

No. 640,568.

Patented Jan. 2, 1900.

E. C. & F. L. JONES.
TICKET PRINTING MACHINE.

(Application filed Feb. 25, 1899.)

(No Model.)

4 Sheets—Sheet 2.

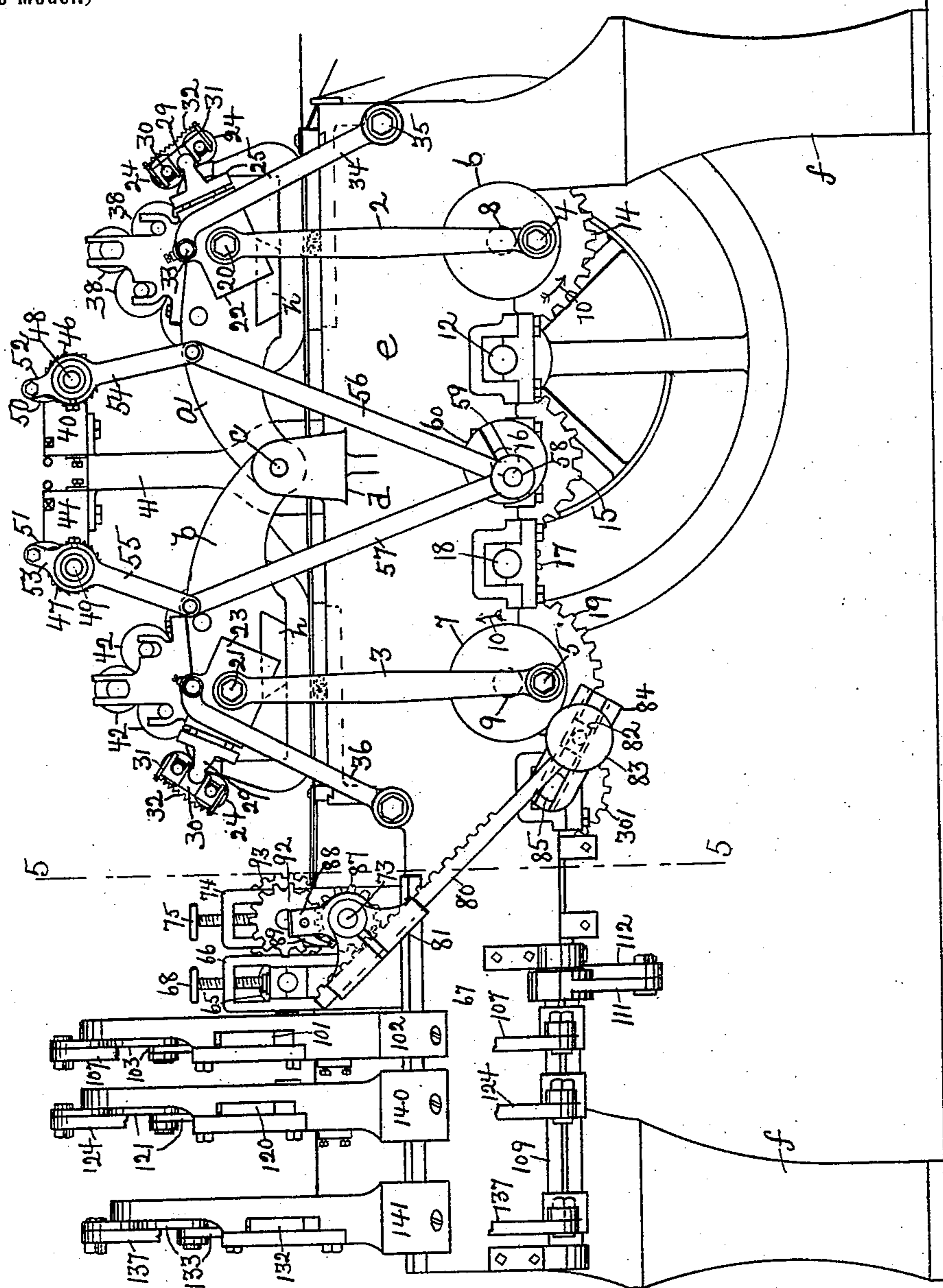


FIG. 2.

WITNESSES.

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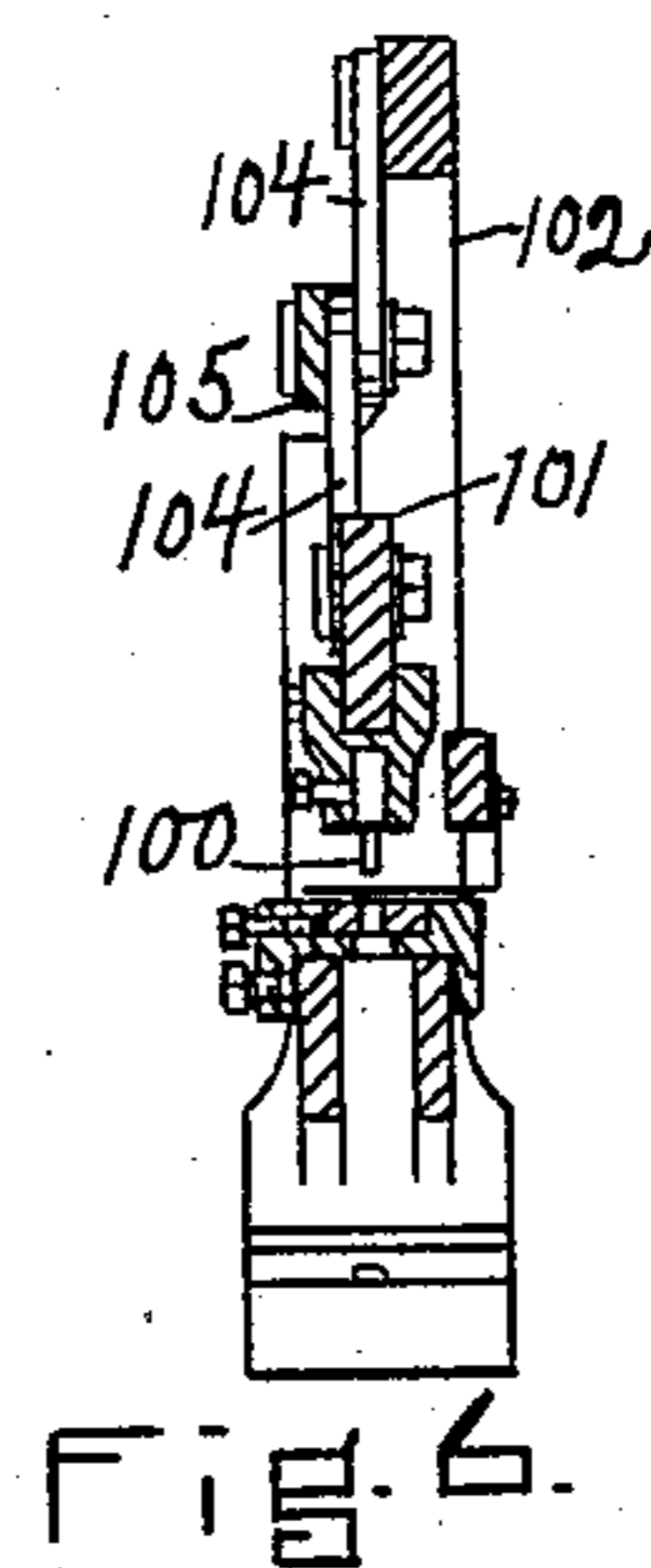
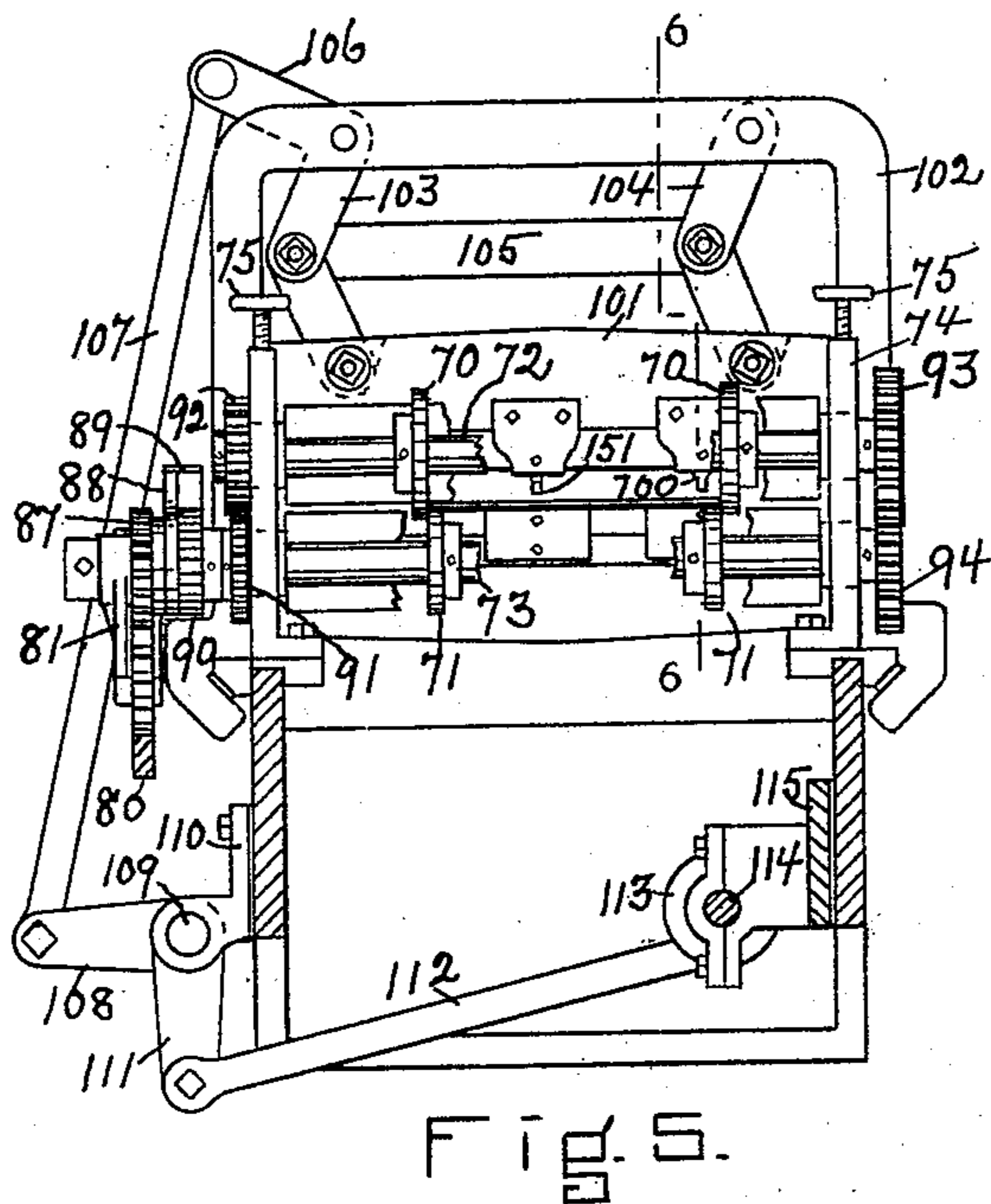
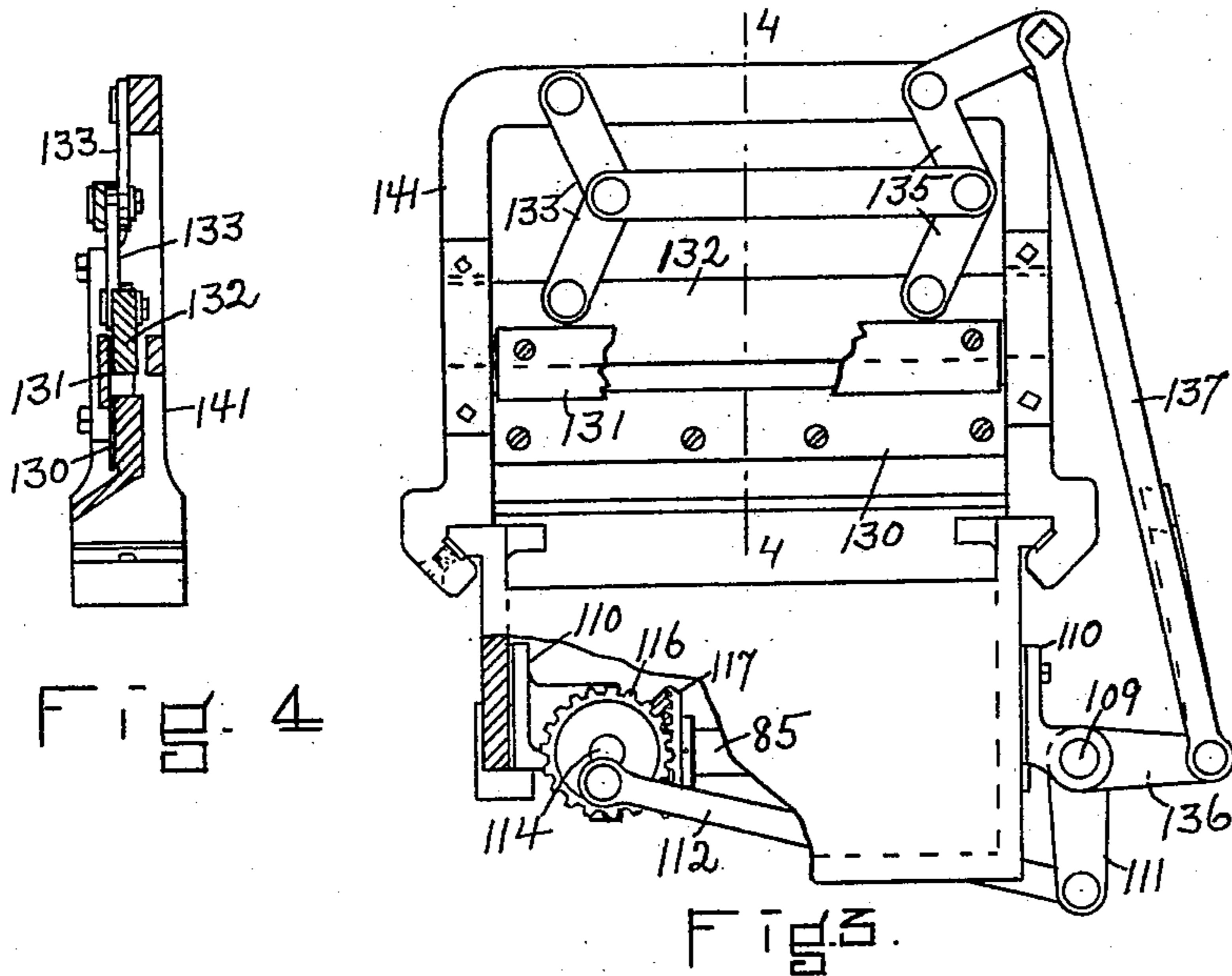
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4 Sheets—Sheet 3.



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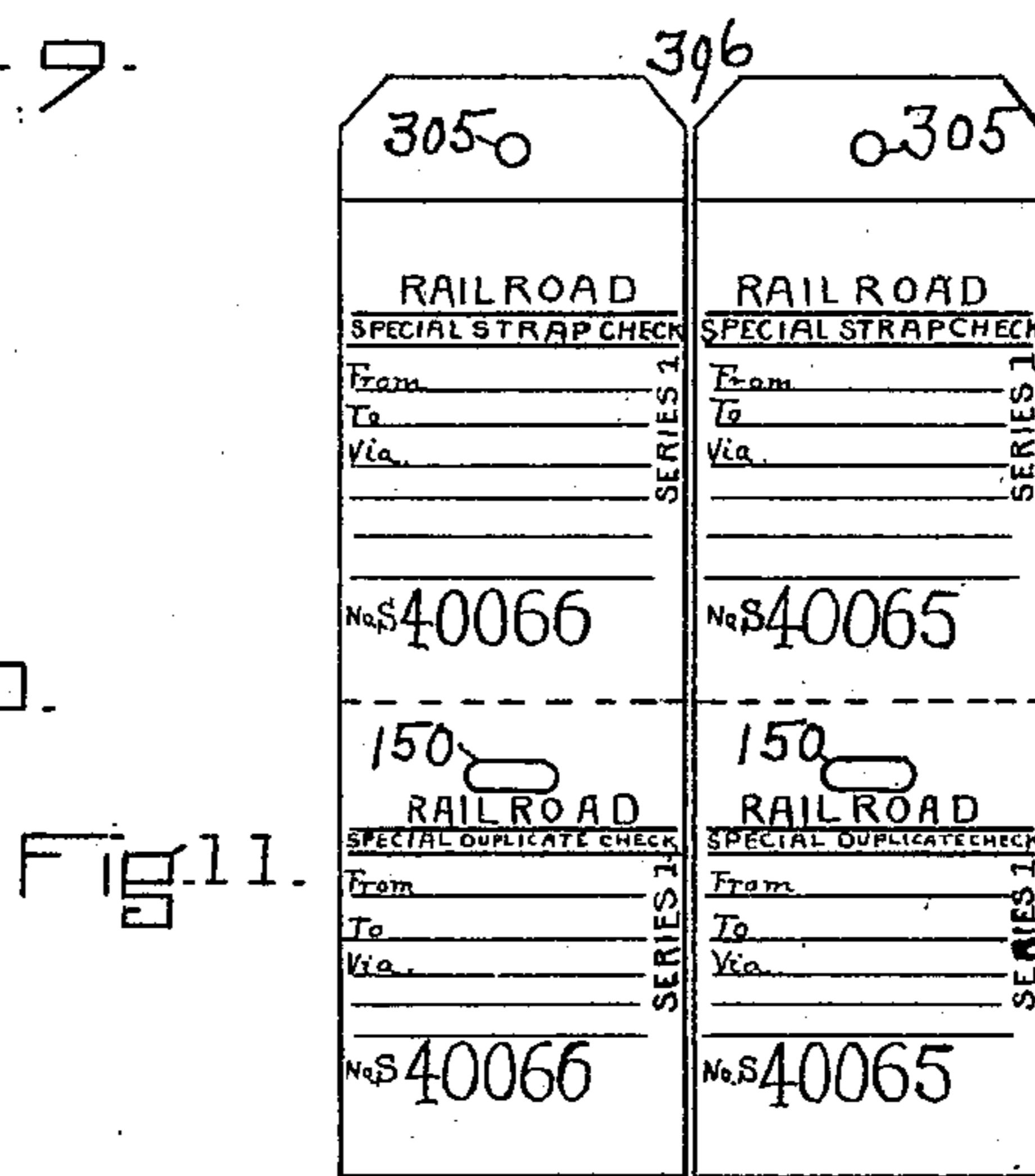
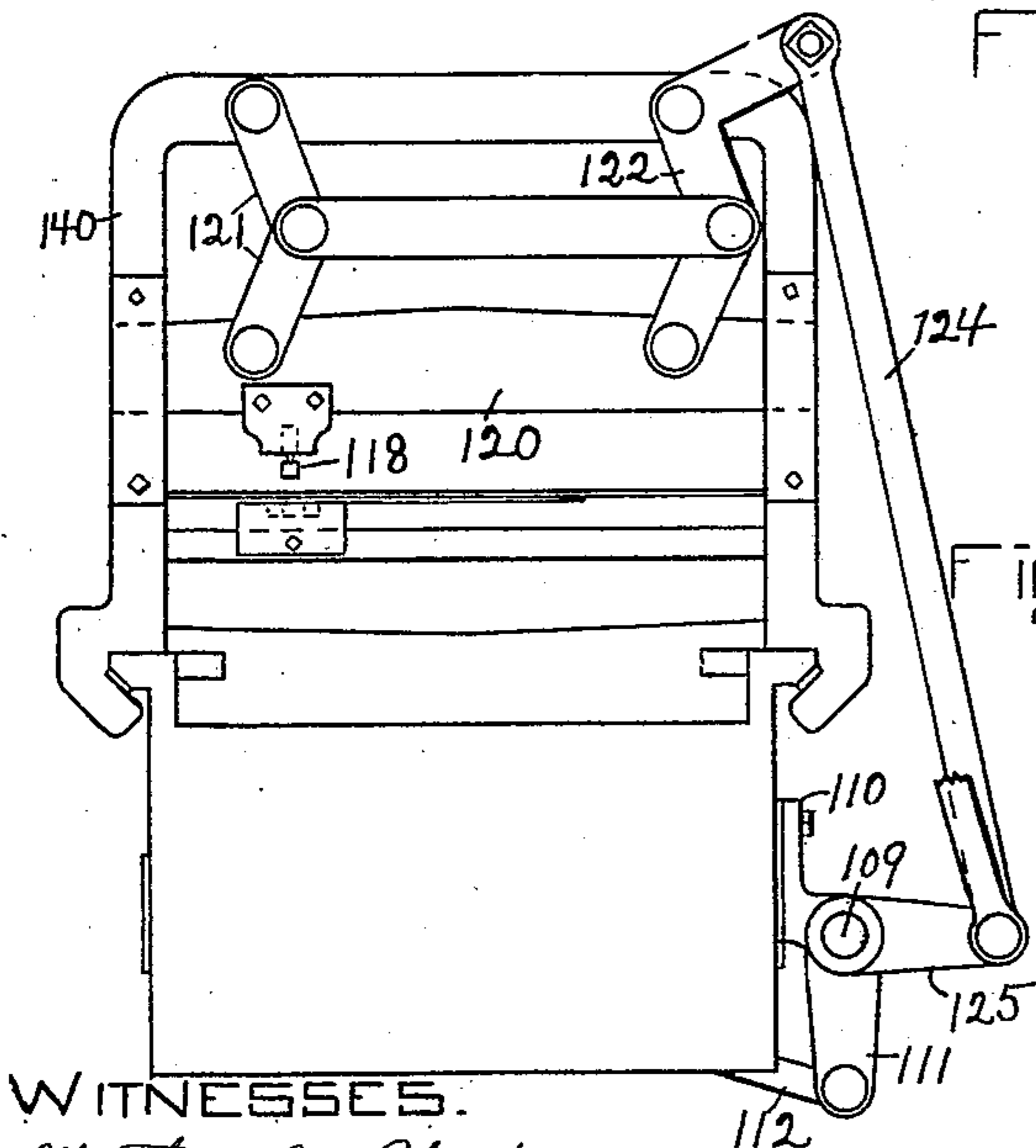
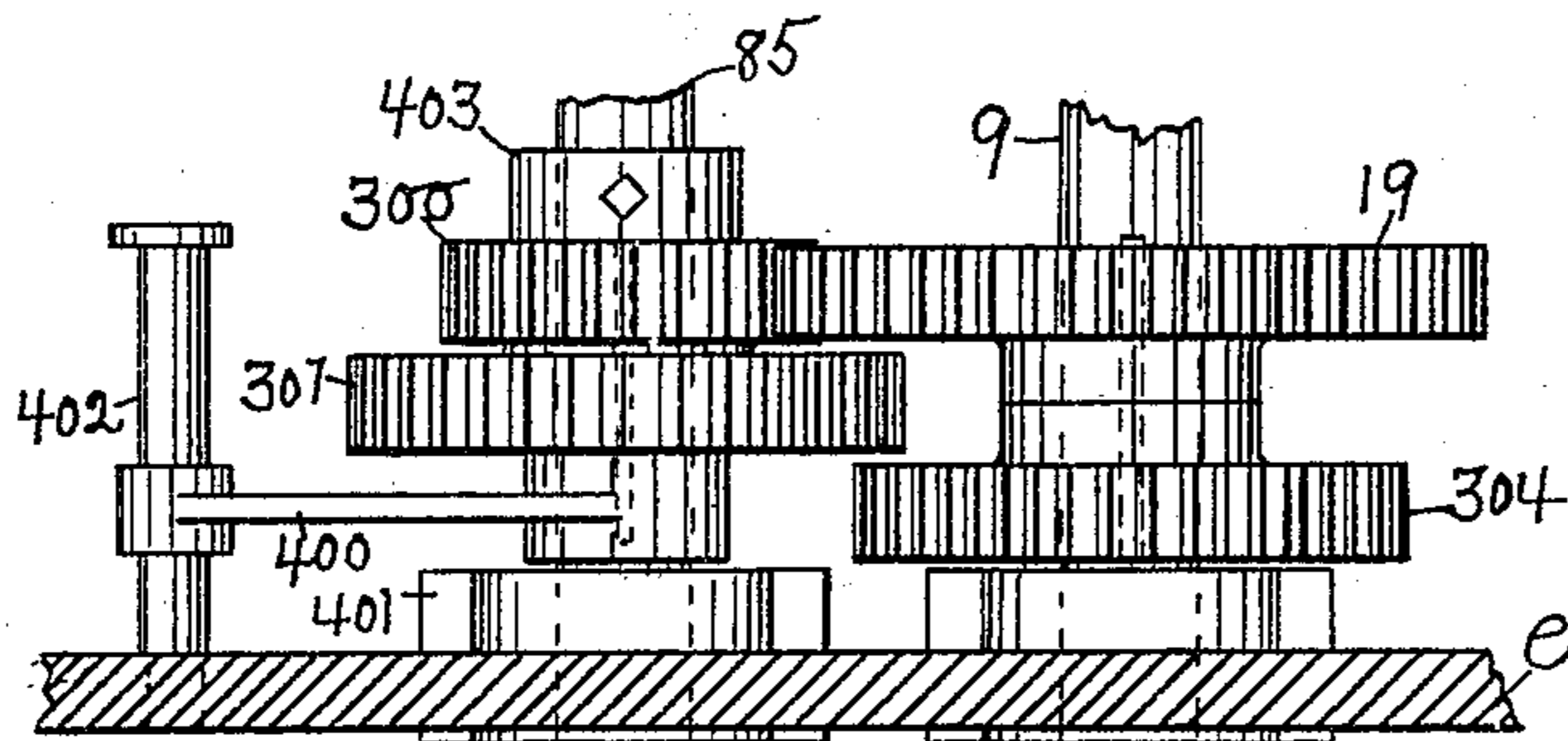
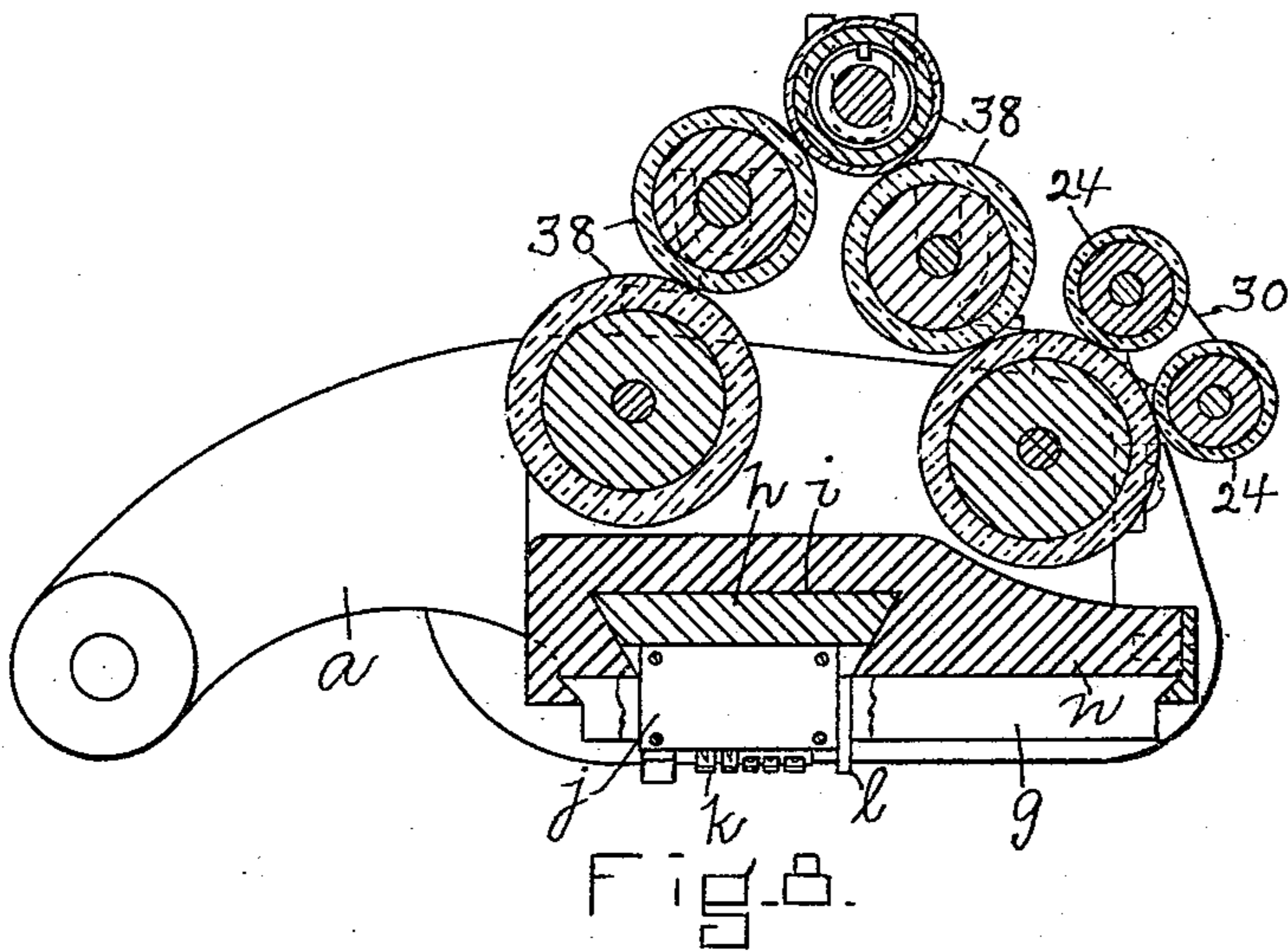
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4 Sheets—Sheet 4.



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UNITED STATES PATENT OFFICE.

EDWIN C. JONES AND FRANK L. JONES, OF BOSTON, MASSACHUSETTS, ASSIGNORS TO THE GRAHAM-JONES COMPANY, OF KITTERY, MAINE.

TICKET-PRINTING MACHINE.

SPECIFICATION forming part of Letters Patent No. 640,568, dated January 2, 1900.

Application filed February 25, 1899. Serial No. 706,763. (No model.)

To all whom it may concern:

Be it known that we, EDWIN C. JONES and FRANK L. JONES, citizens of the United States, residing at Boston, in the county of Suffolk and State of Massachusetts, have invented an Improvement in Printing Machines or Presses, of which the following description, in connection with the accompanying drawings, is a specification, like letters and figures on the drawings representing like parts.

This invention relates to a printing machine or press, and is herein shown as embodied in a machine especially designed and adapted for printing upon a continuous web and thereafter separating the printed web into tickets.

The invention has for one of its objects to provide a machine in which the tickets while forming a part of the web may be consecutively numbered with type of increased size while the main portion of the ticket is being printed in the same or a different color by type of a smaller or standard size, the machine being constructed so that it may be used as described or it may be used for printing after the manner of ordinary presses, in which the size of the type is that known as "type-high."

Another feature of this invention consists in a construction, as will be described, whereby a more perfect alinement of the printed characters may be obtained.

The invention further consists in providing the machine with auxiliary tools to act on the web after it has been printed, which tools may be a puncher for forming slots or eyelets, a perforator to practically separate the printed web into tickets, a slicer to trim the corners of the tickets, and a knife to completely sever the printed tickets from the web.

The machine is further provided with a novel feed for the paper-web and with other novel features, which, with those above specified, will be pointed out in the claims at the end of this specification.

Figure 1 is a side elevation of a printing machine or press embodying this invention with the form-carriers in their elevated positions; Fig. 2, an elevation of the opposite side of the machine with the form-carriers lowered or in their printing position; Fig. 3,

an end elevation, with parts broken away, of the machine shown in Fig. 1; Fig. 4, a section on the line 4 4, Fig. 3; Fig. 5, a section on the line 5 5, Fig. 2, to be referred to; Fig. 6, a sectional detail on the line 6 6, Fig. 5; Fig. 7, a detail, on an enlarged scale, to be referred to; Fig. 8, a sectional detail, on an enlarged scale, through one of the form-carriers; Fig. 9, a detail in plan of the feed mechanism to be referred to; Fig. 10, a detail in elevation of the slitting mechanism, and Fig. 11 details of two tickets to illustrate the work performed by the machine herein shown.

The machine herein shown as embodying this invention is provided with two form-carriers *a b*, pivotally mounted on a center or shaft *c*, supported in lugs *d*, attached to the opposite sides of the supporting-frame *e*, provided with suitable legs *f*. The form-carriers *a b* may and preferably will be of like construction, and each has secured to it a chase *g*, (see Fig. 8,) containing the type of ordinary height.

In certain classes of work it is desirable to consecutively number the impressions made by the press with a type of larger size than that employed to produce the impression and preferably with a different-colored ink. This result is accomplished as now commonly practiced and known to us by means of a second and separate press and requires two distinct operations. To effect this result in one operation and on one machine is one of the objects of this invention, and in the present instance we have shown one way of accomplishing this result—namely, by providing the form-carrier with a recess extended back from the face, against which the type of the ordinary height bear a sufficient distance or depth to permit consecutive-numbering disks of increased diameter requisite to obtain the desired length of number on the periphery of the said disks to be secured in the chase with the periphery of the disks in line with the impression-surface of the types of ordinary height.

In Fig. 8 the form-carrier *a* is shown as provided with a dovetail recess *i*, into which may be inserted a dovetailed piece or block *h* to fill said recess and form a firm backing for the consecutive-numbering device *j*, having

numbering-disks k of greater diameter than the height of the type l . The consecutive-numbering device j and the type l are set up in the chase g in the usual manner, and the
 5 said chase is secured to the form-carrier a with the type of standard height backed by the front portion n of the form-carrier, while the block h , or it may be the rear surface or wall of the recess, serves as a solid backing
 10 for the consecutive-numbering disks. The front portion n of the form-carrier might in some cases be made separate from the form-carrier and inserted into the chase behind the ordinary type, in which case the chase would
 15 be made of a depth equal to the diameter of the numbering-disks; but in this case the form-carrier would be practically recessed when the chase was attached to it ready for printing. In the present instance the form-
 20 carriers a b are oscillated on their common center c by rods 2 3, eccentrically connected at 4 5 to disks 6 7, fast on shafts 8 9, having bearings in the opposite sides of the supporting-frame e , the said shafts being rotated in
 25 the same direction, as indicated by arrows 10 in Fig. 2, from a main shaft 12, having a pinion 13, which meshes with a gear 14 on the shaft 8 and which also meshes with a gear 15 on a counter-shaft 16, the gear 15 meshing
 30 with a pinion 17 on a shaft 18 and the pinion 17 meshing with the gear 19 on the shaft 9. The connecting-rods 2 3 have their upper ends fitted upon studs 20 21, projecting from the sides of the form-carriers a b , and upon these
 35 studs are also loosely mounted blocks 22 23, which support movable carriers for the ink-applying rolls 24, the said movable carriers consisting of bars 25, having rods 26, which slide in holes extended through the said blocks and
 40 are encircled by springs 28, (see dotted lines, Fig. 1,) each bar 25 having an arm or projection 29 fitted into a socket in a housing or box 30, in which the ink-applying rolls 24 are locked or retained by removable pins 31 and
 45 spring 32. The pivoted blocks 22 on opposite sides of the form-carrier a have pivotally connected to them at 33 one end of rods 34, pivotally attached at their opposite end at 35 to the sides of the frame e . The pivoted blocks 23 on
 50 opposite sides of the form-carrier b are joined to the frame e by the rods 36. The ink-rolls 24 are thus caused to move bodily through the arcs of circles with the studs 20 21 as centers in the upward and downward movement
 55 of the form-carriers, the movement of the ink-rolls being reverse to that of the form-carriers. The ink-rolls 24, with the form-carrier a , are supplied with ink from a series of distributing-rolls 38, common to printing-presses, and
 60 which receive their ink from a roll 39, supplied from a fount or trough 40, attached to uprights 41, erected from the frame e . The ink-rolls 24 for the form-carrier b receive ink from a series of distributing-rolls 42, which
 65 are supplied with ink by a roll 43, cooperating with a fount or trough 44, attached to the uprights 41. The fount or trough 40 may con-

tain an ink of a different color from that held by the fount 44, and for the purpose of this invention the fount 40 may be supposed to
 70 contain red ink and the fount 44 black ink. The ink-rolls 39 43 are adapted to be intermittently rotated to present a fresh supply of ink to the distributing-rolls carried by the form-carriers a b by means of ratchet-wheels 46 47,
 75 fast on the shafts 48 49 of said rolls and actuated by pawls 50 51, carried by levers 52 53, loosely mounted on the shafts 48 49 and having their long arms 54 55 pivotally connected to rods 56 57, mounted on a stud 58, eccentrically fastened in a radial slot 59 of a crank-
 80 disk 60, fast on the shaft 16. The amount of ink supplied to the distributing-rolls may be controlled by adjusting the stud 58 in the radial slot 59 to obtain more or less movement
 85 of the levers 52 53, and thereby effect more or less rotation of the ink-supplying rolls 39 43.

The ink-distributing rolls 38 42, carried by the form-carriers a b , are rotated, as shown in Figs. 1 and 7, by bevel-gears 200 201 on the
 90 rearmost of the said distributing-rolls meshing with bevel-gears 203 204, keyed to upright shafts 205 206, having bearings in yokes 207 208, loosely mounted on the shafts 12 18, the shafts 205 206 having bevel-gears 210 211,
 95 which mesh with like gears 212 213 on the shafts 12 18. The gears 203 204 are held in mesh with the gears 200 201 by yokes 214 215, loosely mounted on the shafts of the gears 200 201, which yokes are turned on their pivots by the movable form-carriers a b , the arms of said yokes being fitted over the rods or shafts 205 206 and between which arms lie the hubs of the gears 203 204.

The machine as thus far described is
 105 adapted to print upon a continuous or substantially long web of paper, shown in Fig. 1 as wound upon a shaft 61, supported in a suitable frame 62 in front of the machine or which may be part of the framework, the said
 110 web of paper on its way to the printing-machine passing below guide-bars 63 630 and thence over the bed of the machine and between feed-rolls 64 65, having their boxes supported in suitable uprights 66, erected
 115 upon the rear portion 67 of the frame e , which rear portion is below the level of the bed of the machine. The upper roll 65 is adjustably supported by screw 68.

The machine may and preferably will be
 120 provided with rotary paper-cutters 70 71, (see Fig. 5,) shown in the present instance as located in front of the feed-rolls 64 65 and adjustably secured on shafts 72 73, having bearings in boxes supported by uprights 74, the
 125 shaft 72 being adjustably supported by screws 75. The rotary cutters 70 71 may have plain circular edges, as shown in Fig. 5, in which case the web 60 is cut clean through to obtain the tickets of the desired length, or the cut-
 130 ters 70 71 may have projections on their circumference to perforate the web. The rotary cutters 70 71 and the feed-rolls 64 65 may be intermittently rotated by a feed mechan-

ism preferably of the construction herein shown and consisting of a rack-bar 80, (see Fig. 2,) adapted to reciprocate in a yoke-shaped hanger or bracket 81, loosely mounted on the shaft 73, (see Figs. 2 and 5,) the said rack-bar being pivotally connected at its lower end to a block 82, adjustably secured by set-screw 83 in a slotted crank-arm 84, attached to a shaft 85, which may be designated the "feed-shaft," and which is provided with a pinion 300 and gear 301, (see Fig. 9,) adapted to mesh, respectively, with gears 19 and 304 on the shaft 9. The rack-bar 80 engages a pinion 87, loose on the shaft 73 and having attached to it an arm 88, carrying a pawl 89, which engages a ratchet-wheel 90, (see Fig. 5,) fast on the shaft 73. The shaft 73 has fast on it a gear 91 in mesh with a gear 92, fast on the shaft 72, and the latter shaft has fast to its other end a gear 93, which meshes with a gear 94 on the shaft of the feed-roll 64, the upper feed-roll 65 being rotated by friction, as herein shown.

The extent of feed may be regulated by adjusting the block 82 in the slotted crank-arm 84.

The printed tickets now connected together may and preferably will be operated upon after the web has passed the feed-rolls, and in the present instance the machine is provided with suitable devices, as will be described, whereby a hole, slot, or eyelet 305, Fig. 11, may be punched in each ticket, also a substantially V shaped slit or cut 306 may be cut in the head of the ticket, whereby each ticket may be cut off from the web. The three devices specified may be designated the "puncher," the "slitter," and the "knife."

The puncher herein shown consists of a plunger 100, (see Fig. 5,) attached to cross-bar 101, vertically movable in the sides of a yoke-shaped frame 102, attached to the opposite sides of the framework of the machine, the said cross-bar being reciprocated by toggle-levers 103 104, joined by a bar 105, the upper lever of the toggle 103 having an arm 106 connected by a link 107 to a crank 108, fast on a rock-shaft 109, having bearings in brackets 110, attached to one side of the framework, and provided with a crank 111, joined by a link or rod 112 to a crank-disk 113, fast on a shaft 114, supported in brackets 115 beneath the bed of the machine and driven by bevel-gears 116 117 (see Fig. 3) from the paper-feed shaft 85. The slitter is of similar construction and consists of a V-shaped knife 118, (see Fig. 10,) which is attached to a cross-bar 120, vertically reciprocated by toggle-levers 121 122, similar to those which operate the puncher and which are connected by rod 124 to a second crank 125 on the rock-shaft 109. The cutters (shown best in Fig. 4) consist of a stationary knife 130 and a movable knife 131, which latter is secured to the cross-bar 132, reciprocated by toggle-levers 133 135, operated by a crank 136 on the rock-shaft 109, the said crank being joined by rod 137 to an arm of the toggle-lever 135.

The connecting-rods 107 124 137 are de-

tachable from their toggle-levers, so that the puncher, slitter, or knife, either or all of them, may be disconnected and rendered inoperative to suit the particular work to be done.

The toggle-levers 121 122 for the slitter are supported by a yoke-shaped frame 140 and those for the knife 131 by a similar frame 141.

In some cases it is desirable to provide the tickets with an elongated slot 150, which may be effected by an elongated tool 151, attached to the cross-bar 101 of the puncher. (See Fig. 5.)

It will be noticed that the rock-shaft 109 is driven from the feed-roll shaft 85, and the operations of the puncher, slitter, and knife are timed with relation to the feed of the paper-web.

In practice it is desirable to reinforce one end of the ticket—namely, that end having the eyelet 305 punched through it—and this may be accomplished, as herein shown, by affixing to the upper and lower surfaces of the web, at one edge thereof, narrow strips or ribbons 160 161 of reinforcing-paper gummed on one side and taken from rolls 162 163, the gummed side of the strips or ribbons 160 161 being passed over and in contact with rollers 164 165, revolving in vessels 166 167, containing water. The gummed strips are thus moistened and are firmly attached to the paper-web by pressure of the form-carrier *a*. The upper roll of ribbon 160 may be supported in the frame 62 and the lower roll of ribbon 161 in a part of the framework of the machine.

The machine herein described is especially designed and adapted among other uses for the production of tickets for use by railroads, which tickets are consecutively numbered with a type of increased size and preferably numbered with a different-colored ink from that employed to print the main portion of the ticket.

The operation of the machine herein shown will now be briefly described and may be clearly understood by reference to Figs. 1 and 11.

The web 60 is passed below the guide-bars 63 630 and between the feed-rolls 64 65, and the ends of the reinforcing strips or ribbons 160 161 are affixed to the opposite surfaces of the web, at one edge thereof. The machine is set in operation, and the form-carriers *a b* are brought down in contact with the web to print the tickets. The form-carrier *a* in the present instance prints at each consecutive downward movement a consecutive number in type of extra height and in one-colored ink—as, for instance, red—and at the same time may print with type of ordinary size or height. In Fig. 11 two tickets are shown, having printed upon them the consecutive numbers "40065" and "40066" in large type and also the words "Series 1" in small type. The form-carrier *a* prints in the present instance on one downward movement the number "40065" and "Series 1" in red ink and on the next impression prints the number

"40066" and "Series 1." The paper-web 60 is fed forward, and the rest of the ticket is printed by the form-carrier *b*, which may be supposed in this instance to print with black ink. At each impression of the form-carrier *a* the gummed strips or ribbons 160 161 are firmly pressed upon the web 60. After each impression on the web 60 it is fed forward the distance equal to the width of one ticket and in time reaches the rotary cutters 70 71, which trim the web and reduce its width, if too wide, so as to obtain tickets of the desired length. After passing the rotary cutters and feed-rolls the printed web is passed below the punchers 100 151, which form the eyelet 305 and the slot 150, and thereafter the printed web is passed below the slit 118, which forms the V-shaped cut 306 in the reinforced edge of the web, after which the printed web is fed forward below the knife 131, which severs the completed ticket from the printed web.

In the operation of the machine as above described the various operative parts are timed with relation to the feed of the paper-web so that each part operates at every impression of the form-carriers *a b*, in which case the gears 301 300 would occupy different positions from those shown in Fig. 9—that is, the gear 301 would be in mesh with the gear 304 and the gear 300 would be disengaged from the gear 19—the locking lever or dog 400 being at such time interposed between the collar 403 on the shaft 85 and the gear 300. In some cases it may be desired to cut two connected tickets from the web, and in this case the locking-dog 400 is lifted from the position just described and the gears 301 300 moved on the shaft 85 into the position shown in Fig. 9, so as to engage the gear 300 with the gear 19 and disengage the gear 301 from the gear 304, the locking-dog being then moved along its pivot 402 and dropped between the gear 301 and the bearing 401, as shown in Fig. 9.

With the feed mechanism arranged as shown in Fig. 9 the feed-roll shaft 85 makes two revolutions to one of the main shaft and the paper-web is fed forward twice for each impression of the form-carriers, which arrangement increases the capacity of the machine when work with ordinary-size type is being done and which arrangement of feed is also available when a consecutive numbering with extra-size type is to be performed, providing the numbering and printing are of the same-colored ink. In this latter case each form-carrier would be provided with a consecutive-numbering mechanism adapted to print alternate numbers—as, for instance, the form-carrier *a* would print 1 3 5, &c., and the form-carrier *b* 2 4 6, &c.

The recess *i* in the form-carriers is preferably dovetailed and extends transversely thereof from one side, so that the backing-block *h* may be readily inserted to fill up the recess in the rear of the numbering device,

and in practice the backing-block instead of being in one piece, as herein shown, will preferably be made of a number of thin plates or pieces, so that numbering devices having wheels or disks of different sizes may be used and yet be firmly and quickly backed.

By making the connecting-links 107 124 137 detachable from their toggle-levers one or all of the tools above specified may be rendered inoperative to obtain different styles of tickets designed for different purposes.

The machine herein shown is designed to print tickets such as shown in Fig. 11 and which are now largely used by railroads, the said tickets having consecutive numbers of large type; but the machine may be changed so as to be used for ordinary work, if desired, by filling up the recess in its form-carrier, as is the case in the form-carrier *b* in the present instance.

By means of the invention herein described tickets may be printed and consecutively numbered with type of extra size on one machine, which as heretofore practiced has required the use of two different machines.

It will be understood that instead of the particular forms of auxiliary tools herein described other forms may be substituted therefor or used in conjunction therewith—as, for instance, instead of detaching the printed tickets from the web by the knife 131 the web may be pin-perforated instead of cut and the pin-perforating tool may be substituted for the knife.

We claim—

1. In a printing-press, a bed, and a movable form-carrier coöperating therewith and having secured to it a chase adapted to contain type of ordinary size which make contact with said form-carrier, said form-carrier having a recess for the reception of a consecutive-numbering mechanism carried by said chase and provided with numbers of increased size or length, the said numbering mechanism making contact with the rear wall of said recess, substantially as described.

2. In a printing-press, a bed, movable form-carriers coöperating therewith, one of said form-carriers having secured to it a chase containing type of ordinary height, and the second form-carrier having secured thereto a chase provided with a consecutive-numbering mechanism having numbers of extra size or length, said second form-carrier having a recess into which said numbering mechanism extends and makes contact with the rear wall of the same, and inking-rolls coöperating with said form-carriers to apply different-colored inks to the type carried by said form-carriers, substantially as described.

3. In a printing-press, a bed, and a movable form-carrier coöperating therewith, and a chase attached to said form-carrier, the latter having its type-engaging surface in different planes, whereby a consecutive-numbering mechanism having type of extra size and type of ordinary size may be carried by

said form-carrier and printed simultaneously, substantially as described.

4. In a printing-press, a bed, and movable form-carriers cooperating with the same face of the bed and pivotally mounted to move in the same vertical plane, the pivots of said carriers being transverse with relation to the length of the bed, whereby perfect alinement of the type printed on the same surface by said form-carriers may be obtained, substantially as described.

5. In a printing-press, a bed, and independently-movable form-carriers pivotally mounted on a common center extended transversely of the said bed, and means to operate said form-carriers toward and away from the same surface of said bed, substantially as described.

6. In a printing-press, a stationary bed over which a web of paper is passed, feed-rolls to move said web, a movable form-carrier located above and cooperating with said bed and provided with type-engaging surfaces in different planes, a chase attached to said carrier and provided with type of ordinary size and with a continuous-numbering mechanism having type of extra size, an inking device cooperating with said form-carrier, a main shaft, gearing connecting the movable parts with said main shaft, and a plurality of independent vertically-sliding tools to act on said web after it has been printed upon operatively connected with the main shaft, substantially as described.

7. In a printing-press, a stationary bed over which a web of paper is passed, means to move said web over said bed, a movable form-carrier cooperating with said bed and provided with type-engaging surfaces in different planes, a chase attached to said carrier and provided with type of ordinary size and with a continuous-numbering mechanism having type of extra size, an inking device cooperating with said form-carrier, a main shaft, gearing to connect said movable parts with said main shaft, a reciprocating tool-carrying bar cooperating with the web after it has been printed upon, an upright frame supported above the said bed and in which said bar slides, a rock-shaft, connections between said rock-shaft and said tool-carrying bar to bodily move the same vertically, and means to operatively connect said rock-shaft with said main shaft, substantially as described.

8. In a printing-press, a bed, a movable form-carrier cooperating therewith, mechanism to feed a web of paper over the bed and beneath said form-carrier, a reciprocating tool-holder, toggle-levers connected therewith near its opposite ends, a link or bar connecting said toggle-levers, an arm attached to one of said toggle-levers, a rock-shaft, and a link or bar connecting said arm with said rock-shaft, substantially as described.

9. In a printing-press, a bed, a movable form-carrier cooperating therewith, feed-rolls to move a web of paper over said bed beneath said form-carrier, an intermittent feed mechanism for said feed-rolls provided with a reciprocating rack-bar, and a crank-shaft provided with a crank to which said bar is attached, gearing to rotate said crank-shaft at different speeds, comprising gears 19, 304 separated from each other, a small gear 300 and a larger gear 301 keyed on the crank-shaft and adapted to slide thereon to engage respectively the gears 19, 304, and means to lock one of the movable gears in engagement with its cooperating gear and to hold the other movable gear out of engagement with its cooperating gear, substantially as described.

10. In a printing-press, a bed, movable form-carriers pivoted to the bed-frame, to move in the same vertical plane, ink-distributing rolls carried by said form-carriers, inking-rolls movable about the said form-carriers, a main shaft and counter-shafts extended across the machine, mechanism connecting said counter-shafts with the said form-carrier and inking-rolls, feed-rolls, mechanism to intermittently rotate said feed-rolls, a plurality of reciprocating tool-holding devices, a rock-shaft extended in the direction of the length of the machine, and driven from the main shaft, and detachable means to connect said rock-shaft with the reciprocating tool-holders, substantially as described.

11. In a printing-press, a bed, a movable form-carrier cooperating therewith and provided with a plurality of ink-distributing rolls, a color-pan supported above the bed, a rotatable ink-supplying roll cooperating with said pan and with said distributing-rolls, a ratchet-wheel on said supply-roll, a lever pivoted on said roll and provided with a pawl, a shaft provided with a crank, and a connecting-rod positively connecting the said crank with the pawl-carrying lever, substantially as described.

12. In a printing-press, a bed, and a movable form-carrier cooperating therewith and provided with a recess, a chase attached to said form-carrier and provided with a consecutive-numbering mechanism having disks or wheels provided on their periphery with numbers or type of increased size, and a removable back piece fitted into said recess above the said numbering mechanism, substantially as described.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

EDWIN C. JONES.
FRANK L. JONES.

Witnesses:

JAS. H. CHURCHILL,
J. MURPHY.