

T. ALLATT.
MECHANISM FOR MAKING PAPER RECEPTACLES.
APPLICATION FILED MAR. 20, 1909.

982,780.

Patented Jan. 31, 1911.
19 SHEETS—SHEET 1.

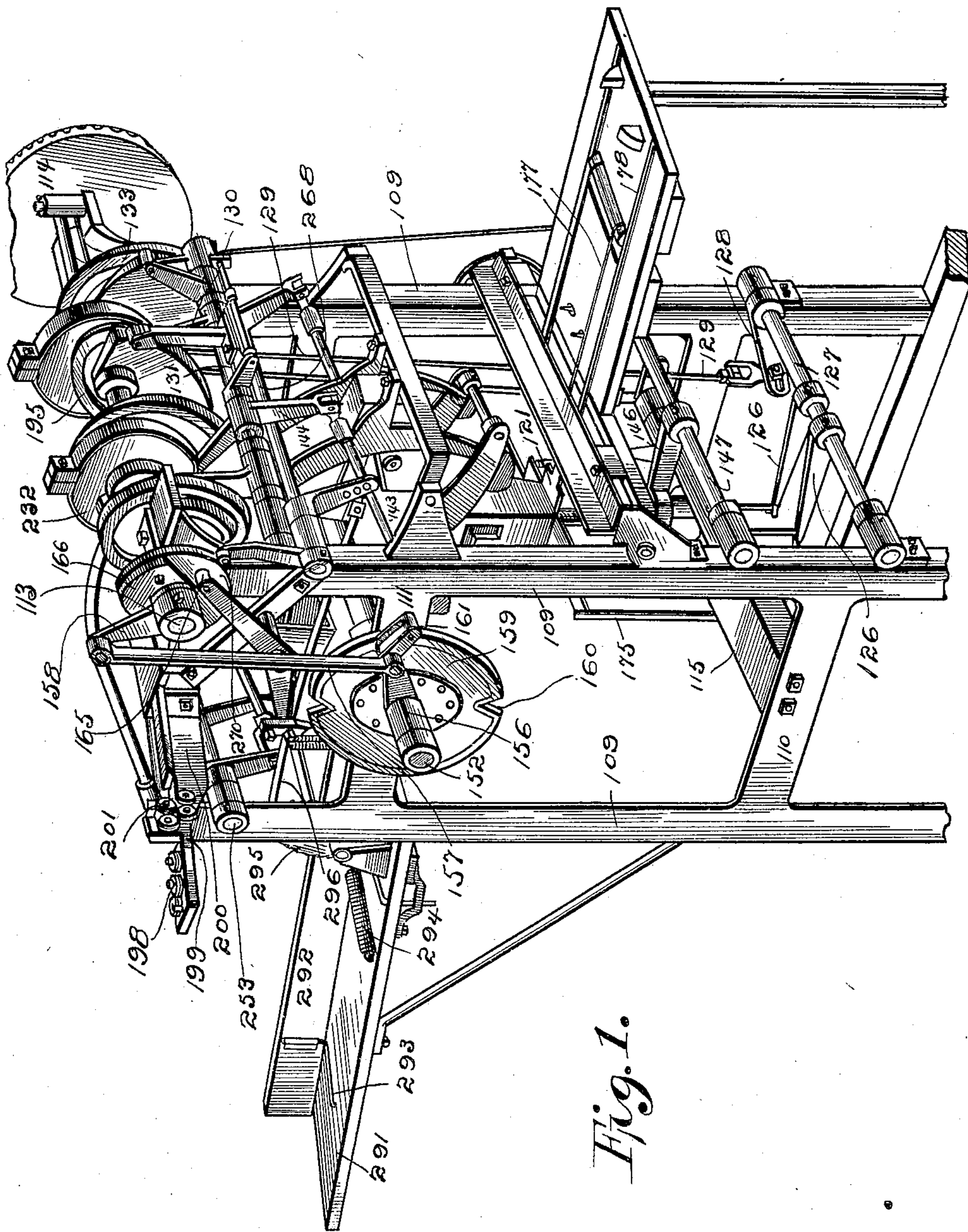


Fig. 1.

Witnesses
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By *E. E. Vrooman,*
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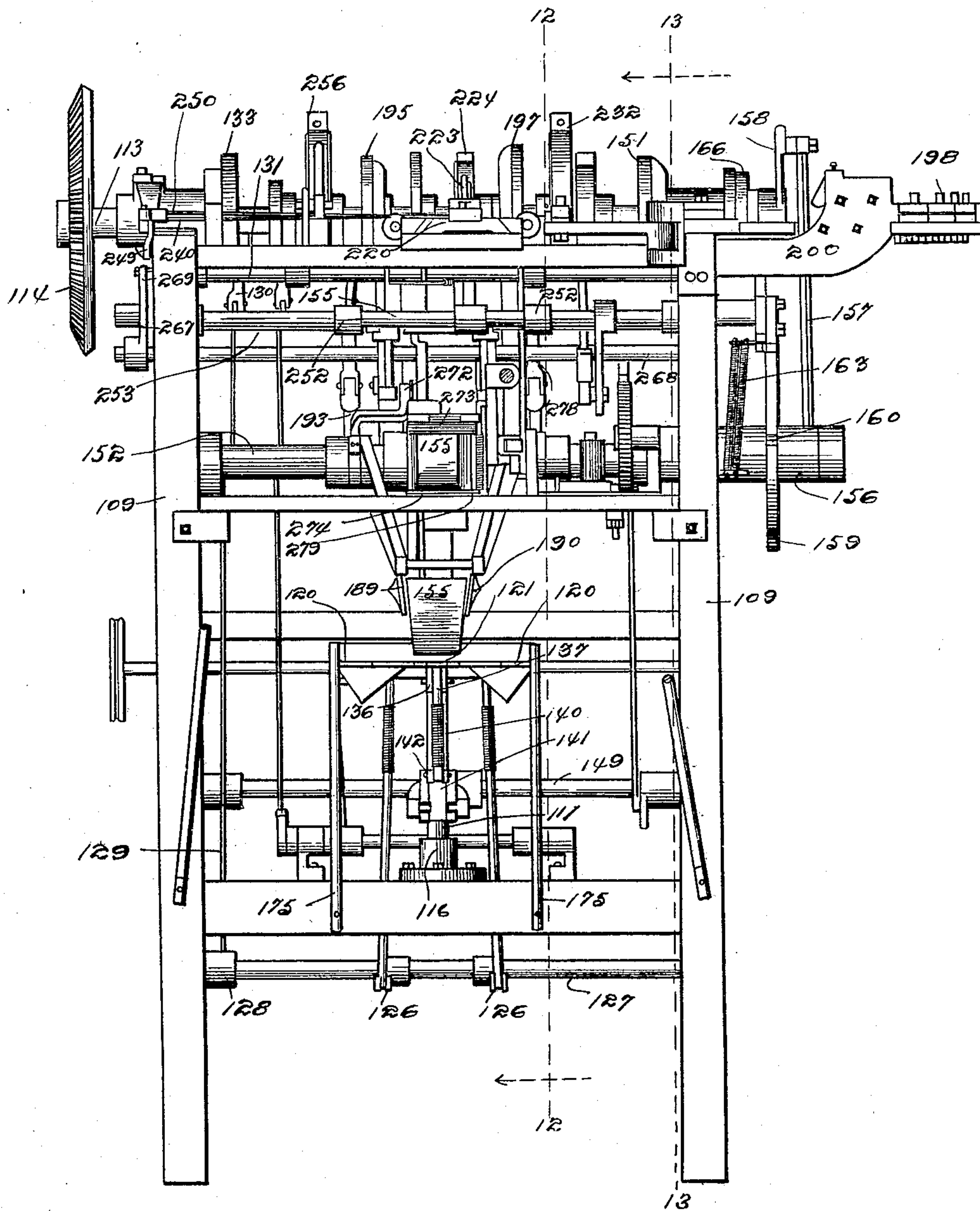
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Fig. 2.



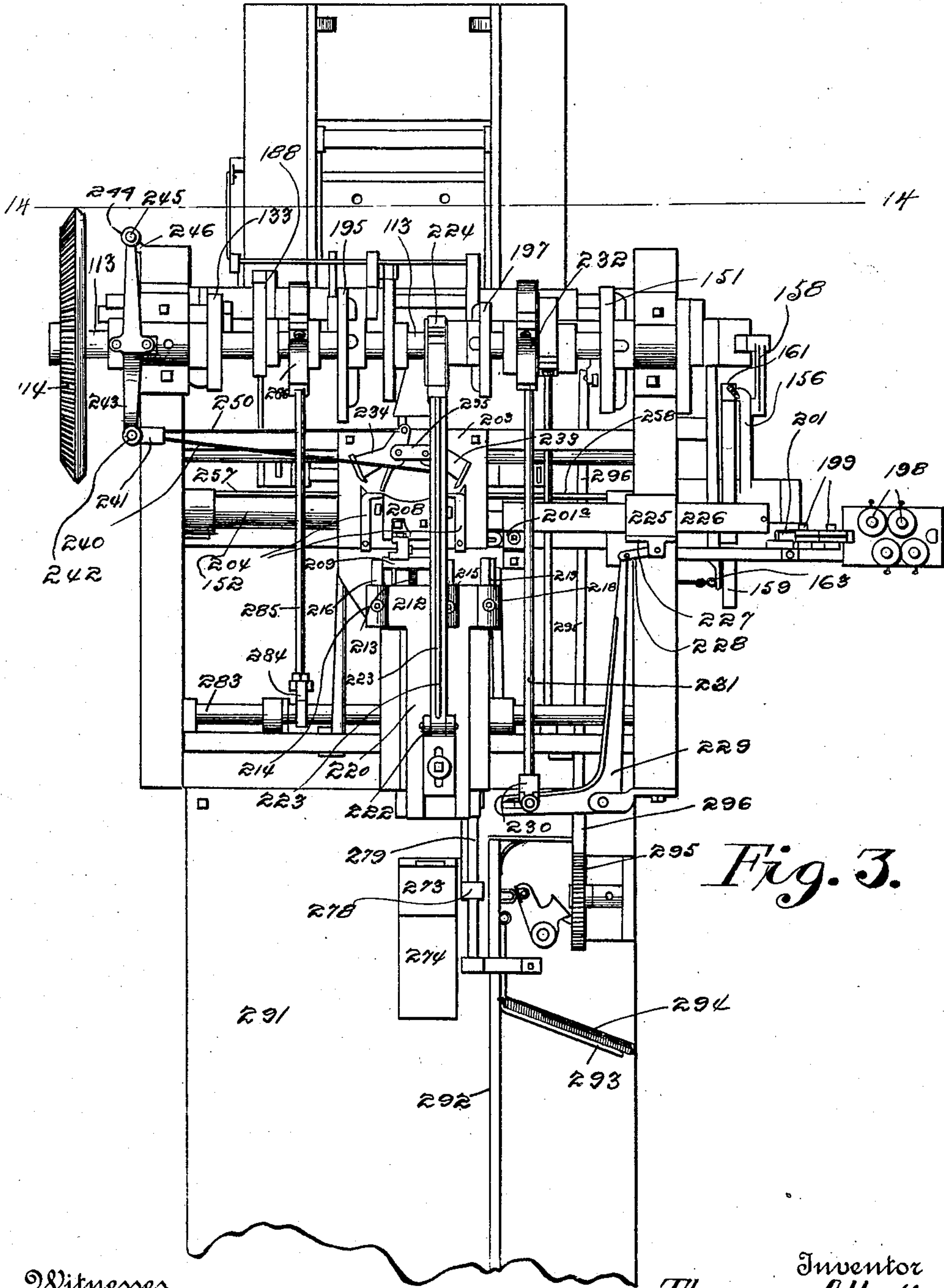
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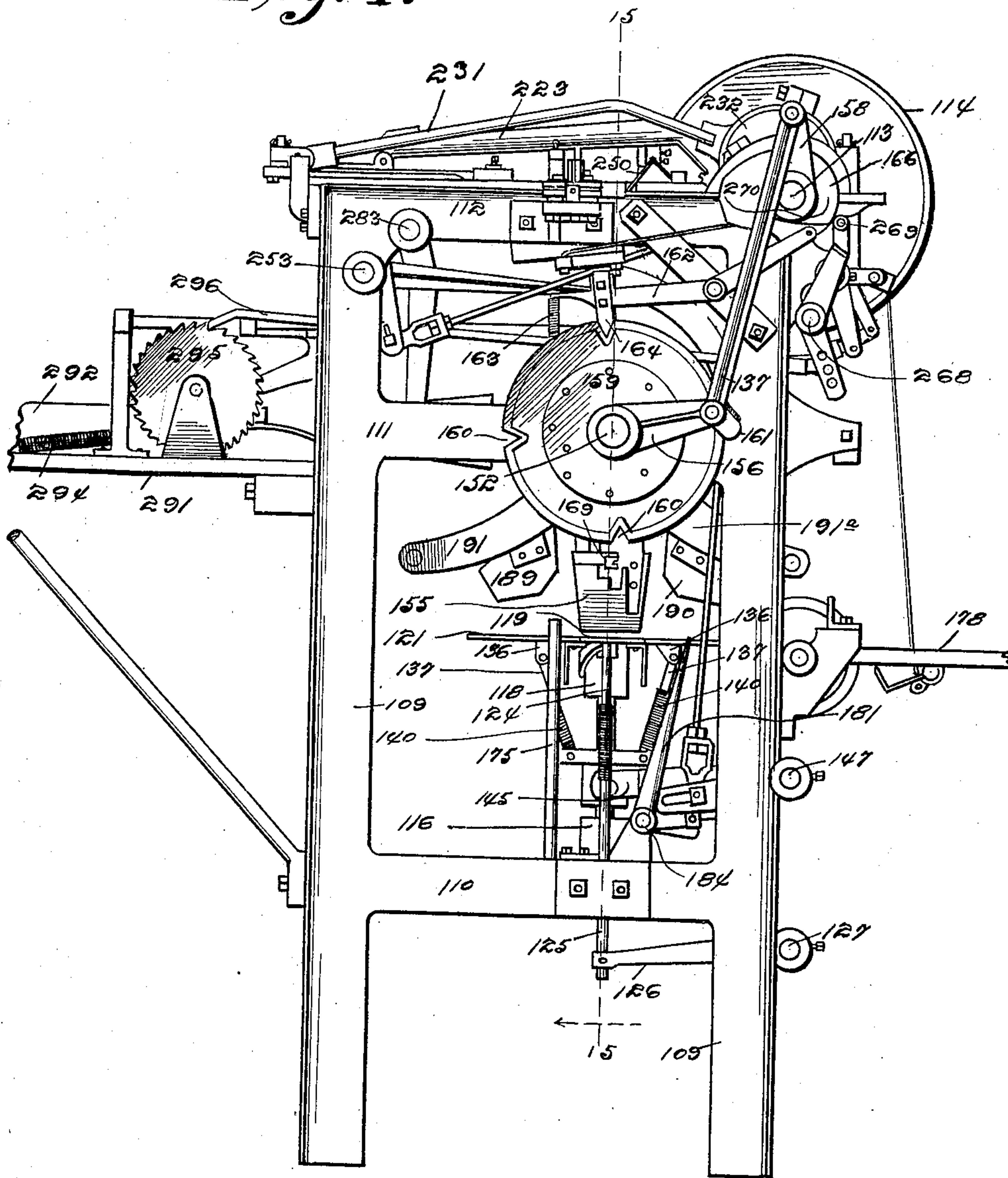
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Fig. 4.



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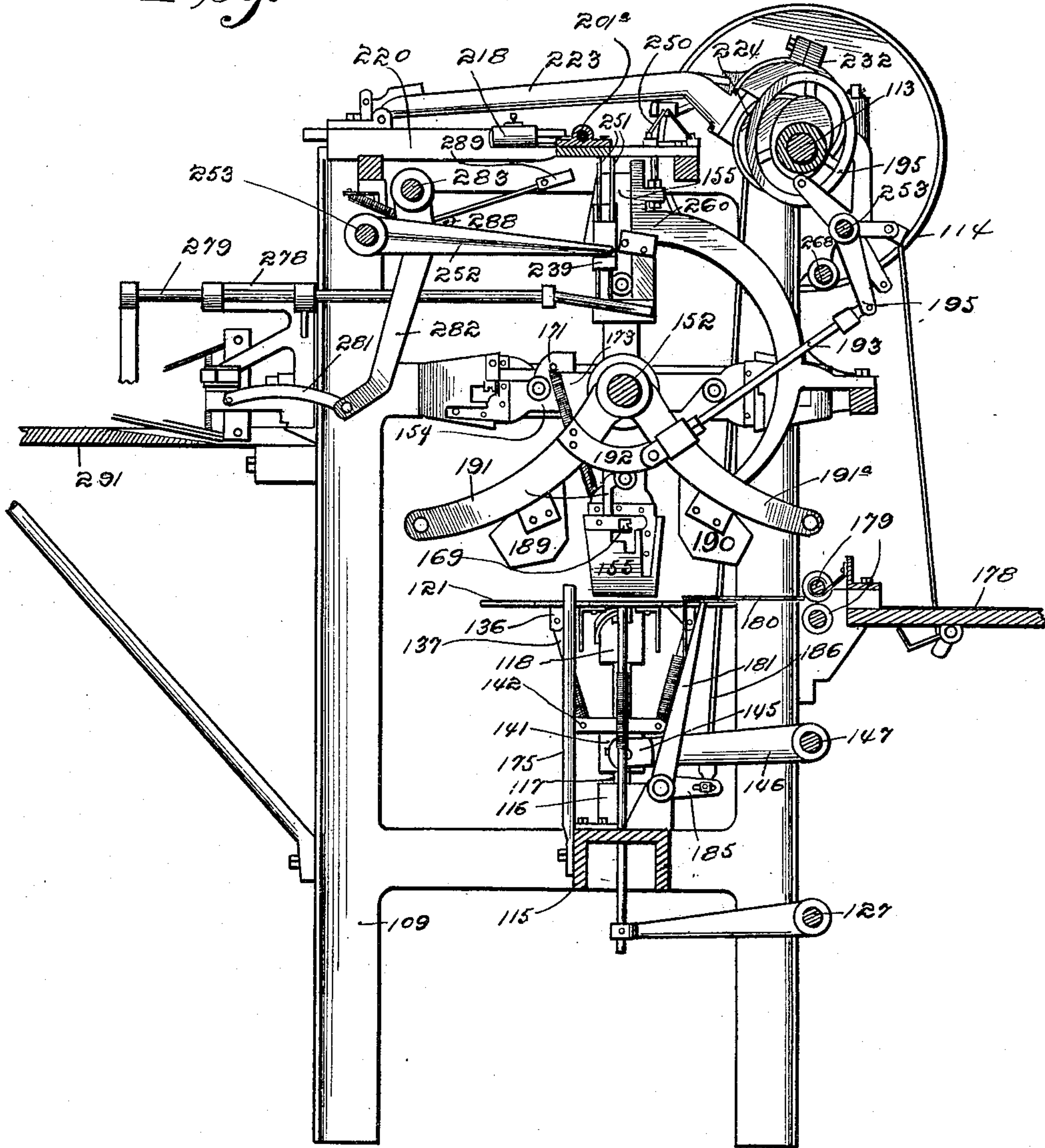
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Fig. 5.



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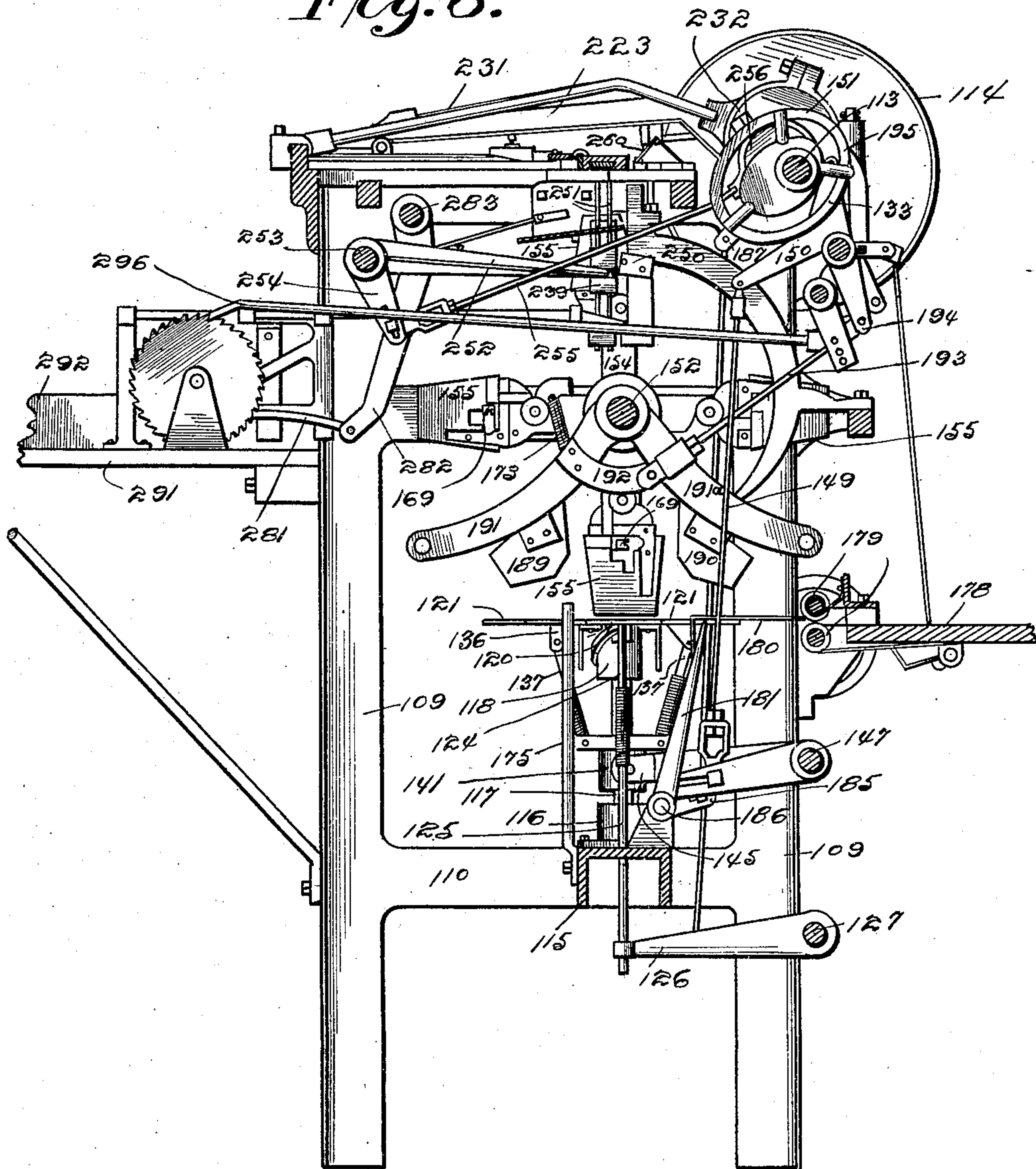
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19 SHEETS—SHEET 6.

Fig. 6.



Witnesses
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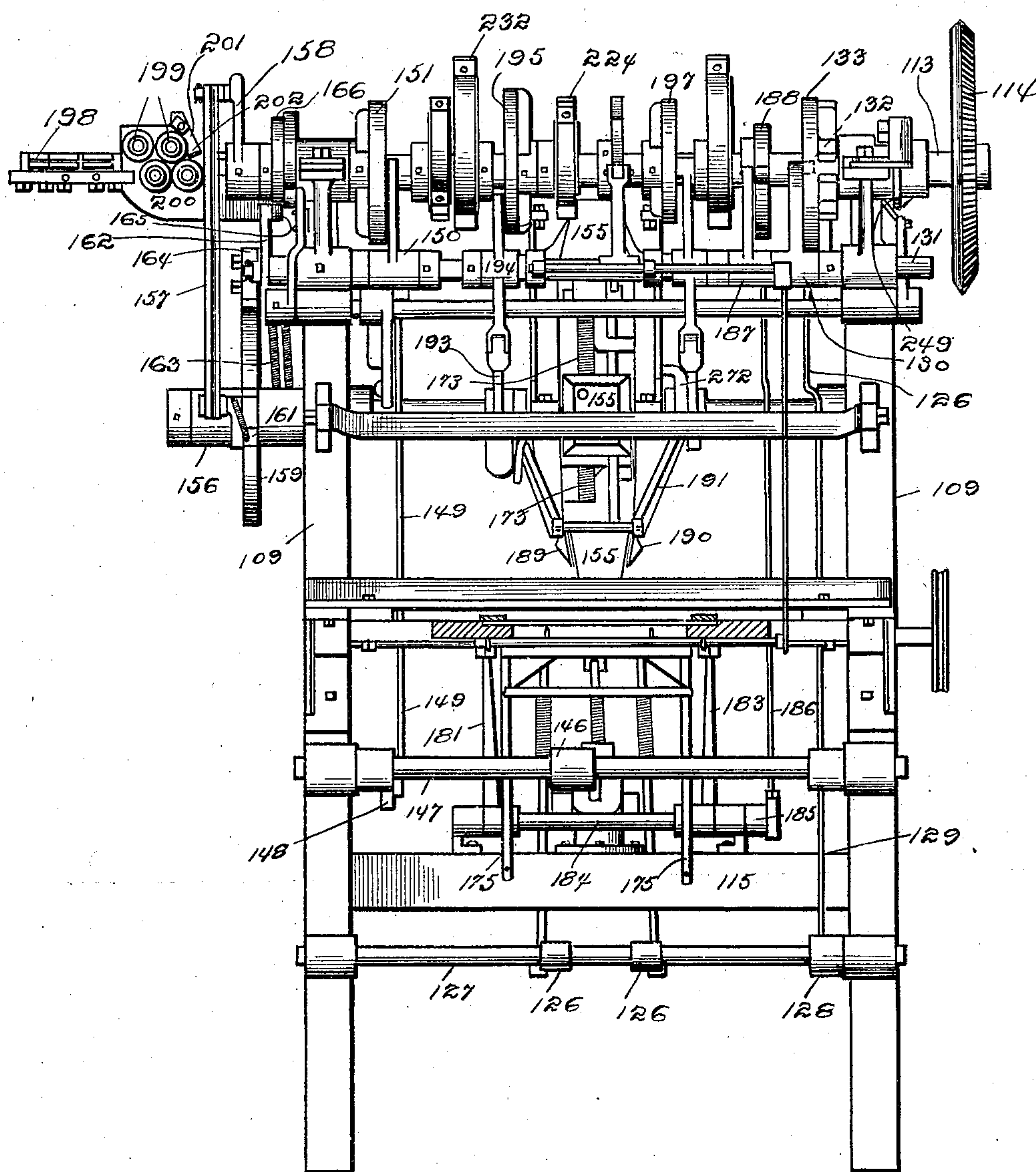
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19 SHEETS—SHEET 7.

Fig. 7.



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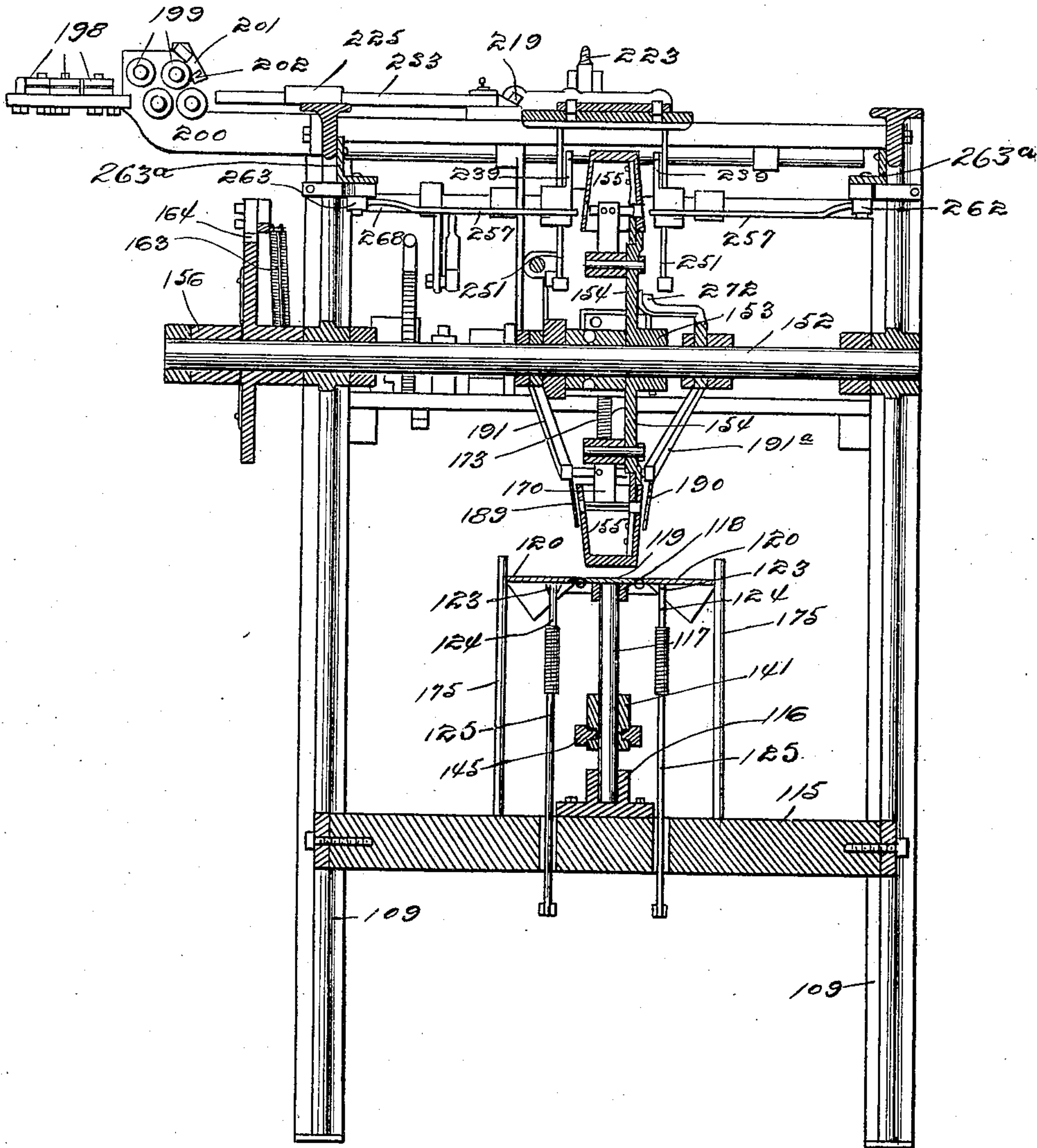
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Fig. 8.



Witnesses

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Fig. 35.

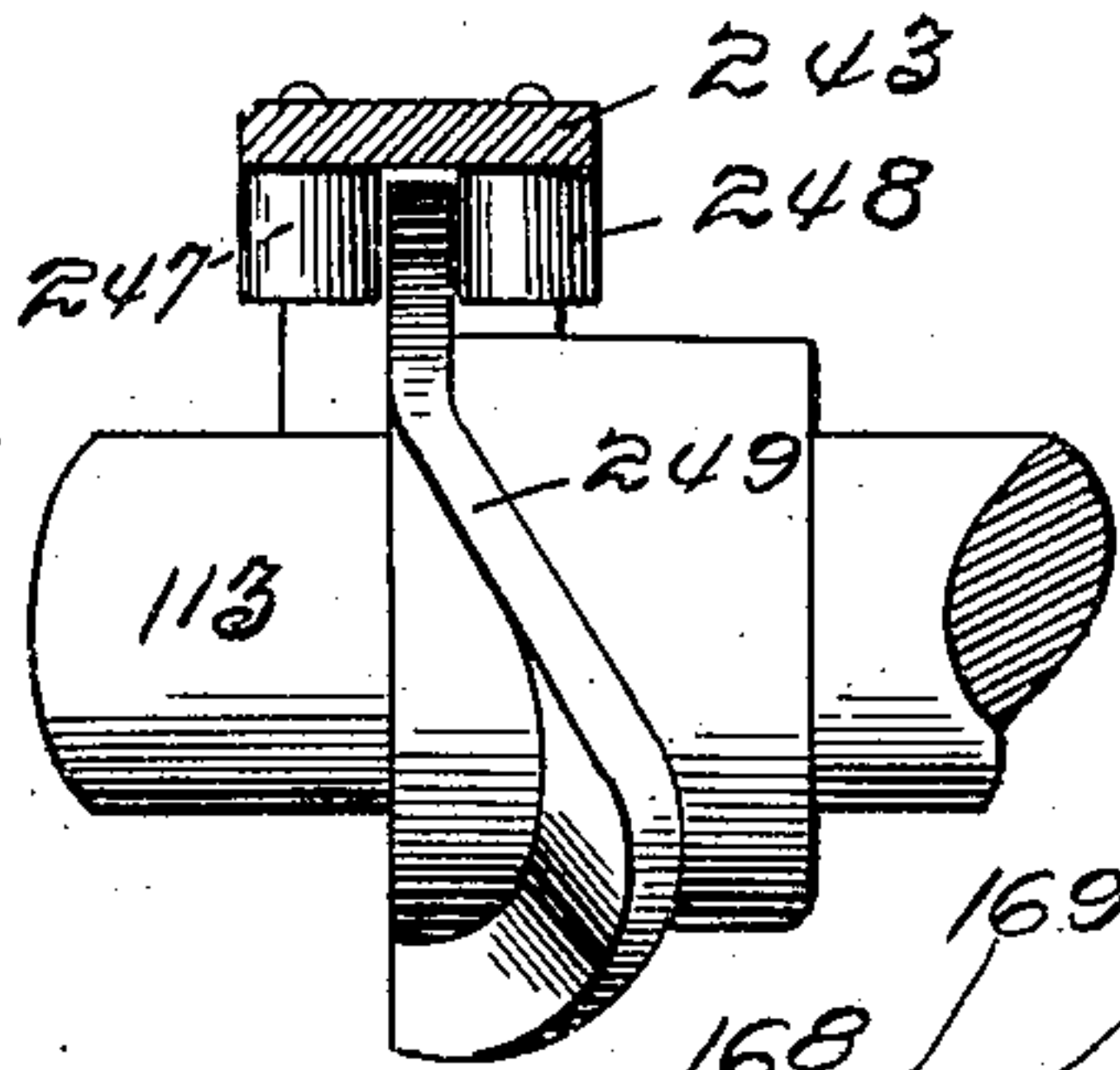


Fig. 37.

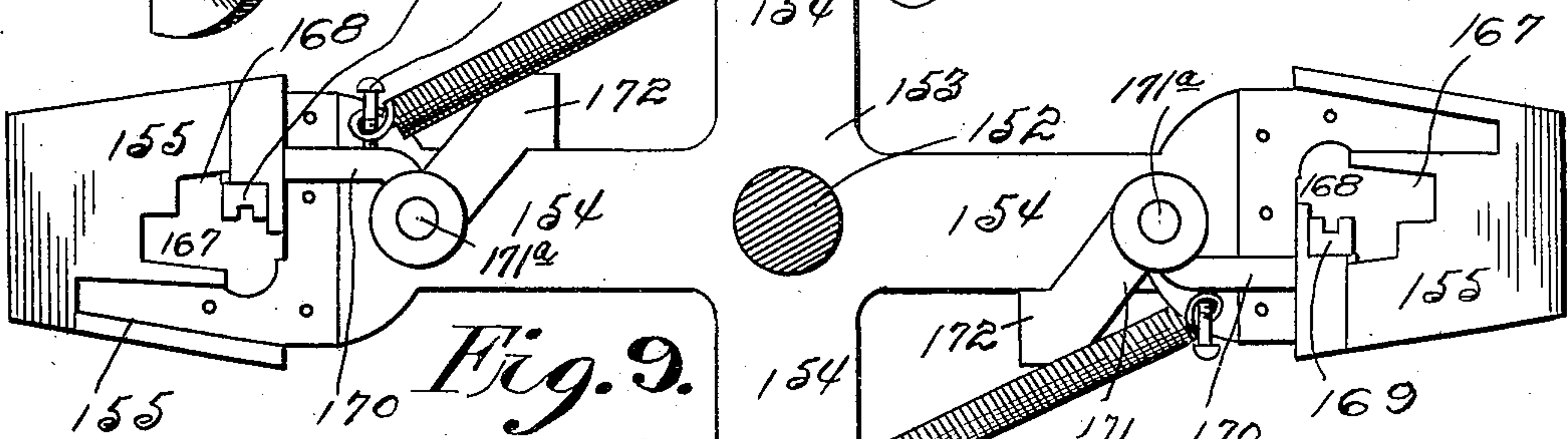
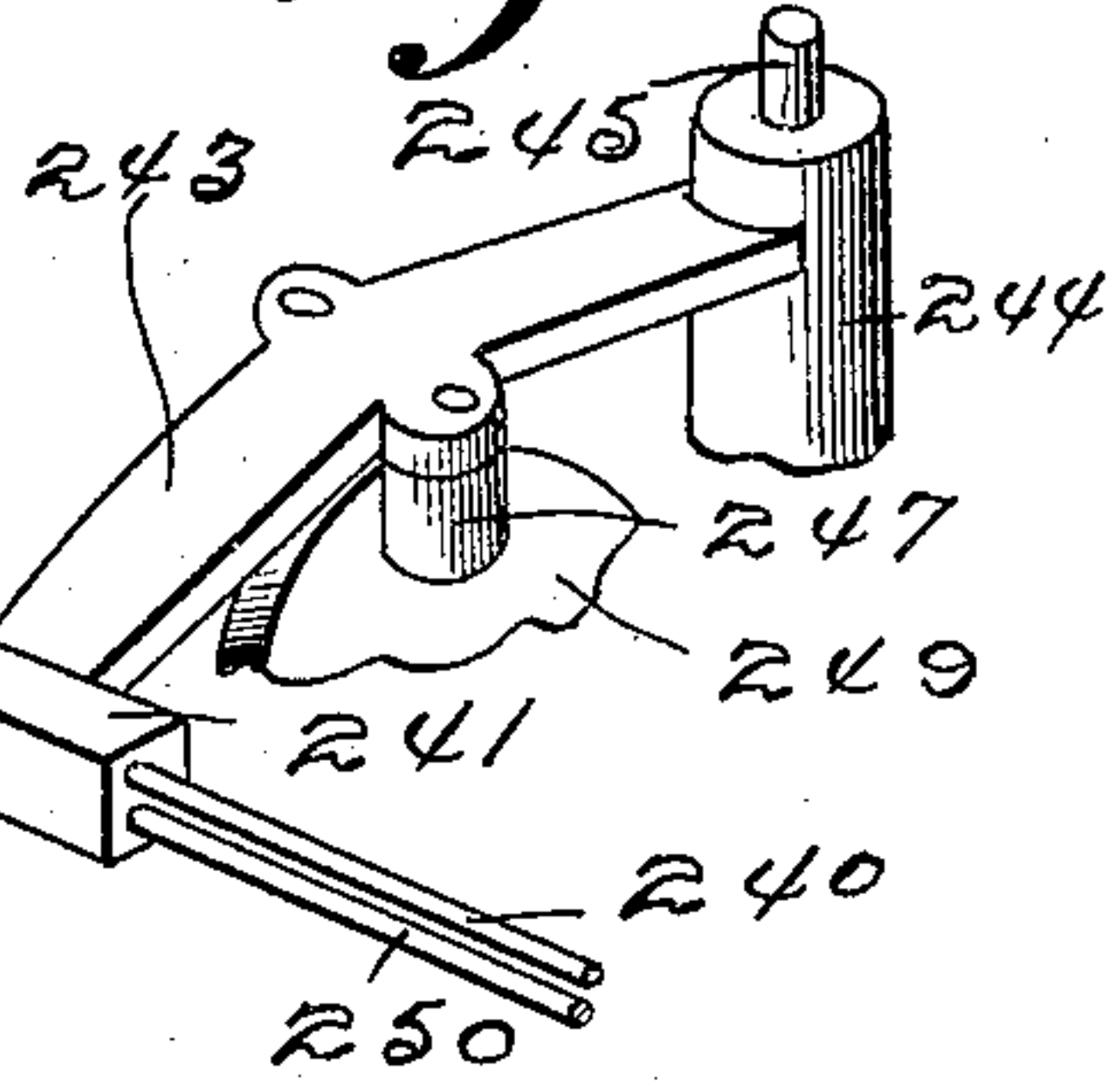


Fig. 9.

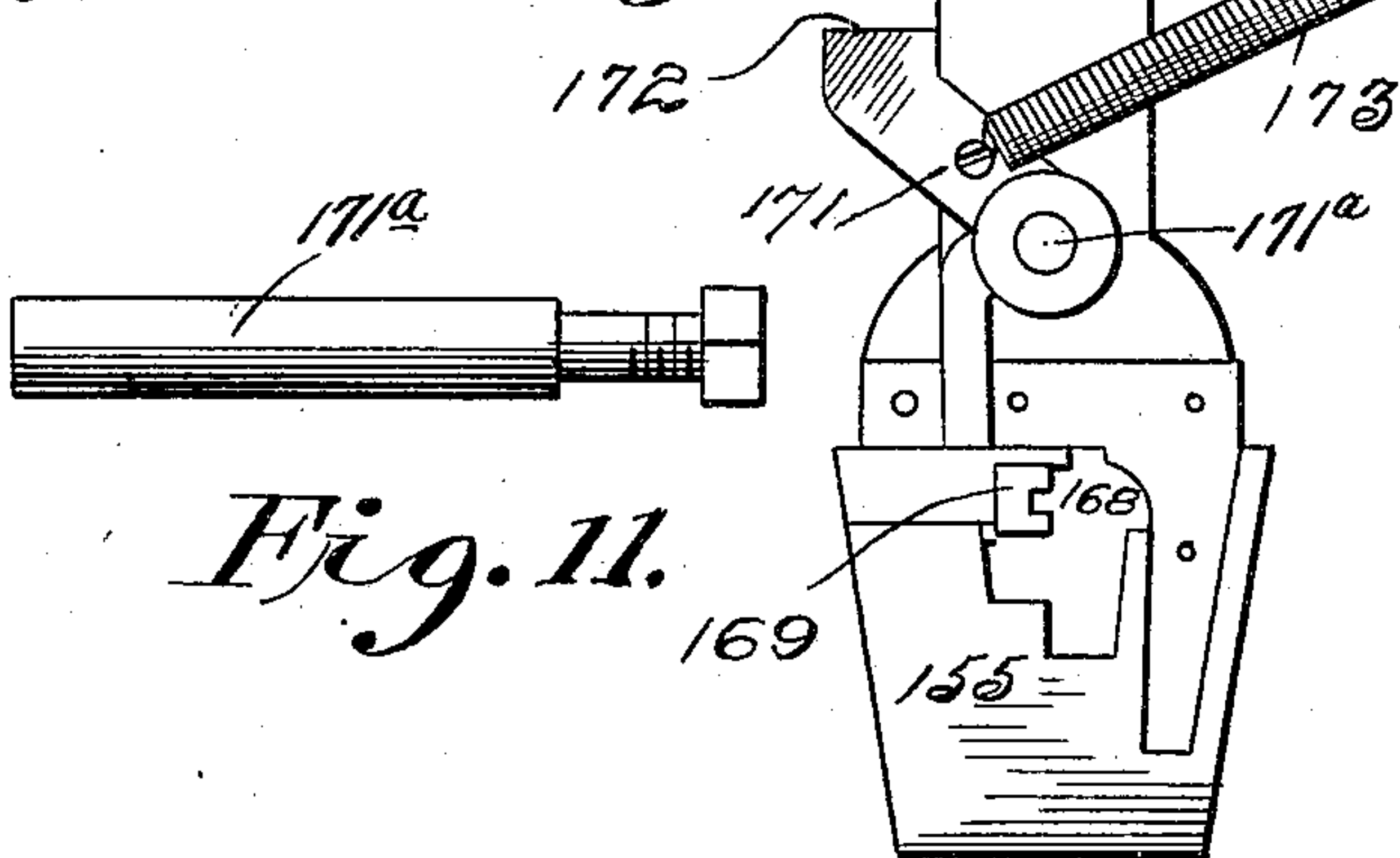


Fig. 11.

Fig. 36.

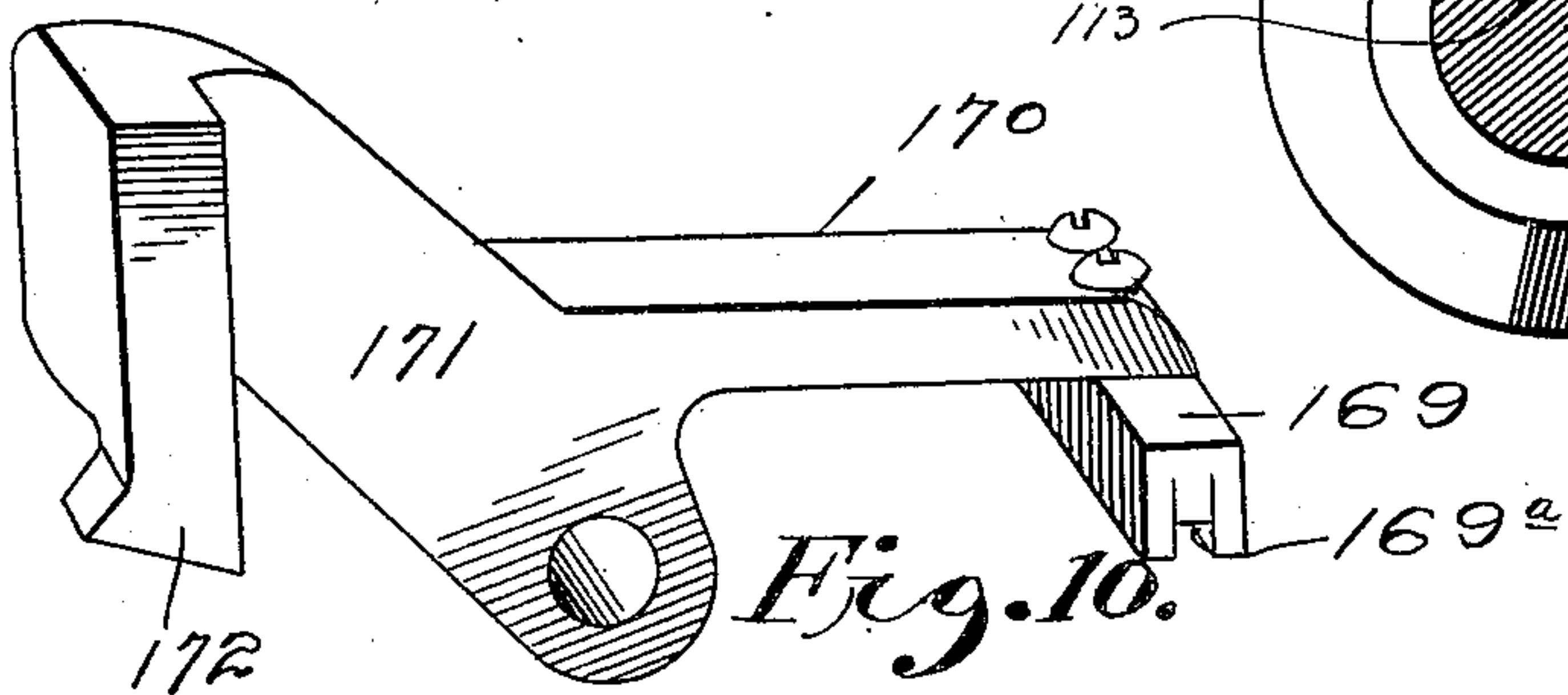
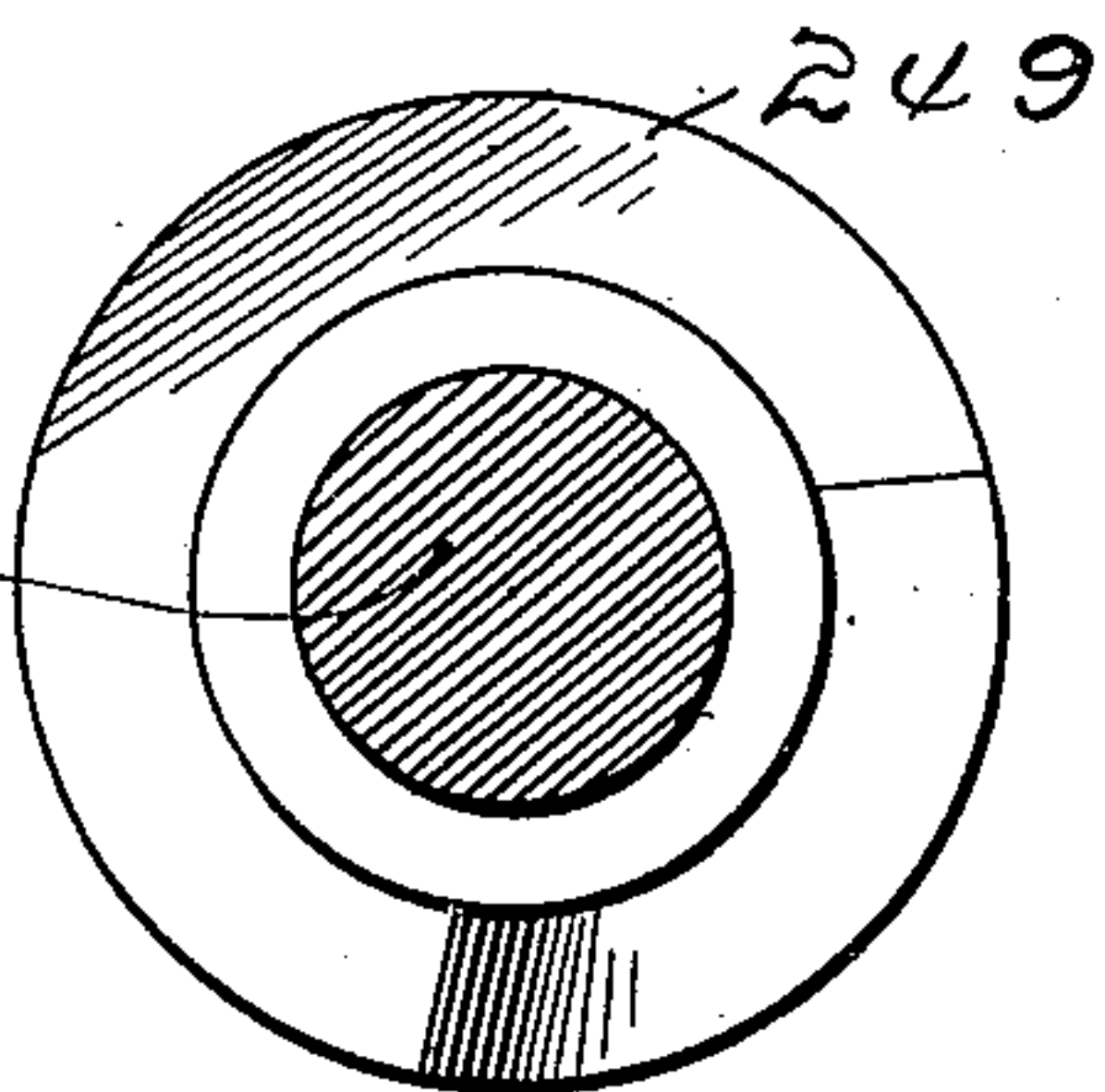


Fig. 10.

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Fig. 12.

Fig. 48.

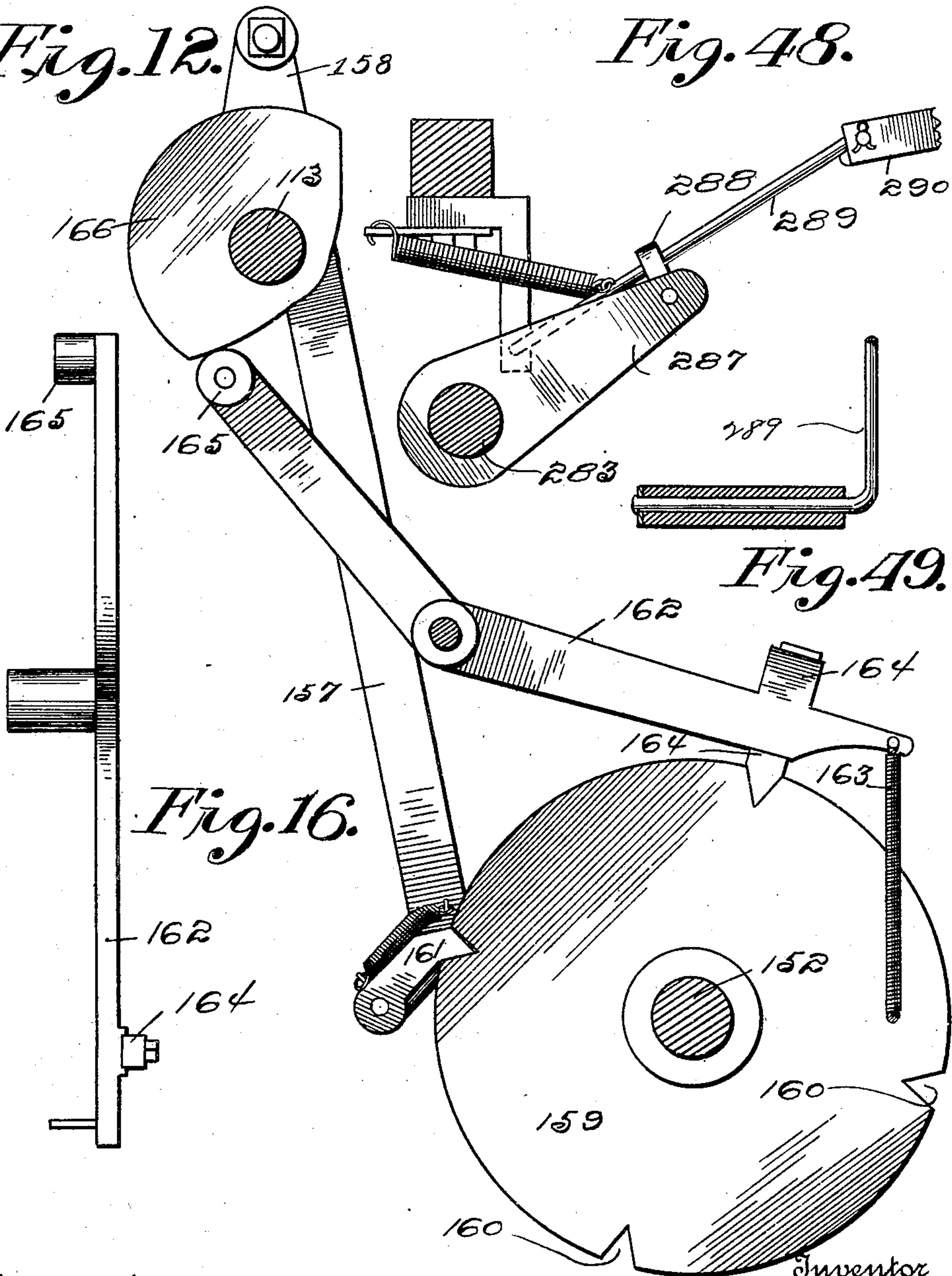


Fig. 16.

Fig. 49.

Witnesses
J. W. Wells.

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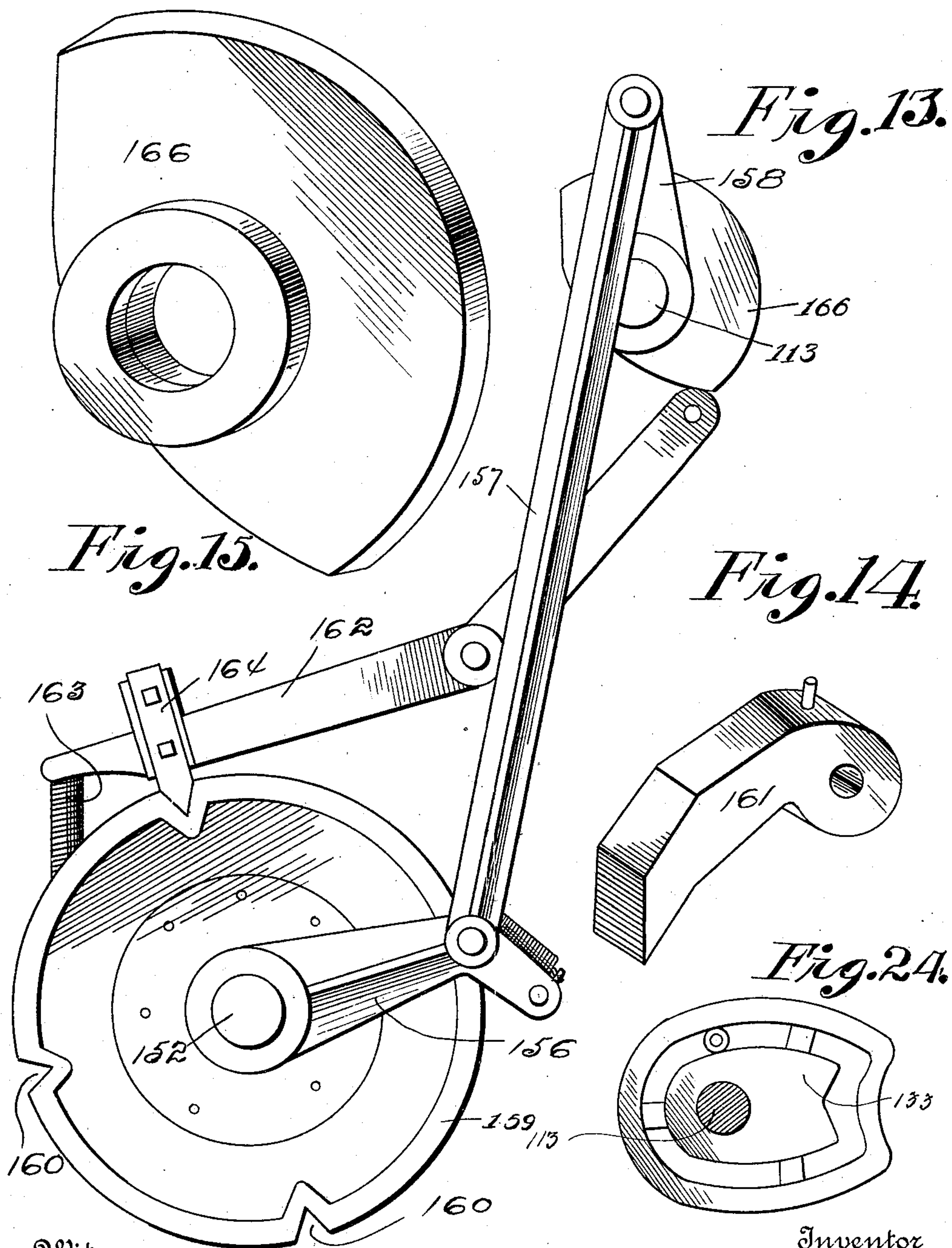
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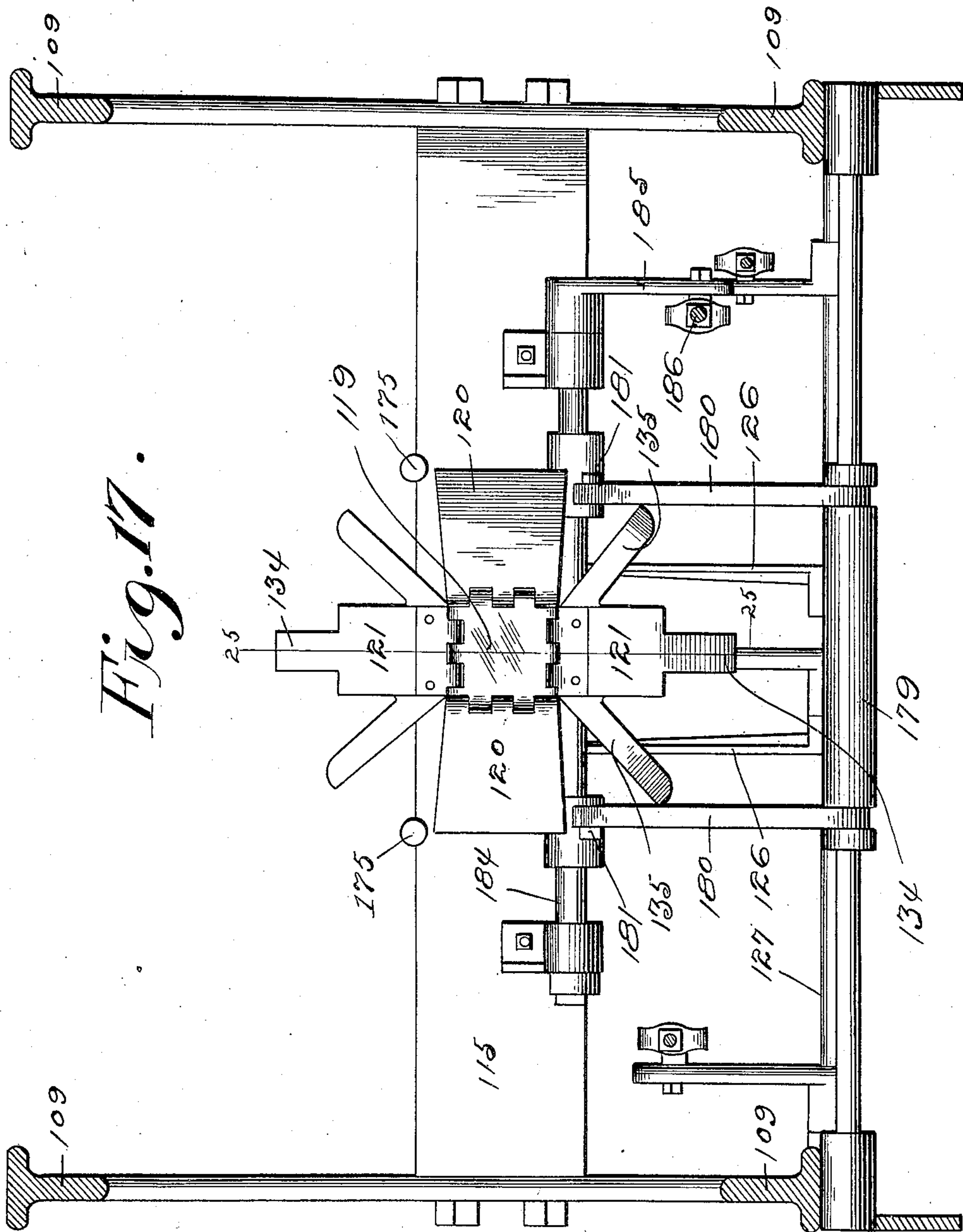


Fig. 17.

Witnesses
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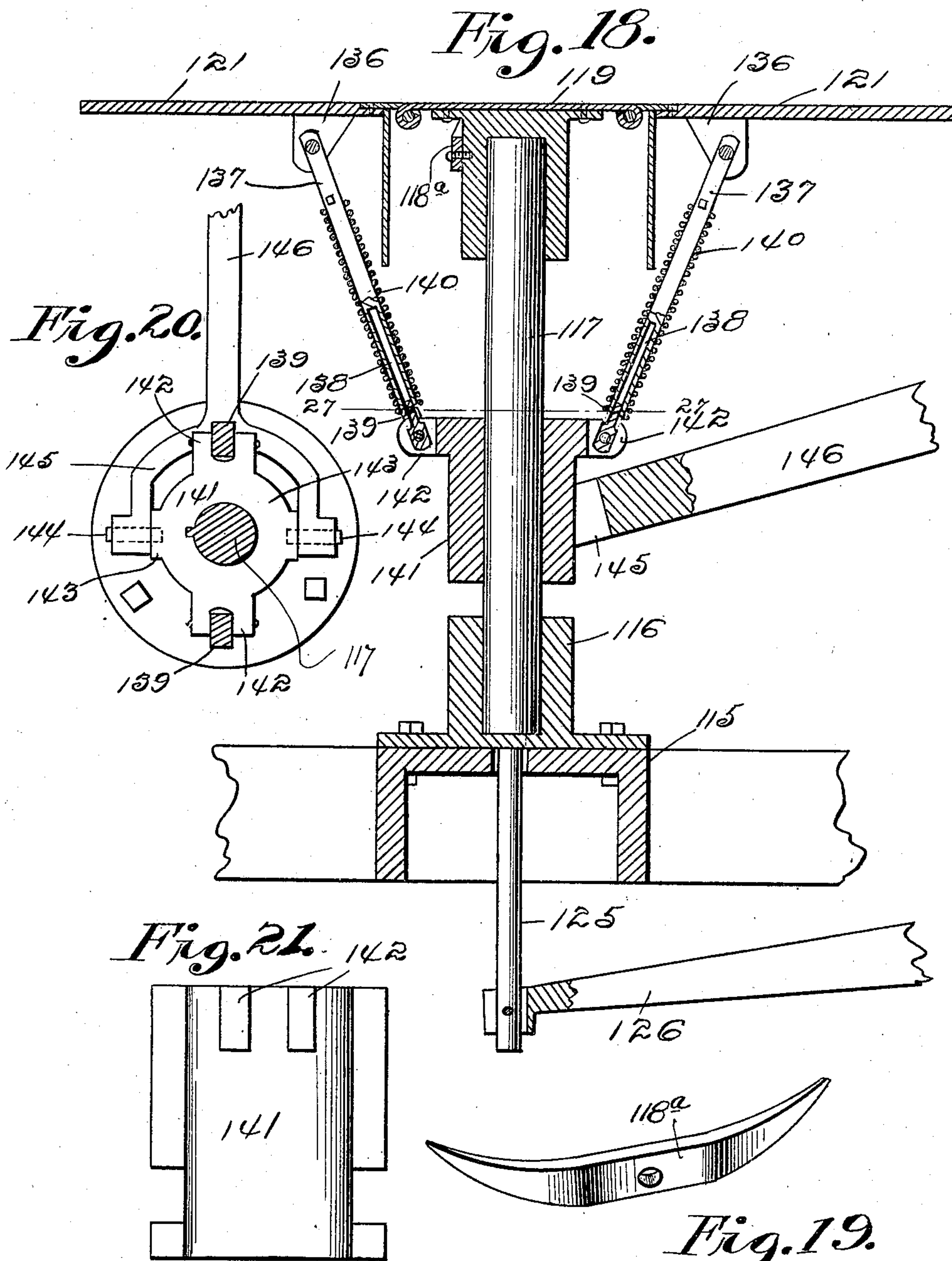
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19 SHEETS—SHEET 13.



Witnesses
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Fig. 19.
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Fig. 44.

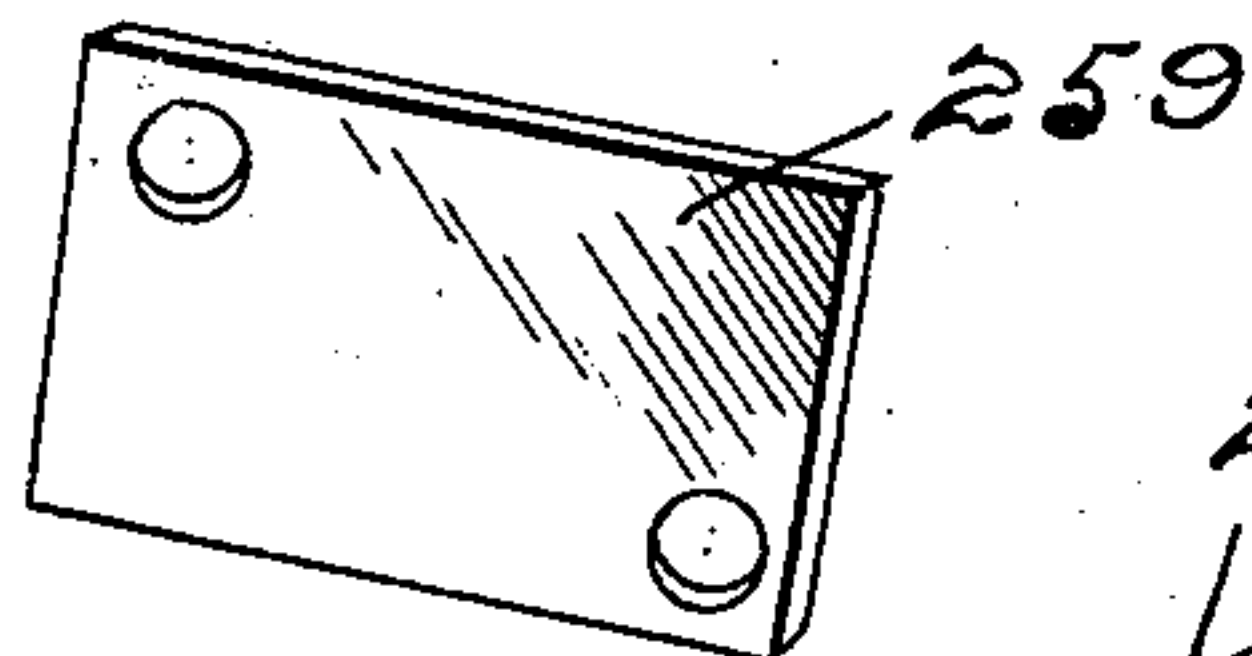


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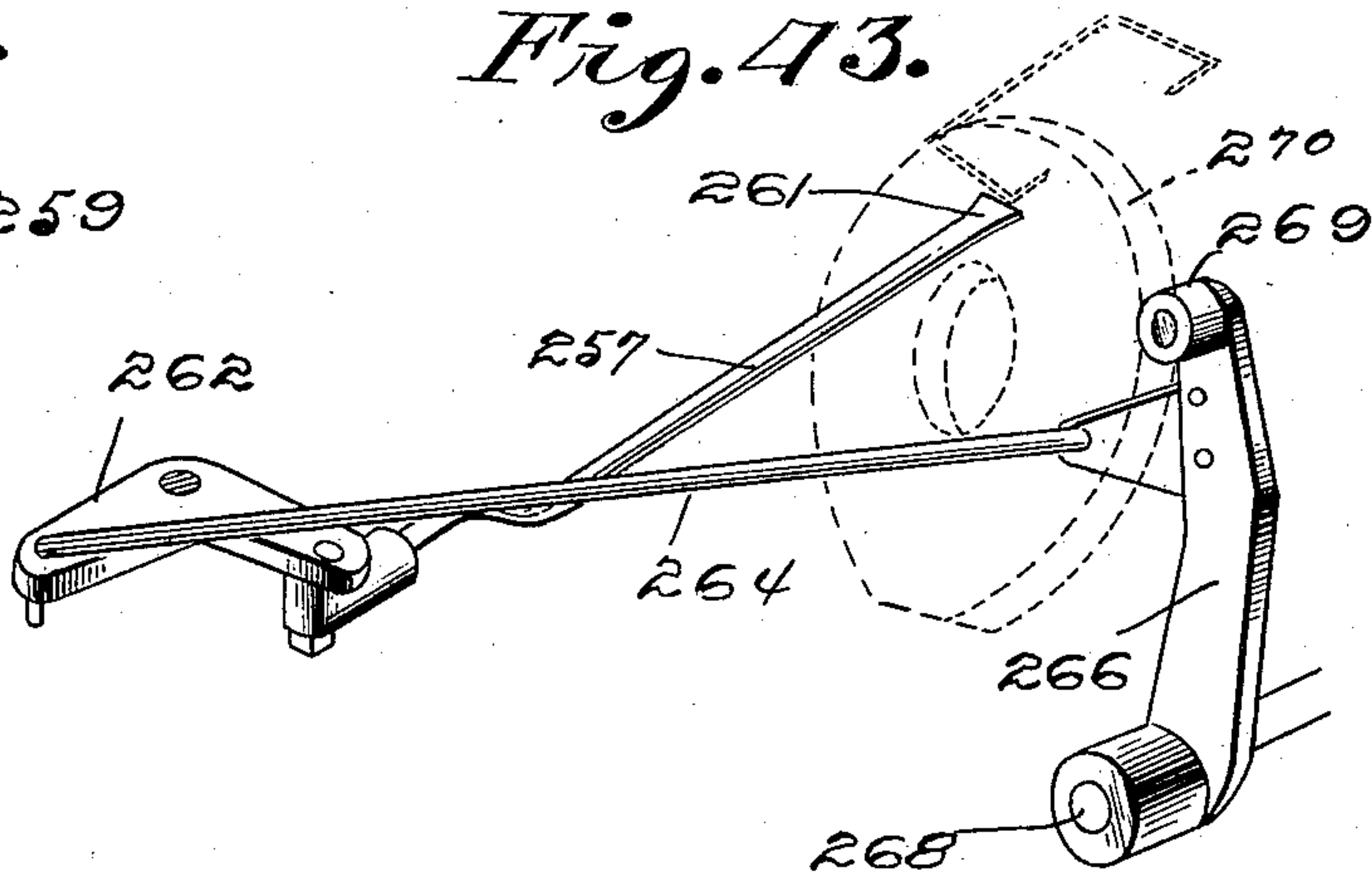


Fig. 22.

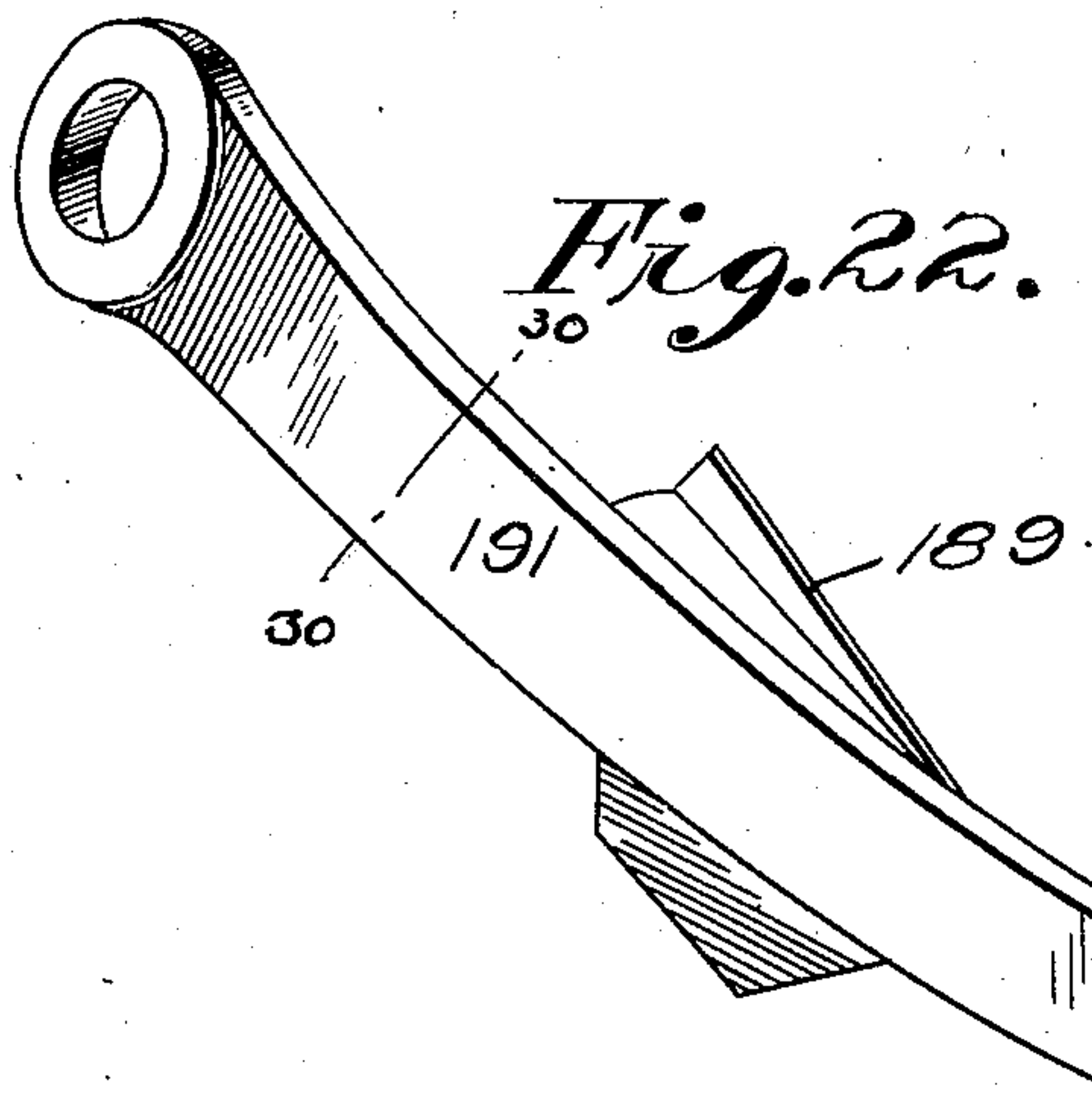


Fig. 23.

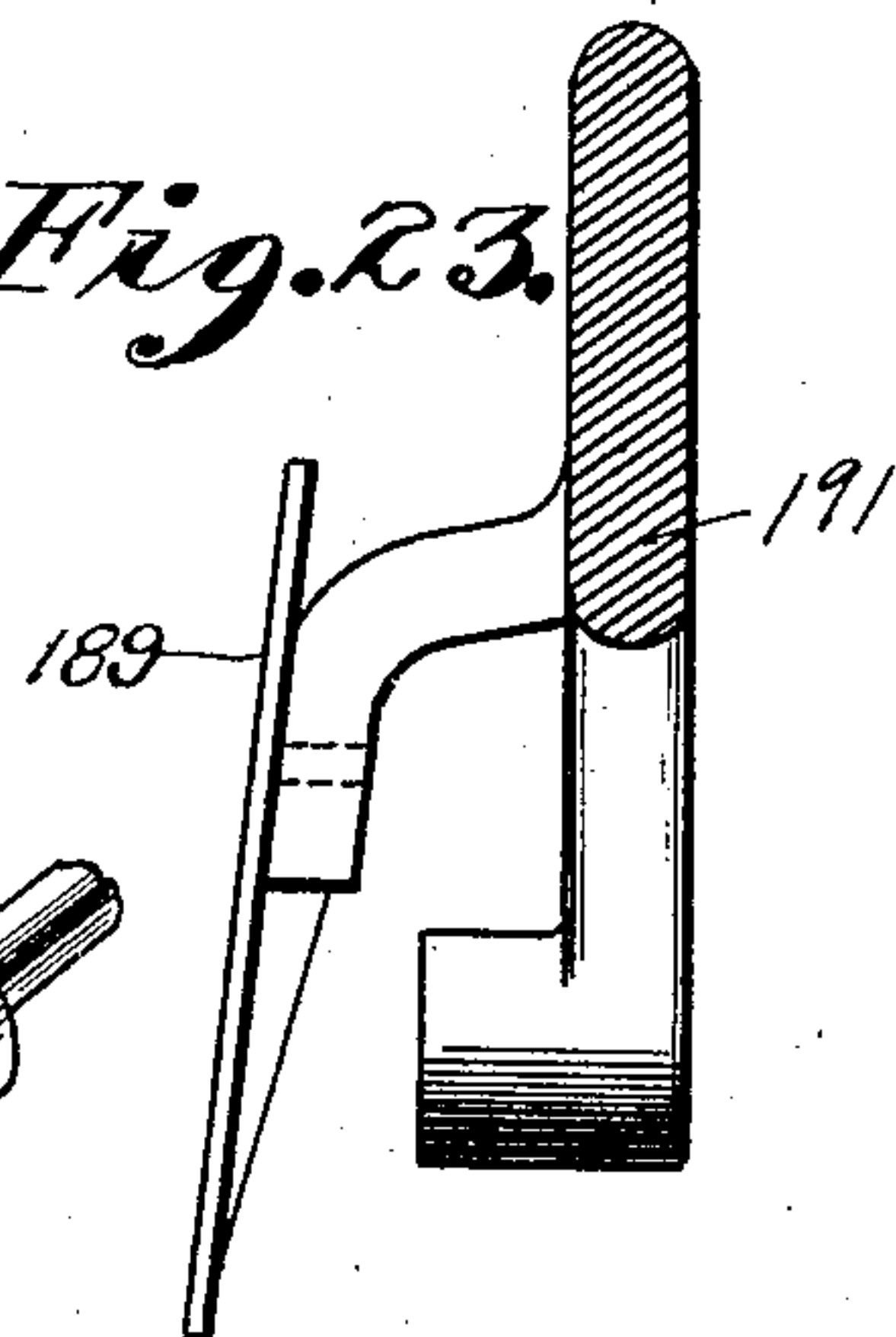
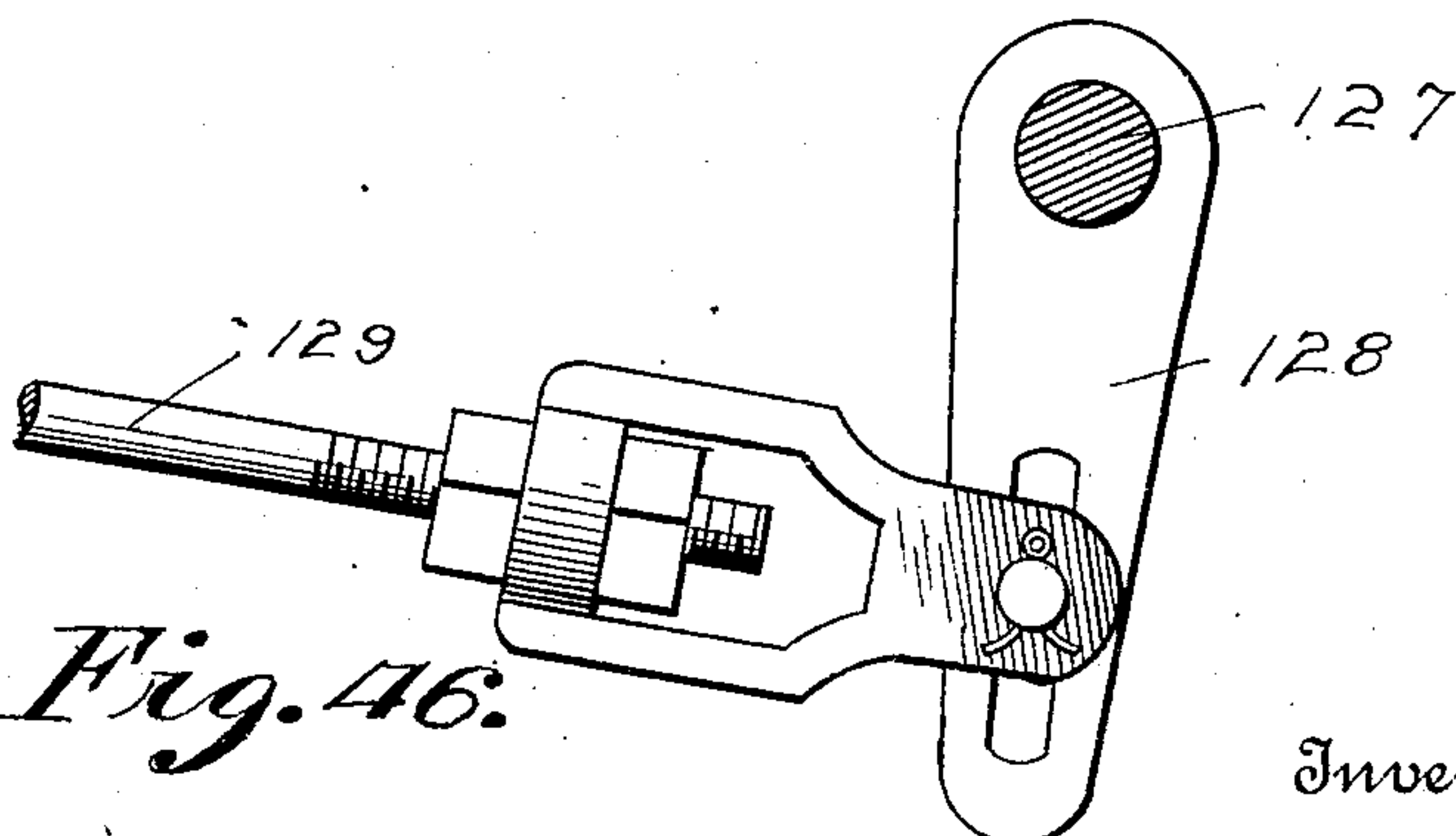


Fig. 46.



Witnesses
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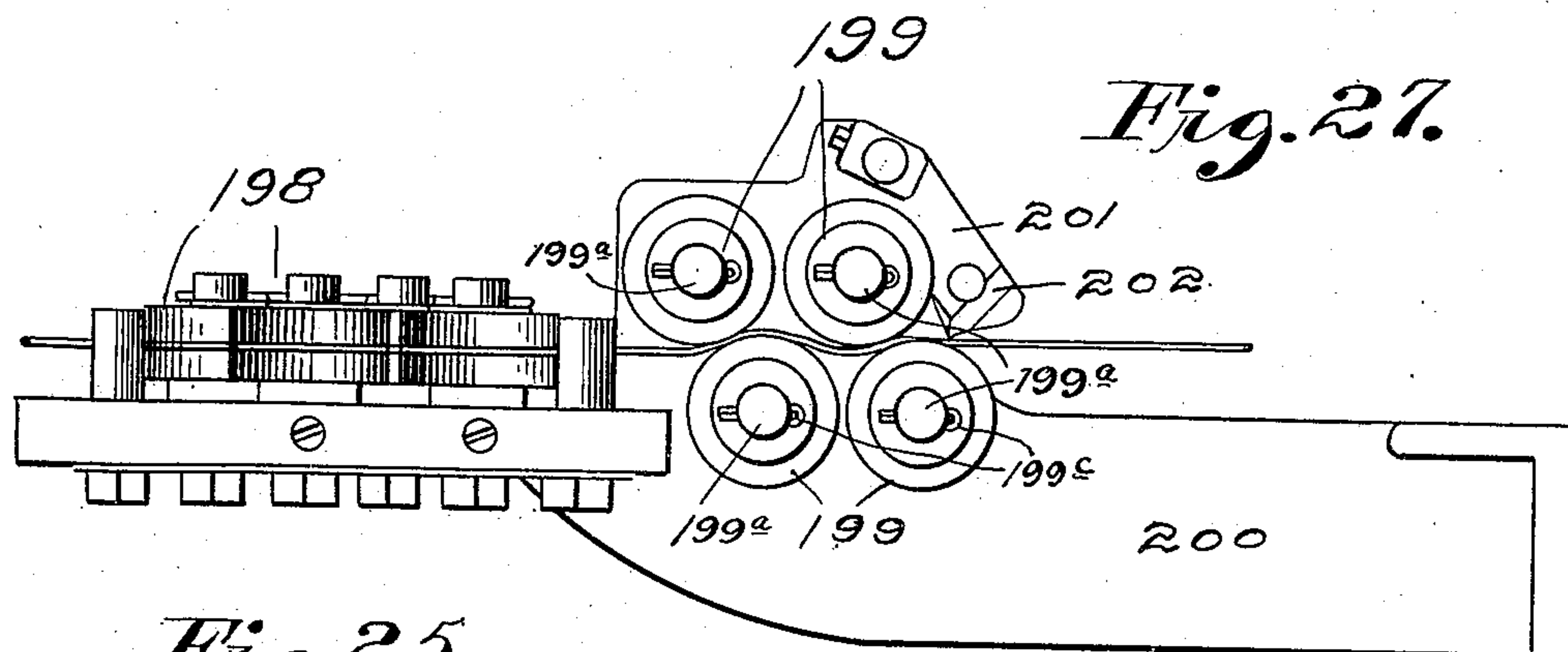


Fig. 27.

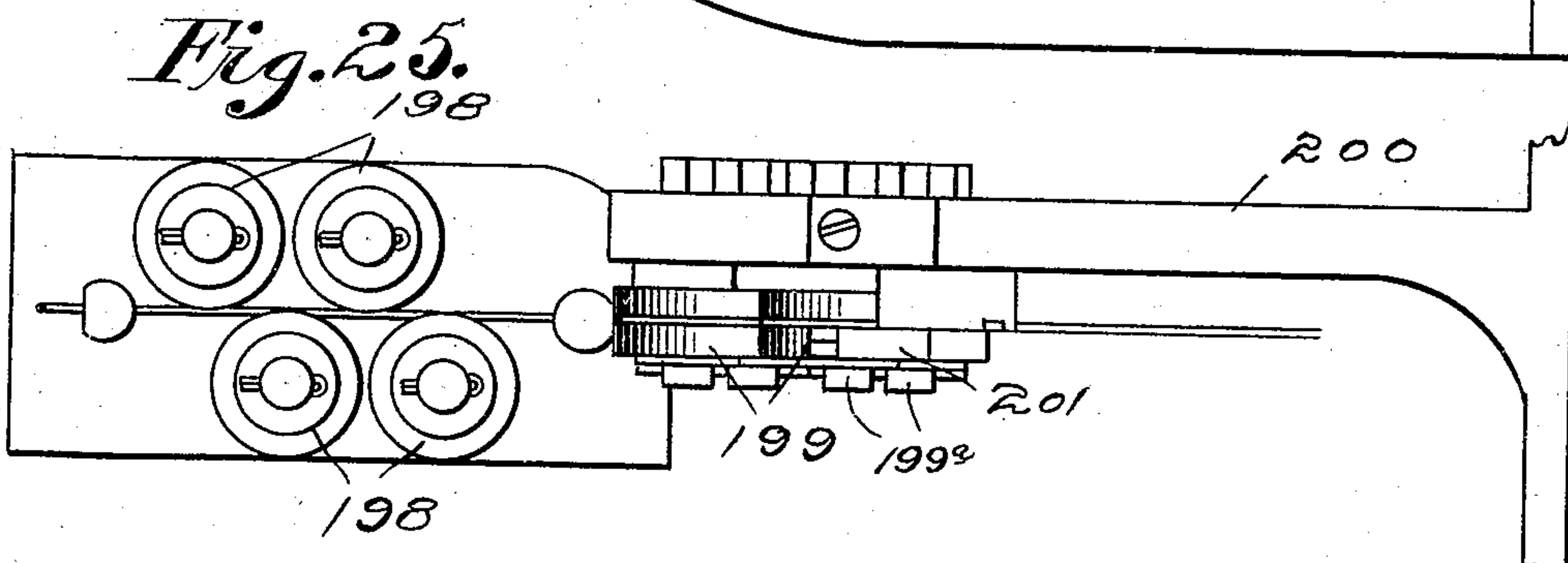


Fig. 25.

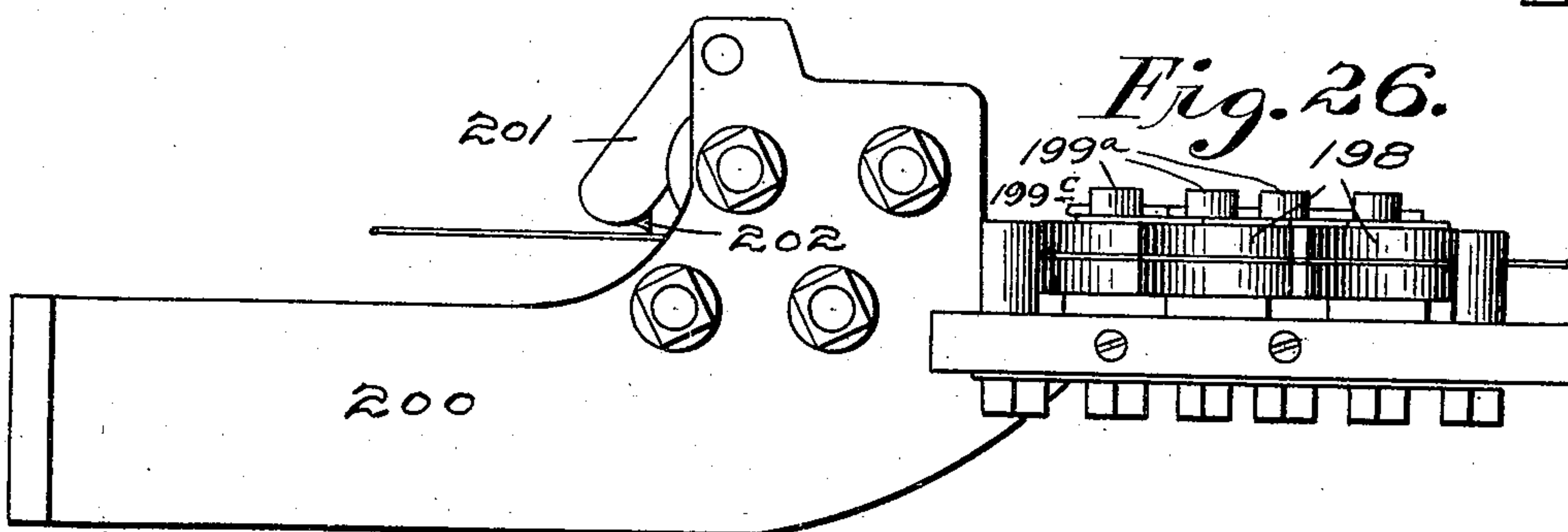


Fig. 26.

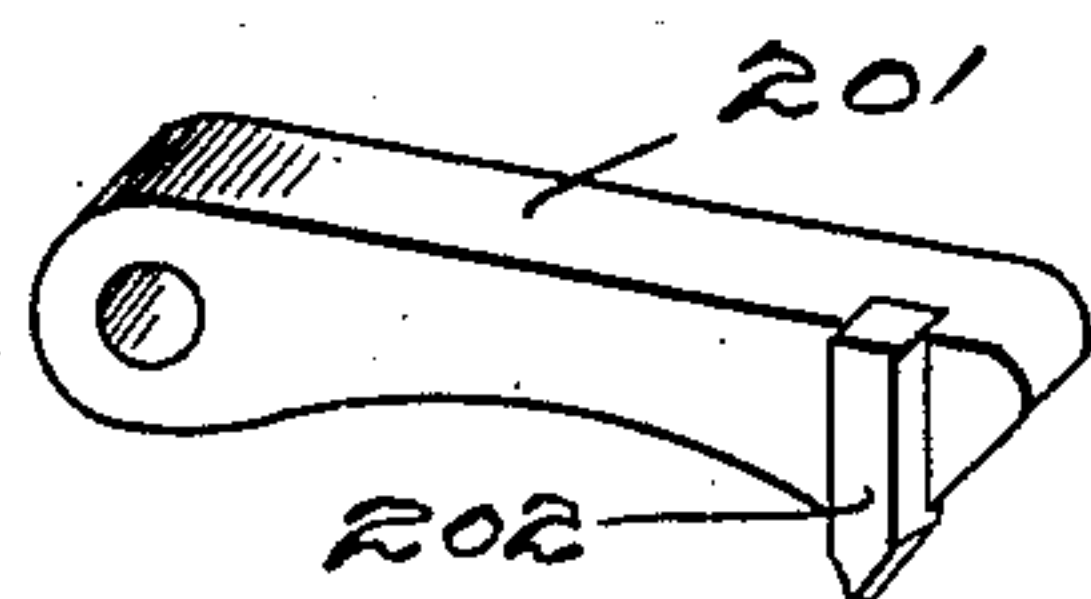


Fig. 29.

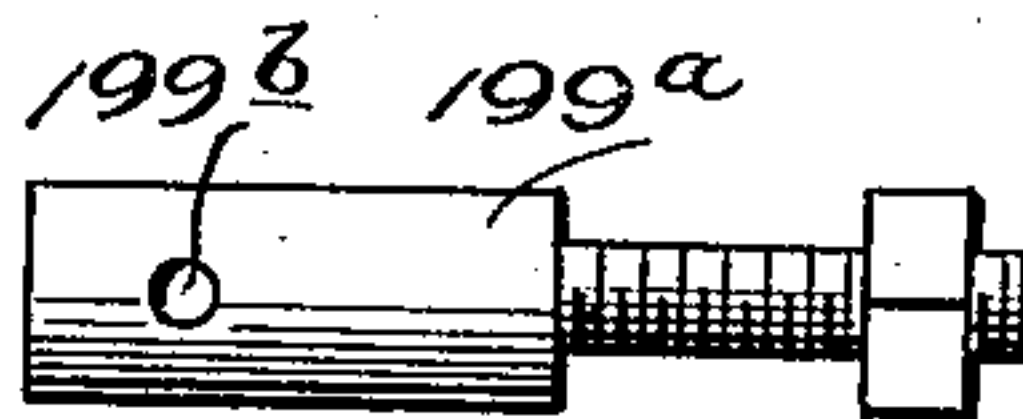


Fig. 28.

Witnesses
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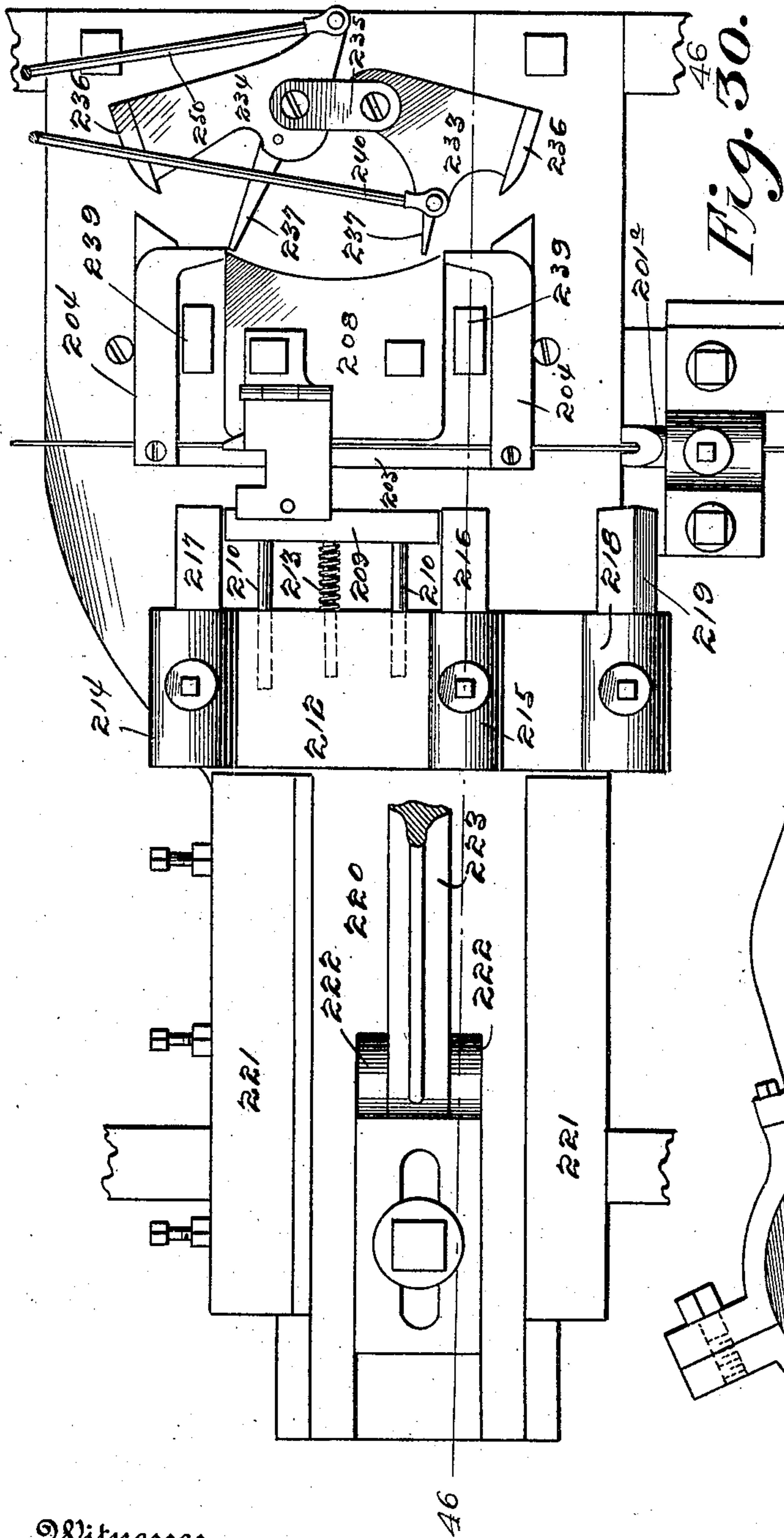


Fig. 30.

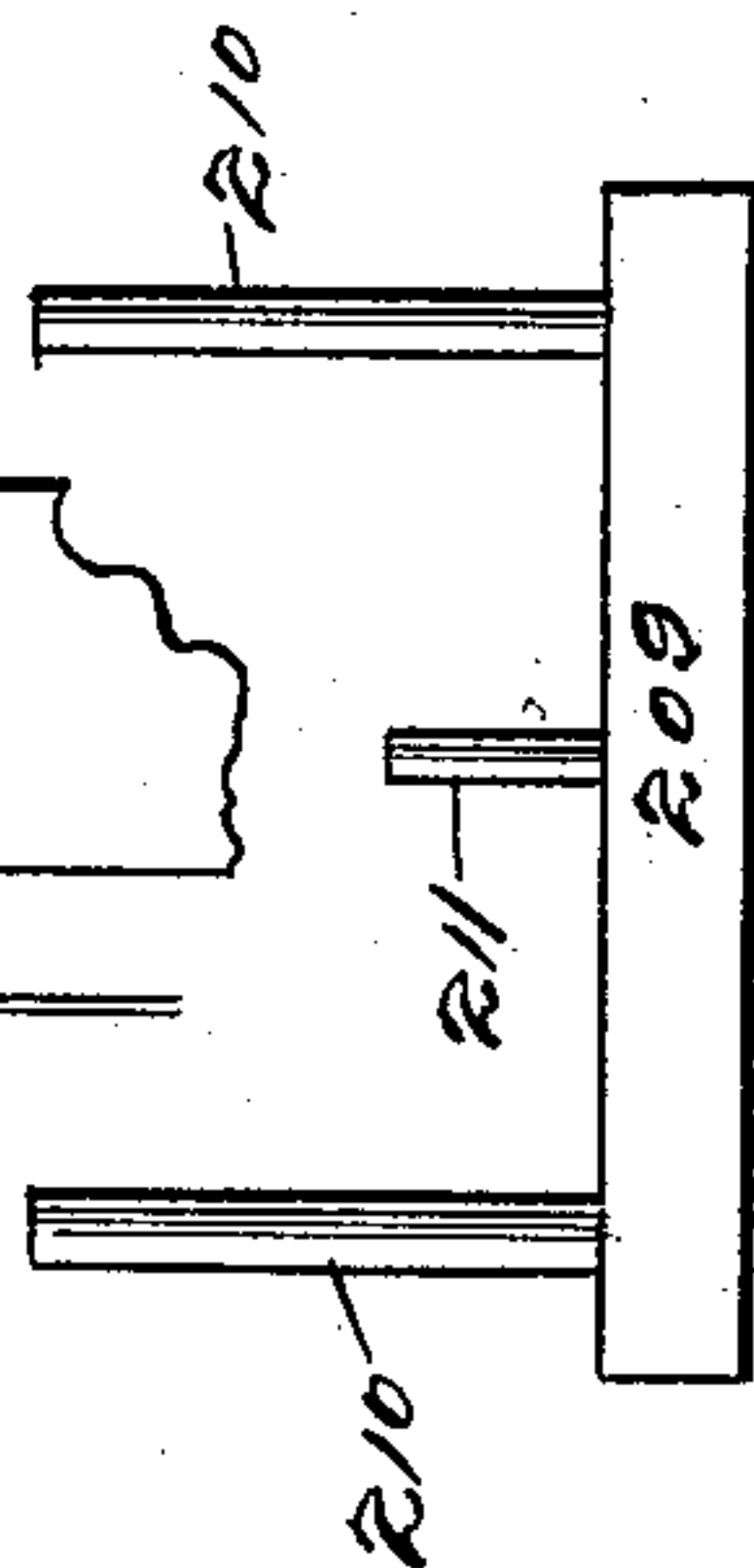


Fig. 42.

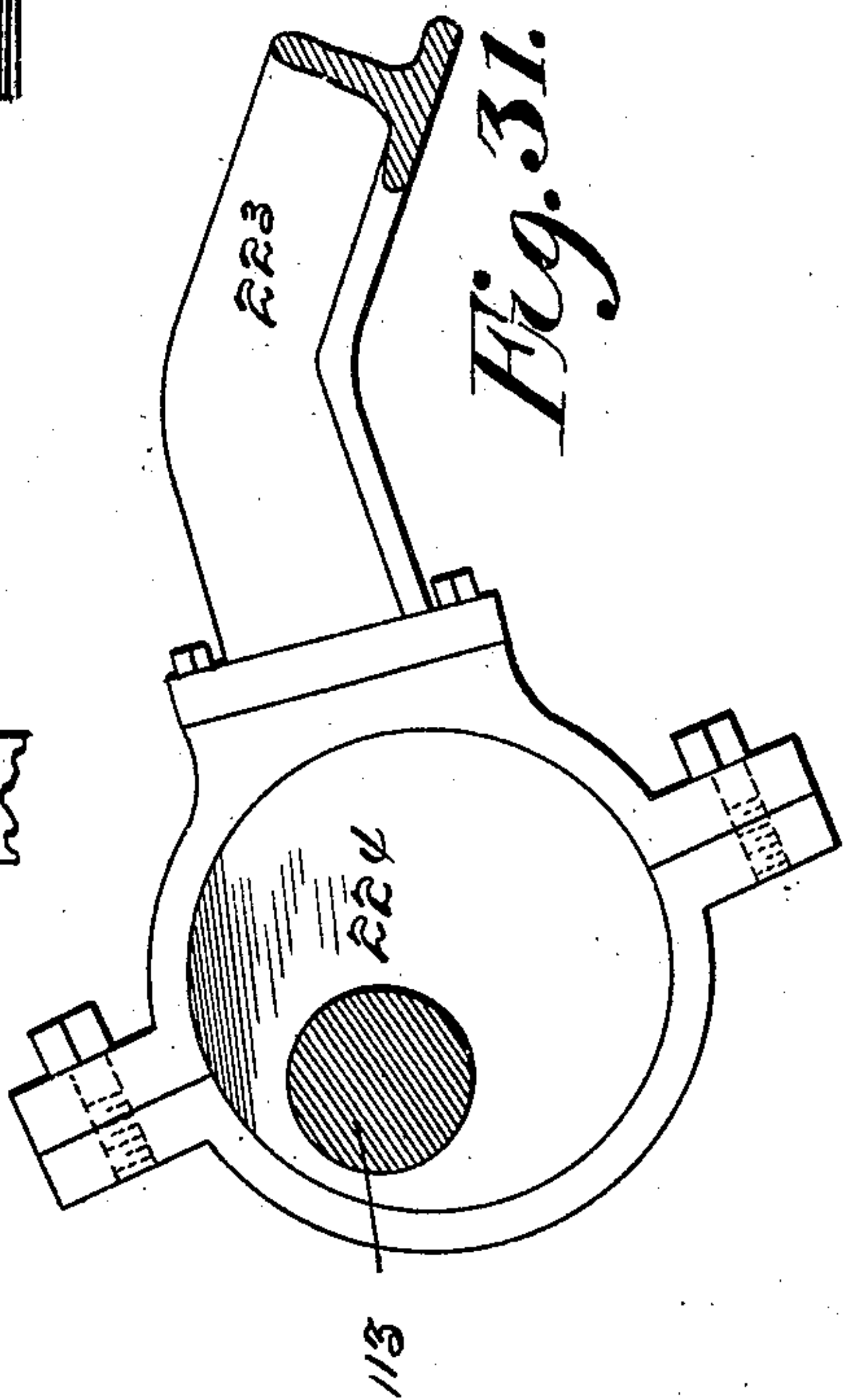


Fig. 31.

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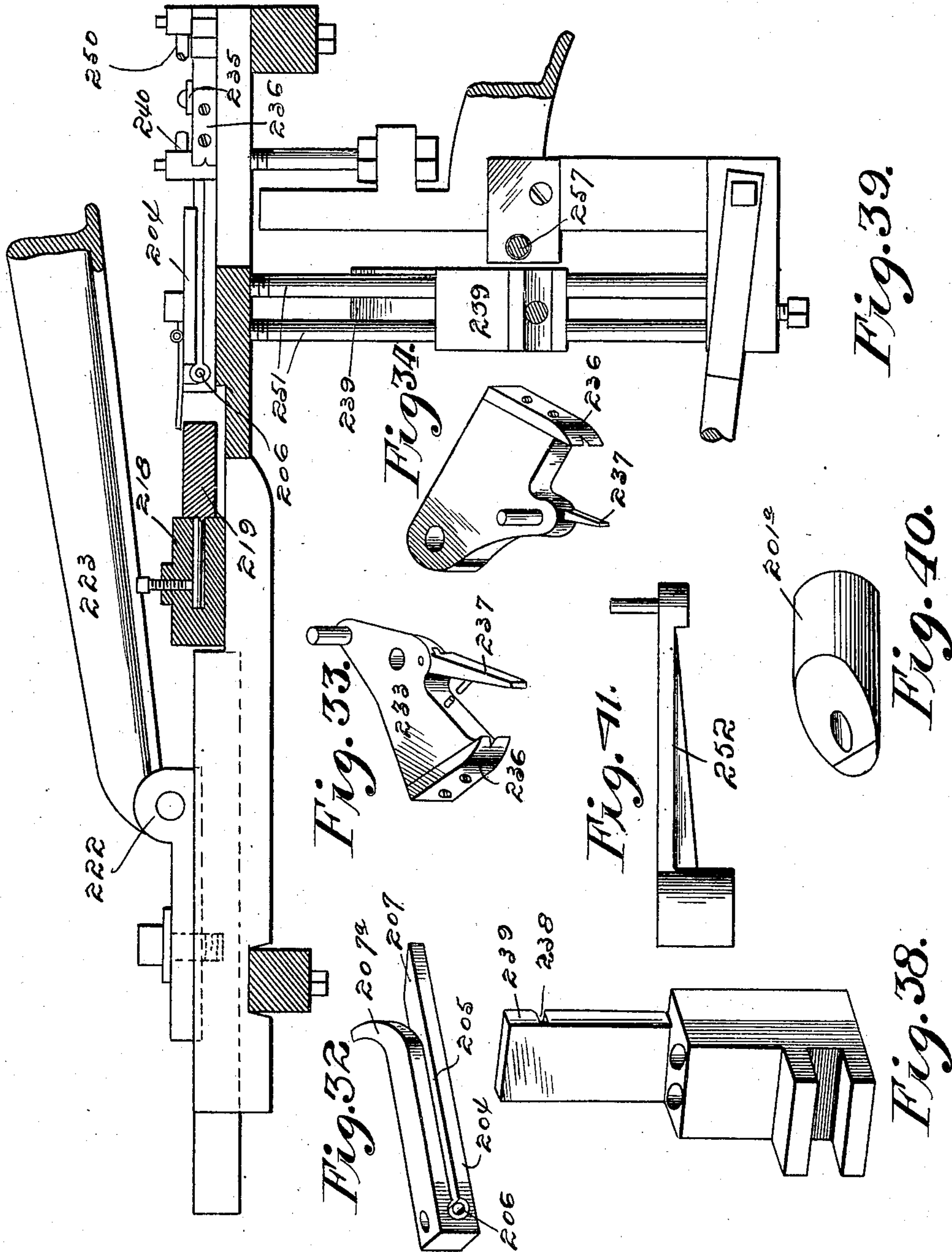
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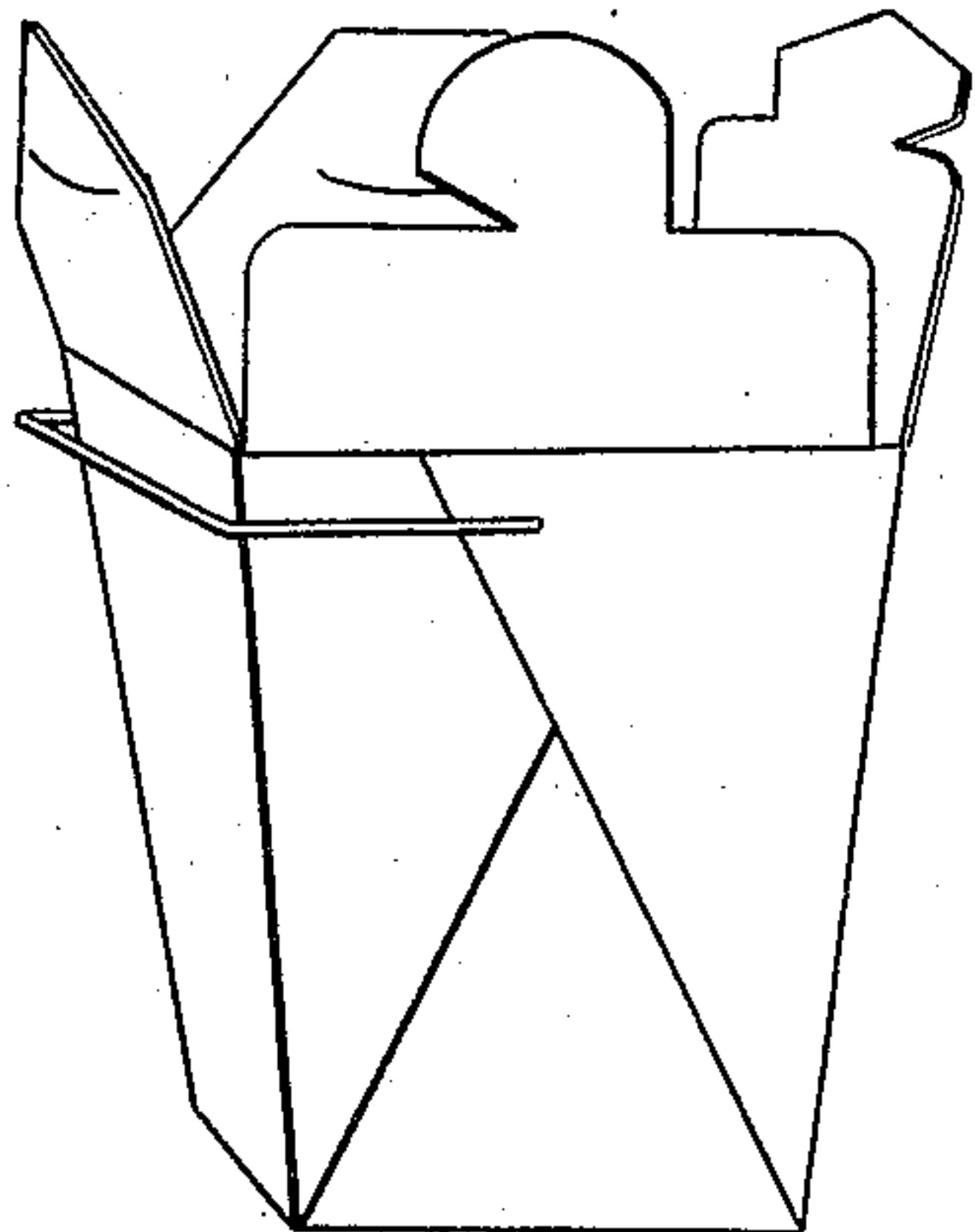


Fig. 56.

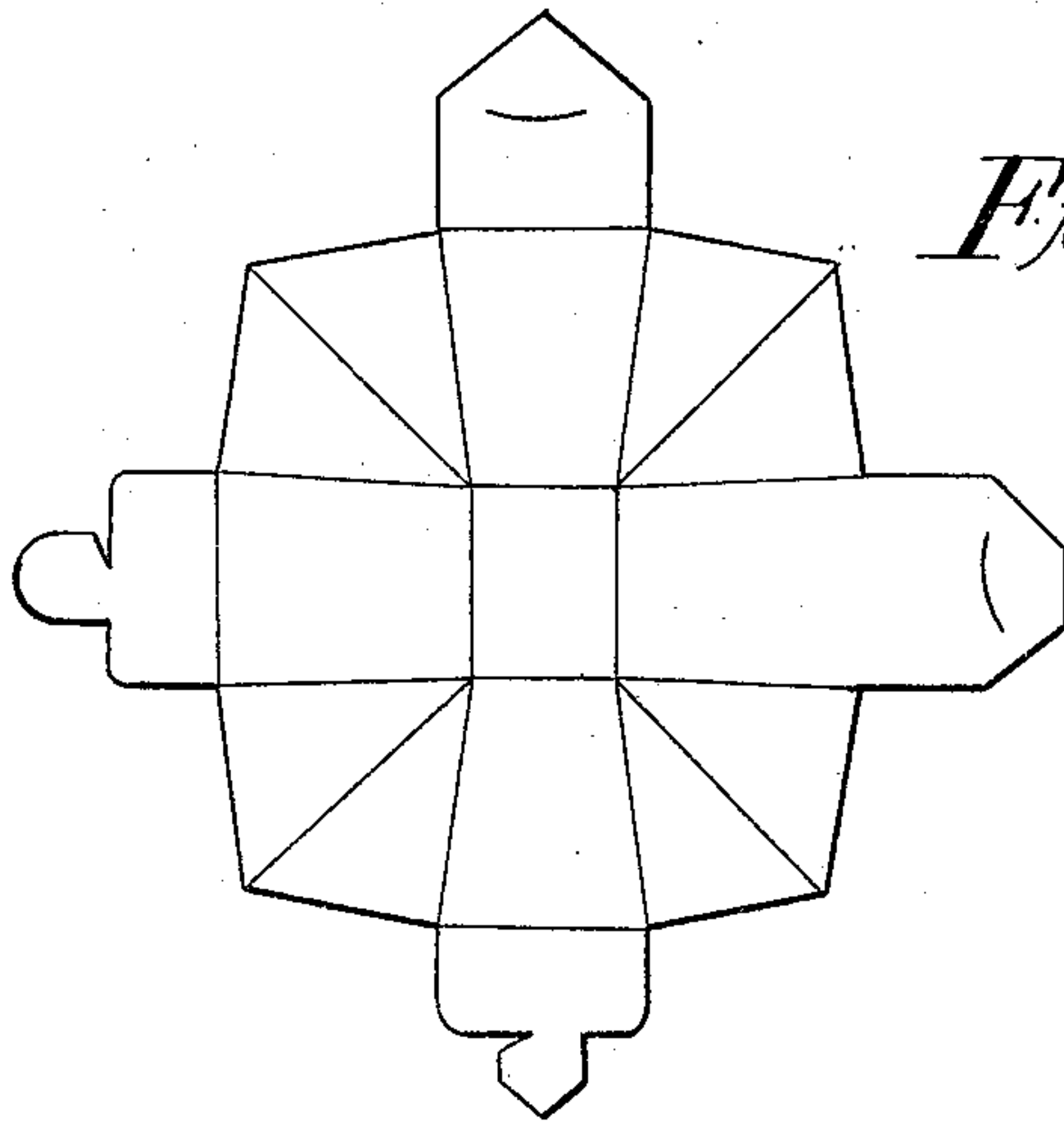


Fig. 55.

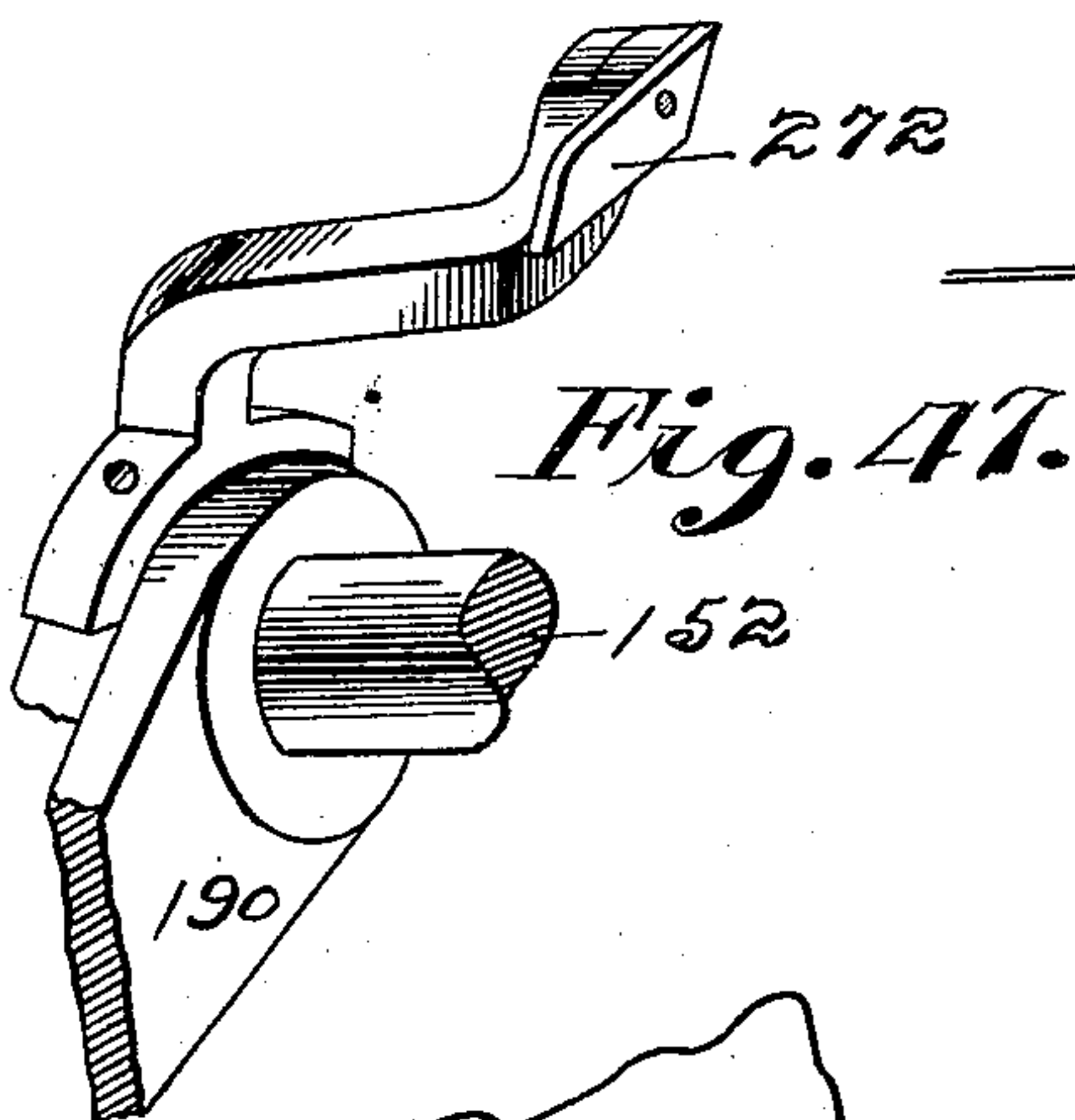


Fig. 47.

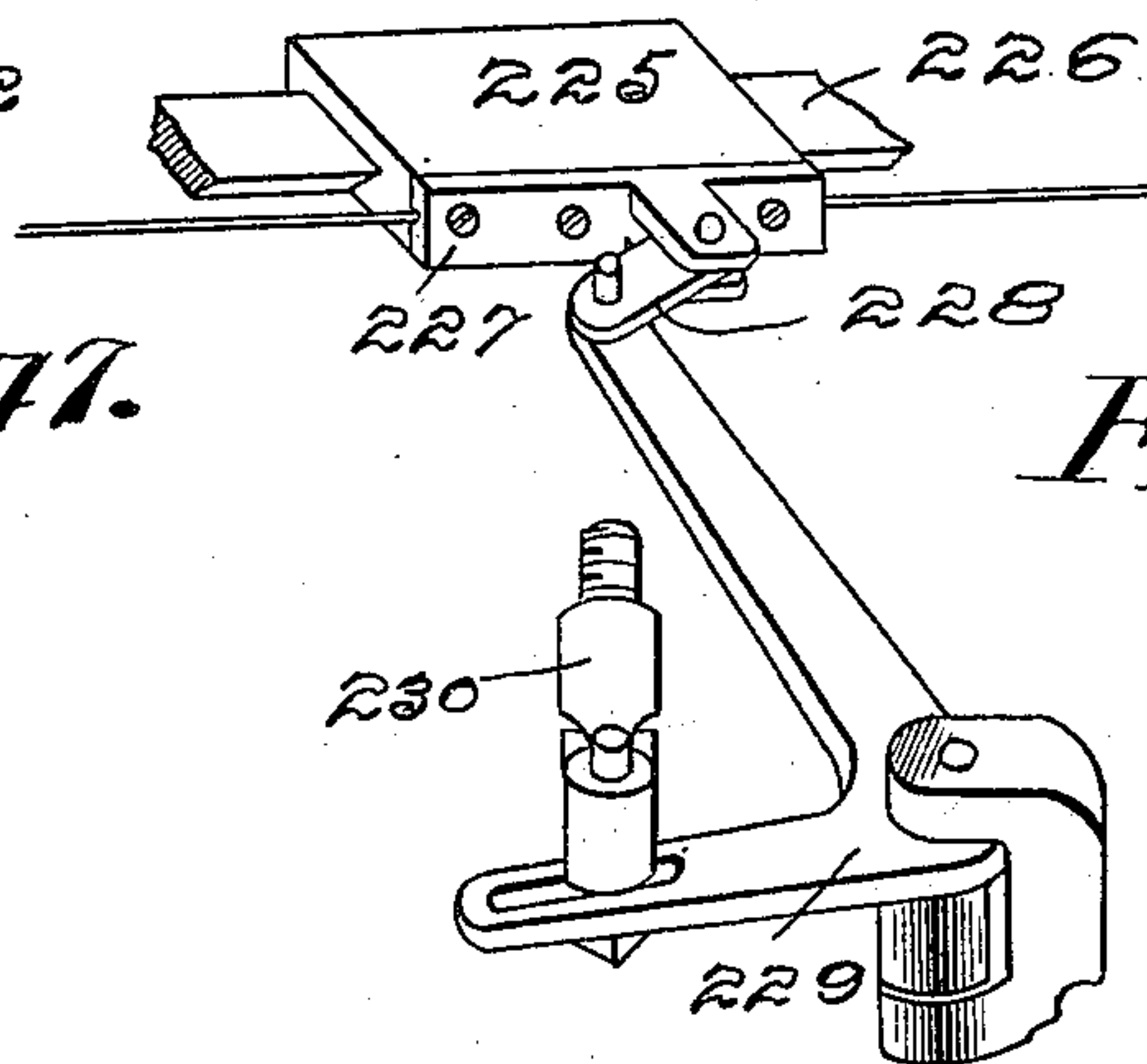


Fig. 50.

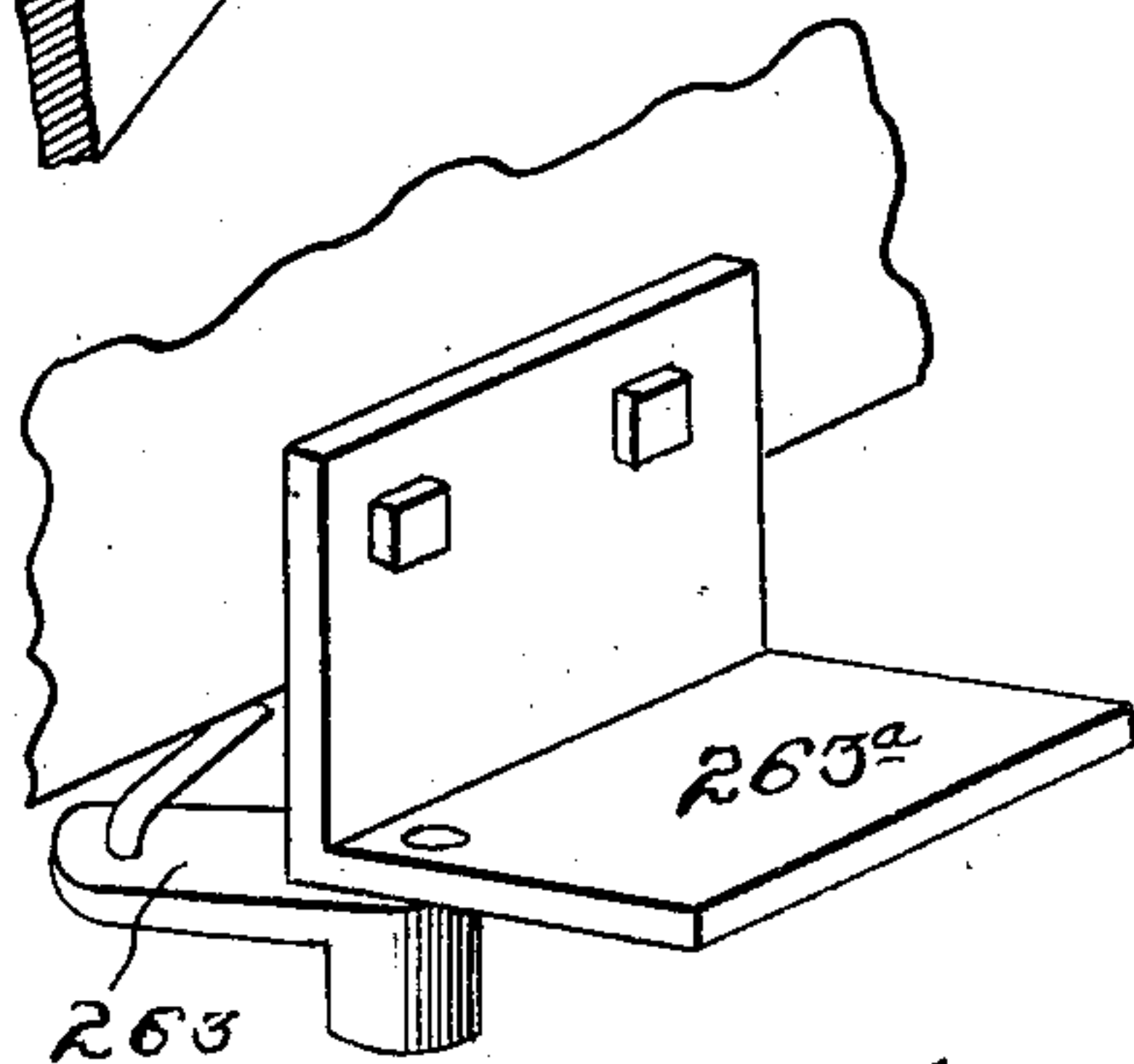


Fig. 54.

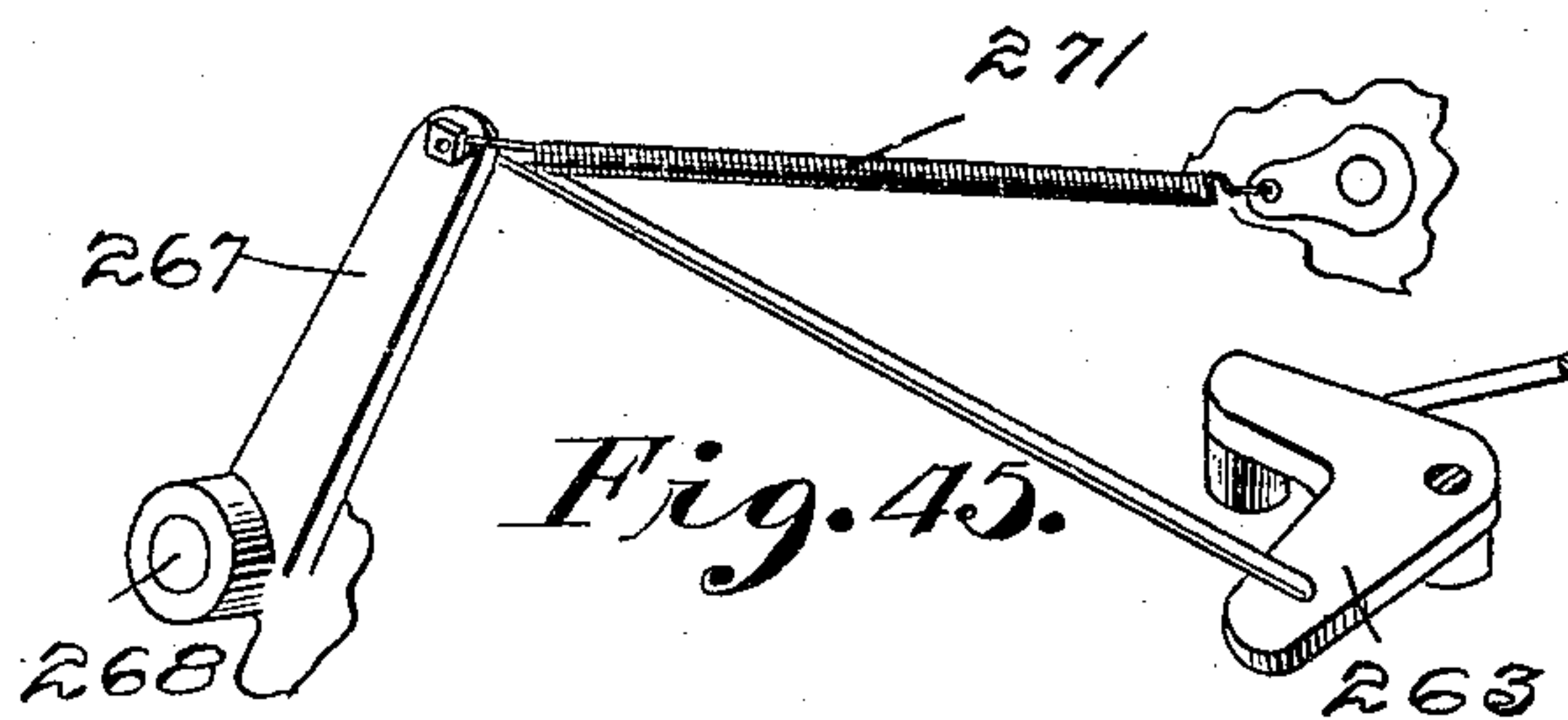


Fig. 45.

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19 SHEETS—SHEET 19.

Fig. 52.

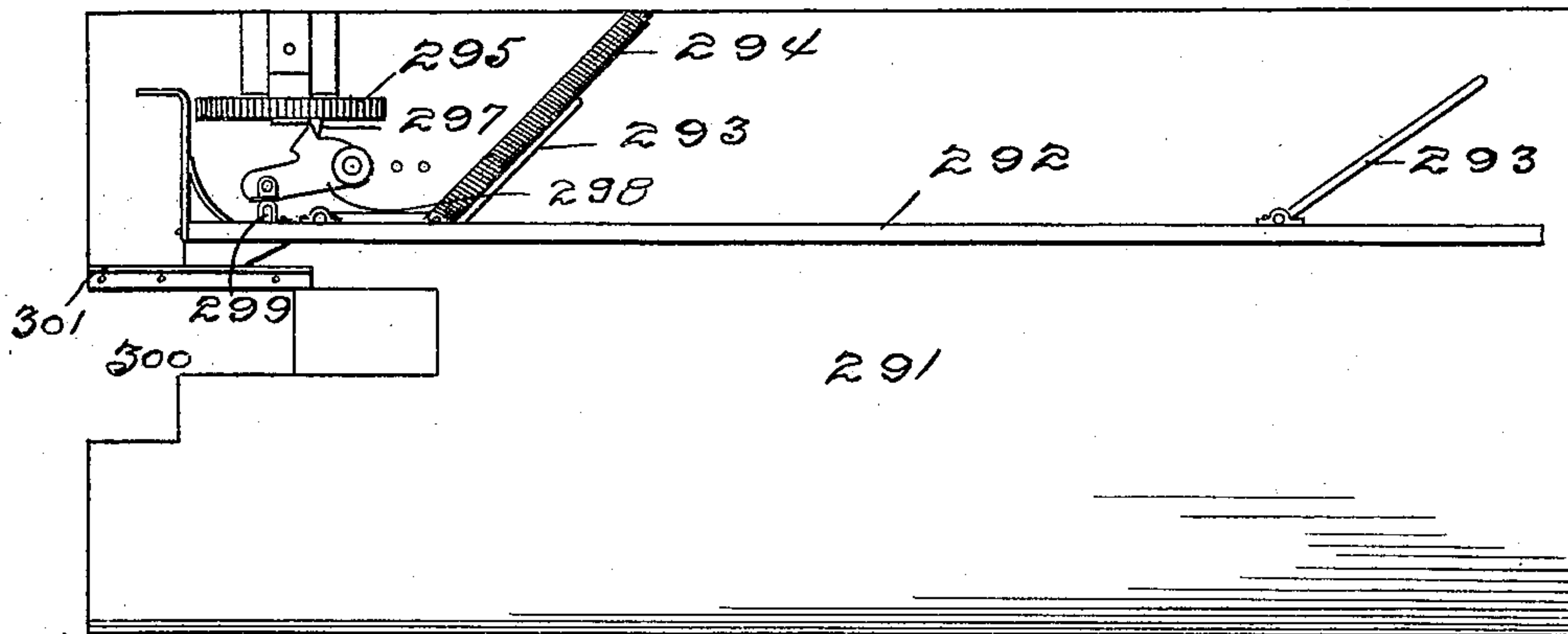


Fig. 51.

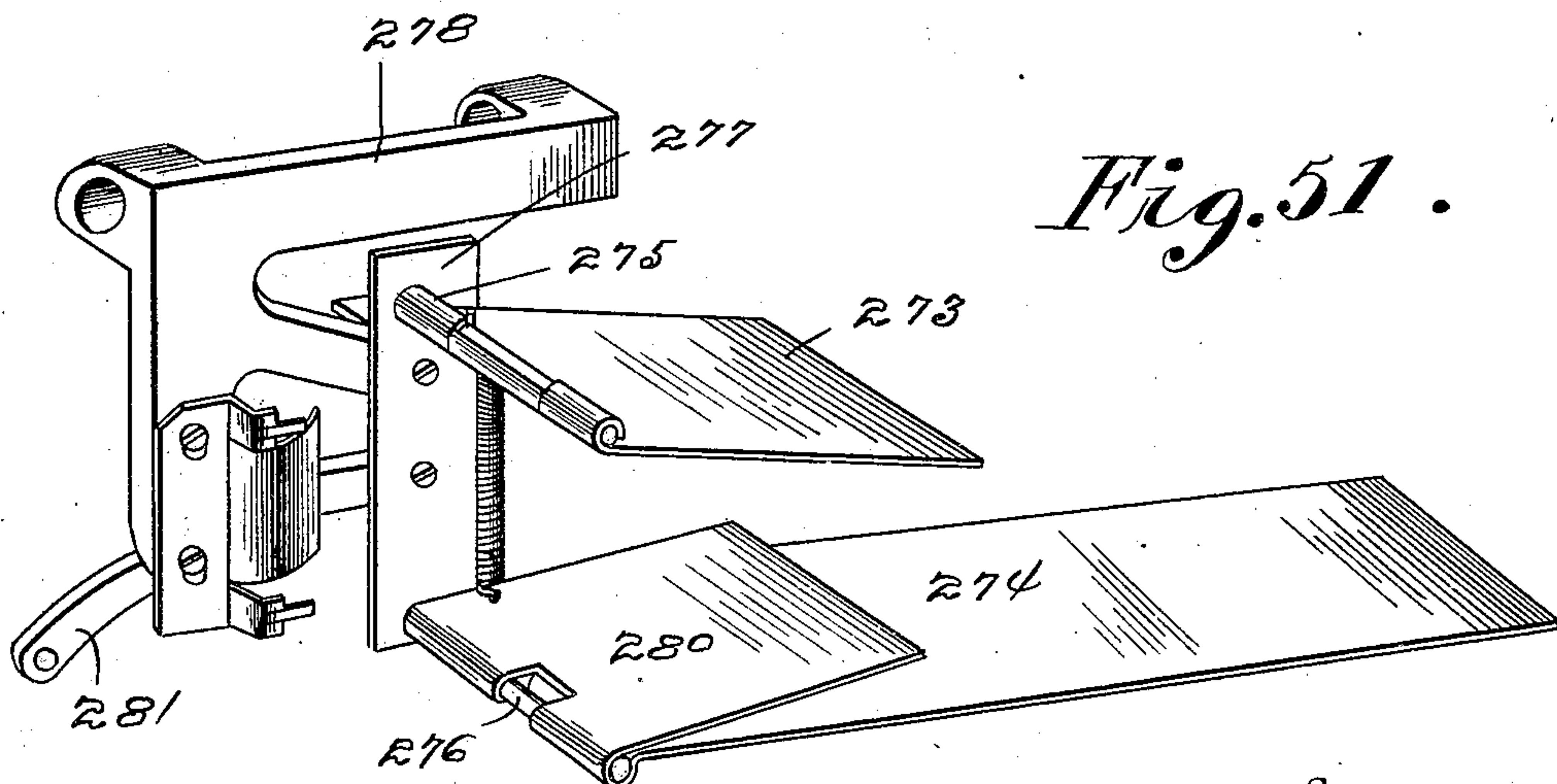
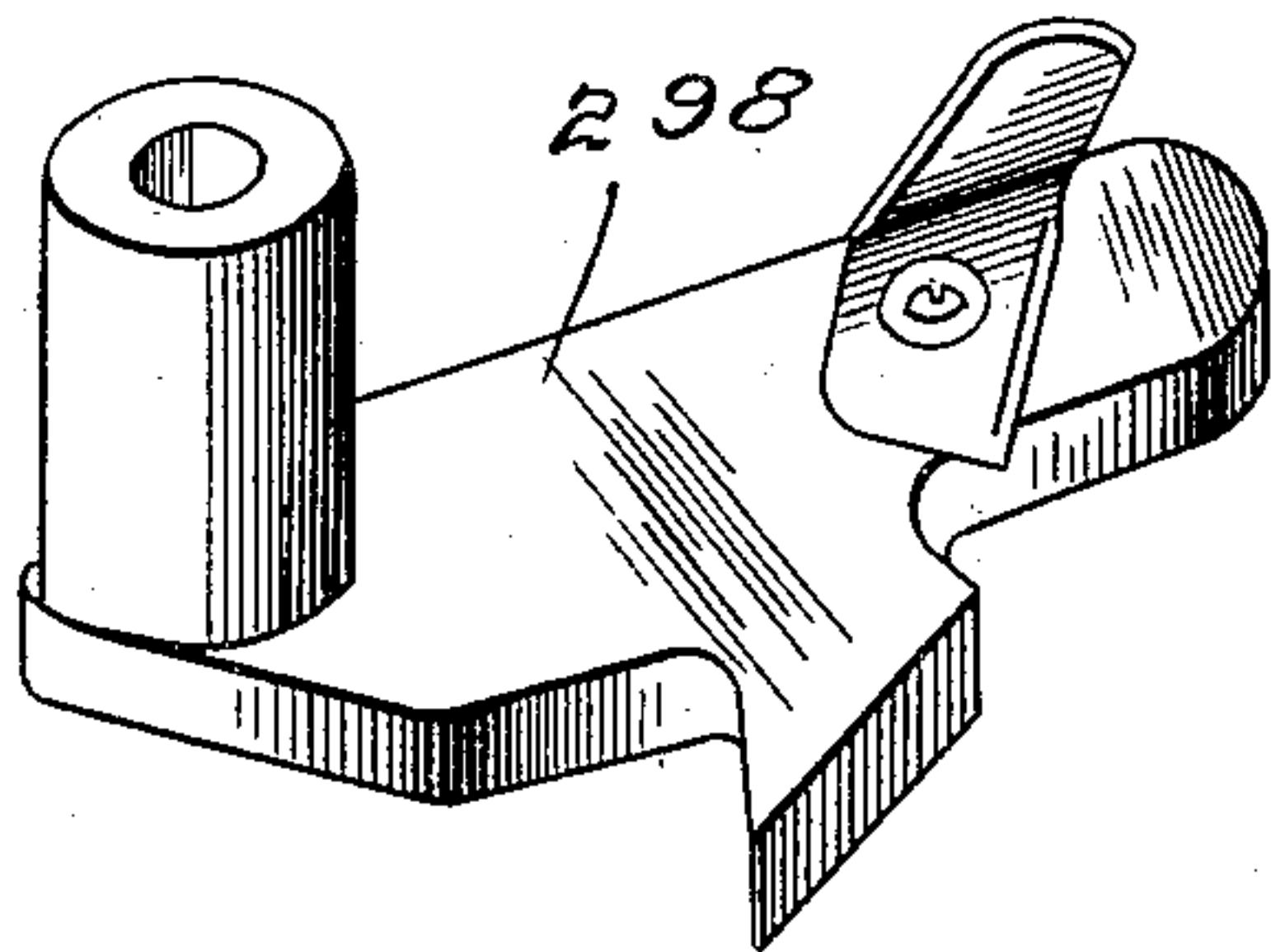
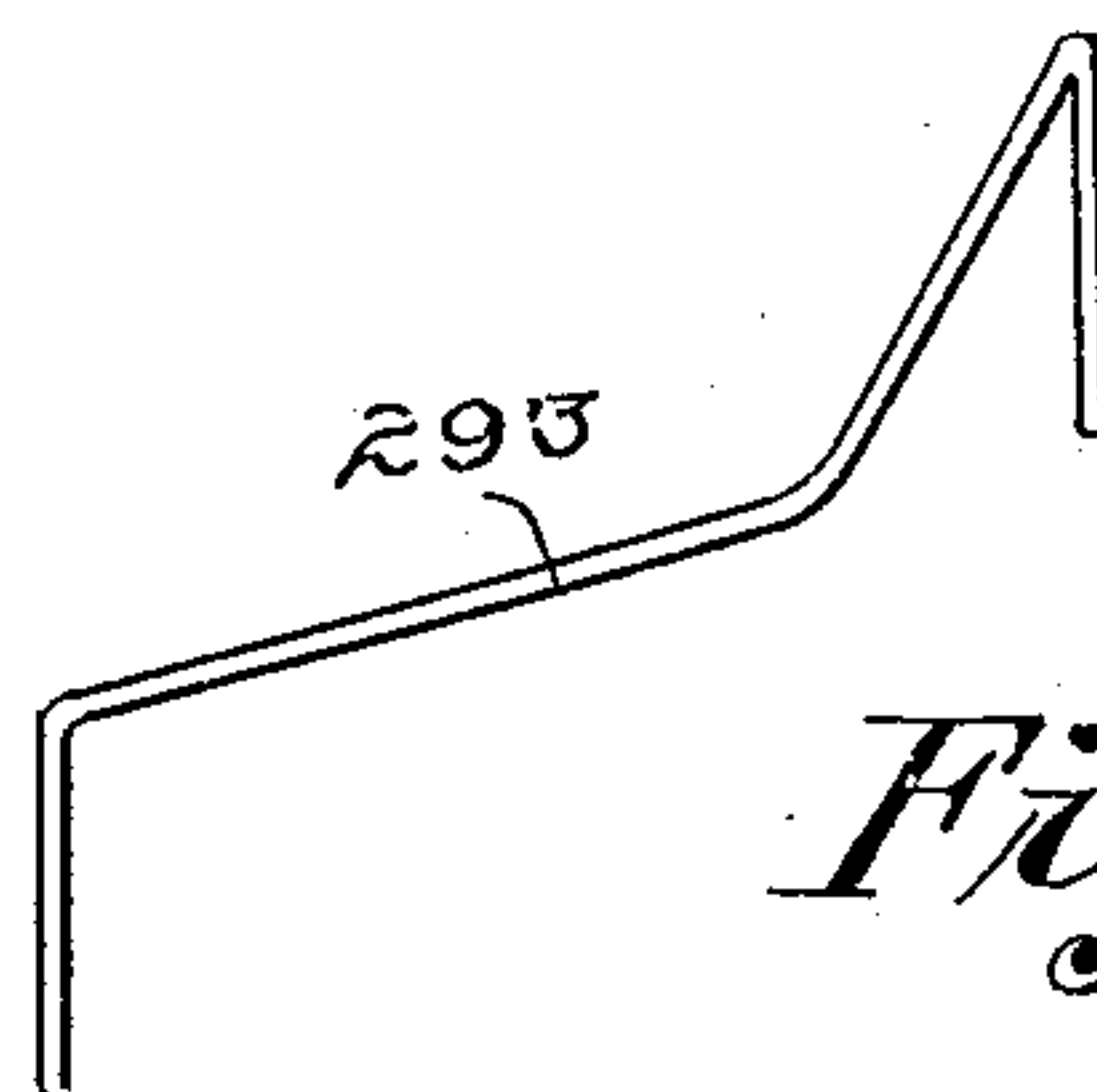


Fig. 57.



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Fig. 53.



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UNITED STATES PATENT OFFICE.

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MECHANISM FOR MAKING PAPER RECEPTACLES.

982,780.

Specification of Letters Patent.

Patented Jan. 31, 1911.

Application filed March 20, 1909. Serial No. 484,749.

To all whom it may concern:

Be it known that I, THOMAS ALLATT, a subject of the King of Great Britain, residing at the city of Toronto, in the county of York and Province of Ontario, Canada, have invented certain new and useful Improvements in Mechanism for Making Paper Receptacles, of which the following is a specification, reference being had therein to the accompanying drawing.

This invention relates to box or pail making machines, and has specially in view mutually coöperating mechanism by means of which a blank is acted upon by improved folding and setting up mechanism so that the blank is folded and set up and provided with a wire bail or handle, the said wire bail or handle being forced through the folded portions of the box and stapled therein, so that the same in addition to serving as a handle, also serves in an efficient manner to retain the box or pail in proper shape.

In the practical application of the improved box or pail making machine it will, of course, be readily understood that the same is susceptible to a wide range of essential elements and structural arrangements of details, but a preferred and perfectly practical embodiment thereof is shown in the accompanying drawings, wherein—

Figure 1 is a perspective view of the folding and bailing mechanism. Fig. 2 is a front elevation thereof, the feed table being omitted. Fig. 3 is a top plan view. Fig. 4 is a side elevation. Fig. 5 is a vertical sectional view taken on the line 12—12, Fig. 2. Fig. 6 is a similar view taken on the line 13—13 Fig. 2. Fig. 7 is a vertical sectional view taken on the line 14—14, Fig. 3. Fig. 8 is a sectional view taken on the line 15—15 Fig. 4. Fig. 9 is a detail elevation of the former blocks. Fig. 10 is a detail perspective view of a pivoted lever or arm which is carried by each former block. Fig. 11 is a side view of a pivot bolt therefor. Figs. 12 and 13 are detail elevations of opposite sides of the rotating mechanism for the formers. Fig. 14 is a perspective view of a pivotally mounted pawl carried by the former blocks rotating mechanism. Fig. 15 is a detail view of a cam for the rotating mechanism shown in Figs. 12 and 13. Fig. 16 is a detail view of a crank arm operated by the cam shown in Fig. 15. Fig. 17 is a

plan view of blank receiving plate and folding wings carried thereby. Fig. 18 is a vertical sectional view taken on the line 25—25, Fig. 17. Fig. 19 is a detail view of a stop for supporting or holding the wings. Fig. 20 is a horizontal sectional view taken on line 27—27 Fig. 18. Fig. 21 is a detail side elevation of the slide collar shown in Fig. 18. Fig. 22 is a detail perspective view of one of the arms which carry the blank pressing plates. Fig. 23 is a sectional view thereof taken on the line 30—30, Fig. 22. Fig. 24 is a plan view of a cam for operating the plates and arms shown in Fig. 22. Figs. 25, 26 and 27, are, respectively, a top plan and side elevations of opposite sides, of guide rollers and their supporting arm which feed the wire to the machine. Fig. 28 is a detail view of a detachable wire guide. Fig. 29 is a perspective view of a pawl for preventing withdrawal of the wire. Fig. 30 is a plan view of the top of the machine, showing the devices for cutting, and shaping the wire. Fig. 31 is a detail view of a crank and eccentric for operating the cutting and shaping devices. Fig. 32 is a detail view of the slotted bars forming a part of the wire shaping mechanism. Figs. 33 and 34 are detail perspective views of arms for bending the ends of the wire inwardly. Fig. 35 is a detail view of a cam and operating rods for the arms shown in Figs. 33 and 34. Fig. 36 is a side elevation of the cam shown in Fig. 35. Fig. 37 is a detail perspective view of an operating crank arm for the arms shown in Figs. 33 and 34. Fig. 38 is a perspective view of the wire carriers. Fig. 39 is a sectional view taken on line 46—46, Fig. 30. Fig. 40 is a detail view of wire guides which coöperates with the wire cutter. Fig. 41 is a detail view of a crank for operating the wire carriers. Fig. 42 is a detail view of a hammer for straightening the wire. Fig. 43 is a detail view of a hammer device for attaching the wire bails to the blanks. Fig. 44 is a detail view of a bearing plate and guide for the hammer devices shown in Fig. 43. Fig. 45 is a detail view of a spring connection of one of the bending arms shown in Figs. 33—34. Fig. 46 is a detail side elevation showing a form of adjustable connection between the various operating rods and their cranks. Fig. 47 is a perspective view of a clenching block

tripping lever carried by one of the swinging arms shown in Fig. 22. Fig. 48 is a detail side elevation of a device for loosening the blanks from their formers. Fig. 49 is a detail view showing the pivot end of the rod for loosening the blanks from their formers. Fig. 50 is a perspective view of a wire forcing device. Fig. 51 is a perspective view of a device for removing finished articles from their formers. Fig. 52 is a top plan view of a table upon which the finished articles are delivered. Fig. 53 is a perspective view of a swinging lever pivoted to the table for oscillating a wing thereof. Fig. 54 is a perspective view of a hanger bracket carried by the frame of the machine and forming a bearing for one end of one of the crank arms. Fig. 55 is a plan view of a blank before being operated upon by the folding and bailing mechanism. Fig. 56 is a perspective view of the blank after being operated upon by the folding and bailing mechanism. Fig. 57 is a detail perspective view of a tripping lever forming a part of the means for delivering finished boxes.

The improved blank folding and bail attaching mechanism is supported by a skeleton frame which may be composed of vertical corner standards 109, having lower, intermediate, and top horizontally arranged connecting members 110, 111 and 112. The front upper portion of said frame has a transversely extending shaft 113 arranged thereon one end of which carries a wheel 114 adapted to be connected to any suitable source of power whereby to drive the shaft 113 and the other devices forming part of the mechanism.

A supporting plate or bar 115 extends transversely across the lower portion of the frame and has centrally located thereon a socket 116 which receives one end of a rod or plunger 117 the other end of which is seated in a socket 118 carried by a blank receiving plate 119. Said socket carries a stop or rest 118^a for the wings to be referred to. Said blank-receiving plate or bed plate 119 has two pairs of flaps, or folding wings 120—121, hinged thereto, the wings 120 being oppositely disposed and of duplicate construction and may be formed of thin sheet metal which tapers longitudinally and have pendent side edges which may be of a substantially-V-shape. The bottom surfaces of each wing 120 is provided with a pivot ear 123 to which one end of a rod 124 is pivoted, the other end of said rod being telescopically or otherwise connected with a rod 125 passing through the supporting plate 115 and being connected with a crank arm 126 mounted on a rocker shaft 127 extending transversely of the lower part of the frame and provided with a crank arm 128 having a rod connection 129 with one arm of a bell crank lever 130 mounted on an up-

per transversely extending shaft 131, the other arm of said bell crank lever being provided with a pin or stud 132 for engagement with a grooved cam 133 mounted on the shaft 113. The oppositely disposed wings 121 are also of duplicate construction, their free ends being provided with an elongated, reduced extension 134 and each of their sides being provided with an outwardly projecting inclined extension 135, the ends of which may be rounded or beveled, and which are extended from said wings adjacent their hinge connection with the bed plate 119. Each wing 121 has a pivot ear 136 on its bottom to which is connected one end of a rod or link 137, the other end of said link being slotted, as indicated at 138 and carrying a slidable block 139 which is normally retained at the bottom of the slot 138 by means of a spring 140 coiled about the link 137. A collar 141 is slidably mounted on the plunger rod 117 and is provided with pivot ears 142 to which the blocks 139 of the links 137 are pivoted. Said collar 141 is provided with oppositely disposed bosses 143 which receive pivot pins 144 of a yoke 145 at the end of a crank arm 146 carried by a shaft 147 having a crank and rod connection 148—149 with one arm of a bell crank lever 150 mounted on shaft 131, the other arm of said bell crank lever being provided with a stud or pin which engages with a groove in a cam 151.

A central shaft 152 extends across the frame and has a hub 153 fast thereon provided with a plurality of radiating arms 154 the free end of each arm having a detachable connection with a hollow shaping block or former 155. One end of the shaft 152 is provided with a loose crank arm 156 having a rod connection 157 with a crank arm 158 on shaft 113. A ratchet wheel 159 is mounted fast on the end of shaft 152 adjacent to the loose crank arm 156, the peripheral teeth or notches 160 thereof corresponding in number to the radiating arms 154. The crank arm 156 carries a spring pressed pawl 161 for engagement with the teeth or notches of the ratchet wheel, so that an intermittent rotation may be imparted to the shaft 152 through the operation of the shaft 113, crank arm 156 and its pawl, and the engagement between the said pawl and one of the teeth of the ratchet wheel, as will be readily understood. A crank arm 162 has one end connected to one of the crossing members of the frame by means of spring 163, and at its other end it carries a holding pawl 164 normally held in contact with the periphery of the ratchet wheel 159. Said crank arm 162 is intermediately pivoted to the side of the frame, and its pawl is adapted to engage with one of the teeth or notches of the ratchet wheel to prevent a rotation of the same when the crank arm 156 is not exert-

ing a turning pressure thereon. The said arm 162 also carries a stud or roller 165 which is in the path of movement of a cam 166 mounted on shaft 113, whereby said arm will be rocked by said cam 166 to lift its pawl from engagement with the ratchet disk or wheel and permit the latter to rotate, the removing operation of the pawl being had when the crank arm 156 is exerting a turning pressure on said ratchet wheel.

The shaping blocks or formers 155 are of like construction and each is provided with a longitudinal slot 167 on two of its sides and adjacent to said slots the transverse edges of said sides are notched or cut away as indicated at 168 to provide clearance space for a wire clenching block 169 carried by an arm 170 of a lever 171, said levers being pivoted intermediate of their ends to the respective radiating arms 154 by the bolts 171^a. Each lever has its free end provided with an outstanding shoulder 172 which is normally retained in contact with its arm 154 by means of a spring 173 fastened at one end to a lug or pin 174, the other end of the spring being connected to the lever on the adjacent arm, the arrangement being as shown best in Fig. 9, so that the levers are coupled in pairs. The wire clenching block may be in the form of a trough, as shown, and may have a detachable screw or bolt engagement with its lever arm 170. The shoulder 172 of said arm forms a tripping shoulder, as will presently appear.

Stationary rods or arms 175 project from the supporting bar 115 so as to be in a position to hold the blanks on the plate 119. The blanks when received on the supporting plate 119 are of a substantially rectangular shape and provided with four outwardly projecting flaps which are slitted and notched for interlocking engagement when the blanks are folded or "set up," and are also provided with lines to indicate the lines of fold. The blanks are delivered onto the tapes 177 of the table 178 and from thence through the feed rollers 179 over the guiding strips 180 and onto the plate 119, they being assisted to proper position by means of the rocking fingers 181—183 mounted on a shaft 184 which has a rod and crank connection 185—186 with one arm of a bell crank lever 187 whose other arm is in the path of movement of a cam 188 on the shaft 113. The first movement of the shaft 113 brings one of the rotatable former blocks directly in position so that its end will bear on the center of the blank. The continued movement of said shaft first brings the side wings up and folds the wide sides of the blank against the wide side of the former. After this has been accomplished, the wings 121 fold the ends of the blank with the four corners thereof project-

ing outwardly and in the path of movement of pressing plates 189—190, which are carried by oppositely swinging curved arms 191—191^a arranged in pairs and loosely mounted on the shaft 152. One of the arms 191 has a projection 192 pivotally connected to one end of a rod 193, the other end of said rod 193 being connected with an arm of a bell crank lever 194 which is in turn provided with a stud or pin for engagement with a groove formed in a cam 195 on the shaft 113. One of the arms 191^a has a similar connection with a cam 197 on said shaft 113. The two plates 189 are transversely spaced from each other as is manifest, and the two plates 190 are similarly disposed, and it will be seen that as they are swung past the folded blank, the projecting corners will be flattened onto the sides of the blank in overlapping relation. During the blank shaping operation, the former blocks are stationary, but, of course, the shaft 113 is rotating, and through its crank arm and pawl connection with the ratchet wheel 159 on the shaft 153, the same are advanced step-by-step, the arrangement being such that while one former is on the plate 119 and having a blank folded thereon, another former is held idle with a folded blank on it, a third former is held idle awaiting its turn to be brought in contact with the plate 119, and a fourth former is at the upper part of the machine in position to have the folded blank supplied with a wire bail.

The mechanism for feeding, shaping and attaching the wires to the blanks is shown in the detail views of the accompanying drawings, and by reference thereto it will be observed that the wire is guided across the top of the machine by means of the horizontally and vertically disposed rollers 198—199 which are mounted on the bolt-shafts 199^a. Said shafts are provided with transverse openings 199^b for the reception of cotter pins or other removable fasteners 199^c, which hold said shafts to an arm 200 detachably connected to the frame. A gravity pawl 201 is pivotally connected to said arm and has a pointed end 202 which engages with the wire to prevent the same being withdrawn from its guiding rollers. Beyond said pawl 201 the wire passes through a guiding sleeve 201^a, the outlet end of which is beveled, and thence passes across a plate 203 which has oppositely disposed bars 204 thereon which are longitudinally slotted as indicated at 205, and have an end eye 206 formed in their ends which aline with the outlet of the beveled end of the guide sleeve 201^a. The rear ends of the slotted bars 204 terminate in an upper and a lower member, the lower member 207 being arranged in the same plane as the bars, and has its end inwardly beveled. The upper member 207^a is intumed at right angles to its bar, and

terminates adjacent to the rear dished end of an anvil 208 which is supported upon the plate 203 between the two bars 204. The front face of the anvil is straight, and co-
 5 operates with a hammer 209 having side guide rods 210, and an intermediate guide rod 211. These rods 211—210 are rigidly connected to hammer and enter suitable openings formed in a slidable block 212. A
 10 spring 213 is coiled about the intermediate rod 211 and interposed between the hammer and the block. The slidable block carries sockets 214—215 in which one end of bending tools 216—217 are adjustably
 15 mounted, said sockets being arranged so that they will cause their tools to project between the bars 204 and the anvil 208 on one stroke of the said block. The block 212 at one side carries another socket 218 in
 20 which a cutter 219 is adjustably mounted, said cutter coöperating on its forward stroke with the beveled end of the guiding sleeve 201^a to cut the wire. The wire cutter 219 may be a flat-sided bar which is held
 25 in its socket so that a sharp edge will be presented to the wire. The slidable block 212 has a shank 220 which is retained between side guides 221 supported upon the top of the machine. The said shank 220
 30 has pivot ears 222 on its top surface to which one end of a crank arm 223 is connected, the other end of said arm 223 being connected to an eccentric 224 mounted on shaft 113. It will be seen that a rotation
 35 of the shaft 113 will reciprocate the block 212 and cause its cutter 219 to sever the wire, its bending tools 216 and 217 to deflect each end of the wire along the sides of the anvil 208, and the hammer to
 40 straighten the intermediate portion of the wire against the front of anvil.

The wire is fed to position for the cutting and bending operation by means of a block 225 slidably mounted on a guide plate
 45 226. The block 225 has a plate 227 detachably carried by one edge and provided with a wire receiving groove which holds the wire with sufficient force to draw the same from the reel or other source of supply.
 50 Said block has a link connection 228 with a long arm of a bell crank lever 229 pivotally mounted on the frame, the short arm thereof being pivotally connected with an adjustable sleeve 230 of a crank arm 231
 55 having an eccentric connection 232 with the shaft 113. This block when moved in one direction by the bell crank lever feeds the wire toward the cutting and shaping devices, but on its reverse movement slips
 60 along the wire for the reason that the pawl 201 prevents a reverse movement of the wire.

The plate 203 supports two oppositely disposed bending arms 233—234 pivoted
 65 thereon. The arms are connected by means

of a link 235. Said arms each carry a flat thickened end 236 for bending the ends of the wires inwardly around the rear end of the anvil 208, and are also each provided with a finger 237 for forcing the ends back so
 70 that the side arms of the bent wire will enter a transverse groove 238 in a pair of reciprocating carriers 239, one of which is disposed on each side of the anvil so as to reciprocate through slots formed through
 75 the plate 203. The arm 233 has a rod connection 240 at its front portion with a block 241 mounted upon a stud 242 at one end of a lever 243, the other end of said lever being provided with a socket 244 fitting over
 80 a stud 245 carried by an arm 246 at the rear end of the frame. Said lever 243 at its intermediate portion is provided with two spaced-apart bearings 247—248 between which a cam 249 mounted on shaft 113 rotates to oscillate said lever. The arm 234
 85 has a similar rod connection 250 at its rear end with the block 241, the connection of both rods with the block being preferably an adjustable one. The wire carriers may be in the form of blocks mounted upon ver-
 90 tically arranged guide rods 251, and each having a crank connection 252 with a rocking shaft 253 carried by the frame and which is operated by means of a crank and
 95 rod connection 254—255 with an eccentric 256 mounted on the shaft 113.

As thus described, it will be seen that the wire is fed into the machine and cut and
 100 shaped and then placed in position on the carriers, so that when said carriers are lowered, the inwardly bent ends of the wire will be held in position to be forced through the folded overlapping side flaps of the box
 105 or pail on the uppermost former. To force the said ends through said overlapped flaps, two hammers 257—258 are employed, one at each side of the machine, and which reciprocate horizontally through bearings 259—260.
 110 The hammers may be in the form of rods having a widened and flattened head 261. Bell crank levers 262—263 carried by hanger brackets 263^a disposed on opposite sides of the machine each have an adjustable and
 115 pivotal connection with one of the hammers, said bell crank levers also having a separate connection 264—265 with crank arms 266—267 mounted on a rocker shaft 268. One of the crank arms is provided
 120 with a roller 269 held in the path of movement of a cam 270 mounted on the shaft 113. The other crank arm has a spring connection 271 with a bracket carried by the side of the frame, the tension of said spring being
 125 exerted to pull the hammer away from the former block. It will be seen that when the rocker shaft 268 is rocked, the bell crank levers will be similarly actuated to impart a reciprocatory movement to the hammers,
 130 and cause them to force the bent ends of the

wire through the overlapped flaps of the pail or box. After the ends of the wire have been forced through the sides of the box or pail, they are bent over so as to lie flush with the inner sides of the same by means of the clenching blocks 169 having their grooved ends 169^a forced against the ends of the wire when the shouldered end of the lever 171 is struck and rocked by a finger 272 carried by one of the arms 191. After the wire has been attached to the box or pail, the next movement of the shaft 152 brings the finished box or pail to a position where it will be stripped from its former block by means of two spaced apart wings 273—274 each of which has a hinge connection (275—276) with a side plate 277 carried by a bracket 278 slidably mounted upon a guide rod 279 one end of which is supported by the frame and the other end supported by a table onto which the finished articles are delivered. The wings are formed of flat sheet metal and are held horizontally, the lower wing being the longer, and having an integral inwardly bent spring leaf extension 280. The bracket 278 has a link connection 281 with a crank arm 282 carried by a rocker shaft 283 actuated by a crank 284 connected to a rod 285 which is in turn connected to an eccentric 286 mounted on shaft 113. Said rocker shaft also carries an arm 287 provided with a finger 288 which depresses a spring-held arm 289 carried by the frame and having a block 290 pivoted to its free end which contacts with one side of the shaped pail or box to loosen the same from its former.

The operation of the mechanism for removing the box or pail is as follows:— While the shaft 152 is stationary, one of its formers is having a blank folded around it; another former is having its box or pail wired, and a third former is in a position to discharge its pail or box. At this time the bracket 278 is drawn inwardly causing its wings to engage over the top and bottom of the pail or box with sufficient force to cause the box to be removed from the former when the wings are drawn outwardly. When the next former arrives at the discharge end of the machine, the wings are moved inwardly carrying with them the previously removed box which is telescoped within the box about to be removed, and on the outward stroke both boxes are carried with the wings. This operation is continuous, the boxes when taken from the former blocks being telescoped over the previously removed boxes, so that the same are delivered onto the table 291 in an assembled condition.

The table 291 may be provided with a longitudinally extending wing 292 having a link connection 293 and also a spring connection 294 with the table 291. The table has mounted thereon a ratchet wheel 295

which is rotated step-by-step by means of a rod 296 connected to a crank carried by the rocker shaft 131 carried by the front portion of the frame. The ratchet wheel 295 also carries a laterally projecting stud 297 which contacts with a swinging lever 298 pivotally mounted on the table and causes said lever to strike a projection 299 carried by the wing 292, and thereby swing said wing laterally to move the delivered articles from the table as will be understood.

The table may be provided with a cut-away portion 300 to provide clearance for the delivery mechanism, and also with an upstanding guard plate 301 to prevent the articles falling over onto the ratchet wheel 295.

As the operation of the machine has been set forth in its various steps as the various elements of the machine have been pointed out, it has not been thought necessary to refer to the same further.

What I claim as my invention is:—

1. A machine of the character described, comprising a plurality of intermittently operating rotatably mounted formers, a stationary table, side wings carried by the table for folding the blanks about the formers, and means for attaching a wire bail to the sides of the folded blanks.

2. A machine of the character described, comprising a stationary table, wings hinged thereto, a plurality of intermittently rotating formers coöperating with said table and about which the blanks are folded by said wings, means for attaching a wire bail to the folded blanks while on their formers, and means for stripping the folded blanks from the formers.

3. A machine of the character described, comprising a frame, a stationary table mounted in the frame, a plurality of intermittently rotating formers carried by the frame and coöperating with the table to hold the blanks thereon, wings carried by the table for folding a blank about one of the formers while the blank is held to the table by said former, bail attaching mechanism for supplying the folded blanks with bails, while on their formers, and means for removing the blanks from their formers.

4. A machine of the character described, comprising a frame, a table mounted in the frame and on which the blanks are received, a shaft extending across said frame, means for intermittently rotating said shaft, a plurality of radiating arms carried by said shaft, a former carried by each arm, said formers being adapted to coöperate with said table to retain a blank thereon, means for folding a blank about the formers, means for attaching a bail to the folded blanks while on their formers, and means for removing the blanks from the formers.

5. A machine of the character described

comprising a table on which the blanks are delivered, intermittently rotated formers co-operating with said table to hold a blank thereon, means for folding the blank about the former while held on the table, bail attaching mechanism for applying a bail to each folded blank while on its former, and means for removing the folded blank from the formers after the bail has been attached thereto.

6. A machine of the character described comprising a frame provided with a transversely arranged shaft, a plurality of radiating arms mounted thereon, formers carried by said arms, means for intermittently rotating said shaft, a table carried by said frame and on which the blanks are delivered, one at a time, wings carried by said table, said formers being adapted to be intermittently operated to bring one of the same at a time in contact with said table, means for operating said wings to fold a blank about one of the formers, mechanism for attaching a bail to the blanks carried by the formers after said formers have left the table, and means for removing the folded blanks from the formers after the bails have been attached thereto.

7. A machine of the character described, comprising a folding and bailing mechanism composed of a table on which the blanks are received one at a time, formers for intermittently contacting with said table, wings carried by said table for holding a blank about the former in contact therewith with the corners of said blanks projecting outwardly, oppositely swinging plates for folding said projecting corners in an overlapped position, mechanism for forcing the ends of a wire bail through the overlapped corners of the blank while on its former, and means for removing the finished article from the formers.

8. A machine of the character described comprising a table on which the blanks are received one at a time, intermittently rotating formers adapted to singly contact with said table, means for folding a blank about the former in contact with the table with the corners of the blank projecting outwardly, means for folding said projecting corners in an overlapping condition, means for attaching a bail to the overlapped portions of the blanks, and means for removing the blanks from the formers after the bails have been attached.

9. A machine of the character described having in combination a table on which the blanks are received one at a time, a plurality of intermittently rotating formers adapted to singly contact with the table, wings carried by said table for folding the sides and ends of the blank about the former with the corners thereof projecting outwardly, oppositely swinging plates for folding the

projecting corners in an overlapped condition, means for forcing the ends of a bail through the overlapped portions of the folded blank, and means for removing the finished article from the former after the bail has been attached.

10. A machine of the character described, comprising a table on which the blanks are received one at a time, wings hinged to said table, a plurality of intermittently rotating formers adapted to contact one at a time with said table, means for operating said wings to fold a blank about the former with the corners thereof projecting outwardly, oppositely swinging arms carrying plates for folding the projecting corners in an overlapped position, means for attaching a bail to the overlapped portions of the folded blank after the former has removed the same from the table, and means for removing the finished article from the former.

11. A machine of the character described, comprising a frame provided with a table on which the blanks are received one at a time, a shaft extending across the frame above the table, a hub mounted thereon and provided with a plurality of radiating arms, a former carried by each arm, means for intermittently operating said shaft to cause the formers to contact with the table one at a time, wings hinged to said table for folding the sides and ends of a blank about a former with the corners of the same projecting outwardly, oppositely swinging arms carried by the frame and adapted to fold the projecting corners of the blanks in an overlapping position, means for attaching a bail to the folded blanks after the formers have removed the same from the table, and means for removing the finished articles from the formers.

12. A machine of the character described, comprising a frame provided with a table on which the blanks are received one at a time, an intermittently operated shaft extending across the frame over the table, a plurality of radiating arms carried by said shaft, a former carried by each arm and adapted to contact one at a time with the table, wings carried by the table for folding the sides and ends of a blank about the former with the corners thereof projecting outwardly, oppositely swinging arms loosely mounted on said shaft and carrying plates for folding the projecting corners of the blank in an overlapping position, means for attaching a bail to the folded blank after it has been carried from the table by its former, and means for removing the finished articles from the formers.

13. A machine of the character described, comprising a frame, a folding table mounted therein, means for feeding blanks to the table, wings hinged to said folding table, a

shaft extending across the frame above the folding table, means for intermittently operating the same, a plurality of radiating arms carried by said shaft, a former carried
 5 by each arm and adapted to contact one at a time with the folding table, means for operating the wings of the folding table to fold the sides and ends of a blank about the former with the corners of said blank projecting outwardly, oppositely swinging arms
 10 loosely mounted on said shaft and provided with end plates for folding the projecting corners of the blank in an overlapping position, means for attaching a bail to the overlapped portions of the folded blank after
 15 the same has been removed from the table, and means for removing the finished article from the formers.

14. A machine of the character described
 20 comprising a frame provided with a table on which the blanks are received, formers cooperating with said table and about which the blanks are folded, a rod mounted to reciprocate across the frame, a bracket carried
 25 by said rod and provided with a side plate, an upper horizontally arranged short wing and a lower horizontally arranged elongated wing hinged to said plate and arranged in spaced relation, the elongated wing having
 30 a gripping member at its hinged end, said upper and lower wing being adapted to embrace a finished article on one of the formers while on their instroke, and to have the gripping extension or member engage with the
 35 same on their out-stroke to remove the said article from the former.

15. A machine of the character described, comprising a table on which the blanks are received, formers cooperating with the table
 40 and about which the blanks are folded, a trip lever carried by the frame and adapted to loosen the finished articles from their formers, and wings for engaging over the finished article for removing the same from
 45 its former.

16. A machine of the character described, comprising a frame provided with blank folding mechanism, a wire feeder carried by
 50 the frame, a plate stationary on said frame, a plunger slidably mounted on the frame and carrying a wire cutter and wire bending tools adapted to sever the wire and bend the ends of the same around the plate, arms carried
 55 by said frame for inturning the ends of the wire, wire carriers for the side arms of the shaped wire which carry the same to a position where the inturned ends will be on opposite sides of the folded blank, and oppositely moving hammers for driving said
 60 ends into the folded blank.

17. A machine of the character described, comprising a frame, blank folding mechanism mounted therein, a wire feeder carried
 65 by the upper portion of the frame, an anvil mounted on the frame, a plunger slid-

ably mounted on the frame and carrying a wire cutter and oppositely disposed wire bending tools, the bending tools being adapted to bend the wire along the sides of
 70 the anvil after the same has been cut by the cutting tool, arms for bending inwardly the ends of the wire, oppositely disposed carriers receiving the ends of the wire, and hammers for attaching the ends of the wire to a folded blank.
 75

18. A machine of the character described, comprising a frame provided with a table on which the blanks are received, a former carried by said frame and cooperating with
 80 said table for folding the blanks, a wire feeder carried by the frame, wire guides also carried by the frame, a slotted plate mounted on the frame and carrying an anvil, a plunger slidable on the frame, a pad carried by the slidable plunger and cooperating
 85 with one edge of the anvil to hold the wire, a wire cutter and oppositely disposed bending tools carried by the plunger, the bending tools being adapted to bend the ends of the wire along the sides of the anvil after
 90 the cutting tool has severed the wire, oppositely disposed arms pivotally mounted on the frame at the rear of the anvil and adapted to inturn the ends of the wire, wire carriers vertically movable through the slotted
 95 plate and disposed on opposite sides of the anvil and provided with transverse grooves into which the wire is forced by the end bending arms, means for operating said wire carriers to cause the same to carry the
 100 wire to a point where the inturned ends will be on opposite sides of the folded blank, oppositely moving hammers for forcing said ends into the folded blank, and a clenching tool carried by the former and adapted to
 105 bend the ends of the wire after the same have been forced through the sides of the blank.

19. A machine of the character described comprising a frame, a shaft mounted there-
 110 in, a rocking shaft operated by the frame shaft, a shaft extending transversely of the frame and provided with a plurality of radiating formers, ratchet mechanism controlled by the rocker shaft for imparting an
 115 intermittent motion to the transversely arranged shaft, means carried by the table for folding a blank about the formers, oppositely swinging arms loosely mounted on the transverse shaft and operated by the rocker
 120 shaft to fold the corners of the blank in an overlapping position, bail forming mechanism carried by said frame, means for attaching said bails to the blanks while the latter are retained on a former, and means
 125 for removing the finished article from their formers.

20. A machine of the character described comprising a table to which the blanks are
 130 delivered one at a time, an intermittently

operating shaft carrying a plurality of radiating formers which coöperate with the table to form a box or pail, means for forming a bail and attaching the same to a box while the latter is retained on its former, and means for removing the finished article from the formers.

21. A machine of the character described comprising folding and bailing mechanism, and a delivery table receiving the finished articles from the folding and bailing mechanism and provided with an oscillating wing for feeding the finished articles away from the folding and bailing mechanism.

22. A machine of the character described comprising folding and bailing mechanism, and a delivery table receiving the finished articles from the folding and bailing mechanism and provided with a hinged wing which is oscillated by the operation of the folding and bailing mechanism to feed the finished articles away from the folding and bailing mechanism.

23. A machine of the character described, embodying a table, a rod on which the table is supported, folding wings hingedly connected to said table and arranged in oppositely disposed pairs, rods connected to the respective wings of one pair, cranks connected to said rods, a rocking shaft to which the cranks are connected, means for rocking said shaft, a collar slidably mounted on the first-named rod, links pivotally connected to said collar and to the respective wings of the other pair, means for moving said collar on the first-named rod, and a former adapted to hold a blank on the table, whereby the wings will fold the blank about the former.

24. A machine of the character described, embodying a rod, a table supported by said rod and adapted to receive a blank to be folded, folding wings hingedly connected to said table and arranged in oppositely disposed pairs, a collar mounted to slide on said rod, longitudinally yieldable links pivotally connected to said collar and to the respective wings of one pair, means for moving the collar on the rod, longitudinally yielding rods connected to the respective wings of the other pair, means for moving said last-named rods, and a former adapted to hold a blank on the table, whereby the wings will fold the blank about the former.

25. A machine of the character described, embodying a former, means for folding a blank about the former, said folding means including a swinging arm arranged to assist in overlapping the projecting corners of the folded blank, the former being formed with oppositely disposed openings, means for forcing the ends of a bail wire through the overlapped corners of the blank on the

former and into said openings, a clenching device mounted in the former, a lever pivotally connected to the former and carrying said clenching device, and means carried by said swinging arm for automatically tripping said lever, whereby to actuate the clenching device.

26. A machine of the character described, embodying an intermittently rotatable shaft, means for moving said shaft, radiating arms carried by said shaft, formers carried by the respective arms, a table upon which a blank may be laid, means for folding a blank about a former with the blank held over the table, the former being formed on opposite sides with openings, bailing mechanism arranged to force the ends of a bail wire through the overlapped corners of the blank while on the former and into said openings, clenching tools mounted in the respective formers, levers pivotally connected to said blocks and carrying said tools, said levers being respectively provided with trip shoulders, springs connecting together the arms of two adjoining levers whereby to hold the clenching tools under tension and in an inoperative position, and means for tripping said levers whereby to actuate the clenching tools.

27. A machine of the character described, embodying an intermittently rotatable shaft, means for moving said shaft, four radiating arms secured to said shaft in right angular relation to each other, formers carried by the respective arms, a table underneath and in vertical alinement with said shaft, said table being adapted to receive a blank to be folded, bailing mechanism mounted above said shaft, the shaft actuating means being arranged to hold the shaft temporarily stationary with one former at the bailing mechanism, an opposite former upon the table and the other two formers disposed horizontally, means for simultaneously bailing a folded blank upon the uppermost former and for folding a blank about the lowermost former, stripping mechanism arranged to strip a folded and bailed blank from one of the horizontally disposed formers, while the upwardly and downwardly projecting formers are having their blanks bailed and folded respectively, the shaft-actuating means subsequently imparting a quarter movement to said shaft in a direction to carry the other horizontally disposed former herein referred to up to the bailing mechanism.

In testimony whereof I hereunto affix my signature in presence of two witnesses.

THOMAS ALLATT.

Witnesses:

D. S. TOVEILL,
E. MERNER.