released, the counterweight 11 withdraws the presser-rod 4, the clamping-lever 37 having been previously withdrawn by the movement of the table 41, and the last may then be removed from the machine.

Having described the machine in detail and the functions of its various parts, the complete operation of lasting a shoe by our improvement may now be traced.

A last properly prepared, with an insole temporarily attached to the bottom and the several sections of the upper secured together and drawn over it and with the depending

edges prepared with glue for adhesion to the insole, is placed on the supports 2 2 and the presser-rod 4 is drawn down to secure it, as described. At this time the last-nippers 22 are open and raised to their highest position by the table 26, the tables 30 and 31 being also raised, and when all is in readiness the treadle 108 is depressed, engaging the clutch 98 with the worm 99 and starting the cam-shaft 53. As this shaft rotates the tables 30 and 31 are depressed, closing the nippers upon the depending edges of the leather, as described in the patent of O'Neill, before referred to, whereby they are prevented from seizing by a tongue which must pass below the leather to permit the jaws of the nippers to seize the leather at its lower edge only. The movement of these tables is soon followed by that of the table 26, all continuing downward until the position shown in Fig. 7 is reached. By this means the upper is drawn tightly over the last, and to prevent retraction the frames 35, 35^a, 35^b, and 35^c are moved to pinch it all around against the last by the action of the cams 123 raising the table 41 and compressing the springs 42, while at the same time and by the same means the clamping-lever 37 is brought to bear upon the toe of the last and the binders 36 around the toe and heel are advanced, as shown in Fig. 6, firmly holding the upper in place before the nippers are released. The release of the nippers is now accomplished by the cam-wheels 117 in the grooves 118 raising the tables 30 and 31 to a point where the spring 29, Figs. 7 and 8, may act to open the jaws 22 and 27 and allow the supporting-washer 25 to drop and rest upon the table 26. These tables then all move down together to the position shown in Fig. 8, clearing the nippers from the path of the folders now coming forward. The folders around the toe and heel are operated in sequence, as hereinbefore described, by the cams 52, Fig. 3, while the folding-clamps 71, Figs. 9, 10, 11, and 12, are operated together by the downward movement of the tables 26, 30, and 31. These tables in returning to their original position cause the folding-clamps 71 to roll back against the edges just rolled together, thus repeating their service, and finally presenting the nippers with open jaws in a position to seize another upper when placed in the machine upon another last. When these operations of stretching, clamping, and folding are completed and as the worm-wheel 100 approaches the end of its rotation, the movable frames 35, 35^a, 35^b, and 35^c are all swung back by the downward movement of the table 41, and the cam-segment 144 engages its lever 142, thereby releasing the presser-rod 4 and permitting the last, with its upper and insole glued together, to be removed from the machine. Continuing its movement, the pin 115 in the worm-wheel 100 strikes the lever 113, releasing the latch 111 and permitting the spring 106 to disengage the driving-clutch 98 from the worm 99, thus

stopping the machine with everything in proper position for lasting another shoe.

Having now described our improved machine in detail and also its mode of operation, what we claim as new, and desire to secure by Letters Patent, is—

1. In a machine for lasting shoes, a suitable support for the last, means for clamping said last in position upon said support, a series of stretchers for drawing the leather downward and into conformity with the shape of the last, a series of clamp-bars arranged radially about the heel and toe of said last, means for moving said bars to and from the last, a series of folding-bars for turning the depending edges of the leather inward against the under surface of the last or insole carried thereby, a series of clamping-pads 88 adapted to bear against the shank of the last, a series of folding-clamps 71 to bear and move upon the surface of the last or the material placed thereon and means for bringing about the operation, substantially as shown and described.

2. In a machine for lasting shoes, a suitable support for the last, means for clamping said last in position upon said support, a series of clamp-bars adapted to be brought into contact with the leather upon the last, a series of binders for turning certain portions of the depending leather inward, a series of folding-bars for carrying said leather inward against the insole carried by the last, and means for effecting these movements, substantially as shown and described.

3. In a machine for lasting shoes, a suitable support for the last, means for clamping said last in position upon said support, a series of clamp-bars adapted to be brought into contact with the leather upon the last, a series of binders for turning certain portions of the depending leather inward, a series of folding-bars for carrying said leather inward against the insole carried by the last, a series of clamping-pads 88, means for bringing said clamping-pads into conjunction with the shank of the last, a series of folding-clamps 71 adapted to bear and move upon the surface of the last or material placed thereon, and means for bringing about the operations of the machine, substantially as shown and described.

4. In a machine for lasting shoes, a suitable support for the last, means for clamping said last in position upon said support, a series of clamp-bars adapted to be brought into contact with the leather upon the last, a series of binders for turning certain portions of the depending leather inward, a series of folding-bars for carrying said leather inward against the insole carried by the last, a series of clamping-pads, 88 means for bringing said clamping-pads into conjunction with the shank of the last, a series of folding-clamps 71 adapted to bear and move upon the surface of the last or material placed thereon, a cam-shaft carrying a series of cams and

cam-disks, means for starting and stopping said shaft, and means for transmitting motion from said cams to the mechanisms for operating upon the shoe, substantially as shown and described.

5. In a machine for lasting shoes, the combination of a suitable support adapted to receive the last, a presser-rod, means for depressing said rod into contact with the last, a clutch for holding said rod in contact with said last, means for releasing said clutch, a lever 37 adapted to be swung into engagement with the fore part of the last, a series of stretchers having jaws for grasping the depending edges of the leather upon the last, means for effecting the movements of said jaws and stretchers, a series of clamp-bars arranged radially about the heel and toe of the last, means for carrying said bars into contact with the material upon the last, a series of binders adapted to hold the leather against the under side of the last or insole carried thereby before the nippers are released, a series of folding-bars adapted to fold said leather under the insole between the binders, means for effecting these movements, movable frames, upon each side of the last, clamp-bars movable therewith, a series of folding-clamps 71 carried by a series of levers pivoted to said movable frames, means for moving said frames, and means for operating the folding-clamps 71 independent of the movements of the movable frames, substantially as shown and described.

6. In a machine for lasting shoes, the combination of a suitable support adapted to receive the last, a presser-rod, means for depressing said rod into contact with the last, a clutch for holding said rod in contact with said last, means for releasing said clutch, a lever 37 adapted to be swung into engagement with the fore part of the last, a series of stretchers having jaws for grasping the depending edges of the leather upon the last, a series of clamp-bars arranged radially about the heel and toe of the last, means for carrying said bars into contact with the material upon the last, a series of binders adapted to hold the leather against the under side of the last or insole carried thereby before the nippers are released, a series of folding-bars adapted to fold said leather under the insole between the binders, means for effecting these movements, movable frames, upon each side of the last, clamp-bars movable therewith, a series of folding-clamps 71 also carried by a series of levers pivoted to said movable frame, levers 80 connected by links 81 to the last-named levers, rods 82 pivoted to the levers 80, and means for operating the machine, as and for the purpose described.

7. In a device of the character described, an upright having a passage therethrough, a movable spring-pressed bottom in the passage, a binder slidable on the bottom, a cam-nose on the end of the binder adapted to slide be-

neath the edge of the last against the action of the spring-pressed bottom as and for the purpose described.

8. In a device of the character described, 5 an upright having a passage therethrough, a movable bottom in the passage, a spring-pressed button in the passage beneath said bottom, a binder slidable on the bottom, a cam-nose on the end of the binder adapted 10 to slide beneath the edge of the last against the action of the spring-pressed button and means for operating the binder, as and for the purpose described.

9. In a device of the character described, 15 a rocking frame pivoted to the frame of the machine, two parallel upright levers pivoted to the rocking frame, two parallel levers pivoted to the upright levers, a shoe pivoted to the second pair of parallel levers and adapted 20 to bear on the side of the last when the frame is rocked and means for rocking the frame, as and for the purpose described.

10. In a device of the character described, a rocking frame pivoted to the frame of a 25 machine, a spring-actuated bell-crank lever pivoted to the rocking frame, a lever pivoted to the rocking frame, a link connecting the lever to the bell-crank lever, a spring-pressed arm pivoted to the lever, a shoe pivoted to 30 the end thereof, a link connecting the shoe and lever, a link connected to the arm and slidably connected to the rocking frame and means for operating the rocking frame and bell-crank lever, as and for the purpose de- 35 scribed.

11. In a machine for lasting shoes, a last-support, a rod which presses the last on said support, a friction-grip which automatically holds the pressure of said rod, and means 40 which automatically release the last from the rod, when the operation of lasting is completed.

12. In a machine for lasting shoes, a last-support, a pressure-pad, a movable support 45 for said pad, which pad automatically presses upon the upper at the toe of the last, and holds the last against the last-support during the lasting operation, after which it automatically releases the last, and means for ef- 50 fecting said movements.

13. In a machine for lasting shoes, a series of movable frames so disposed about the position for the last as to permit the last with the upper to be lasted, to be readily placed 55 in position, a fixed projection on each of said frames which pinches the upper between the last and the fixed projection as the movement of each frame is arrested by it, and means for effecting the movements of said frames.

14. In a machine for lasting shoes, a series 60 of movable frames so disposed on each side of the position for the last, as to permit the last with the upper to be lasted to be readily placed in position, a pad supported in each 65 of said frames by parallel bars, and movable about an axis in advance of said frame, which

pad pinches the upper between the last and the pad as the movement of said frame is arrested by it, and means for effecting said movements. 70

15. In a machine for lasting shoes, a plurality of movable frames so disposed about the position for the last as to permit the last with the upper to be lasted, to be readily placed in position, a fixed projection on each 75 of said frames which pinches the upper between the last and the fixed projection, as the movement of each frame is arrested by it, a folder-bar carried by each of said frames and movable in a vertical plane therein, and means 80 for effecting said movements.

16. In a machine for lasting shoes, a plurality of movable frames so disposed about the position for the last as to permit the last with the upper to be lasted, to be readily 85 placed in position, a fixed projection on each of said frames which pinches the upper between the last and the fixed projection as the movement of each frame is arrested by it, a folder-bar carried by said frame and movable 90 in a vertical plane therein, a folder pivoted upon one end of said bar and rotatable thereon, and means for effecting said movements.

17. In a machine for lasting shoes, a plurality of movable frames so disposed on each 95 side of the position for the last as to permit the last with the upper to be lasted, to be readily placed in position, a pad supported in each of said frames by parallel bars, and movable about an axis in advance of said frame, which 100 pad pinches the upper between the last and the pad as the movement of said frame is arrested by it, a folder-bar carried by said movable frame and movable in a vertical plane 105 therein, a folder pivoted upon one end of said bar and rotatable thereon, and means for effecting said movements.

18. In a machine for lasting shoes, a series of lasting-nippers which seize the depending edges of the upper and draw it down with a 110 regulated force, a series of binders between the nippers, that force portions of the upper under the last and press these portions against the insole thereon, while the nippers are holding the upper down between the binders, and 115 means for effecting said movements.

19. In a device of the character described, a bar supported to move to and from the last, a pad on said bar which presses the depending edge of the upper against the insole on 120 the last, a support for the bar through which the pad-pressure against the insole is regulated, and means for effecting the movements of said bar.

20. In a device of the character described, 125 a plurality of folders arranged about one end of the last and mechanism for advancing and retracting adjoining folders alternately for the purpose specified.

21. In a device of the character described, 130 a folding-pad with a plurality of parallel ribs upon that side of the pad which presses the

edge of the upper against the insole on the last, as and for the purpose specified.

22. In a machine for lasting shoes, a plurality of movable frames disposed radially
5 around one end of the last position so as to permit the last with the upper to be lasted, to be readily placed in position, a plurality of fixed frames alternating with the said movable frames, a bar carried by each of said fixed

frames and movable in a vertical plane therein and means for effecting said movements. 10

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