

(No Model.)

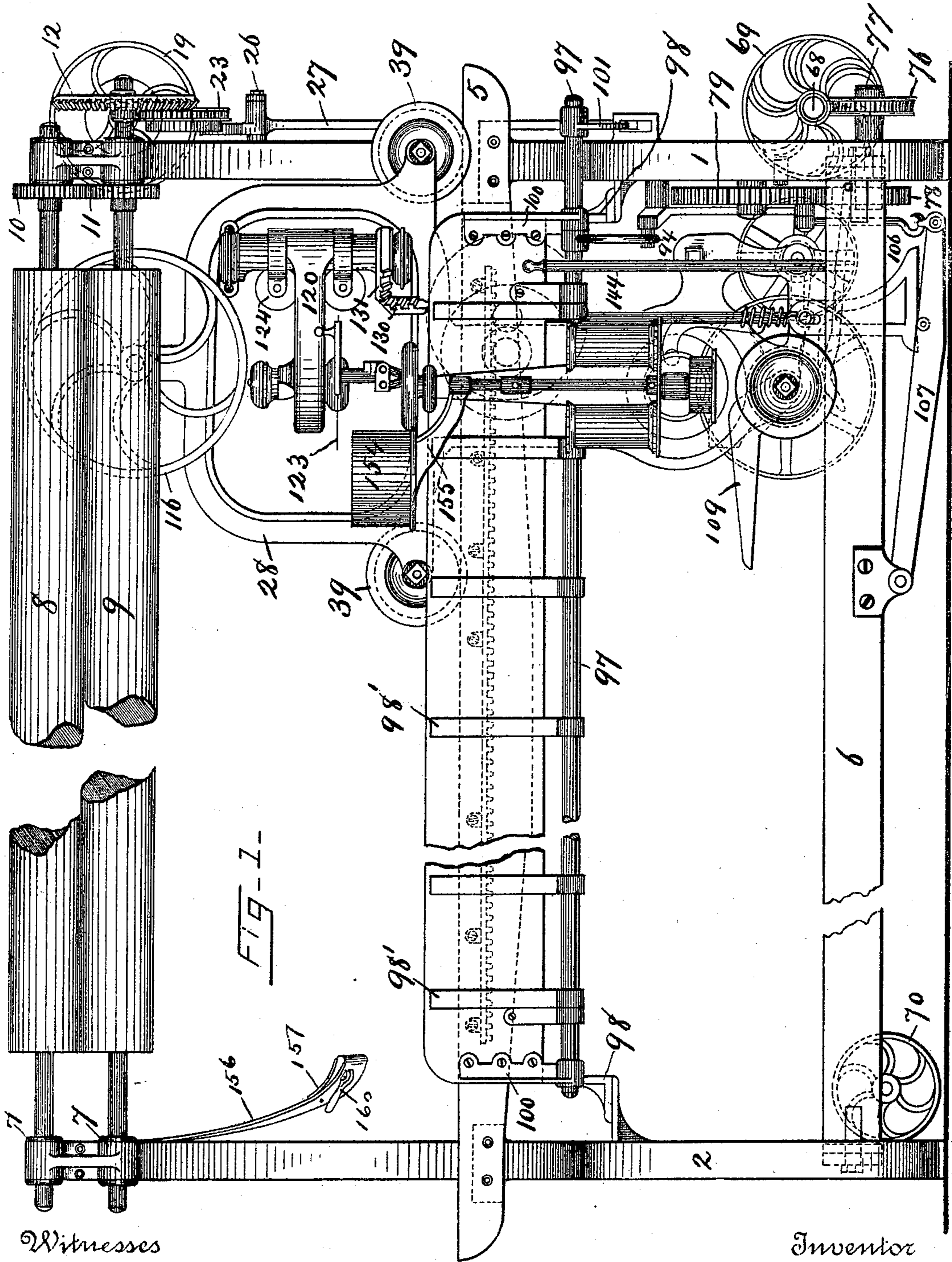
11 Sheets—Sheet 1.

W. H. PALMER, Jr.

MACHINE FOR MEASURING, CUTTING, AND STITCHING FABRICS.

No. 516,357

Patented Mar. 13, 1894.



Witnesses

Allen Terry
George M. Luthin.

Inventor

William H. Palmer Jr.
By his Attorney
Frank H. Allen

(No Model.)

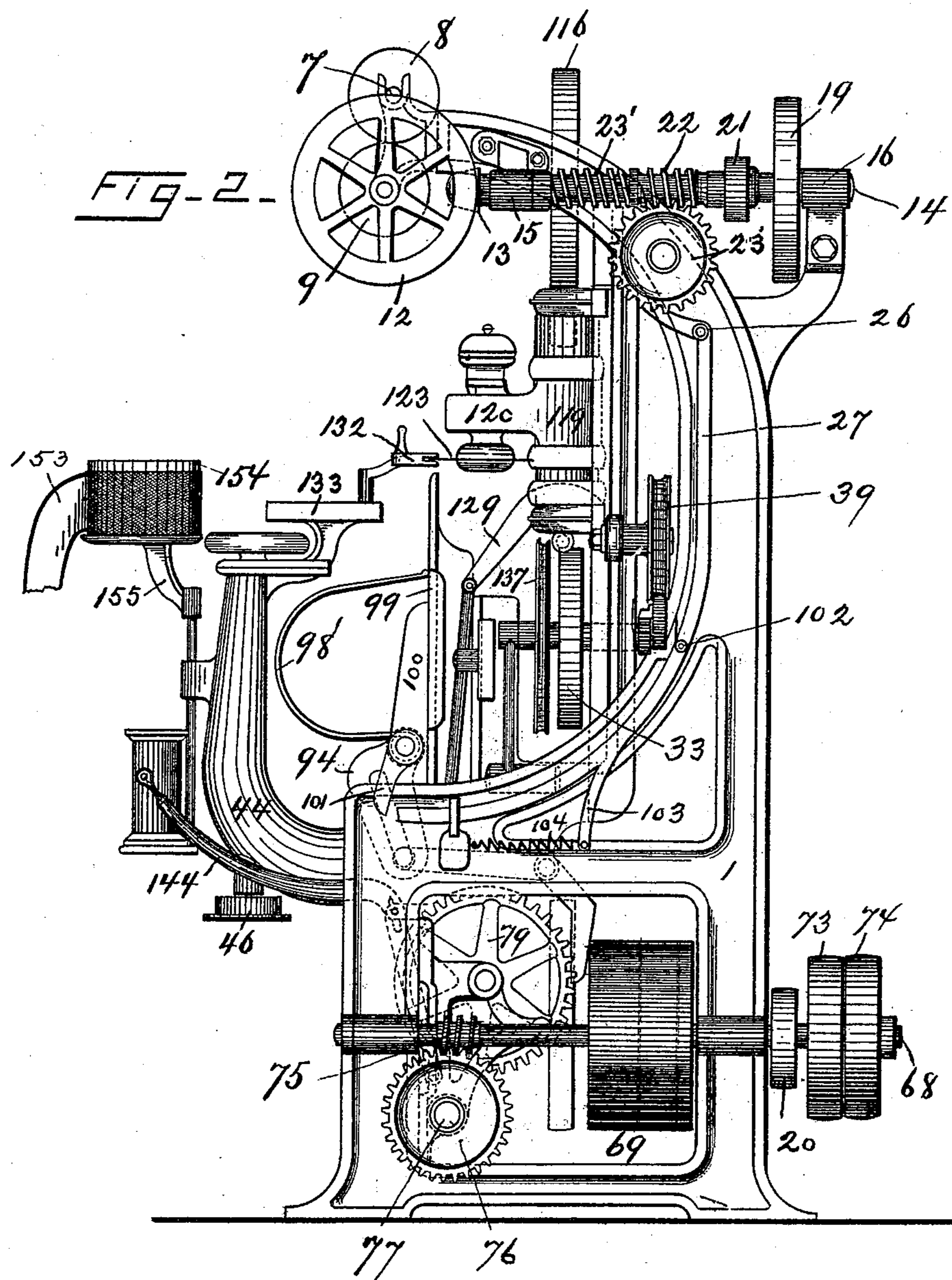
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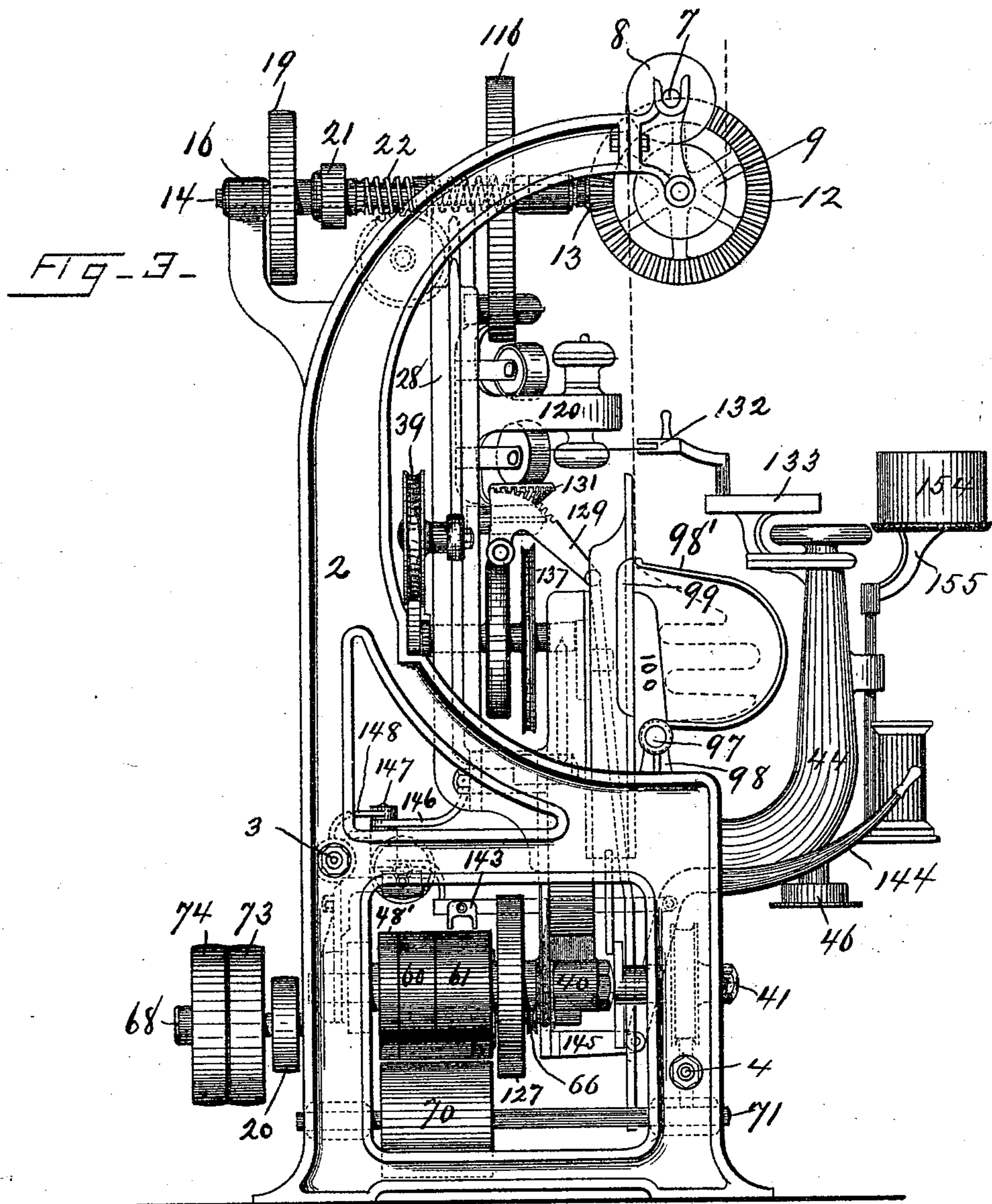
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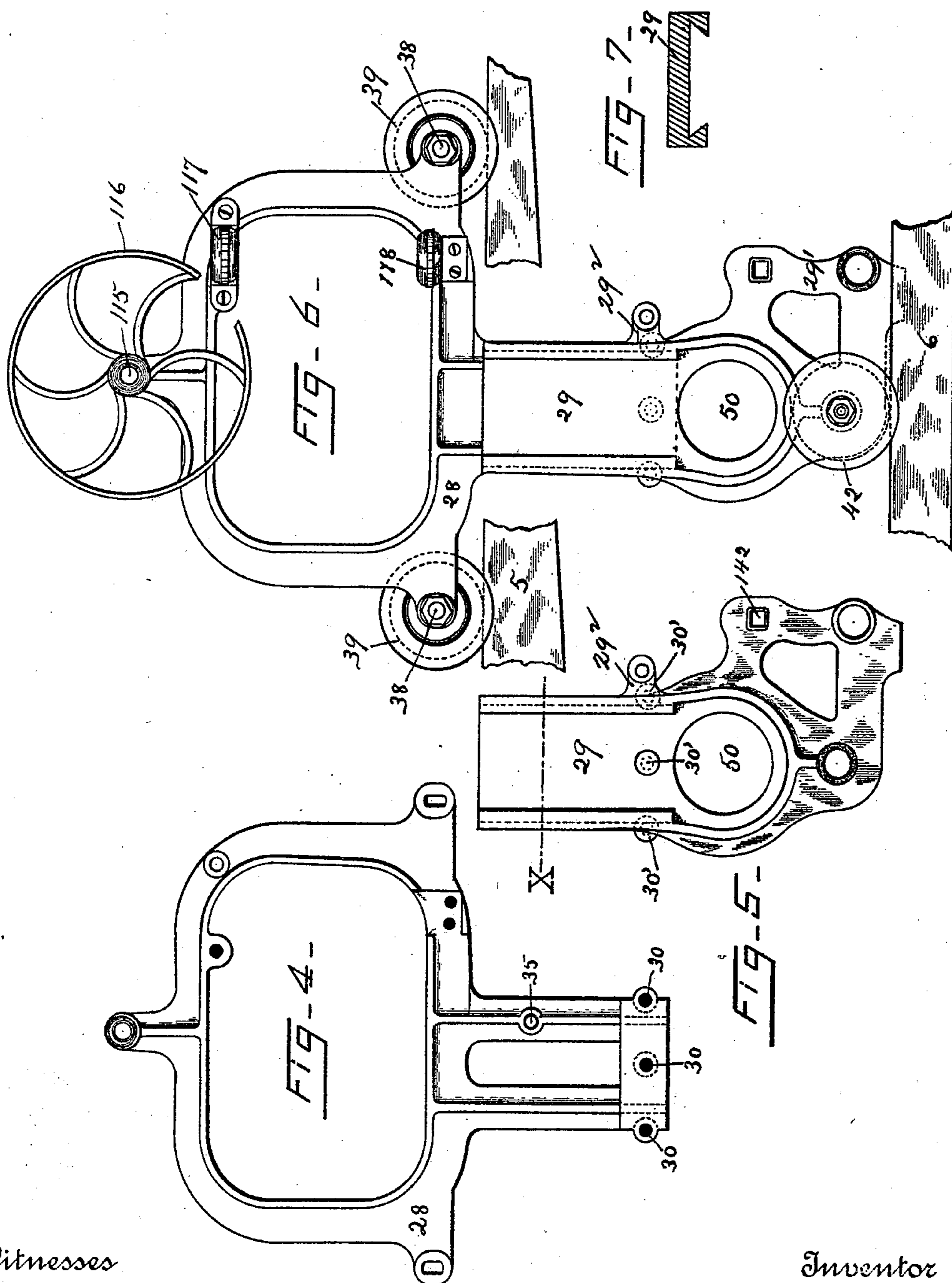
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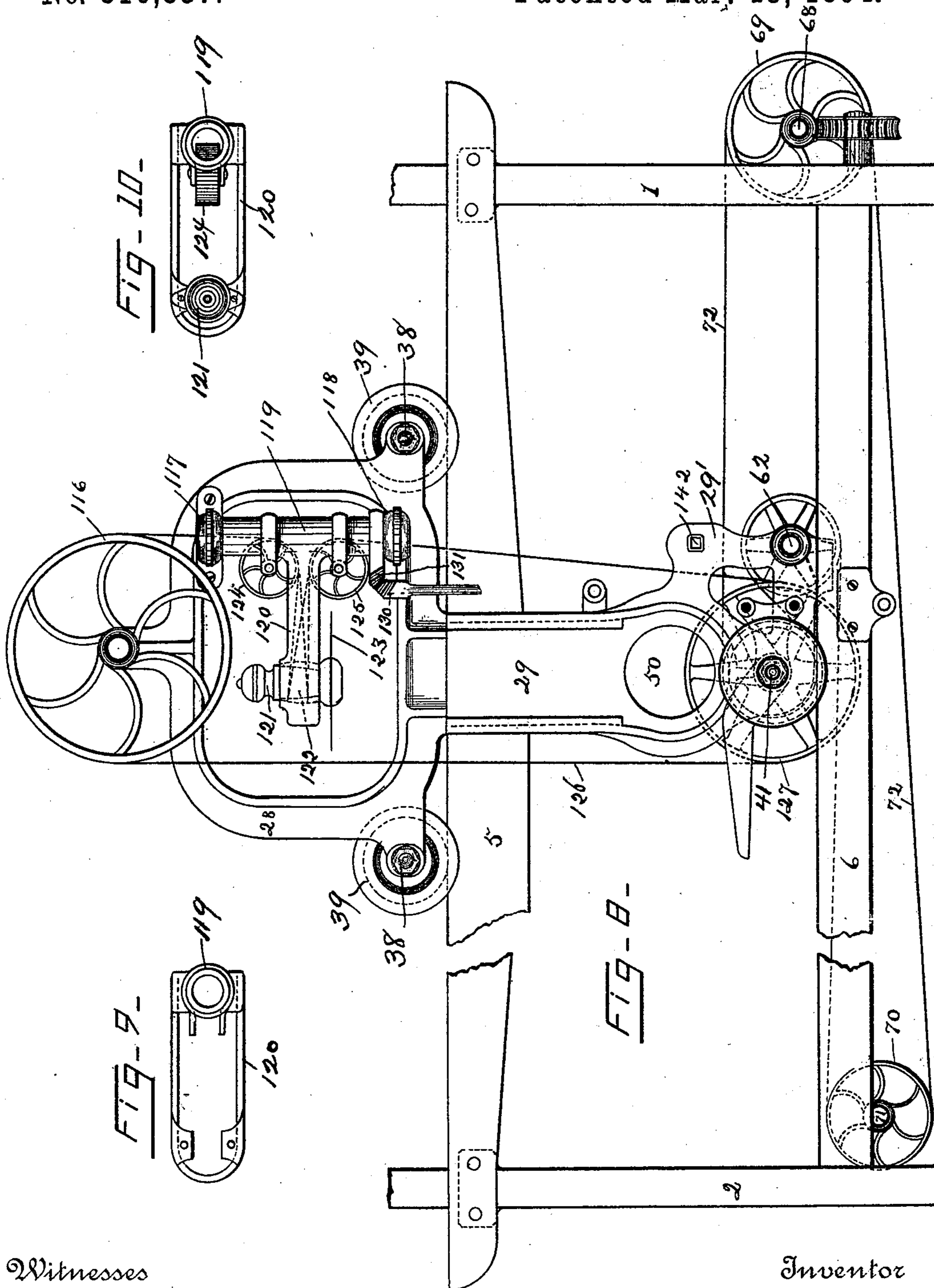
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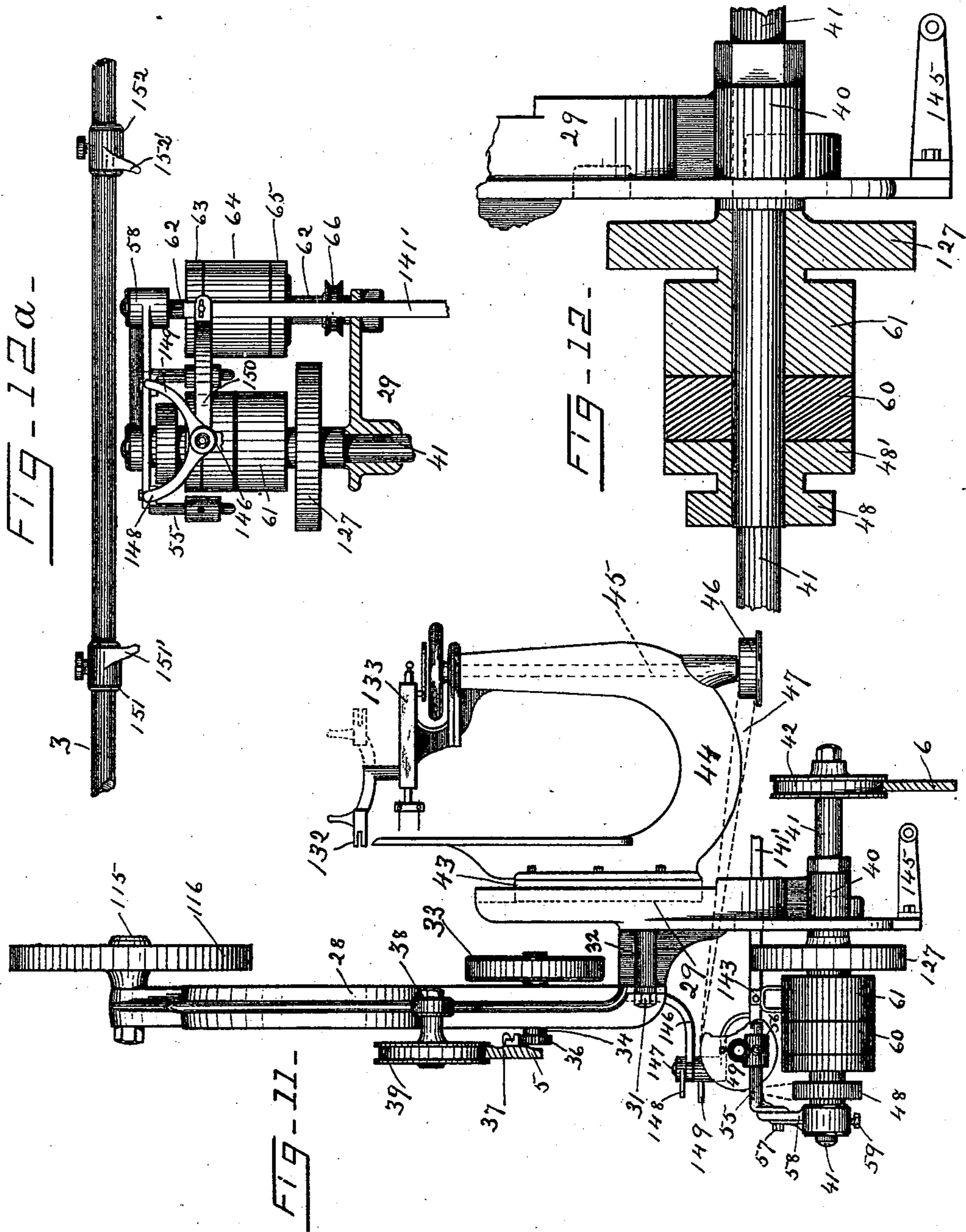
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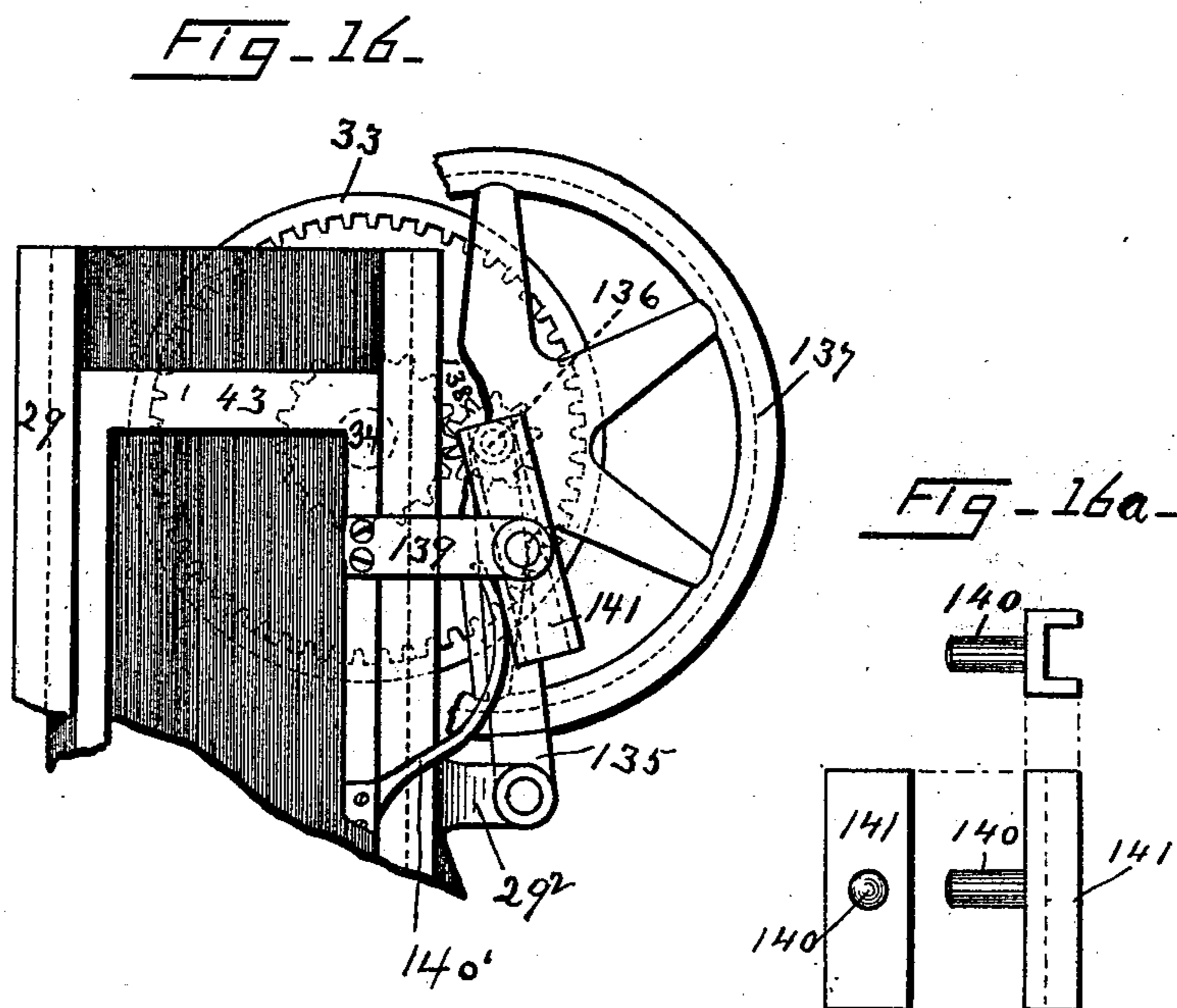
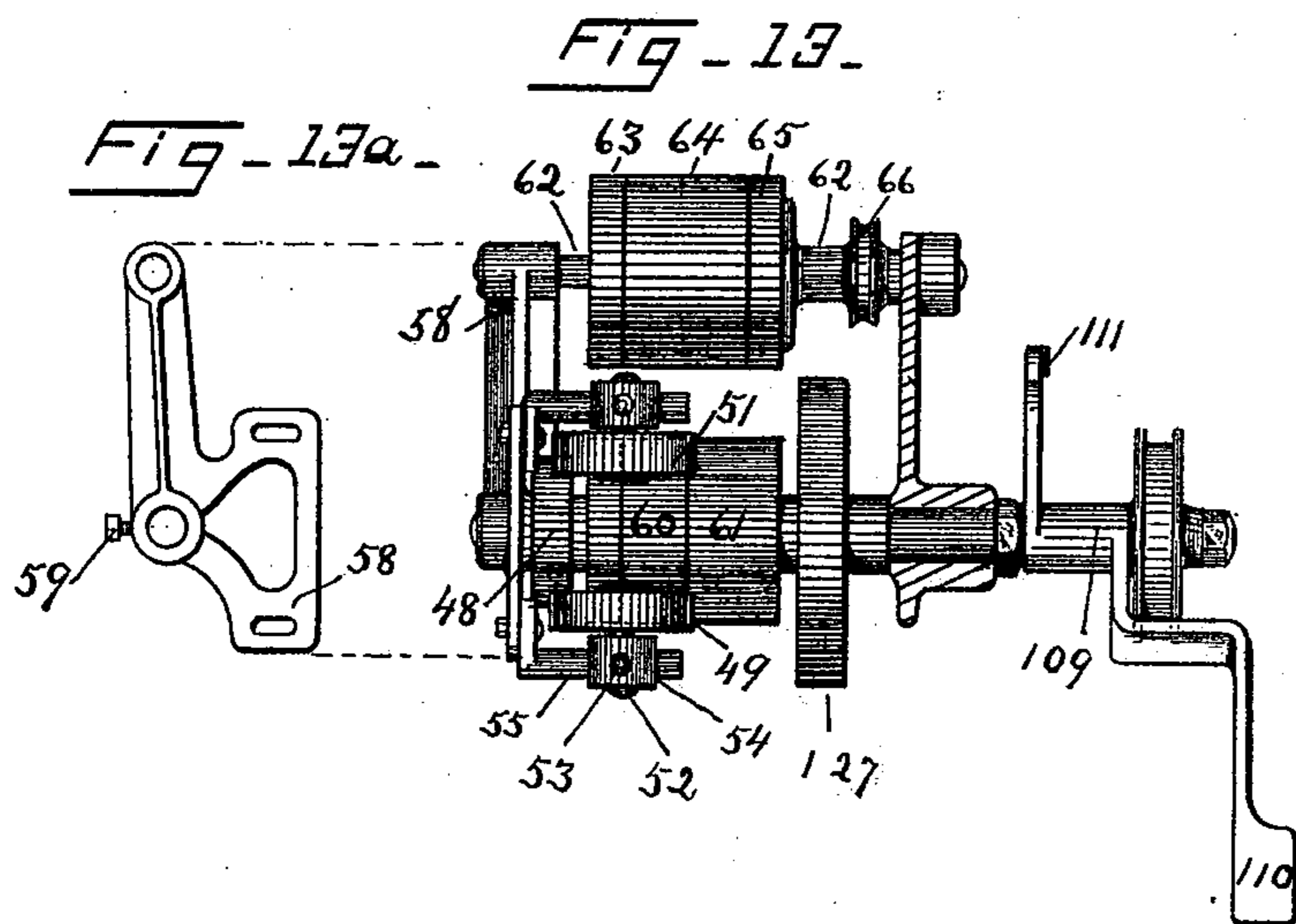
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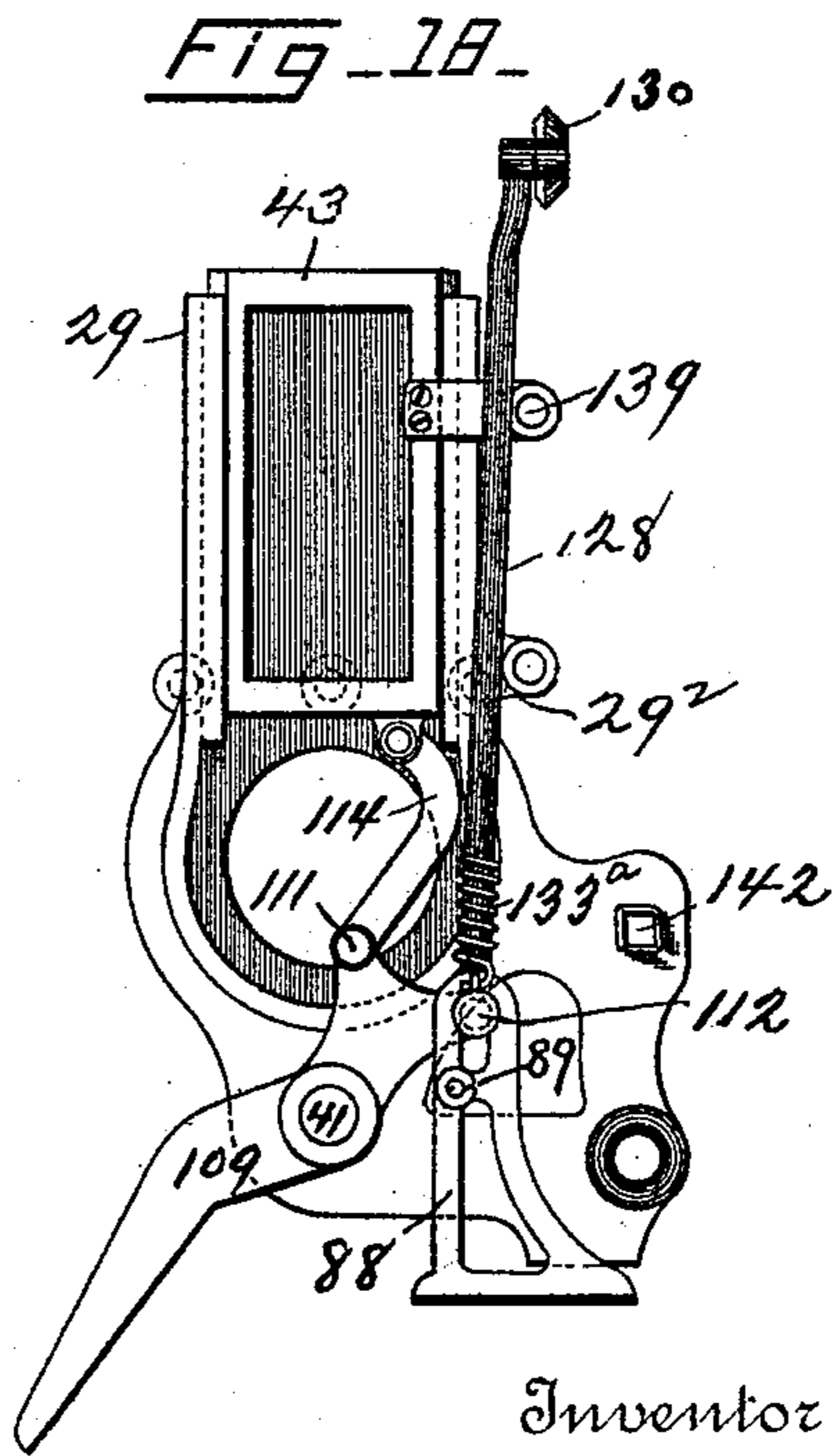
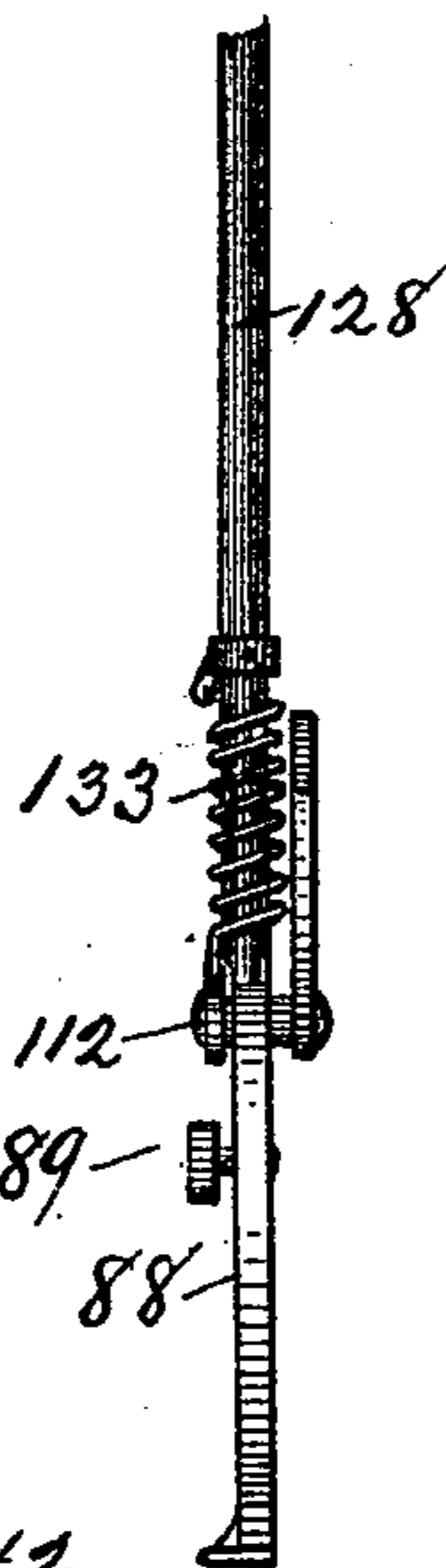
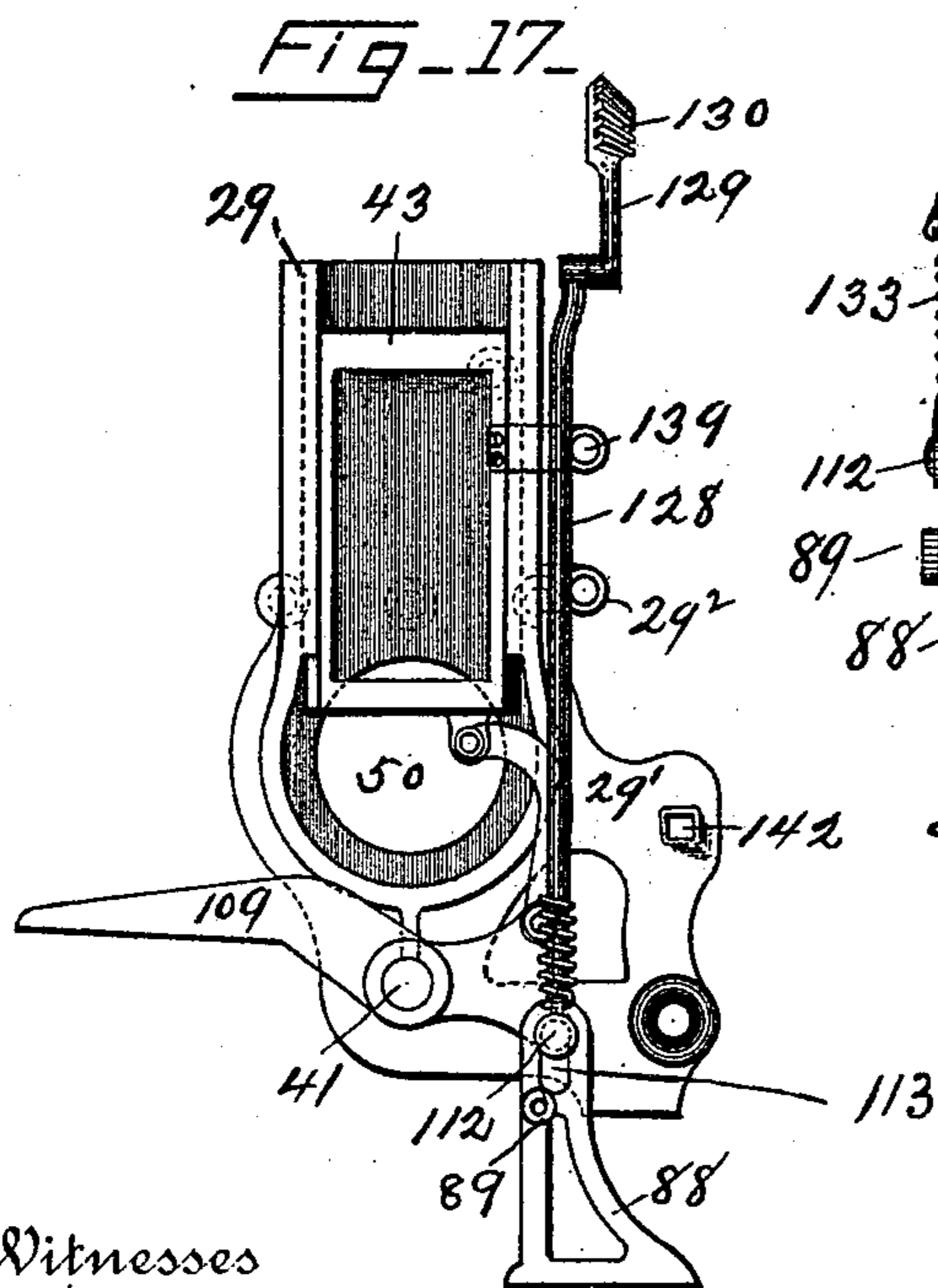
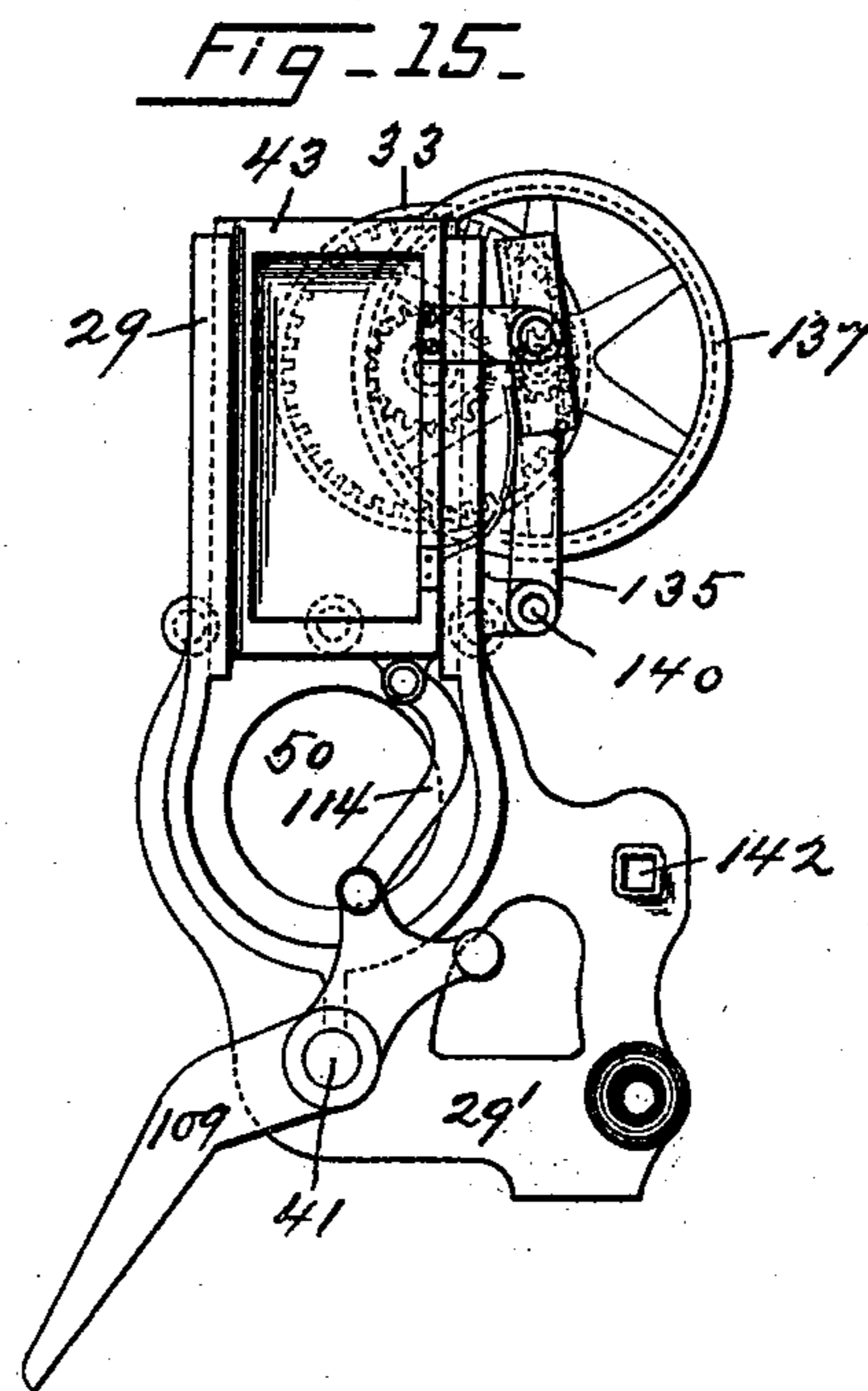
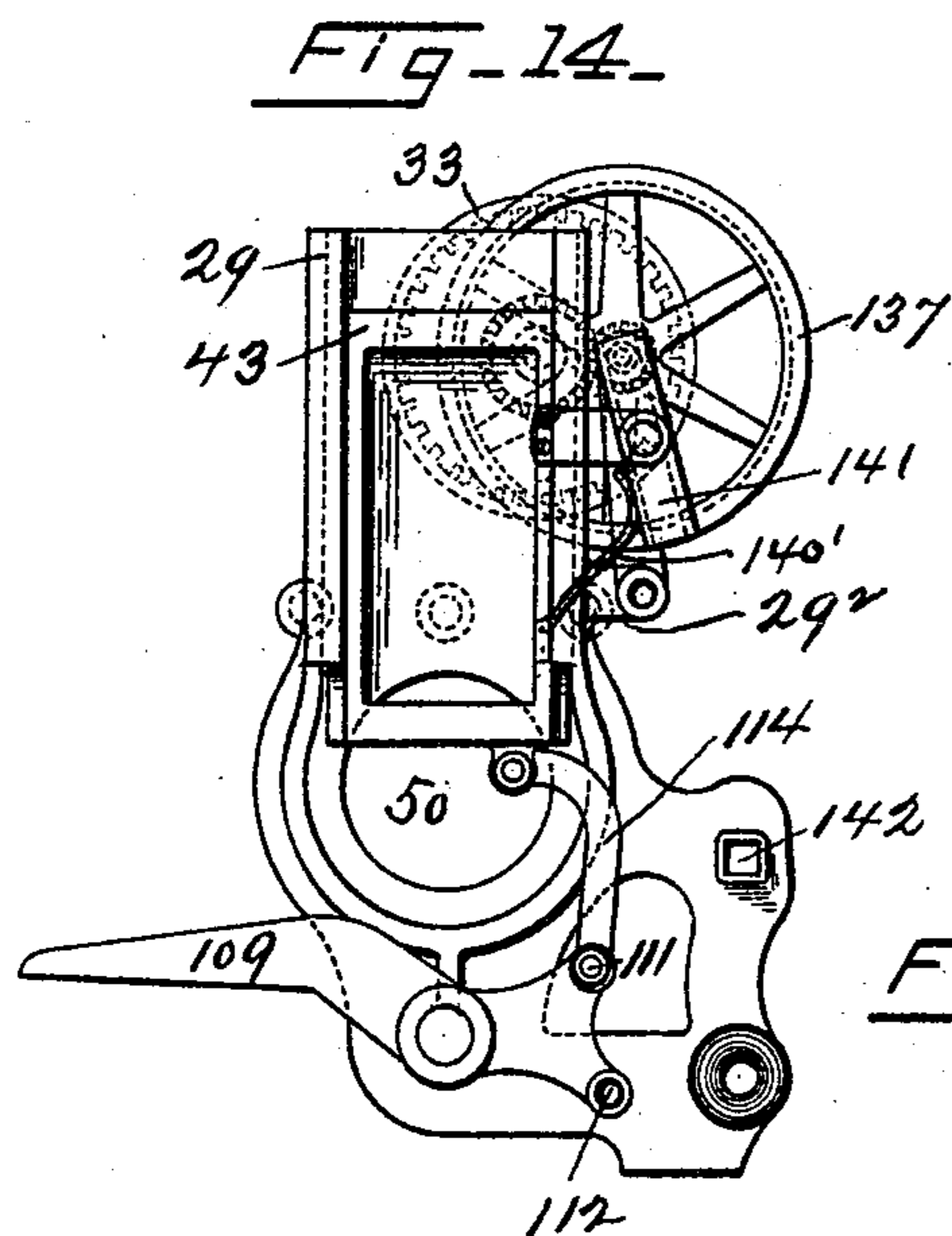
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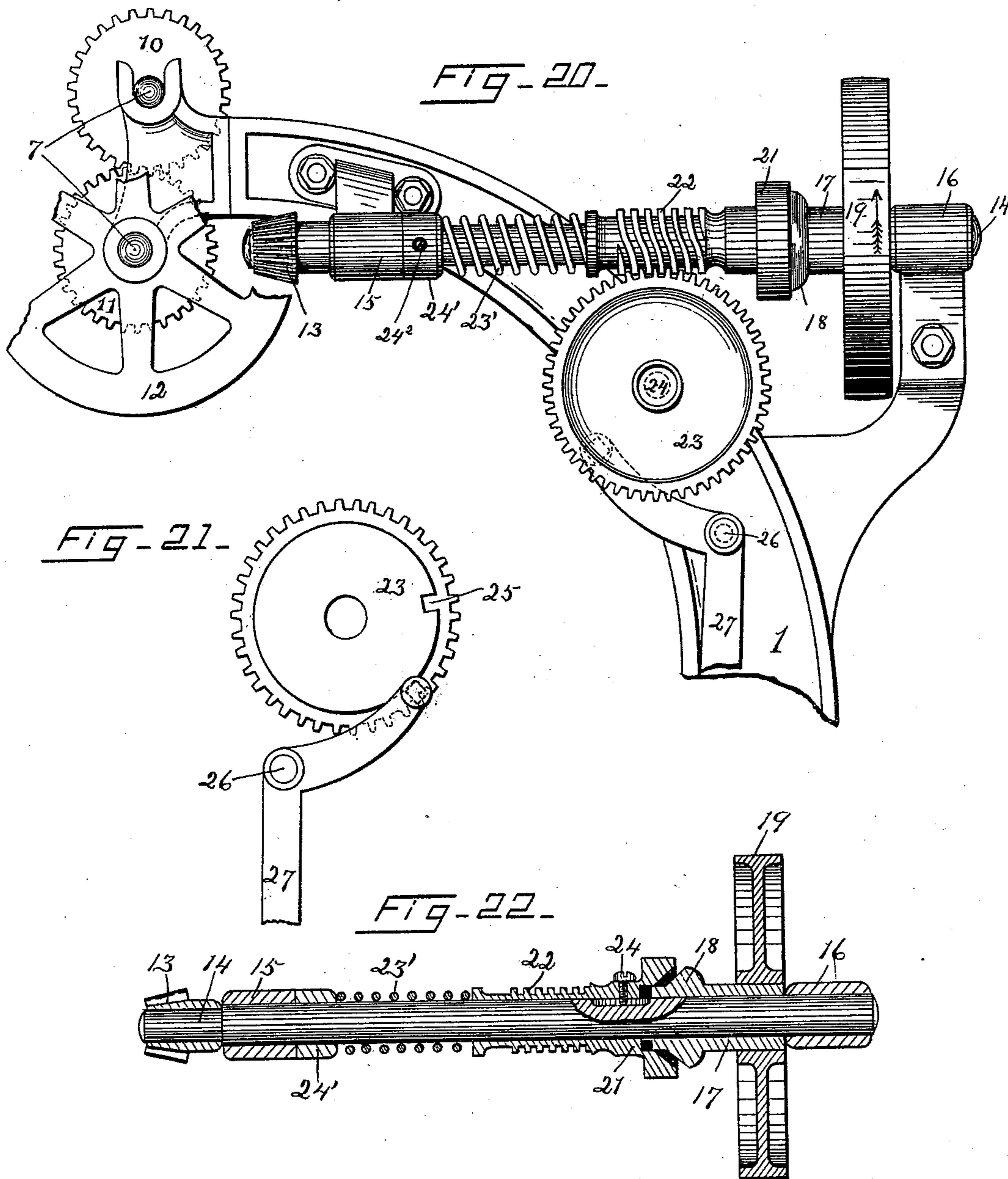
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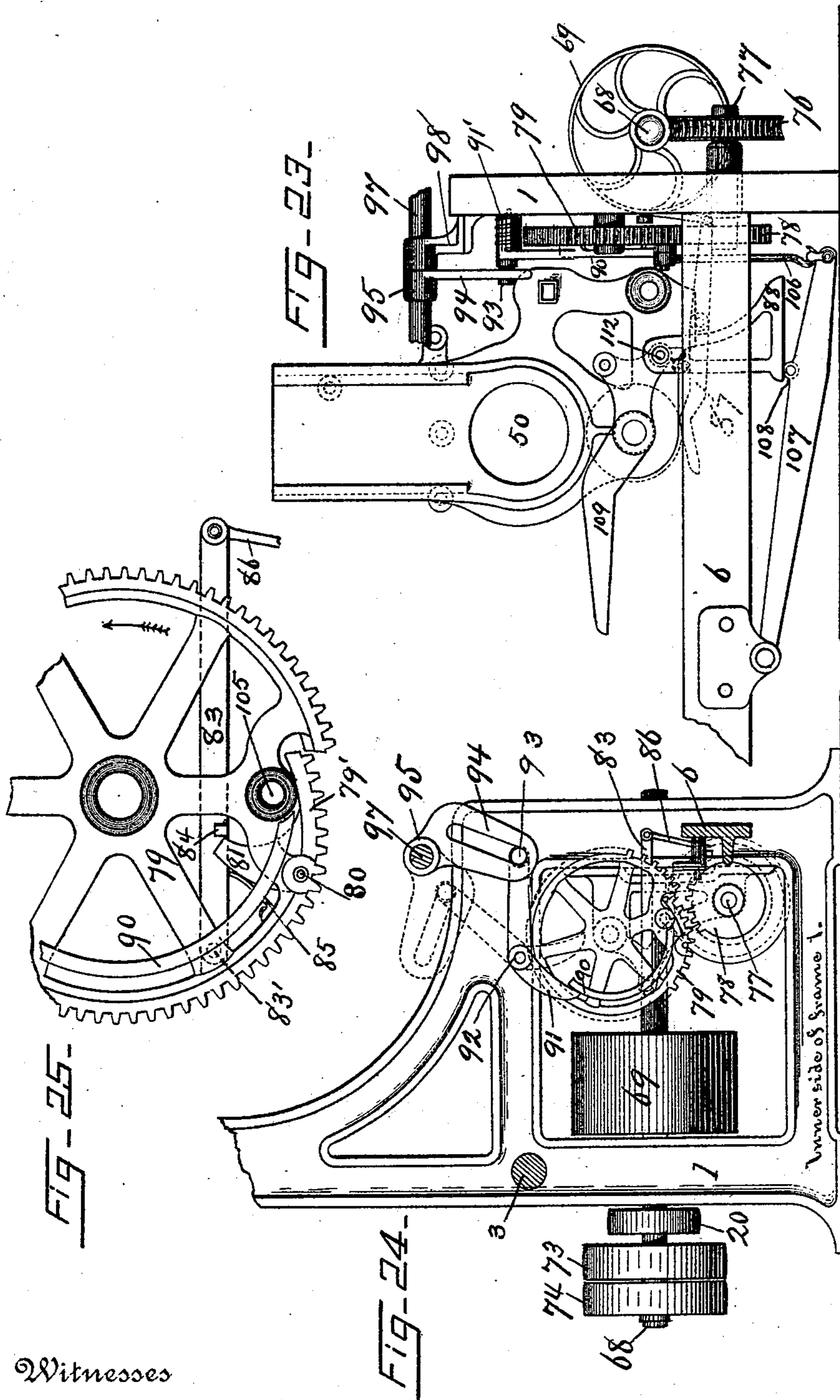
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(No Model.)

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Fig-26-

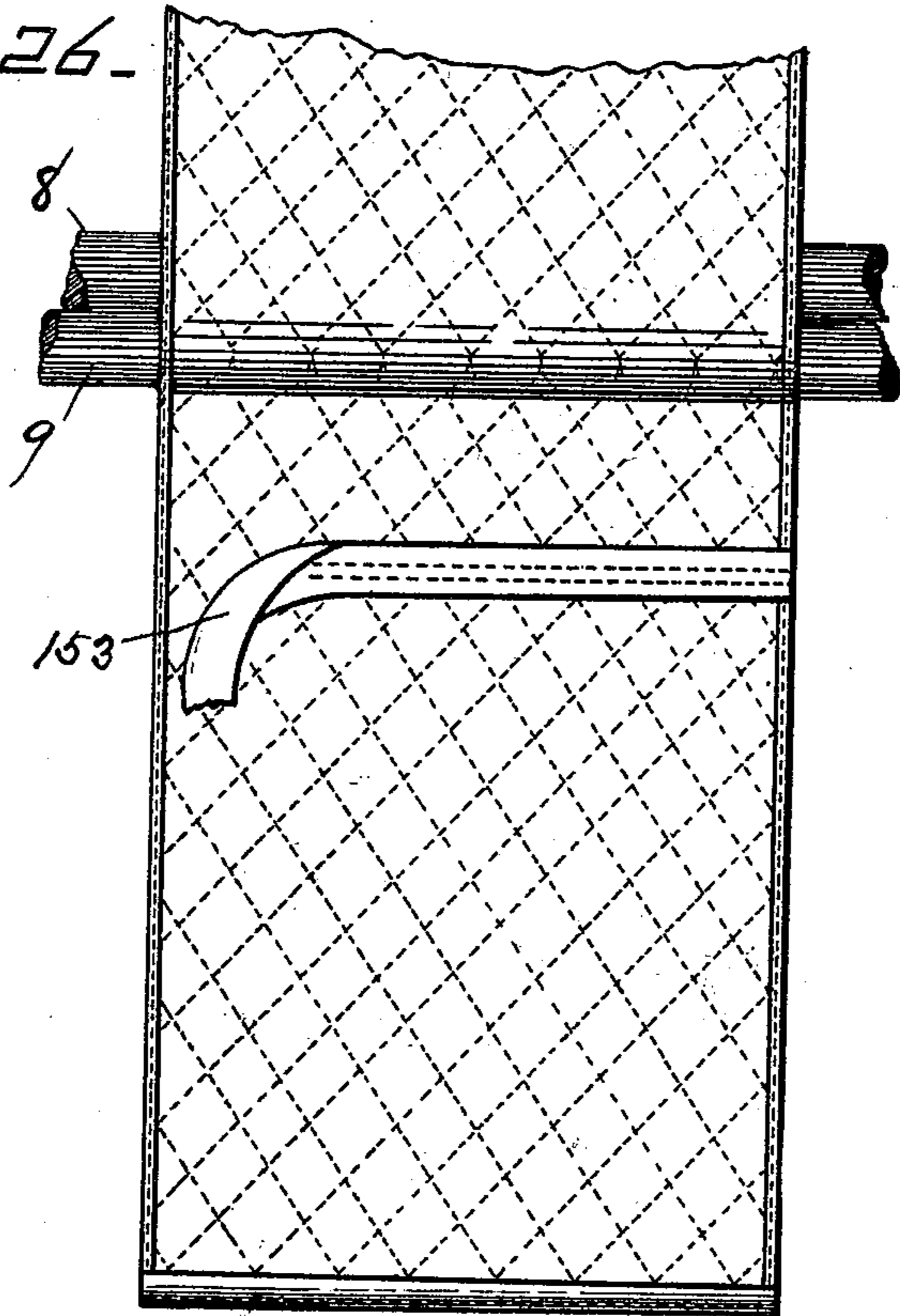


Fig-27-

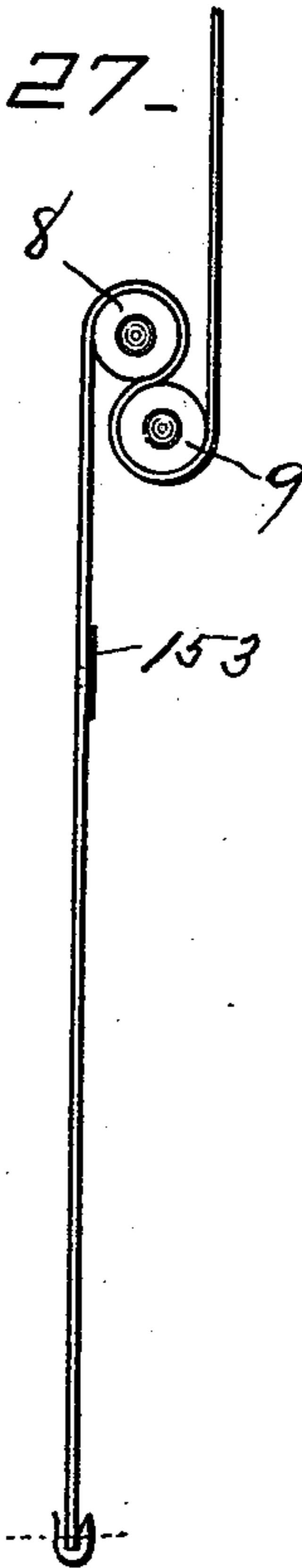
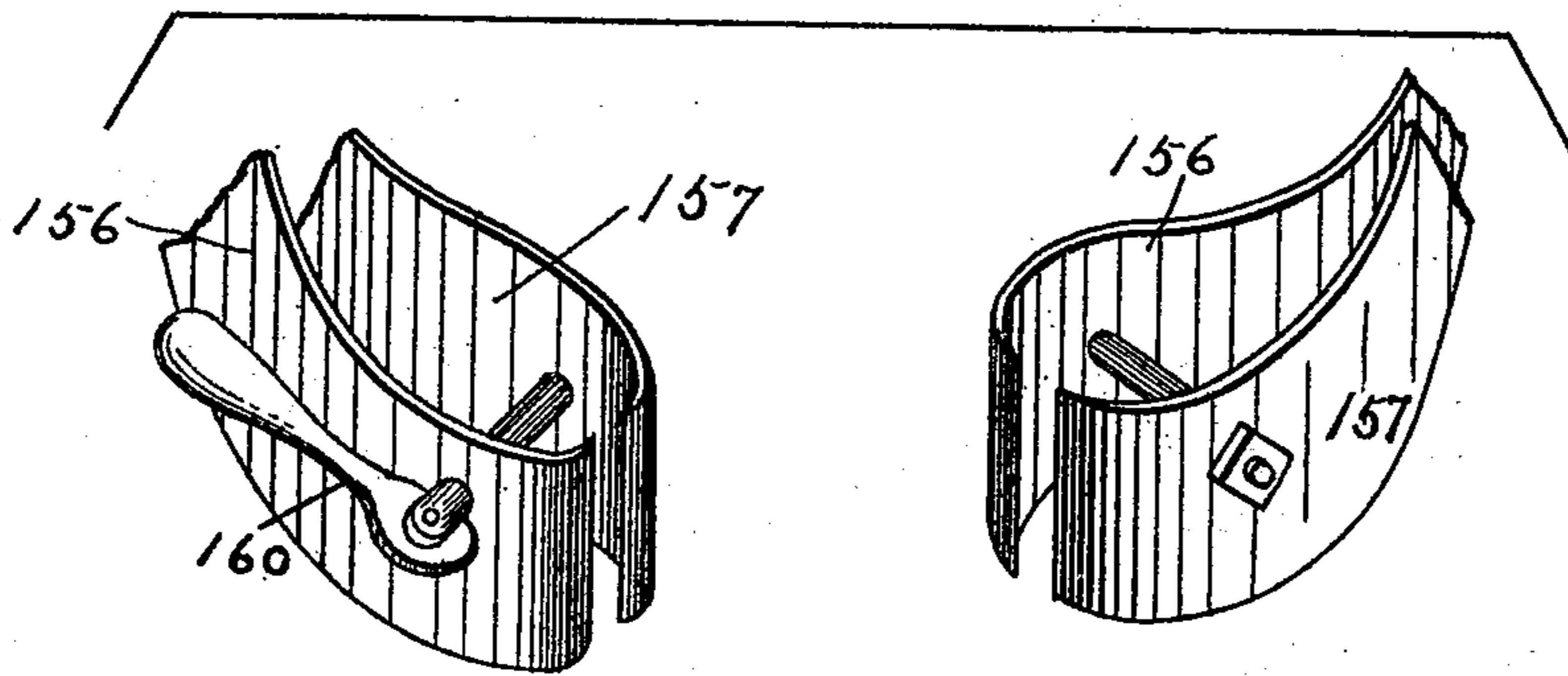


Fig-19a-



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UNITED STATES PATENT OFFICE.

WILLIAM H. PALMER, JR., OF NORWICH, ASSIGNOR TO PALMER BROS., OF
NEW LONDON, CONNECTICUT.

MACHINE FOR MEASURING, CUTTING, AND STITCHING FABRICS.

SPECIFICATION forming part of Letters Patent No. 516,357, dated March 13, 1894.

Application filed May 8, 1891. Serial No. 392,135. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM H. PALMER, Jr., a citizen of the United States, residing at Norwich, in the county of New London and State of Connecticut, have invented certain new and useful Improvements in Machines for Measuring, Cutting, and Stitching Fabrics, which improvements are fully set forth and described in the following specification, reference being had to the accompanying eleven sheets of drawings.

On the 10th day of April, 1888, Letters Patent No. 380,815 were issued to Frank L. Palmer for a machine for producing in continuous lengths a compound fabric, composed of face fabrics and a suitable interposed filling; the edges of the complete fabric being, at the same operation, stitched.

My present invention has for its object the production of a machine, chiefly automatic in its action, by means of which compound fabrics as above briefly described may be cut into lengths to form bed-comfortables, and the cut ends wholly or in part finished by a suitable binding in manner substantially as described in the Re-Issue Patent No. 10,861, granted to the said Frank L. Palmer August 23, 1887. To accomplish the desired end I have brought together in a single machine (first) feeding devices for controlling the delivery, in desired lengths, of the compound fabric, (second) stitching mechanism for sewing transverse strips of binding material onto said fabric, and (third) mechanism for cutting the compound fabric in proper lengths to form comfortables.

My invention further consists in various mechanisms, combinations of mechanisms and details of construction, hereinafter described, for controlling and moving the three principal mechanisms above specified.

To more clearly explain the said invention I have annexed hereto several sheets of drawings, representing the machine complete and in detail, in which drawings—

Figure 1 is a front-side elevation of a machine of my new construction with its various driving and distributing belts removed. Figs. 2 and 3 are, respectively, right and left hand end elevations of said machine, as viewed from the front side. Figs. 4 and 5 show front-

face views of the two frame sections which, when assembled as in Fig. 6, form a carriage adapted to support both a sewing-machine by means of which a strip of binding cloth may be stitched across the compound fabric, and also a rotary cutting knife by means of which said fabric may, at the proper time, be cut into lengths for comfortables. In Fig. 6 are shown (secured to the described carriage) traction wheels arranged to travel on upper and lower tracks, portions of which are also shown. Fig. 7 is a cross-sectional view of Fig. 5 on line *x*. In Fig. 8 the carriage is shown mounted on the tracks, with the cutting mechanism in place and with portions of the machine frames illustrated; this view showing particularly the manner of connecting the belts by which motion is transmitted to the carriage, and to the rotary cutter already referred to. Figs. 9 and 10 are top or plan views of the frame that supports said cutter. Fig. 11 is a side view of the carriage, together with its connected traction wheels, pulleys and sewing machine, and Fig. 12 is an enlarged, central, sectional view of the pulleys shown in said Fig. 11. Fig. 12^a is a top view of the carriage-pulleys and belt shipping devices. Fig. 13 is a plan view of the system of pulleys connected with the carriage and shown at the lower end of Fig. 11. Fig. 13^a is a plan view of the frame 58, forming the rear support for shafts 41 and 62. Figs. 14 and 15 illustrate section 29 of the carriage, having suitably connected thereto the vertically sliding plate or frame to which the sewing machine is secured; said plate being shown both in its lowest and highest positions. Said figures also illustrate a system of gearing hereinafter described in detail, for automatically moving the carriage backward and forward along the tracks on which it is supported. This system of gearing is shown enlarged in Fig. 16. Fig. 16^a shows side, plan and end views of the trunnioned guide-block 139. Figs. 17 and 18 show the carriage section 29 having connected thereto a vertically movable rod and gear-segment by means of which the rotary cutter may be thrown rearward out of the way of the sewing machine when the latter is raised to its working position. Fig. 19 is an enlarged side view of the lower portion of said

vertically movable rod. Fig. 19^a shows in detail the clamp for the material. Fig. 20 is an enlarged, detached, view of the fabric-feed controlling devices and Figs. 21 and 22 are details of the same. Figs. 23 and 24 are respectively, front and side views of the mechanism by which the said fabric-feed controlling devices are actuated, at stated times, and Fig. 25 is an enlarged, detached, view of the mutilated gear 79 employed in said actuating devices. Figs. 26 and 27 show front and end views of the fabric feeding rolls with the compound fabric in place and with transverse strips of binding attached thereto. The fabric is brought to the rolls from above (being fed down from the room over-head, or delivered from a roll) and passes down around the lower feed-roll, thence upward between the two rolls and finally around the upper roll, as shown in the drawings. When the rolls are rotated the fabric is drawn down from above and its end descends, by gravity, to a point where it may be received and acted upon by the stitching and cutting devices, whose offices are to attach a strip of binding cloth to the compound fabric, by two parallel lines of stitching near the longitudinal center of said binding cloth, and then to cut through between the lines of stitching; thus dividing the binding strip in two parts, one of which is attached to the cut section of compound fabric and the other part is attached to the suspended end of said fabric. Fig. 26 shows a half section of binding cloth attached to the end of the compound fabric and also a binding strip of full width partly secured in place by two parallel lines of stitching. After the cut sections of compound fabric are removed from this machine the binding strip is folded around the cut (raw) edges of the compound fabric and stitched in place by any of the means commonly resorted to in binding the edges of fabrics of this class.

The various operative parts of my newly invented machine are supported on, or between, suitable end frames 1 and 2, said frames being held in proper relation to each other, and stiffened, by tie-rods 3 and 4, extending from frame to frame, and also by angle-bars 5 and 6 which form the tracks or ways on which the sewing-machine carriage travels. The upper portions of the main frames 1 and 2 curve toward the front of the machine as best seen in Figs. 2 and 3 of the drawings and terminate in journal bearings 7 in which are hung fabric-feeding rolls 8—9 whose shafts bear meshing gears 10—11. The shaft of feed-roll 9 projects outward through the bearing 7 and has secured to it a bevel gear 12 that is controlled by a corresponding gear 13 on a shaft 14 hung in bearings 15—16 secured to end-frame 1; said shaft 14 being at right angles to the described feed-rolls and driven by peculiar mechanism which I will proceed to describe, asking particular attention to Figs. 20, 21 and 22 of the drawings. On the end of shaft 14 adjacent to the bear-

ing 16, is a loose collar 17 having one end formed as one half (18) of a friction clutch and having secured to said collar by spline or set screw a pulley 19 which, when the machine is in service is connected by belt with a pulley 20 near the bottom of the machine, and it should be kept in mind that this pulley 19 and its connected collar 17 are constantly in revolution. Located on shaft 14 in operative relation to the clutch section 18 is the companion clutch section 21 having an elongated hub on which is cut a worm 22 that meshes with a gear 23 hung on a stud 24 projecting from the end-frame 1. This clutch section 21 and worm 22 are splined on shaft 14, or keyed thereto by a screw 24 projecting into a slot in the shaft (as shown in Fig. 22 of the drawings), in such manner that the worm and clutch are free to slide longitudinally a limited distance but are compelled to rotate the said shaft with them. The movable clutch section 21 is held normally in locking engagement with the companion section 18 by a spiral spring 23' encircling shaft 14, one end of the spring bearing against the end of the hub on which worm 22 is formed, while the opposite end of said spring abuts a washer 24' interposed between the spring and journal bearing 15 and clamped to said shaft by a set-screw 24². I have shown and described a frictionally acting clutch to control the movement of shaft 14 but wish it understood that any other form of clutch may be substituted for the one here shown. Gear 23 has on its rear face a projecting disk providing an annular circumferential path that is broken by a depression or notch 25 (see Fig. 21 of the drawings). Pivoted at 26 on end frames 1, below gear 23, is an angle arm 27 whose shorter end extends upward in the rear of gear 23 and bears a boss or projection that may ride on the circular edge of the described disk and drop into the notch 25 when the latter is brought into coincidence with said projection, thus serving as a stop motion and as a lock, to check the rotation of gear 23 when a sufficient quantity of fabric has been fed down.

The devices by means of which the lower end of lever-arm 27 is moved, at the proper time, to allow shaft 14 and feed-rolls 8—9 to operate, to feed down the fabric, will be described later on; for the present purpose it is sufficient to say that as often as the fabric feeding-rolls are required to be brought into use, the lever-arm 27 is rocked slightly on its pivot, throwing its projection out of notch 25, when gear 23 is free to make one complete revolution. Said projection then drops into the notch and again stops the gear. This sudden stopping of gear 23 serves, in a peculiar manner, to disengage the clutch section and so stop the feed-rolls 8—9. When the gear 23 is suddenly stopped, shaft 14 is kept in revolution by the constantly moving pulley 19, and worm 22 would either be broken or would itself strip the teeth from gear 23,

were it not for spring 23' which yields and allows the worm to screw itself forward on the teeth of the gear until the clutch sections are disengaged, when shaft 14 and the connected fabric-feed rolls immediately stop. When the locking projection is again removed from notch 25 of gear 23, the spring 23' shoots the worm forcibly forward, thus throwing the clutch into operative connection and the shaft 14 and feed-rolls 8—9 are again set in motion.

The construction, of the carriage which supports the sewing-machine and cutting devices, and its arrangement relative to the main or end frames of my machine, are perhaps best seen in Figs. 1 to 11. Angle-bars 5 and 6, already referred to, are secured to frames 1 and 2 the former (5) being located near the center of the complete machine and the latter (6) at the front lower portion, their positions relative to each other being best seen in Fig. 11. The carriage proper is composed of two sections 28—29, each formed as a skeleton frame suitably ribbed to insure stiffness, and strength. Said sections are provided with a series of corresponding holes 30—30' to receive bolts or screws 31 by means of which the two carriage sections may be fastened together and made practically, as a single casting. At the point where the three bolts or screws pass through the holes 30' of section 29 said section is formed with an extended boss or projection 32 which offsets said frame from its companion section 28 and provides a considerable clear space between the two sections; as plainly seen in Fig. 11 of the drawings, this space being provided, in part, to accommodate an internal gear 33 whose shaft 34 is journaled in carriage section 28 (at 35, see Fig. 4). On the rear end of shaft 34 is a pinion gear 36 which meshes with the teeth of a rack 37 secured to the angle-bar or track 5. The upper carriage section 28, has secured to each end a stud 38 having journaled thereon a score pulley 39 that rests on track 5 and forms the support for said upper section. The lower carriage section 29 is formed at its lower end, with an elongated boss 40 in which is securely clamped a stud 41 extending a considerable distance from the boss in both directions, and bearing on its extreme front end a score-pulley 42 which rests on the lower track 6. The complete carriage, and its attached parts, thus supported, may be easily moved from end to end of the complete machine. The front face of carriage section 29 is formed with undercut, or dove-tail, ways (see Fig. 7) in which is fitted to slide vertically a frame 43 to which is bolted a sewing-machine 44 having a duplex system of needles, take-ups, &c., adapted to produce parallel lines of stitching but, as the said sewing machine in itself is substantially like others in common use I have thought it unnecessary to illustrate or describe the same in detail. The needle-operating shaft 45 of the sewing-machine, bears at its lower end a pulley

46 that is connected by a belt 47 with a pulley 48 near the rear end of stud 41. Said belt passes from pulley 48 upward around a guide-pulley 49, thence toward the front of the machine, through a circular opening 50 in carriage section 29, to and around the sewing-machine pulley 46 and thence back to and around a guide-pulley 51, and finally downward to the pulley 48. The guide-pulleys 49 and 51 are peculiarly supported to provide adjustments in any desired direction. The studs 52, on which said guide-pulleys rotate, are clamped by screws 53 in bearing 54, the lower portion of said bearings being drilled to provide a second bearing at right angles to the first named. The lower, or second bearing, thus provided, slips over a stud 55 and is firmly clamped thereto, (after the desired adjustment is attained) by set-screws 56. The described means for supporting the two guide-pulleys permits universal adjustment of said pulleys to insure the proper running of the belt 47. Stud 55 are clamped by bolts, or screws, 57 to a frame 58, hung to the rear end of stud 41 and secured to said stud by a set-screw 59. On stud 41 are several pulleys, all of which are loose, their construction being clearly explained by Fig. 12. The three central pulleys, 48'—60 and 61, are of uniform diameter and the first and last named (48' and 61) may be called driving pulleys inasmuch as they are each acted upon, at times, by the main belt of the machine and at such times serve to distribute motion and power to various secondary mechanisms in the machine. The intermediate pulley 60 is an idler on which the belt may run during the time consumed by the feeding down of the fabric, or at any other time when the cutting and sewing mechanisms are at rest. Hung in a laterally projecting portion 29' of carriage section 29 is a short shaft 62 (see Figs. 8 and 13) whose rear end is journaled in frame 58 above described, said shaft being slightly below the level of stud 41. This shaft bears three pulleys, 63—64 and 65 of uniform diameter, and also a small score pulley 66. Pulleys 63, 65 and 66 are all secured to shaft 62 while the central, or wide pulley 64 is mounted loosely on said shaft. When the belt is shifted from the central or idle pulley 64 a sufficient distance in either direction, the shaft 62 and its connected score-pulley 66 are caused to revolve. The main driving shaft 68 of the complete machine is located at the right hand (see Fig. 2) and bears a pulley 69 which is equal in width to the three pulleys 63, 64 and 65, of the shaft 62, and to the three pulleys 48', 60 and 61 of stud 41, and is in alignment with said pulleys. At the opposite or left hand end of the machine, as viewed from the front, is a corresponding pulley 70 on a shaft 71 hung in bearings secured to frame 2, or to the tie-rods as may be most convenient.

The arrangement of the main driving belt, which is indicated by the reference figures 72

is shown in Fig. 8, and is as follows: Beginning at the top of pulley 69 said belt passes to and partly around the pulleys on stud 41, thence upward over the pulleys on shaft 62, thence downward and under the last named pulleys, thence to the top of and half around pulley 70 and thence back to pulley 69. With the described systems of pulleys and arrangement of driving belt, it will be obvious that whatever may be the position of the carriage, as it moves back and forth on the tracks 5—6, the belt (72) will preserve the same tension and will in all positions of the carriage serve equally well to rotate the particular pulleys of shaft 62 and stud 41 on which it may chance to be. I have already referred to a pulley 20, fixed on the driving shaft 68 and provided to transmit motion, by belt, to the pulley 19, which is immediately overhead, and which drives the fabric feeding mechanism. Shaft 68 also bears fast and loose pulleys 73—74 to receive a belt from a suitable counter-shaft.

I will now proceed to describe in detail the mechanism which automatically moves the lever-arm 27 to set in motion the fabric feeding devices located at the top of the machine and first above described. Said automatic mechanism is most clearly seen in Figs. 1, 2, 23, 24, and 25 of the drawings. On the driving shaft 68 near the front of the machine, is a worm 75 that meshes with, and drives, a worm gear 76 on the outer end of a short shaft 77 journaled in frame 1 below shaft 68. Shaft 77 extends through frame 1 and has secured to its inner end a gear 78 that meshes with a gear 79 of peculiar construction, shown enlarged in Fig. 25. The location of this gear 79, and its connections, are best illustrated in Fig. 24, which is an inner side view of frame 1. By means of the described worm 75 and worm gear 76, the shaft 77 and the attached gear 78 are kept constantly in revolution, but as it is desired to stop gear 79 during the operation of the sewing and cutting mechanisms, I have broken out a segment 79' of the toothed rim of said gear and have hinged said segment (at 80) so that, at the proper instant for stopping gear 79, this hinged segment may be allowed to swing inward, as shown in Figs. 24 and 25, out of mesh with the teeth of the constantly moving gear 78, whereupon the gear 79 stops. When said gear should again be brought into action the hinged segment is forced outward, completing the peripheral, toothed, rim of gear 79 and bringing the teeth of the segment into mesh with those of gear 78, when gear 79 at once commences to rotate. To control the hinged segment, and throw its teeth out of mesh with those of gear 78, I provide an inwardly projecting horn 81 on the segment and locate a lever 83 of the second order close to the rear side of gear 79. This lever is fulcrumed at 83' and is provided on its side with a stud or projection 84 that is in the path of the horn of the hinged segment, when said lever is in its lowest position. As the gear 79 rotates, horn 81, coming in contact with stud

84, is checked and the hinged segment swings on its pivot, like a bell-crank-lever, until its teeth leave those of gear 78 when gear 79 immediately stops and remains at rest until such time as the free end of lever 83 is raised sufficiently to lift stud 84 out of the path of horn 81 when gear 79 is again set in rotation, as above described. To insure the prompt return of the hinged segment to its normal, closed, position, when stud 84 is removed from its path, I preferably provide a spring, as at 85 which acts with a constant tendency to force said segment outward. The free end of lever 83 is connected by a pitman 86 with one end of a lever 87 fulcrumed, near its center, on a stud, on the rear side of track 6, as shown in dotted lines in Fig. 23. Near its opposite end lever 87 is bent upward to provide a point somewhat above the plane of the lever proper and, from this highest point again projects downward to provide an inclined plane, as shown. The movable carriage, which supports the sewing and cutting devices, bears also an angle iron 88 that carries a small roller 89 which, as the carriage and angle-iron travel toward the right hand end of the machine, engages the inclined plane at the end of lever 87 and forces the free end of said lever downward. The opposite end of said lever, being correspondingly raised, forces pitman 86 and the free end of lever 83 upward and thus lifts the stud 84 out of the path of horn 81 of the hinged segment, which at once swings outward under the force of spring 85. The inner face of gear 79 is formed with an arc-shaped rib 90, extending one third or more around the gear, providing a cam surface which may operate on one arm of an angle lever 91 hung on a stud 92 projecting from the machine frame 1, over gear 79. A spiral spring 91' is coiled around the stud of the lever 91 and acts with a constant tendency to rock said lever to depress its shorter arm. The opposite or longer arm of angle-lever 91 has a stud 93 that projects laterally into a slotted plate 94 formed at its upper end with a hub 95 that is fixed on a rock shaft 97; said shaft being journaled in bracket stands 98 bolted to the end frames 1 and 2 of the machine. Shaft 97 extends from end to end of the machine and has secured to it a multiple of blades 98' that curve outward and upward as best seen in Figs. 2 and 3 and which co-act with a fixed vertical plate or board 99 to form a pocket, or receptacle, into which the compound fabric may descend, and be supported and clamped during the operations of stitching and cutting. The vertical board 99 is attached at each end to plates 100 that form parts of the bracket stands 98. When shaft 97 is rocked in one direction its attached blades 98' are thrown toward the front of the machine, thus providing an open space between their free ends and the board 99; in other words, opening the pocket or receptacle that receives the fabric, as above described, but so soon as shaft 97 is rocked back again (through the action of rib

90, angle lever 91 and slotted plate 94) the free ends of blades 98' are forced against the board 99 and serve to clamp firmly in place the interposed fabric. The rocking movement of shaft 97 also serves another important purpose, through the aid of a dog 101 secured to and projecting radially from its end nearest the fabric feeding mechanism. It will be remembered that I described in connection with said feeding mechanism, a lever 27 fulcrumed at 26 on the machine frame. The lower limb of this lever reaches downward and curves toward the front of the machine until its extreme end lies directly in the path of dog 101, when the blades 98' are in their closed position (see Fig. 2). Lever 27 is jointed at 102 and has a deflecting arm 103 that is connected by a spring 104 with the machine frame and serves to draw the jointed arm of lever 27 toward the front of the machine. When shaft 97 is rocked to open blades 98' the dog 101 abuts the lower end of lever 27 and pushes it back until the projection on the upper (short) arm of said lever is withdrawn from notch 25 of gear 23, thus allowing the fabric feeding mechanism at the top of the machine to start into action. The continued movement of shaft 97 carries dog 101 past the end of lever 27 when said lever is drawn forward by spring 104 and the projection at the upper end of the lever is then ready to drop into notch 25 (so soon as said projection and notch come into coincidence) and thus stop the fabric-feeding mechanism. When shaft 97 and its attached blades 98' are returned to place, to clamp the fabric which has been fed down, the dog 101 simply presses down the end of lever 27, which being jointed at 102 gives way at the joint and so does not move or disturb the upper portion of the lever. Gear 79 is formed with a stud or crank-pin 105 near its hinged segment, to which is connected an arm 106 whose lower end is connected to the free end of a lever 107 hung to and beneath the track 6. Lever 107 bears on its rear side a small roller 108, so located that when the angle-plate 88, which I have already referred to, is carried toward the right hand end of the machine far enough to engage and operate the lever 87 and so set in rotation gear 79, the lower edge of said angle-plate (88) is immediately over the roll 108 carried by lever 107. As the gear 79 continues to rotate, the rod 106 is raised, taking with it the free end of lever 107 and as a consequence, roll 108, forces the angle-plate 88 upward, and while in this elevated position the sewing-machine carriage recedes and roll 89 on plate 88 passes the high point of lever 87 without engaging it. The angle-plate is pivoted to a lever 109 hung by a long hub on stud 41 between the traction roller 42 and the hub 40 of carriage section 29, as perhaps best seen in Figs. 13, 14, 15, 17, and 18 of the drawings. A lever of the first order is thus provided, one of whose arms is formed with a pedal 110 that is offset toward the front of

the machine to bring it within easy reach of the foot of the attendant. The opposite arm of said lever is formed as a plate having two holes or studs 111—112 to the latter of which is connected the angle-plate 88, the opening of said plate being an elongated vertical slot 113 that permits a limited upward movement of plate 88 before acting to move lever 109. To the second stud 111 of lever 109 is connected a bar 114 whose upper end is pivoted to the lower portion of the vertically movable frame 43 which I have described as having the sewing machine attached thereto (see Fig. 11). When the angle-plate 88 is forced upward by the raising of the lever 107, it in turn serves to force upward the lever 109 and also (through the medium of bar 114) the sewing-machine supporting frame 43. The relative positions of the centers of stud 41, stud 111 and the upper connection of bar 114 are such that when frame 43 is carried to its highest position, as in Figs. 15 and 18, the stud 111 will have passed a line drawn through the other two centers and will then serve as a lock to prevent the downward movement of frame 43 and its attached sewing-machine, until such time as the lever 109 shall be rocked on stud 41 to carry stud 111 back past the said center, when the weight of the sewing-machine will assist in forcing the several connected parts downward.

Secured to the carriage section 28 at its top, central, portion is a stud 115 having mounted thereon a pulley 116 and at one end of said carriage section are secured journal bearings 117—118 whose centers are in vertical alignment with each other and also with the face of pulley 116. In these journal bearings is hung a frame having a tubular vertical portion 119 and a laterally projecting frame 120 whose outer or free end has journaled therein a short, vertical shaft 121 having a pulley 122, located within frame 120, and having removably clamped to the lower end of said shaft (121) a circular knife 123.

Hung in suitable bearings in the tubular portion 119 are pulleys 124—125, one immediately over the other and so located that they may receive a belt 126 introduced into the tube 119 and guide such belt to and around the pulley 122 of shaft 121, as illustrated in Fig. 8. Belt 126 passes upward from tube 119 to and around pulley 116, thence downward to and around a pulley 127 on stud 41 and thence upward into tube 119. When the lower pulley 127 is set in revolution belt 126 communicates rotary motion in a horizontal plane to the circular cutter or knife 123. With the described arrangement of belt, pulleys, and frame 119—120 the circular knife may be swiftly rotated and the said frame may also be swung in its bearings 117—118 to bring the knife forward to its operative position to cut off a section of the fabric, or may be swung toward the back of the machine when the cut is completed and the knife no longer required.

I have already described the mechanism for raising and lowering the sewing machine. I may say here, by way of explanation, that when the sewing machine has completed its work (performed while the machine is in its highest position) and is lowered out of the way of the cutter 123, the latter and its supporting frame are automatically swung forward until said cutter reaches the same position before occupied by the sewing-machine, that is to say, the cutter is brought to a position midway between the two lines of stitching by means of which the strip of binding cloth has been sewed to the compound fabric.

The mechanism for automatically swinging the cutter-frame forward, as the sewing-machine is lowered, is constructed and arranged as follows:—The angle-plate 88 which, it will be remembered, is pivoted to a stud 112 on the lever 109, has secured to it a rod 128 whose upper end is jointed to a rock-lever 129 journaled on carriage section 28 near the lower end of the tubular section 119 of the cutter frame. The rock-lever 129 is formed with a toothed sector 130 adapted to mesh with a corresponding toothed segment of a miter gear 131 formed on, or secured to, the lower end of tubular section 119, as most clearly illustrated in Figs. 3, 8, 17 and 18. When lever 109 is rocked on stud 41 to lower the sewing-machine, the rod 128 is by the same movement drawn downward, thus acting through the toothed sector 130 and its meshing segment 131 to rock the cutter-frame and bring the cutter forward into working position. When the sewing-machine is again raised to its working position the same parts operate to swing the cutter-frame back out of the way. During this return movement of the cutter and its frame, the usefulness of the elongated pivot slot in the angle-plate 88 is best seen. In order to insure the perfect working of the rotary knife 123 I provide a forked arm 132 which is secured to an extension 133 of the sewing-machine head and adapted to be swung on its pivot-support as shown in dotted lines in Fig. 11, to remove the fork 132 from the knife before the sewing-machine begins to rise. If, however, the attendant should fail to swing the fork away from the cutter the elongated slot of angle-plate 88 serves as a safety device to prevent any accident or breakage that might otherwise result from such oversight or neglect, as said slot permits the plate 88 and rod 128 to rise a limited distance and to act to start the cutter rearward, out of the fork 132 before the lever 109 and the connected sewing-machine begin to rise.

The manner of connecting the plate 88 and rod 128 to the stud 112 is illustrated in Fig. 19. A spring 133^a is coiled around the rod and fastened to it at the upper end. The lower end of the spring is attached to the stud 112. The tendency of the spring is to draw the stud to the upper end of the slot in plate 88, but when said plate is forced upward by the roll 108 on lever 107, the spring

yields and the lever 109 is not caused to move until the lower end of the slot in plate 88 reaches and engages the stud 112. The spring 133^a serves another valuable purpose. When the upward movement of plate 88 has brought the three centers of stud 41, stud 111 and the upper connection of bar 114, into line with each other, the effort of spring 133^a to return to its normal, or closed, position draws stud 112 upward in its slot and thus throws stud 111 sufficiently past the center to provide a lock to prevent the undue lowering of frame 43 and the attached sewing-machine (see Fig. 18).

I have referred to an internal gear 33 located between the carriage sections 28—29 (see Figs. 2, 3 and 11) and to a small gear 36 (on the rear end of shaft of gear 33), that meshes with a toothed rack 37 secured to the track 5. These constitute parts of the mechanism by means of which the sewing machine carriage is caused to travel with a steady and positive movement back and forth on tracks 5 and 6.

Secured to shaft 34 is a small gear 134 located within and concentric with the internal gear 33 (see Fig. 16).

On the side of carriage section 29 is a bracket-bearing 29² to which is hinged an arm 135 whose upper end is formed as a bearing to receive a short horizontal shaft 136 on which is a score pulley 137 and a small gear 138, the latter being in the recess of the internal gear 33 and in such relation to both the internal gear and its concentric gear 134 that when the upper or free end of arm 135 is swung in one direction the intermediate gear 138 may pass into mesh with the internal gear (see Fig. 15) but when arm 135 is swung in the opposite direction said gear passes into mesh with the small gear 134 and, as shaft 136 constitutes the driver of the carriage-feeding mechanism, it will thus be seen that the intermediate gear 138 may serve to transmit motion from its shaft 136 to the pinion shaft 34 and cause the latter to rotate in either direction, as desired. Score pulley 137 is driven by belt from the small score pulley 66 on the shaft 62, the positions of the two score pulleys in the complete machine being best seen in Fig. 3.

I have made provision for the automatic shifting of the intermediate gear 136 so that the raising or lowering of the sewing machine frame 43 shall act at the proper time to stop and reverse the carriage feeding devices. Projecting laterally from the vertically sliding frame 43 is a bracket 139 whose outer end is bored to receive the trunnion 140 of a slide-box 141, said box being grooved on its rear side (see Fig. 16^a) to receive the front end of the shaft 136 that carries score-pulley 137 and intermediate gear 138. The shaft 136 always preserves the same or practically the same horizontal position, but the slide-box 139 travels upward or downward with the frame 43 and as the arm 135 is free to swing

on its lower, or hinged end it results that as the box 141 is moved in either direction, the end of shaft 136 follows the groove or channel in said box and is thus moved laterally a distance sufficient to transfer the intermediate gear 138 from the internal gear 33 to the small central gear 134, or vice versa, as the case may be.

By referring to the enlarged view, Fig. 16, it will be understood that when frame 43 is moved downward the slide box 141 will act to carry gear 138 into mesh with the central gear 134, and that when frame 43 is raised said slide-block will serve to transfer gear 138 to the internal gear. The lower end of the slide box is forced outward from frame 43 by a spring 140' secured to said frame, the free end of the spring being so shaped that it bears against the side of the slide-box as shown. While the spring 140' acts to hold the slide-box rigid enough to insure the certain transfer of the intermediate gear 138, it may allow said box to move slightly if the teeth of the engaging gears do not come at once into perfect mesh with each other. The trunnioned slide-box and spring 140' thus provide a safety appliance to prevent the breaking or stripping of the gear teeth.

The reference figures 141' denote a shipper-rod arranged to slide in a square opening 142 in the carriage section 29. This rod has the usual fork 143 to straddle the belt 72 (see Figs. 3 and 11) and is connected at its front end with an operating lever 144 whose lower end is hinged to a bracket 145 projecting from the lower portion of carriage section 29. A belt shipper is thus provided by means of which the attendant may stop the machine at any desired stage of its work, by simply shifting belt 72 onto the idle pulleys 60 and 64. Ordinarily this belt is under the control of an automatic shipping device which I will proceed to describe, referring specially to Figs. 3, 12^a and 11.

146 indicates a bracket arm attached to carriage section 28 and suspended over pulleys 48—51. The free end of this bracket arm bears a vertical shaft or stud 147 to which are clamped by set-screws hubs with projecting arms or dogs 148—149 that extend toward the rear of the machine and the hub of dog 149 also bears an arm 150 that extends laterally and downwardly to a point where it engages a hole or slot in the shipper-rod 141' in such manner that the rocking of stud 147 and its attached hubs and dogs will act to slide said shipper-rod in its bearings and so shift the belt. Immediately at the rear of the described system of dogs is a tie-rod 3 connecting the end frames of the machine and on this tie-rod I clamp collars 151—152 having projections 151'—152' which, respectively, lie in the path of the dogs 148—149 and act as stops to check and move said dogs as they are carried in either direction. When the carriage 28—29 has nearly completed the necessary travel in one direction, dog 148 comes in contact with

the stop 151' when the belt 72 is shifted onto the loose pulleys 60—64 and the carriage stops until again set in motion by the attendant through the aid of the shipper-handle 144. When the carriage moves in the opposite direction the dog 149 is stopped and shifted by engagement with the stop 152' and thus belt 72 is again returned to the loose pulleys, but in this latter instance is carried sufficiently far to ride on and set in revolution, the pulley 61, as hereinafter more fully explained.

Having now described separately the various mechanisms which jointly make up my complete machine I will explain more fully the arrangement and duties of the several pulleys which, under the influence of belt 72 serve to distribute motion and power to the said various mechanisms. Referring to Fig. 12 which shows the system of pulleys on stud 41, it will be seen that the pulley 48, from which a belt leads to the sewing machine is connected with the driving pulley 48' and said pulley 48 is therefore in revolution only so long as the driving belt is on pulley 48'. Pulley 127 (from which a belt 126 goes to pulley 116 and to the shaft of the rotary knife 123) is connected with driving pulley 61 and therefore rotates only when the belt is on said pulley 61 which, it should be noted, is much wider than the pulley 48'. 60 denotes an intermediate idle pulley. The arrangement of pulleys on the adjoining shaft 62 I have already explained understandingly but wish to call attention to the relative widths of said pulleys as seen in Fig. 13. The idle pulley 60 is much narrower than the idle pulley 64 and for the following purpose. When the belt 72 is shifted from pulleys 48' and 63 onto said idle pulleys (by the action of the described stops) said belt is carried far enough to ride onto the pulley 61 which thus sets the connected pulley 127 in motion and starts the knife 123 but said belt is not shifted far enough to leave the idle pulley 64 to start the carriage along its ways.

The operation of my machine is substantially as follows:—Assuming that the compound fabric has been entered between the feed-rolls 8—9 and its end drawn down to a level with the knife 123 which, with its supporting frames is swung toward the front of the machine. The sewing machine carriage is then pushed toward the right hand end of the machine (the right hand as seen in Fig. 1) when the stop 151' engages dog 148 to shift belt 72 onto the idle pulleys 60—64 and roll 89 on angle-plate 88 engages and forces down the free end of lever 87 when, through the action of the pitman 86 and lever 83, the hinged segment of gear 79 is released and swings outward to complete the toothed periphery of said gear, which latter is set in revolution by the gear 78. As gear 79 continues to rotate, the end of cam-rib 90 passes beyond the short arm of angle-lever 91, the shaft is rocked to open blades 98' and at the same instant the lever 27 is pushed back by

dog 101 and the fabric feeding devices at the top of the machine are set in motion. The fabric is now fed downward into the pocket provided by the open blades 98' until a sufficient length has been passed down to make a bed comfortable, when the projection on the upper end of lever 27 drops into the notch 25 of gear 23 and the fabric feed-rolls stop. Just at this instant the revolving gear 79 has brought the cam-rib 90 around to a point where said rib again engages the short arm of lever 91 which is then moved to rock the shaft 97 and close the blades 98', as in Figs. 2 and 3. Just before the cam-rib passes beyond the end of lever 91 the horn 81 of the hinged segment engages the projection 84 on lever 83 and said segment is drawn out of mesh with gear 78 and gear 79 stops; the position of the parts at this stage being seen in Fig. 24. During the revolution of gear 79 the crank-rod 106 will have acted through lever 107 and its roll 108, to raise the angle-plate 88 and thus lift the sewing machine to its working position and also to swing the knife 123 and its supporting frame back out of the way. The attendant then grasps the end of a strip of binding fabric 153 which is coiled on a spool 154 hung on a bracket 155 hinged to the sewing machine head, and draws said binding fabric under the presser-feet and needles of said sewing machine. The shipper handle 144 is then pushed toward the rear of the machine to throw belt 72 onto pulleys 63 and 48', the former of which (through its shaft) sets score-pulley 66 in motion and so starts the mechanism for moving the sewing machine carriage along the tracks 5—6 while the latter (48') sets in revolution the connected pulley 48 and thus starts the stitching mechanism. The sewing machine is thus moved along its tracks to the opposite, or left hand, end of the complete machine, sewing the binding strip 153 transversely across the compound fabric by two parallel lines of stitching as shown in Fig. 26 of the drawings. At the instant the carriage reaches the end of its travel the stop 152' engages and acts on dog 149 to shift the belt 72 onto the idle pulley 64 and to the cutter driving pulley 61 when the stitching mechanism and carriage feeding devices stop and the circular knife is set in rotation. The attendant then breaks the thread, cuts off the binding strip, at the edge of the compound fabric and swings the spool 154 toward the front of the machine as shown in Fig. 3. The pedal-end of lever 109 is then raised by the attendant to lower the sewing machine and to swing knife 123 into working position and also to shift the intermediate gear 138. The shipper-handle 144 is then grasped and drawn outward to shift belt 72 onto pulley 65 which sets in motion the carriage feeding mechanism and said carriage begins to travel backward on its ways (*i. e.*, toward the right hand). The knife 123 meanwhile severs the compound fabric and the attached strip of

binding cloth between the two lines of stitching. It will thus be seen that the relative widths of pulleys, on stud 41 and shaft 62 are such that when the belt is shifted to bring into use the cutter 123, said cutter is set in revolution before the carriage feeding mechanism is caused to operate. After the carriage has traveled to the opposite end of the machine, and the cutter 123 has (during such travel) cut off a section of the fabric, the several described operations are repeated until the compound fabric has been cut up into desired lengths and a binding strip has thus been attached to each of the cut ends. The cut sections are removed by the attendant from the pocket formed by blades 98' and board 99, when said blades are opened to receive another length of the compound fabric from the feed rolls 8—9. The cut ends of the several lengths of fabric may be finished and completely bound by separate operation during which the binding strip 153 is folded upon itself and around the cut edge of the compound fabric, as shown in Fig. 27 and finally secured by a line of stitching. I have referred briefly to a forked arm 132, which is attached to the sewing machine head and is used with the rotary knife 123. This fork serves to hold the fabric up to the knife during the act of cutting, and is then swung out of the way until the knife is again brought into use. After the compound fabric is fed down, one or both of its edges may be clamped at or about the level of the binding strip, by jaws attached to the end frames of the machine. A clamp of this character is shown at the left hand end of Fig. 1, and consists of a pendent arm 156 attached to the overhanging upper end of said frame and having loosely bolted thereto a short arm 157 the outer or free ends of said arms being turned inward toward each other, to form jaws that may grasp and hold the fabric. As here illustrated a clamping device for bringing said jaws together, is provided, consisting of a bolt 158 passing through the two sections 156—157 and either held in place by a nut 159 or by threading said bolt and screwing it into section 156. A handled lever 160 with cam-shaped head is hinged to the opposite end of bolt 158 and it will be understood that by raising or lowering the handle 160 the described jaws may be opened or closed to receive or release the edge of the compound fabric.

I have described my machine as one especially suited for cutting and binding bed comfortables but it may be utilized with equal advantage for feeding, stitching and cutting off fabrics of other kinds and for any analogous purposes. It should also be understood that the feeding and cutting devices may be used with advantage (without the stitching mechanism) for feeding, measuring and cutting continuous fabrics into desired lengths also that the feeding and stitching mechanism may be successfully employed, independent

of the cutting off devices. The blades 98' which provide a pocket to receive the fabric as it is fed downward from rolls 8—9, also serve as clamps to hold the fabric firmly during the operations of stitching and cutting. When the blades are swung upward, to close the pocket, the free ends of the blades engage the fabric and clamp it firmly against the board or plate 99.

The fork 132 which is here shown attached to the sewing-machine head could as well be secured to the carriage that supports the sewing machine, or could consist of a long, slotted, fixed, bar, through whose slot the knife could travel during the act of cutting.

Having described my invention, I claim as new and desire to secure by Letters Patent—

1. In a machine of the class referred to, in combination, fabric measuring devices as set forth, a sewing machine mounted to travel transversely along the fabric, mechanism for actuating the said measuring devices between the successive movements of the sewing machine, to deliver desired lengths of fabric and mechanism for severing said fabric transversely, as specified.

2. In a machine of the class referred to, in combination with fabric feeding and measuring devices as set forth and mechanism for automatically actuating the same, a knife mounted to travel transversely along the fabric and mechanism for stitching said fabric between the feeding and cutting operations, substantially as specified.

3. Fabric measuring devices and mechanism for actuating the same between the successive movements of the sewing machine to deliver desired lengths of fabric, in combination with a sewing machine mounted to travel transversely along said fabric, mechanism substantially as described for moving the sewing machine on its tracks or ways and mechanism for cutting the stitched fabric into desired lengths as specified.

4. In combination with a sewing machine mounted to travel forward and backward on tracks or ways, fabric measuring devices, mechanism substantially as described for setting in operation said measuring devices and for stopping the same between the successive movements of the sewing machine and mechanism for cutting said stitched fabric into desired lengths, as specified.

5. In combination with a sewing-machine mounted to travel forward and backward on ways, fabric-feed-rolls located to deliver the fabric to said sewing-machine by gravity, a shaft as 14 geared to one of said feed-rolls, a worm splined on said shaft with one end formed as a clutch section a companion clutch section loosely mounted to rotate on said shaft, a spring serving to hold the clutch sections in operative engagement with each other, a gear as at 23 in mesh with the said worm, and mechanism substantially as de-

scribed for releasing and stopping gear 23, for the purpose specified.

6. In combination with fabric supports, a sewing machine adapted to produce two parallel rows of stitching, mechanism for moving said sewing machine transversely along said fabric, a knife and mechanism for moving the same along the fabric between said rows of stitching and mechanism substantially as described for alternately moving said sewing machine and traveling knife into operative engagement with the fabric.

7. In combination with fabric measuring devices and mechanism for automatically actuating the same, mechanism for stitching two parallel lines across said fabric and a knife mounted to travel along said fabric to sever the same between said parallel lines of stitching, as specified.

8. In combination with fabric feed rolls, and mechanism as herein described for actuating the same to deliver the fabric in given lengths at stated times, a receptacle located below said feed rolls and composed of a fixed plate and coacting blades secured to a rock shaft, as set forth, and a knife mounted to travel transversely along said fabric and sever the same, as specified.

9. In combination with a sewing-machine arranged to travel forward and backward on ways, as set forth, a fabric-receptacle or pocket located within the sewing-machine head, parallel with the line of travel of said machine; said receptacle being composed of a fixed back-board or plate, a rock-shaft journaled to one edge of said plate, and a series of curved or angular blades as 98' secured to and movable with said rock-shaft, in the manner and for the purpose specified.

10. In combination with a sewing-machine mounted to travel forward and backward on tracks or ways, fabric-feeding rolls and mechanism as set forth for automatically actuating said rolls to deliver the fabric to the sewing-machine in given lengths, a receptacle for the fabric so delivered consisting of a fixed plate and curved blades co-acting therewith, and mechanism substantially as described for opening and closing said receptacle for the purpose specified.

11. In a machine of the class referred to, in combination, a carriage mounted to travel forward and backward on ways, a sewing-machine mounted to slide on said carriage, and a knife mounted on said carriage in manner substantially as set forth; the sewing-machine and knife being arranged to occupy the same working position and to be moved out of the way of each other when not in use, as specified.

12. In combination with fabric-feed rolls, and mechanism for automatically moving said rolls to deliver the fabric in given lengths, at stated times, a carriage mounted to travel forward and backward along said fabric as set forth; a sewing machine mounted on said car-

riage, and a knife mounted on the carriage substantially as set forth; the sewing-machine and knife being arranged to occupy the same working position and to be moved out of the way of each other when not in use, as specified.

13. In a machine of the class referred to, in combination, fabric feeding rolls and mechanism for actuating the same to deliver the fabric in given lengths, a carriage mounted to travel forward and backward on ways transversely to the length of said fabric, a pulley at opposite ends of said carriage, a frame hinged to the carriage having journaled in its free end a circular knife and having a system of pulleys 124—125 that may receive a belt from the described pulleys at opposite ends of the carriage and guide said belt to the knife shaft: all being substantially as and for the purpose specified.

14. In a machine of the class referred to, in combination, fabric feeding rollers, mechanism for actuating said rollers to deliver desired lengths of fabric, a sewing machine mounted to travel transversely along the fabric, mechanism as set forth for moving said sewing machine into and out of its working position and mechanism consisting of a traveling knife for cutting the stitched fabric into desired lengths, as specified.

15. In combination, a carriage mounted to travel on ways as set forth, a sewing-machine mounted to slide on said carriage, a knife frame mounted on the carriage substantially as described, a lever as 109 hung to the carriage and connected by link with the sewing-machine, and mechanism as specified connecting the said lever with the said knife-frame for the purpose stated.

16. Fabric measuring devices and mechanism for actuating the same to deliver desired lengths of fabric, in combination with a sewing machine mounted to travel transversely along said fabric, mechanism for moving the sewing machine on its ways, mechanism substantially as described for moving said sewing machine into and out of its working position, all for the purposes specified, and mechanism for cutting the stitched fabric into desired length, substantially as specified.

17. In combination with fabric-feed rolls, and mechanism as herein described for actuating the same to deliver the fabric a receptacle or pocket located beneath said feed-rolls, mechanism as set forth for opening and closing said receptacle, and a clamp composed of spring closed jaws 156, 157 located near, and adapted to receive and hold the edge of the fabric; all being substantially as and for the purpose specified.

18. In combination with suitable supporting frames connected by tracks or ways as set forth, a driving shaft 68 journaled at one end of said machine, bearing a pulley 69, a corresponding pulley 70 journaled at the opposite end of said machine, a carriage mounted to travel on said ways, pulleys 60—64 journaled

to the said carriage, a belt connecting the four named pulleys in the manner described to permit the free movement of the carriage along its ways, a knife frame constructed and hung on said carriage in manner as set forth, and a belt connecting the shaft of said knife with pulley 60, as and for the purpose specified.

19. In a machine of the class referred to, a carriage mounted to move forward and backward along tracks or ways and bearing pulleys 60—64 as set forth, pulleys 69—70 journaled at opposite ends of the machine, a belt connecting the four named pulleys in the manner described, a fixed rack parallel with the line of travel of the said carriage, a shaft journaled in said carriage bearing a pinion-gear in mesh with said rack, and mechanism (intermediate between said pinion shaft and one of the pulleys borne by the carriage) consisting of a pinion and internal gear concentric with each other and a gear 138 that may be swung into mesh with either of said concentric gears for transmitting motion from said pulley to said pinion-shaft and for reversing such motion; all being constructed and combined substantially as described.

20. In combination, a carriage mounted to travel forward and backward on ways; a fixed rack parallel with the line of travel of the said carriage; a shaft journaled in the carriage, bearing a pinion-gear in mesh with said rack, an internal gear and a small gear within and concentric with said internal gear; and a driving gear as 138 intermediate the internal gear and the gear within it; the said driving gear being so arranged that it may be swung into mesh with either the internal gear or its concentric gear; as and for the purpose specified.

21. In combination with a carriage mounted to travel forward and backward on ways, a sewing-machine mounted to slide on said carriage, and a bobbin support consisting of a bracket 155 hinged to said sewing-machine as set forth and adapted to be swung outward when not in use, as specified.

22. In combination, a carriage, a sewing-machine mounted to slide thereon, a rotary knife mounted on said carriage substantially as set forth, and a fork as 132 hinged to the sewing machine as set forth arranged to be swung forward to co-act with the knife or to be swung outward as herein specified, and for the purpose stated.

23. In a machine of the class referred to, in combination with ways supported by end-frames, a carriage mounted to travel on said ways, a stud as 41 secured to said carriage and a system of pulleys, loosely mounted on said stud, consisting of driving pulleys 61—48' and an intermediate idle pulley 60 of uniform diameter; pulley 61 being connected with a greater pulley 127 and pulley 48' being connected with a lesser pulley 48; all being substantially as and for the purpose specified.

24. In combination with fabric feed-rolls

and a driving shaft geared thereto bearing clutch sections and a worm as set forth a spring for holding said clutch sections normally in engagement, a notched gear in mesh with said worm and a lever one of whose arms has a projection adapted to enter the notch of said gear, as and for the purpose specified.

25. In combination with fabric feed-rolls, and a driving shaft geared thereto bearing clutch sections and a worm as set forth, a notched gear in mesh with said worm and a lever one of whose arms has a projection adapted to enter the notch of said gear, and a spring 104 secured to the opposite end of the lever serving to hold the said projection normally in engagement with the described notch: all being substantially as and for the purpose specified.

26. In combination with a carriage mounted to travel forward and backward on ways, and a rock-shaft 97 parallel with the line of travel of said carriage, a pendent slotted arm 94 secured to said rock-shaft, a lever as 91 having one arm connected with said slotted arm, a gear 79 having a cam-rib 90 adapted to engage and move the lever 91 in the manner set forth, and a driving gear 78 in mesh with gear 79, the latter being formed with a hinged peripheral segment that may be swung out of meshing contact with the said driving gear, as and for the purpose specified.

27. In combination, a carriage mounted to travel forward and backward on ways, a gear 78 and mechanism for driving the same, a gear

79 having a hinged peripheral segment with inwardly projecting horn as set forth, a lever 83 hung adjacent to gear 79 bearing a projection that may be moved into or out of the path of said horn, and mechanism as herein described, intermediate the said carriage and lever 83 whereby the latter is actuated at stated times to engage or release the said horn: all being substantially as and for the purposes specified.

28. In a machine of the class referred to, in combination, a carriage mounted to travel forward and backward on ways, a gear as 79 journaled at one end of the machine and having a hinged peripheral segment as set forth, and mechanism, intermediate with the carriage and gear 79, consisting of levers 83 and 87 arranged and connected substantially as described, by means of which the forward movement of the carriage may act to move said hinged segment.

29. In a machine of the class referred to, in combination, a carriage mounted to travel forward and backward on ways, a gear as 79 journaled at one end of the machine, a lever 107 hung to the machine frame, a crank-rod 106 connecting the said lever with gear 79 in manner as described, and mechanism substantially as set forth for setting in revolution the gear 79.

WILLIAM H. PALMER, JR.

Witnesses:

FRANK H. ALLEN,
ALONZO M. LUTHER.