

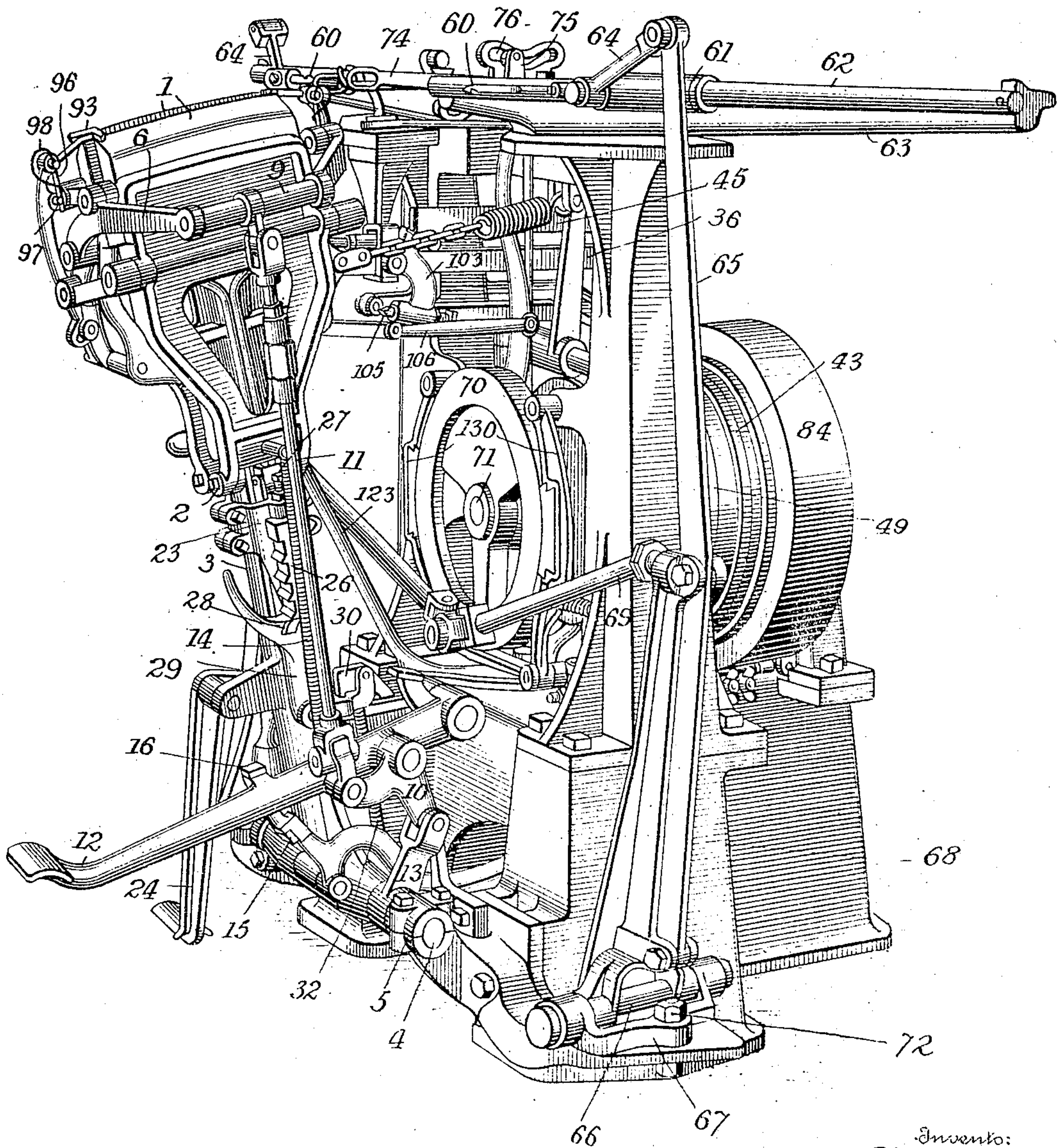
No. 825,402.

PATENTED JULY 10, 1906.

A. E. MILLER.
BROOM SEWING MACHINE.
APPLICATION FILED MAR. 19, 1903.

9 SHEETS—SHEET 1.

Fig. 1.



Witnesses
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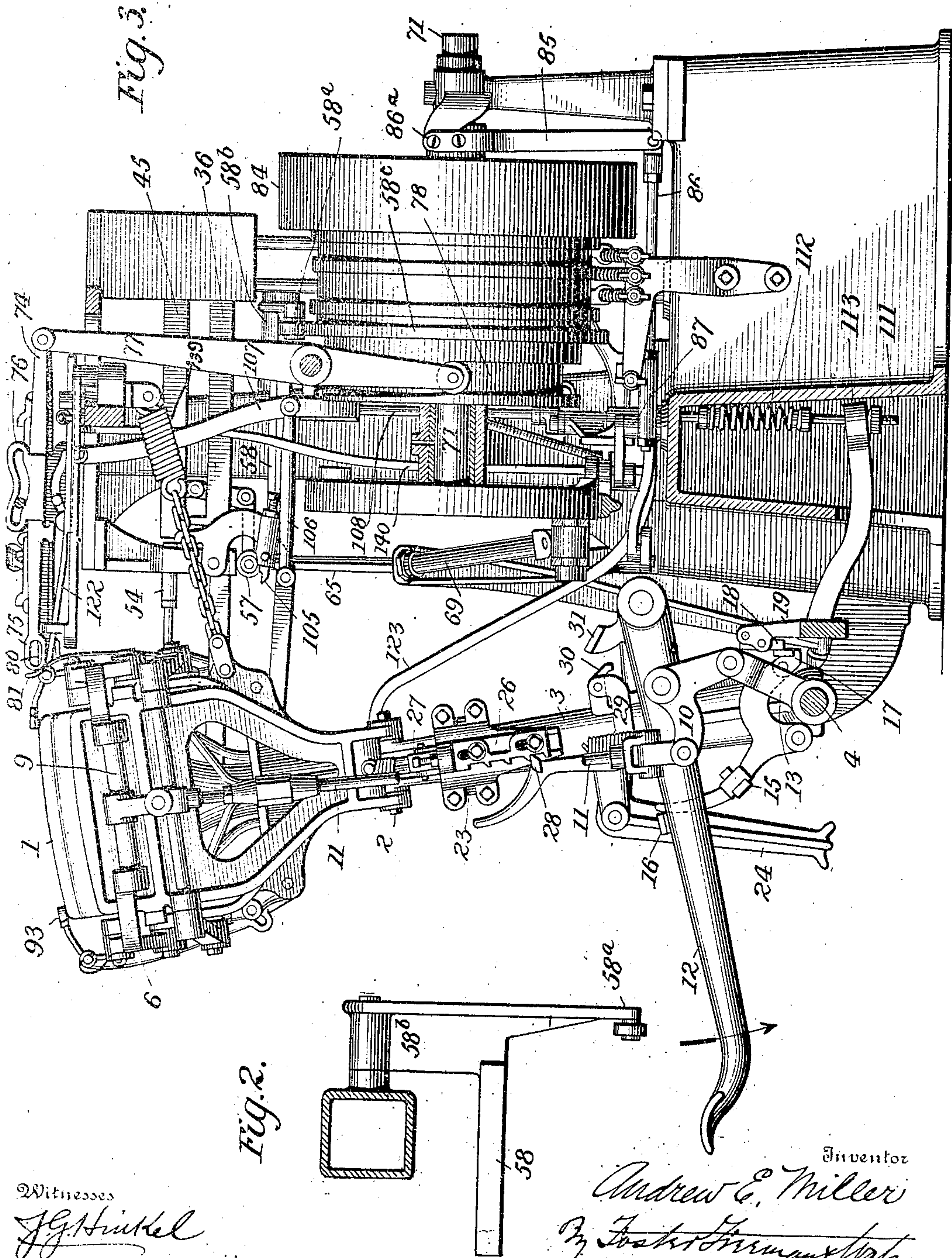
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9 SHEETS—SHEET 2.



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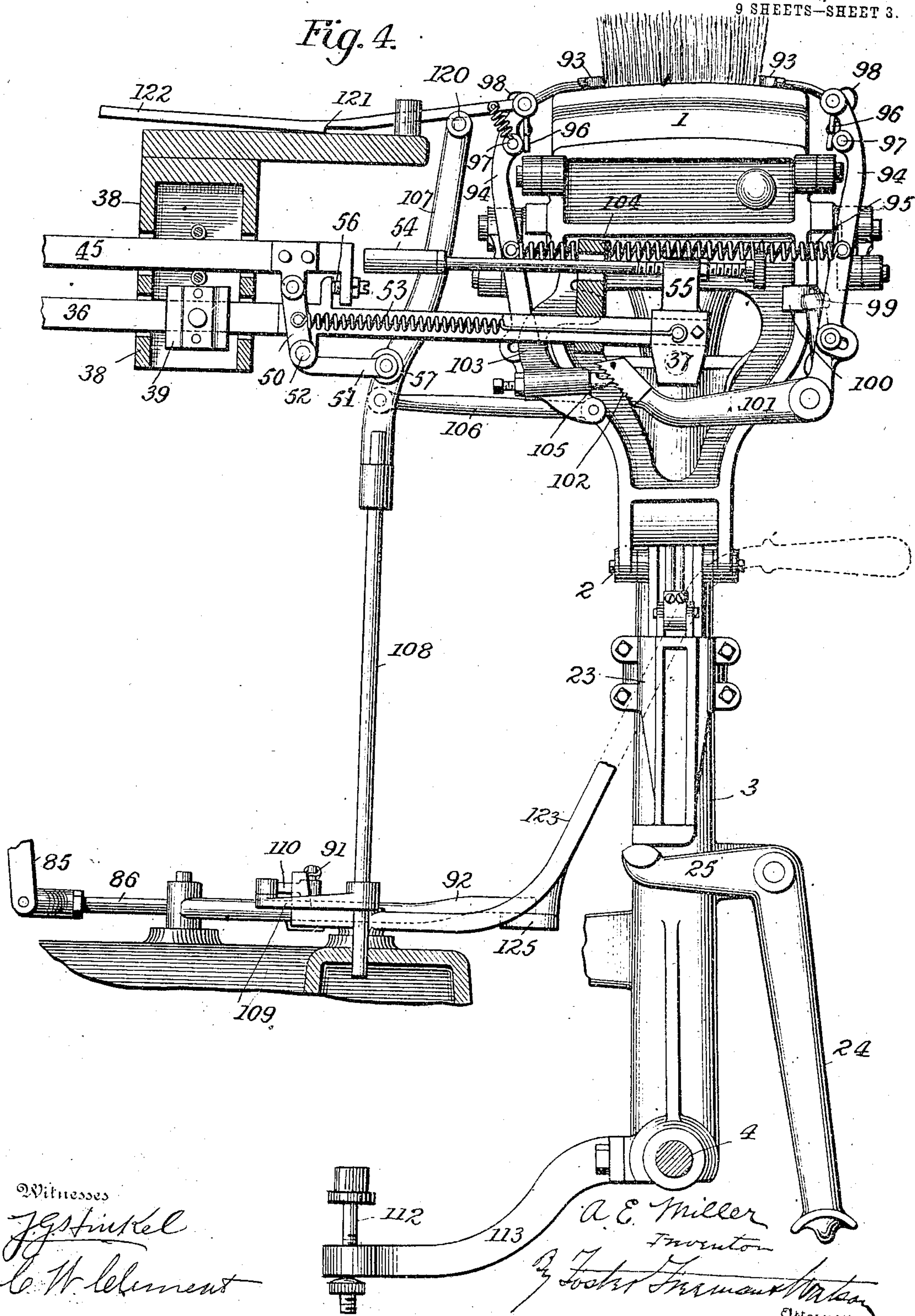
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Fig. 4.



Witnesses

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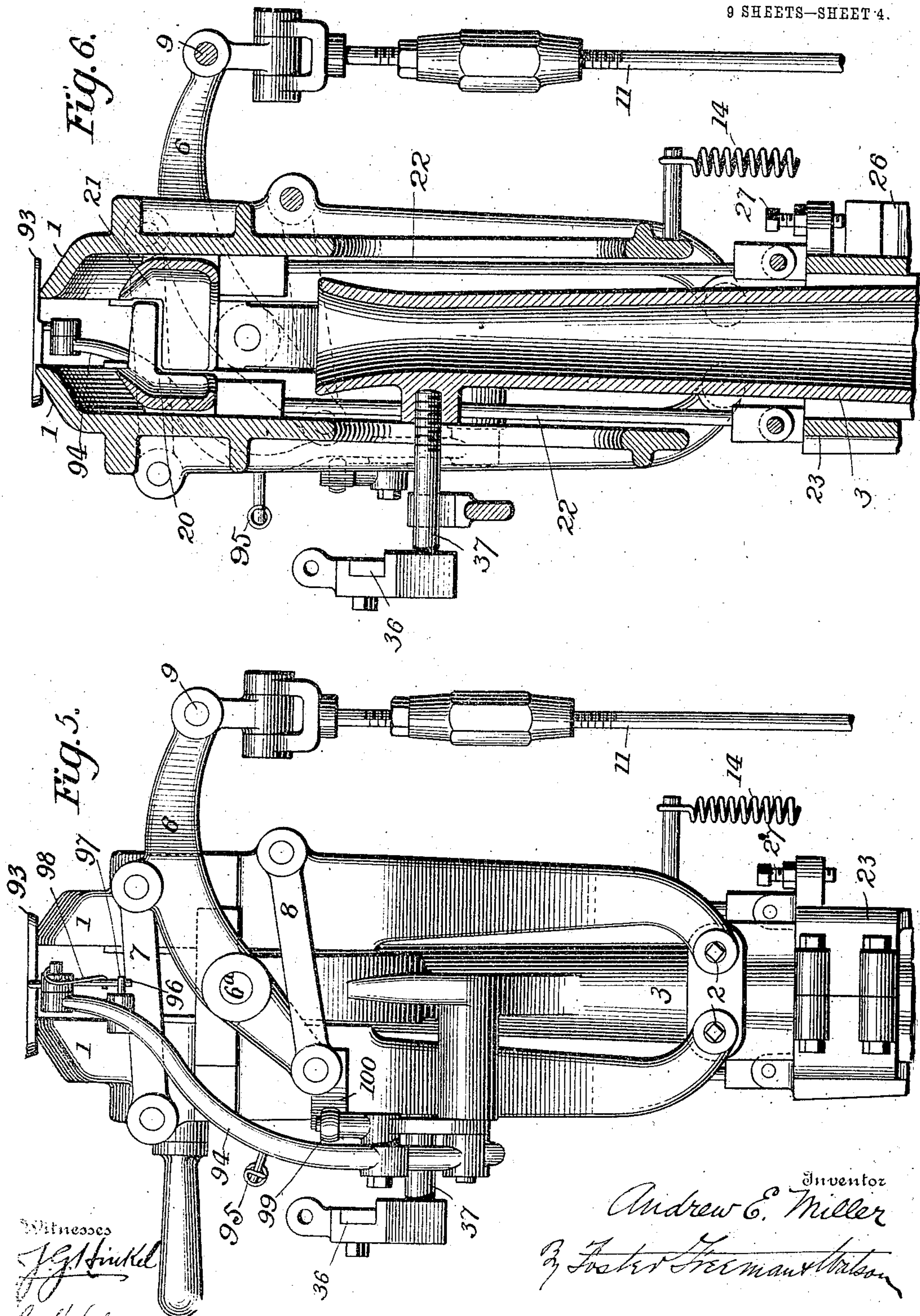
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9 SHEETS—SHEET 4.



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9 SHEETS—SHEET 5.

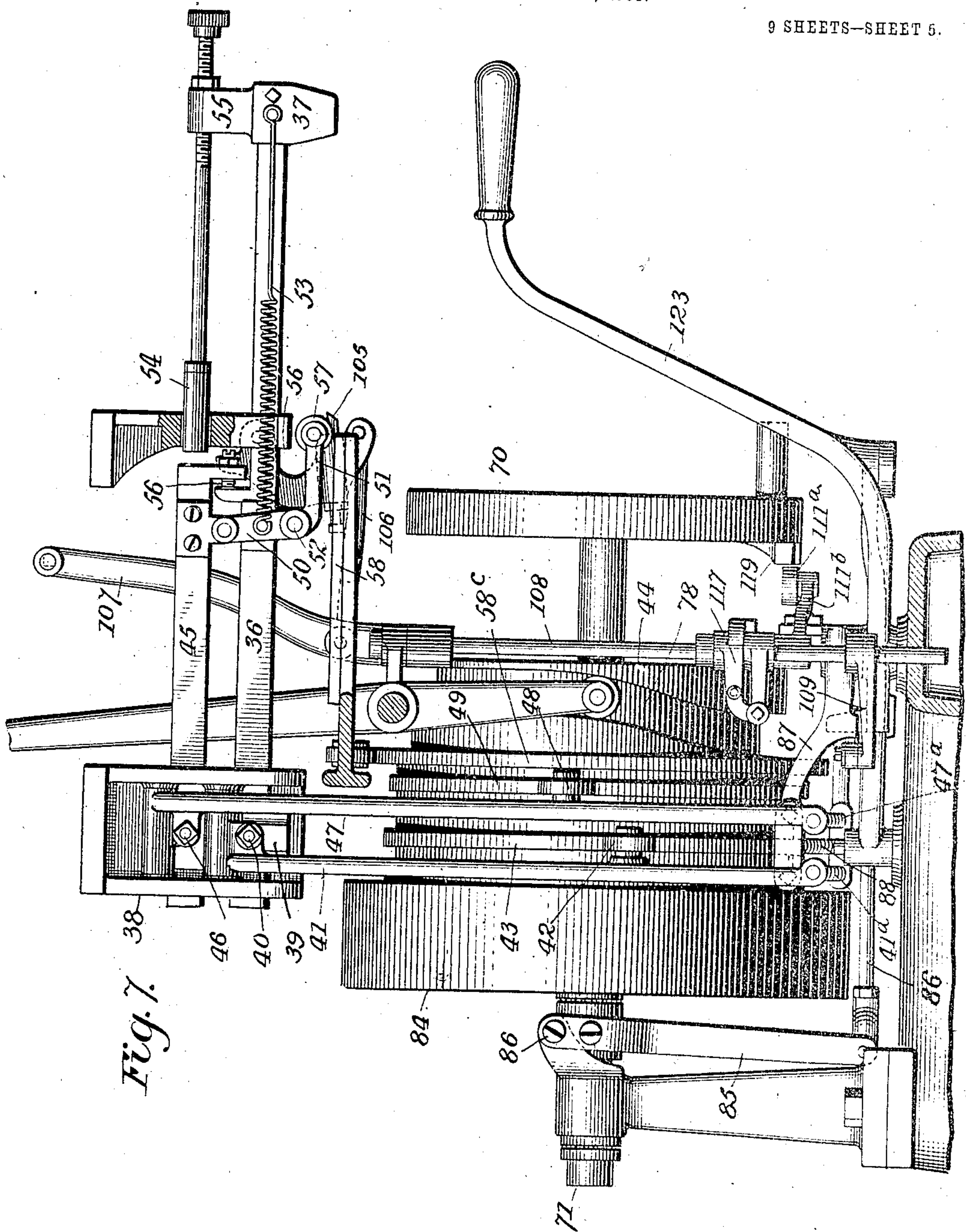


Fig. 7.

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Fig. 8.

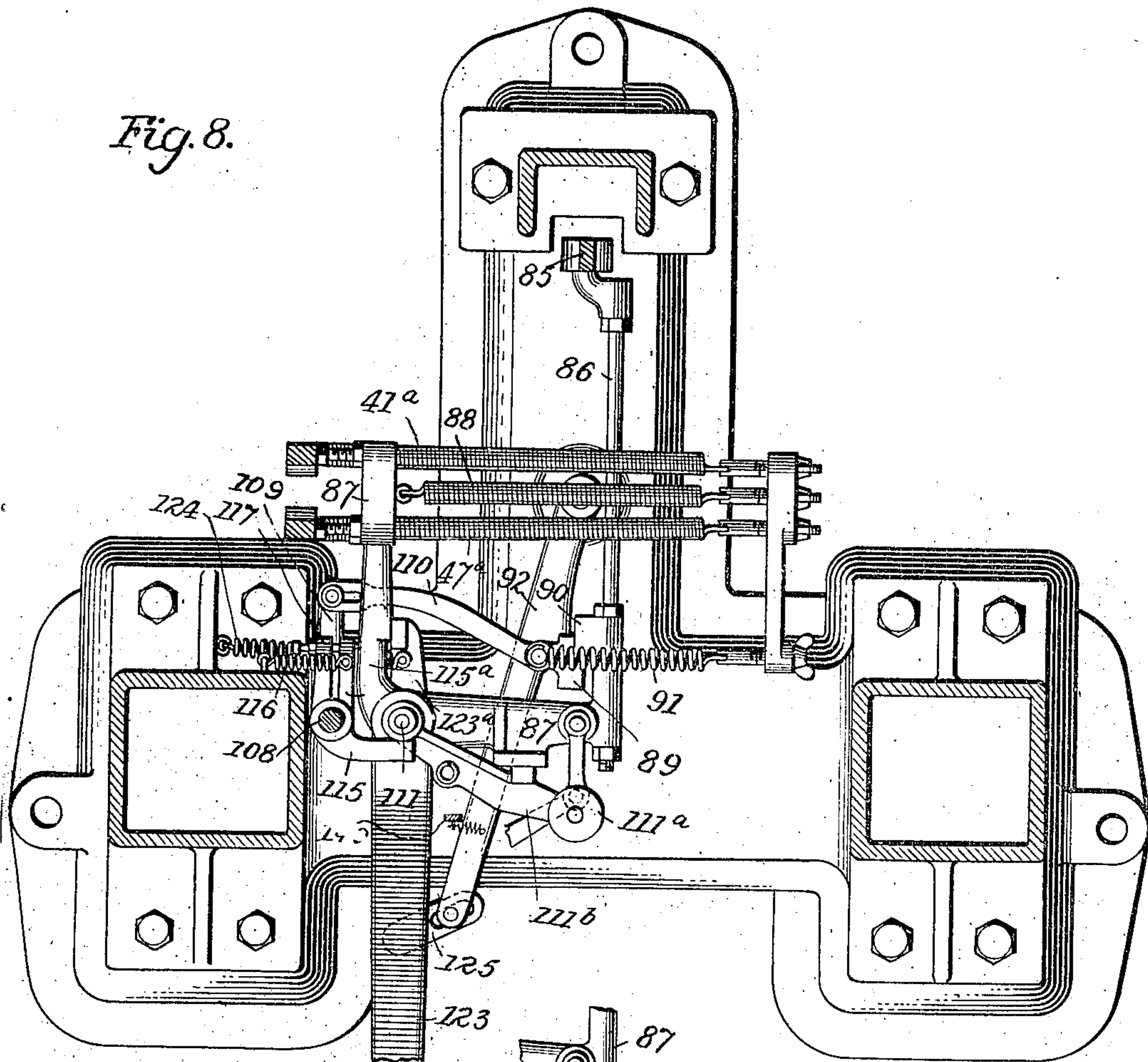


Fig. 14.

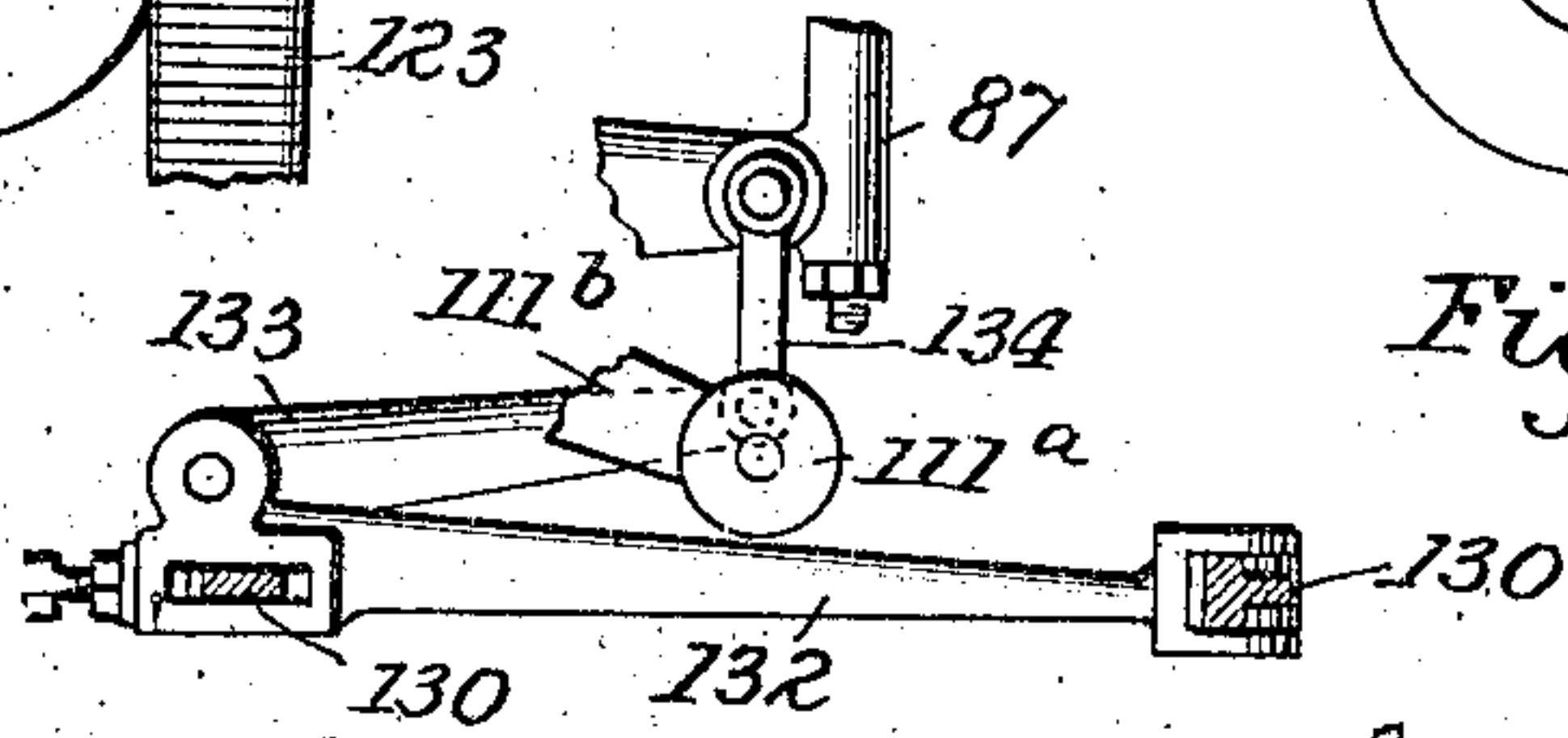
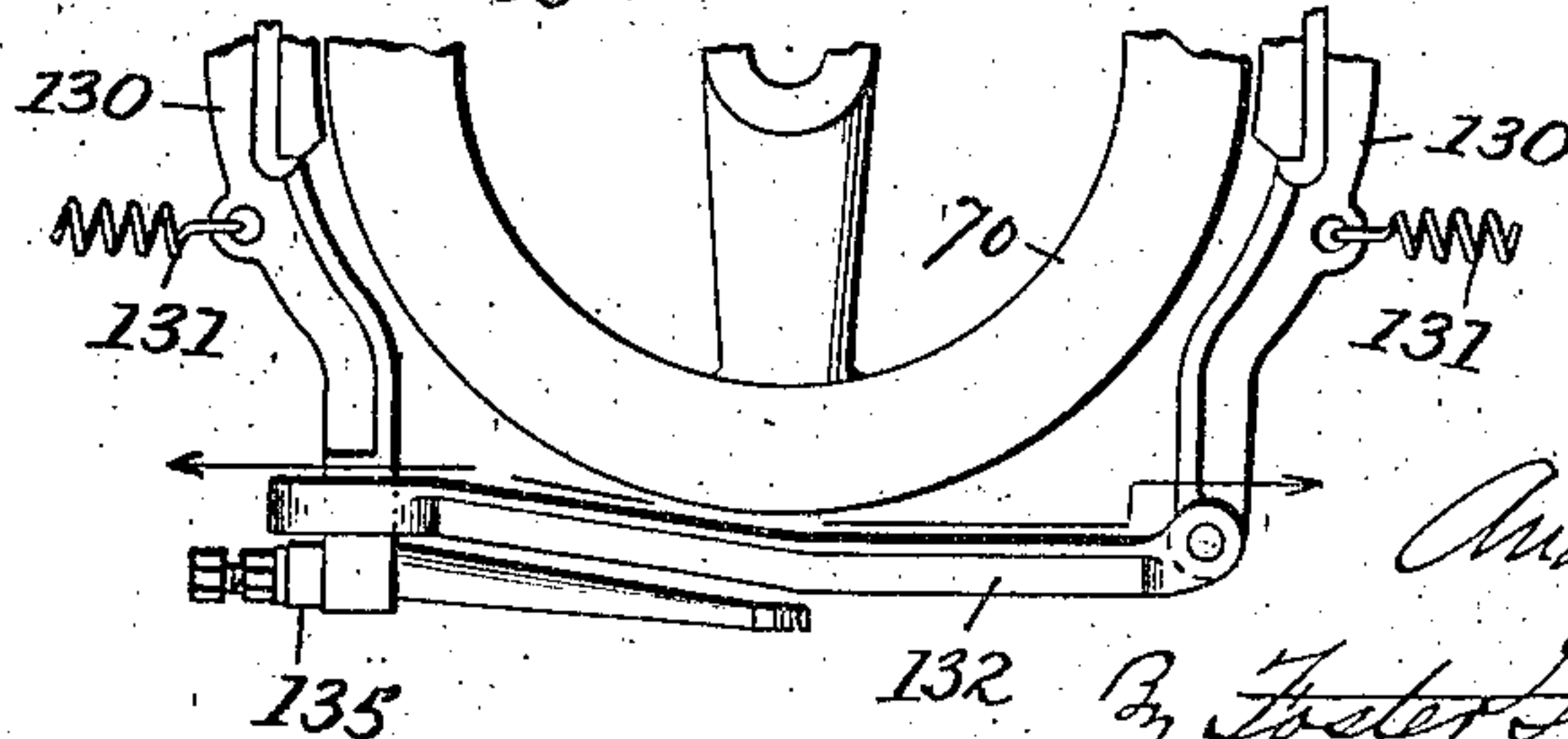


Fig. 15.



Witnesses.

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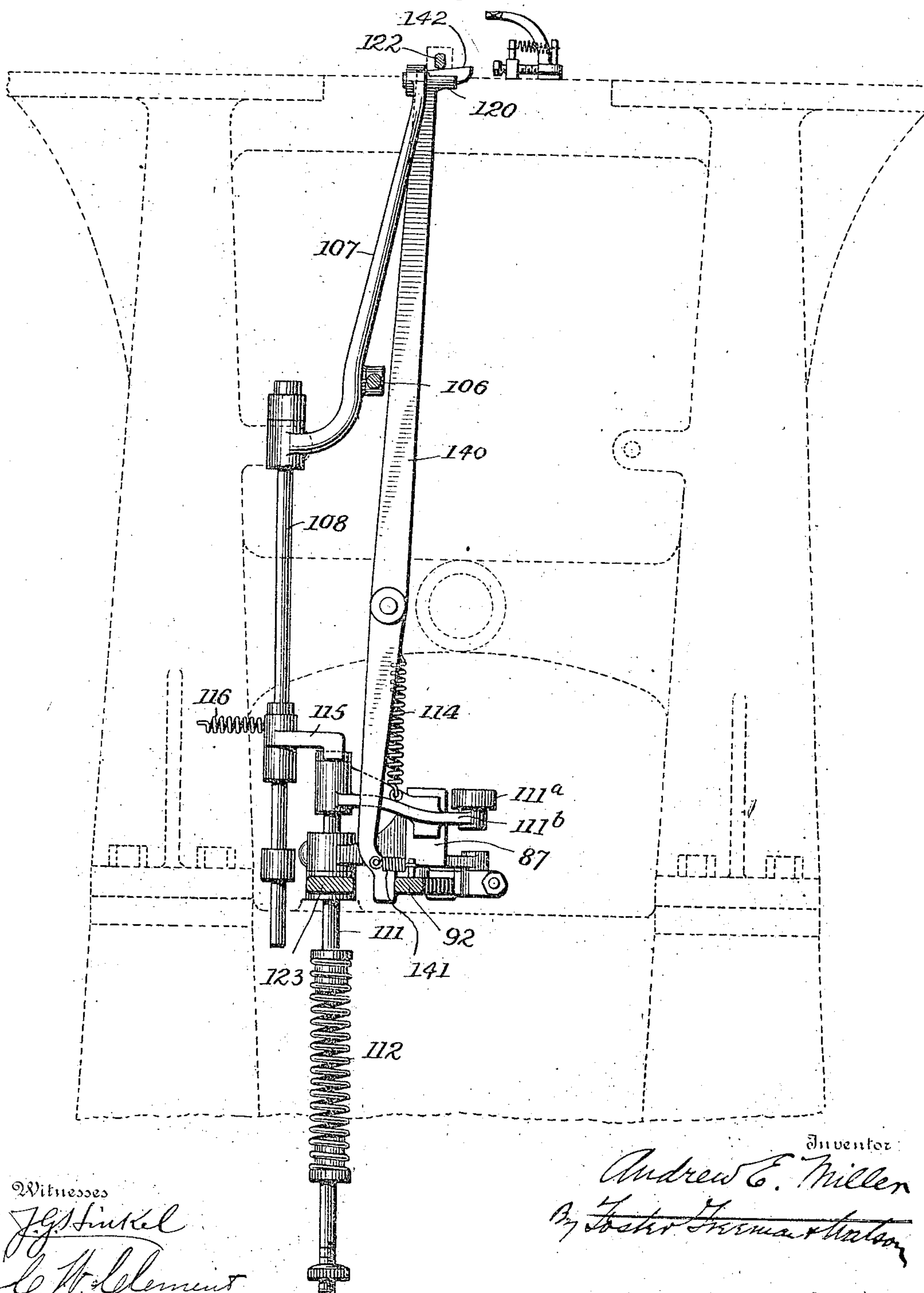
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Fig. 9.



Witnesses

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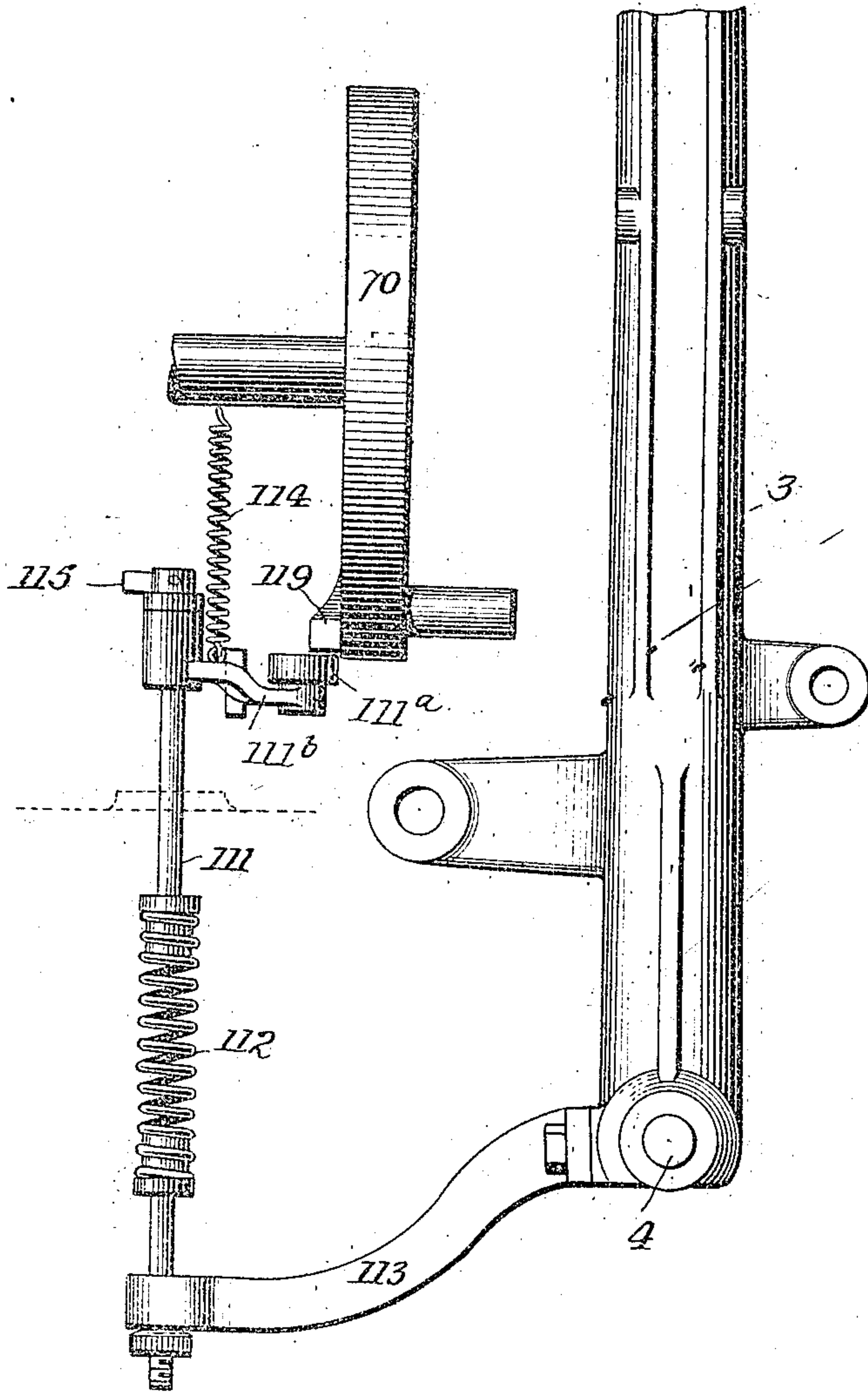
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Fig. 10.



Witnesses
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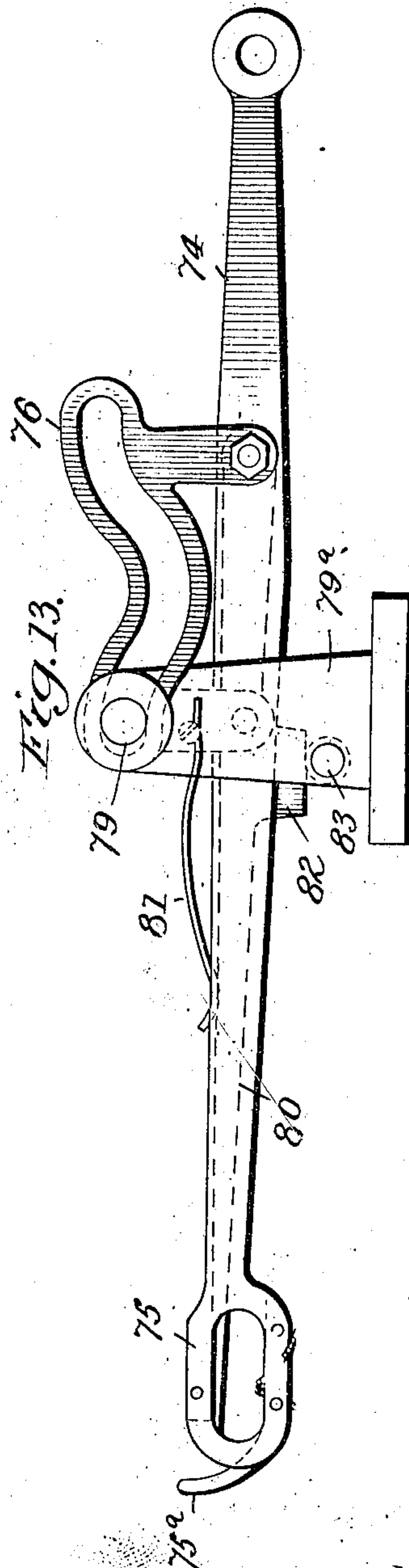
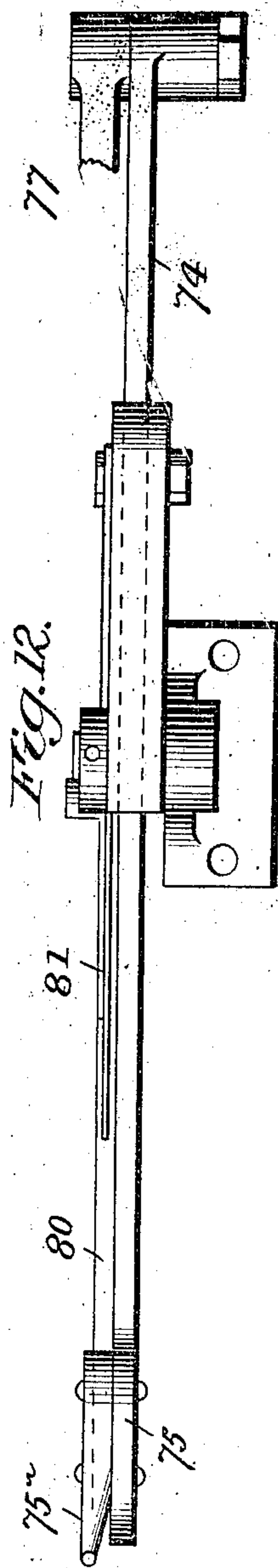
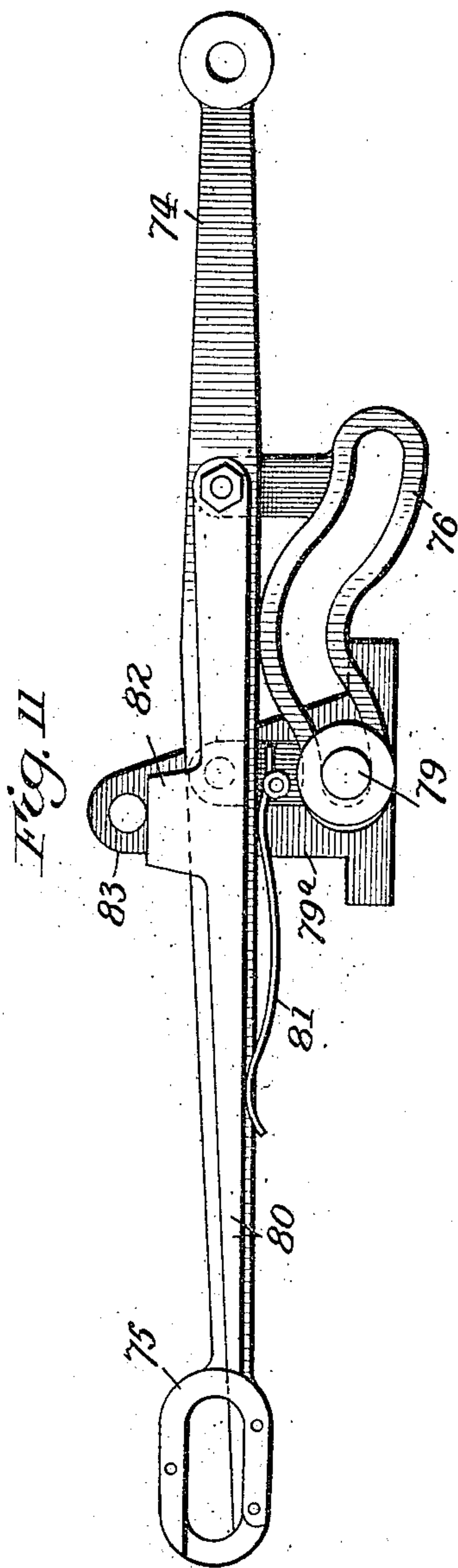
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9 SHEETS—SHEET 9.



Witnesses

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UNITED STATES PATENT OFFICE.

ANDREW E. MILLER, OF BALTIMORE, MARYLAND, ASSIGNOR, BY MESNE ASSIGNMENTS, TO HAMILTON CASSARD, OF BALTIMORE, MARYLAND.

BROOM-SEWING MACHINE.

No. 825,402.

Specification of Letters Patent.

Patented July 10, 1906.

Application filed March 19, 1903. Serial No. 148,612.

To all whom it may concern:

Be it known that I, ANDREW E. MILLER, a subject of the King of Great Britain, residing at Baltimore, in the State of Maryland, have invented certain new and useful Improvements in Broom-Sewing Machines, of which the following is a specification.

The present invention comprises various improvements in machines for sewing brooms, the object being to produce a machine which is strong and comparatively simple in construction and to a large extent automatic in its operation.

A complete machine embodying the various features of the operation is hereinafter described, reference being had to the accompanying drawings, in which—

Figure 1 is a perspective view of the entire machine, showing particularly the front and right side thereof. Fig. 2 is a detail of the feed mechanism. Fig. 3 is a right side elevation, parts being broken away to show the interior construction. Fig. 4 is a left side elevation of the vise and some connected parts. Fig. 5 is a front view of the vise proper. Fig. 6 is a sectional view of the same. Fig. 7 is a left side elevation of the vise-feeding mechanism and the automatic stopping mechanism. Fig. 8 is a plan view, partly in section, of the lower portion of the machine. Figs. 9 and 10 are details showing the automatic stopping devices. Figs. 11 and 12 are side and plan views, respectively, of one of the threading devices. Fig. 13 is a side view of the other threading device. Figs. 14 and 15 are details of the brake mechanism.

The various working parts of the machine are mounted on a frame, which may be of any suitable design. As shown, the frame consists of a base and several connected columns and brackets.

The vising mechanism.—The broom is placed in a vise and clamped tightly, after which the vise is moved to the sewing mechanism and a line of stitches formed across the broom adjacent to the edge of the vise. The vise shapes the broom and clamps the broom-straw tightly while it is being sewed.

As illustrated in the drawings, the vise comprises two jaws 1, which are pivoted at 2 to a hollow shank or vise-frame 3. The vise-frame is provided at its lower end with trunnions 4, about which it is rocked, the said trunnions being mounted in bearings 5.

Referring to Figs. 1, 3, and 5, it will be seen that the vise-jaws are respectively connected with levers 6 by pairs of links 7 and 8. The parts 6, 7, and 8 are similar at both ends of the vise. The levers 6 are pivoted to the vise-frame at points between the jaws, as shown in Figs. 1, 5, and 6, and are connected by a rod 9, and said rod is connected with an elbow-lever 10 by a link 11. The elbow-lever is pivoted on a treadle or foot lever 12, its horizontal arm being connected with the rod 11 and its vertical arm connected with the short lever 13, mounted on the vise-trunnions 4. By means of the levers 10 and 13 a species of toggle action is created, which permits much greater force to be brought to bear upon the broom in the vise than would be the case if the rod 11 were connected directly to the foot-lever 12. The levers 6, 7, and 8 are also so arranged that the power which may be brought to bear upon the broom increases as the vise closes. A spring 14 tends constantly to open the vise and to raise the foot-lever, said spring extending from the lower end of one of the vise-jaws to said foot-lever, as shown in Figs. 1 and 5. When the vise is closed, it is temporarily locked in that condition by a latch 15, Figs. 1 and 3, which engages a projection 16 on the foot-lever 12. The latch 15 is pivoted on the lower part of the vise-shank 3, and it swings with the vise when engaged with the treadle 12. The vise is automatically opened when it moves forward into the position shown in Fig. 3 by reason of the tail 17 of latch 15 coming in contact with a tripping-block 18, pivoted to a fixed bracket 19. A spring connection 139 with the main frame, Fig. 3, relieves the shock as the vise moves forward.

Broom-dropping devices.—Within the vise is a broom holding and forming clamp, consisting of a pair of jaws 20 and 21, Fig. 6. These jaws are sustained by vertical rods 22, the lower ends of which are connected to a collar 23, which slides on the vise-frame 3. The collar 23 and the broom-clamp are raised as each new broom is inserted by a foot-lever 24, which has a horizontally-arranged arm 25, adapted to engage with the lower end of the collar 23, as shown in Fig. 4. On the collar 23 is fixed a rack 26, which has a pin-and-slot connection with the collar, providing for vertical adjustment, Fig. 3. A set-screw 27, mounted in the collar and bearing on the up-

per end of the rack, provides for holding the rack tightly in any desired adjustment and prevents it from being disarranged by shock when the inner vise drops. A series of racks 26 are provided and interchangeably used, the different racks having their teeth differently spaced to provide for different spacing of the rows of stitches on the brooms. A pivotally-mounted spring-pressed pawl 28 engages the teeth of the rack 26 and cooperates with said rack to drop the broom from one line of stitches to the next. The pawl 28 is carried on an elbow-lever 29, Figs. 1 and 3, on a horizontal arm of which is a pivoted tappet 30, which stands in the path of a projection 31 of the vising-lever 12. When the vising-lever rises as the vise is opened, the projection 31 engages the tappet 30 and momentarily throws out the pawl 28, permitting the inner clamps and the collar 23 to drop. Said pawl is immediately returned by spring 32, Fig. 1, and engages the next tooth of the rack. In this manner the broom is automatically lowered from one line of stitches to the next.

Vise-feeding mechanism.—After a broom is vised the vise is pushed to the rear until it is in position for the first stitch. The vise is stopped in position for the first stitch by a device which is automatically adjustable, according to the width of the broom, as will be hereinafter explained. A bar 36 has its forward end connected to an arm 37, extending out from the vise-frame, and its rear end passes through a box 38, in which it is engaged by a clamping-jaw 39, Figs. 4 and 7. The jaw 39 is periodically clamped on the bar by pressure of a pin or bolt 40, carried by a cam-lever 41, which bears a roll 42, riding on a cam-rib 43 on a cam-cylinder 44. Above the rod 36 is a parallel rod 45, which also passes through the box 38 and is periodically clamped similarly to the rod 36 by a pin or bolt 46, cam-lever 47, and a cam-roll 48, bearing on cam-rib 49. The levers 41 and 47 are held to the cams by springs 41^a and 47^a, respectively. The rods 36 and 45 are pivotally connected by an arm 50 of an elbow-lever, which has a horizontal arm or extension 51. The elbow-lever turns about a pivot 52, connected to the lower rod, and the arm 50 is normally drawn forward by a spring 53, which connects it with the arm 37 on the vise-frame.

In the operation of the machine the rods 36 and 45 are alternately clamped and alternately released. When the rod 45 is released, it is drawn by the spring 53 against an adjustable stop 54, said stop being adjustable by means of a threaded rod passing through a threaded eye 55 on the arm 37 of the vise-frame. By the adjustment of the stop 54 any desired movement of the rod 45 relative to the rod 36 may be had, and the length of stitch or step movement of the vise is

thus regulated. When the rod 45 is clamped and the rod 36 released, the vise is moved forward positively by a vertically-oscillating rail 58, which raises rolls 57 on arm 51, carrying the rod 36 and the stop 54 with it. An adjustable stop 56, carried by rod 45, prevents overmotion of the vise. The rail 58 is carried on an arm 58^a, pivoted to the main frame at 58^b and driven by a cam-rib 58^c on the cam-wheel 44. The broom is thus fed forward positively step by step. After a row of stitches is sewed the rods 36 and 45 are simultaneously and automatically released, as will be hereinafter explained, and the vise may be moved back freely into position for sewing a new line of stitches.

Sewing mechanism.—The brooms are sewed by a pair of horizontal needles 60, carried by heads 61, which slide on horizontal guides 62, said guides, as shown, consisting of rods attached at their ends to arms 63. The needle-heads are reciprocated by links 64, connected to arms 65, which rock on pivot-pins 66, carried by adjustable brackets 67. The arms 65 are preferably light steel bars carried by cast arms 68. The arms 68 are connected by links 69 and universal joints with a crank-pin on a wheel 70, mounted on the driving-shaft 71. Each of the needles 60 has an open hook which engages the thread and draws it through the broom as the needle recedes. The needle-guides are adjustable to vary the angle of the needles with relation to each other for the purpose of varying the length of stitch or of sewing thick and thin brooms with stitches of the same length. The point of intersection of the needle-paths preferably lies in a line through the center of the broom. To effect the angular adjustment of the needles, the brackets 67 are adjustably secured to the frame by bolts 72, the guide-supporting arms 63 being so connected to the upper part of the frame as to permit the necessary adjustment.

Needle-threading devices.—The needle-threading devices are shown particularly in Figs. 1, 3, 11, 12, and 13. Referring to Figs. 12 and 13, which illustrate the right-hand threading device, 74 indicates an arm or lever having at its forward end an eye 75, its rear end being jointed to cam-lever 77, the lower end of which carries a roll which runs in a cam-groove 78 in the cam-wheel 44. Rigidly connected with the arm 74 is cam-piece 76, having a serpentine slot into which projects a fixed pin 79 on the bracket 79^a. A thread-clamping finger 80 is pivoted to the arm 74 and extends across the eye 75. This finger is constantly pressed downward by a spring 81, which gives it a tendency to clamp the thread against the lower wall of the eye. When the threading-arm is moved to its rear-most position, a foot 82 on the clamping-finger engages and rests upon a fixed pin 83 on the bracket 79^a, thus raising the forward

end of the finger to the upper side of the eye. The shape of the cam-slot is such that the foot 82 descends upon the rest 83 during the last portion of the rearward movement of the arm. When the arm starts to move forward, it begins to rise, and the foot 82 is raised from its support, permitting spring 81 to press the finger and clamp the thread. During the balance of the forward movement of the arm and the like part of its rearward movement the thread is held in the eye while it is carried around and engaged with the needle. The eye 75 is provided with a hook or support 75^a, in which the thread is placed by the operator before the first stitch is taken. The left-hand threading device (illustrated in Fig. 11) is constructed and operated in the same manner as the right-hand device, with the exception that its parts are inverted, and it has no thread-support, such as 75^a.

Automatic starting device.—Power is applied to a driving-pulley 84, which normally runs idle. This pulley is engaged and disconnected from the driving-shaft 71 by a clutch of suitable construction, which clutch is operated by a clutch-lever 85, pivoted at 86^a, Fig. 3. The clutch-lever is connected by a link 86 with an elbow-lever 87 and a spring 88, Fig. 8, constantly tends to draw the clutch-lever forward to throw in the clutch and start the machine. The clutch is normally held open by a stop 89, which engages a shoulder 90 on link 86. The stop 89 is thrown into the path of said shoulder by a spring 91, which is connected to a lever 92, to which said stop is pivoted. When the stop 89 is withdrawn from the shoulder 90, the spring 88 immediately closes the clutch and starts the machine. The machine is arranged to automatically start sewing when the broom is in position for the first stitch. This position varies with the width of the broom, and means are therefore provided for starting which are governed by the width of the broom.

Referring to Figs. 3, 4, and 5, 93 indicates a pair of fingers or thread-supports which engage the forward and rear edges of the broom. These fingers are pivoted to arms 94, which are connected and drawn toward each other by a spring 95. Each of the fingers 93 has a downward extension 96, which is normally held against a pin 97 by a spring 98. The fingers are thus held normally in position to engage the edges of the broom just above the vise. Each of the arms 94 is provided with an antifriction-roller 99, which engages a cam-surface 100 on the left-hand vise-jaw. When the vise is thrown open, these cams throw back the fingers 93 from the vise to permit a broom of any width to be inserted. The cam-rollers 99 are adjustable with relation to the arms 94, so that the fingers 93 may be thrown back to different distances. The forward arm 94 has a hori-

zontal extension 101, provided on its rear end with an inclined toothed surface 102, which surface is adjusted up and down, according to the width of the broom in the vise. A lever 103, pivoted to the vise at 104, has at its lower end an adjustable tooth 105, adapted to engage the teeth on the extension 101, Figs. 3 and 4. The lower end of lever 103 is connected by a link 106 to a curved arm 107 on the upper end of a rock-shaft 108. The lower end of this rock-shaft carries an arm 109, which has a pin-and-slot connection with a link 110, which is rigid with the stop 89.

The automatic starting of the machine operates as follows: As the vise is closed the fingers 93 engage the jaws of the broom, and the toothed surface 102 is adjusted according to the width of the broom. The vise is then moved to the rear to begin sewing. As it reaches the proper starting position one of the teeth 102 engages the tooth 105 and moves it rearward, slightly rocking the shaft 108, Figs. 3, 4, and 8, and drawing the stop 89 away from the shoulder 90, thus permitting the spring 88 to immediately throw in the clutch and start the machine.

Automatic stopping devices.—A cam-roll 111^a is carried by an arm 111^b on a vertically-reciprocating rock-shaft 111. The lower end of this shaft is connected by a spring-link 112 with an arm 113, extending rearward from the vise-frame, Figs. 8 and 10. The shaft 111 is normally raised by a spring 114, and it is pulled down by the arm 113 each time the vise is moved into the sewing position. When the shaft 111 is pulled down, it is latched in this position by an arm 115, loose on shaft 108, the arm 115 being operated in one direction by a spring 116, Figs. 4, 8, 9, and 10. Beneath the arm 115 is a second arm 117, which is fast on shaft 108 and which carries a set-screw engaging the tail 115^a of the arm 115. When the shaft 108 is rocked in one direction, the arm 115 releases the vertical shaft 111 and permits the spring 114 to raise it until the roll 111^a moves into the path of the cam projection 119 on the rear of the disk 70. Cam 119 thus rocks shaft 111, and the arm 111^b engages the lever 87 and moves the link 86 to the rear, thus throwing out the clutch and stopping the machine. The stop 89 engages the shoulder 90 and prevents the machine from starting until a new row of stitches is to be sewed. The shaft 108 is rocked for the purpose of stopping the machine by engagement of an angular pin 120, Figs. 4, 8, and 9, on the upper end of the arm 107 with the hook 121 on a rod 122, connected to one of the arms 94 on the vise. The rod 122 is drawn forward by the vise, and its position with relation to the vise depends upon the width of the broom, as will be evident from an inspection of Fig. 4. The stopping of the machine is therefore regulated by the width of the broom in much the same

manner as the starting is so regulated. To effect the disengagement of the rod 122 from the pin 120 at the proper moment—just as the clutch is released—a lever 140, Figs. 3, 8, 9, is provided. The lower end of lever 140 is tied to lever 92 by a spring 141, and its upper end has an inclined edge 142. When lever 92 moves to the right—at the instant the clutch is opened—the edge 142 raises the rod 122 from pin 120, as shown in Fig. 9.

The machine may be started and stopped by hand whenever desired, for which purpose a hand-lever 123, Figs. 1, 3, and 8, is provided. This lever is pivoted concentrically with the lever 87, and its rear end 123^a is arranged to bear against said lever 87. Lever 123 is normally held in the position shown in Fig. 8 by spring 124. When the lever 123 is moved to the right, it rocks lever 87 and stops the machine. When lever 123 is moved to the left—in the direction of the arrow, Fig. 8—it rocks the lever 92 by means of a connecting-link 125 and withdraws the stop 89, thus starting the machine.

To effect quick stoppage of the machine after each row of stitches, I have a brake which is automatically applied. The brake devices are shown in Figs. 1, 14, and 15. On opposite sides of the fly-wheel 70 are brake-levers 130, which are provided with suitable brake-shoes. Springs 131 tend to hold the shoes free from the wheel. A link 132 is connected with one lever 130 and has an opening through which the free end of the other lever passes. Pivoted to link 132 is a lever having its longer arm 133 connected by link 134 with the arm 87 and its shorter arm 135 bearing on the end of the lever 130, which passes through link 132. It will be evident that when the lever 87 moves rearward to open the clutch the brake-levers 130 will be powerfully drawn together and clamped upon the wheel 70, and the machine thereby stopped.

Having described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a broom-sewing machine, the combination with a vise and suitable levers for operating the vise, of toggle-levers for increasing the pressure on the vise when closed, and a treadle for operating the vise, one of said toggle-levers being pivoted on said treadle.

2. In a broom-sewing machine, the combination of a pair of vise-jaws, devices for opening and closing said jaws, and a treadle for operating said devices, said devices including an elbow-lever pivoted to the treadle, a lever 13 connected to one arm of said elbow-lever and a rod 11 connected to the other arm of said elbow-lever.

3. In a broom-sewing machine, the combination with a vise-frame, of vise-jaws pivoted to said frame, a treadle also pivoted to said frame, a latch for the treadle pivoted to the vise-frame, and a block pivoted to the main

frame and arranged to trip the latch on completion of a row of stitches.

4. In a broom-sewing machine, the combination with a vise-frame, of vise-jaws pivoted to said frame, broom-supporting clamps within said jaws, a slide upon the vise-frame to which said clamps are connected, a rack vertically adjustable upon said slide, and a set-screw carried by the slide and bearing upon the upper end of the rack, for the purpose set forth.

5. In a broom-sewing machine, the combination of the swinging vise-frame, the vise-jaws, the inner broom-supporting clamps, the rack supporting said clamps, the pawl pivoted to the vise-frame and cooperating with said rack, the tappet 30 pivoted to said pawl, the treadle for operating the vise-jaws, and the arm on said treadle for operating said tappet, for the purpose set forth.

6. In a broom-sewing machine, the combination of a swinging vise-frame, a feed rod 36 connected to said vise-frame, a second feed-rod, a link connecting said feed-rods, a stop carried by the vise-frame and adapted to limit the movement of the second feed-rod, and clamps arranged to alternately grip and release said rods.

7. In a broom-sewing machine, the combination with a swinging vise-frame, of feed mechanism comprising a rod connected to the vise-frame, a second rod parallel with the first, an adjustable stop for the second rod movable with the vise-frame, a connection between said rods, a stop carried by the second rod for limiting the movement of said vise in one direction, and clamps for alternately gripping and releasing said rods.

8. In a broom-sewing machine, the combination with a vise-frame, of parallel rods one of which is connected to the vise-frame, an elbow-lever having one arm forming a link between said rods and a second arm provided with a roll, an oscillating rail for operating said elbow-lever, and adjustable stops for both of said rods.

9. In a broom-sewing machine, the combination with a pair of pivotally-mounted vise-jaws, of a thread-support arranged to move to and from the edge of a broom carried by said jaws, and a cam carried by one of said jaws and arranged to throw the thread-support away from the broom as the vise is opened.

10. In a broom-sewing machine, the combination with the vise, of a pair of pivoted arms 94 in front and rear of the vise, and thread-supports 93 pivotally carried by said arms.

11. In a broom-sewing machine, the combination with the vise, and means for opening and closing the same, of a pair of pivoted arms 94 arranged in front and rear of the vise, a spring tending to draw said arms together, means for automatically throwing said arms

away from the vise on completion of a row of stitches, thread-supports pivotally carried by said arms, and springs for holding said thread-supports in contact with the vise-jaws.

5 12. In a broom-sewing machine, the combination with sewing mechanism, and a vise movable to and from the sewing mechanism, of means for automatically starting the sewing mechanism, said means being controlled
10 by the width of the broom in the vise, whereby the first stitch is properly located.

13. In a broom-sewing machine, the combination with the sewing mechanism, of a vise movable to and from the sewing mechanism, a part pivotally carried by the vise
15 and bearing against the edge of the broom and automatic starting mechanism controlled as to its relative time of starting by the position of said part.

20 14. In a broom-sewing machine, the combination with the vise, of a thread-support arranged to bear against the edge of the broom in the vise, a lever upon which said thread-support is carried, a series of teeth on
25 said lever, automatic starting mechanism, and a pawl connected with said mechanism and adapted to engage said teeth, for the purpose set forth.

30 15. In a broom-sewing machine, the combination with sewing mechanism, and a vise-frame and vise movable to and from said sewing mechanism, of a clutch connecting

the power-wheel with the sewing mechanism, a cam for disconnecting said clutch, a cam-roll normally out of the path of said cam, a
35 latch for holding the roll in said normal position, means for operating the latch on completion of a row of stitches, whereby the cam-roll is thrown into position to be operated by
40 the cam, and means connected with the vise-frame for withdrawing the cam-roll from the path of the cam.

16. In a broom-sewing machine, the combination with sewing mechanism and a vise
45 movable to and from said mechanism, of automatic stopping devices comprising a part or pin 120, and a latch 121 for operating said part, said latch being movable with the vise, and means for positively disconnecting the
50 latch from part 120, at the moment of stopping the machine.

17. In a broom-sewing machine, the combination with the stopping mechanism and
55 the latch 121, of the lever 140 arranged to positively disconnect the latch from the stopping mechanism as the clutch is operated to stop the machine.

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

ANDREW E. MILLER.

Witnesses:

JAMES A. WATSON,
EDW. McCaffray.