

No. 704,807.

Patented July 15, 1902.

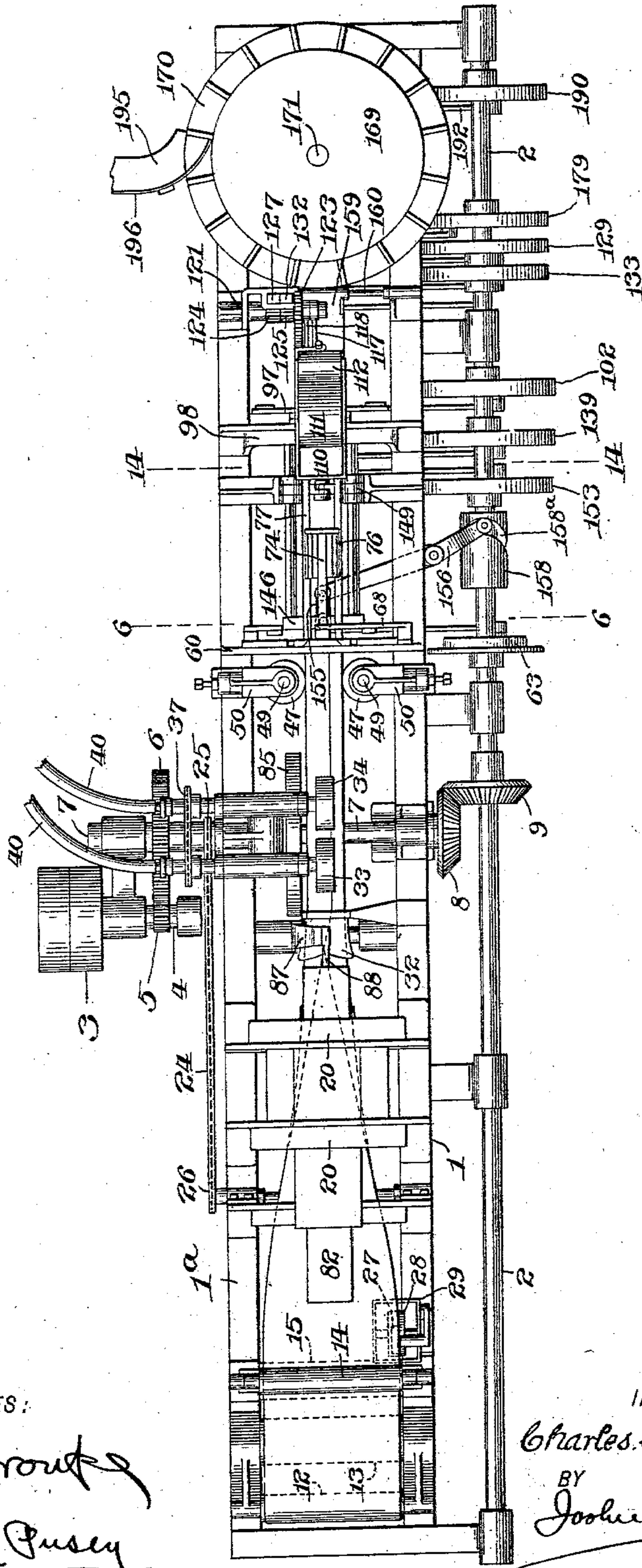
C. F. KELLNER.
PAPER BAG MAKING MACHINE.

(Application filed July 11, 1901.)

(No Model.)

9 Sheets—Sheet 1.

Fig. 1.



WITNESSES:

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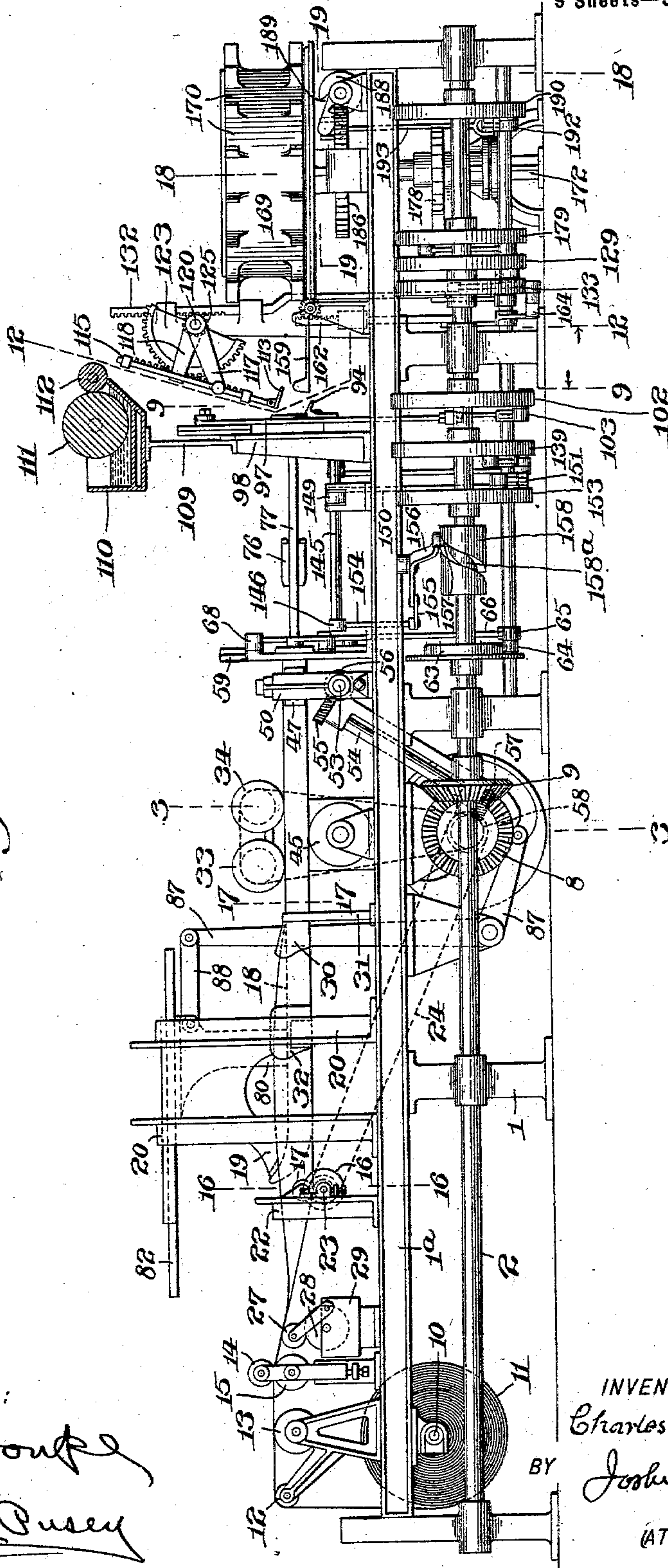
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9 Sheets—Sheet 2.

Fig. 2.



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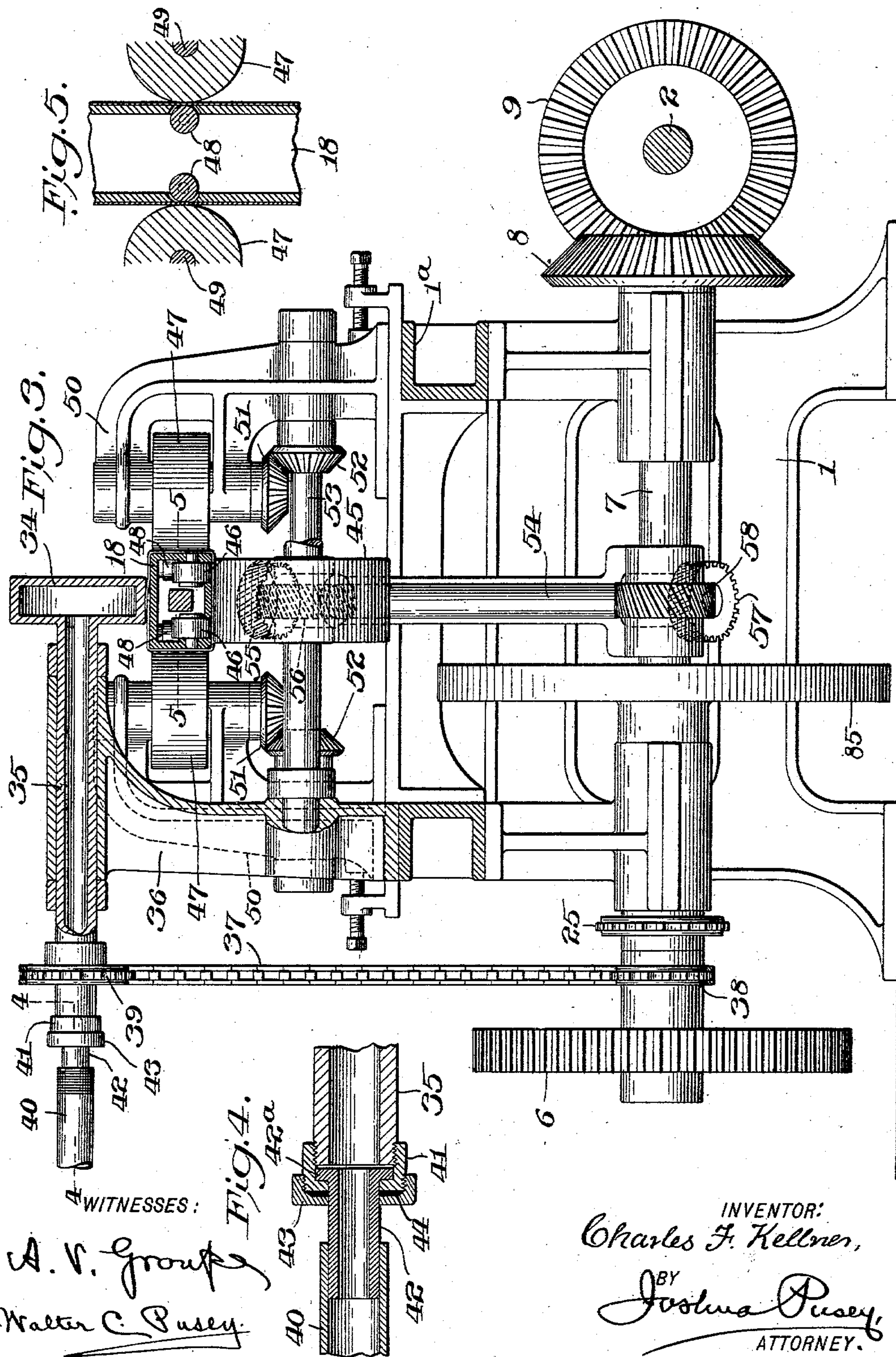
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9 Sheets—Sheet 3.



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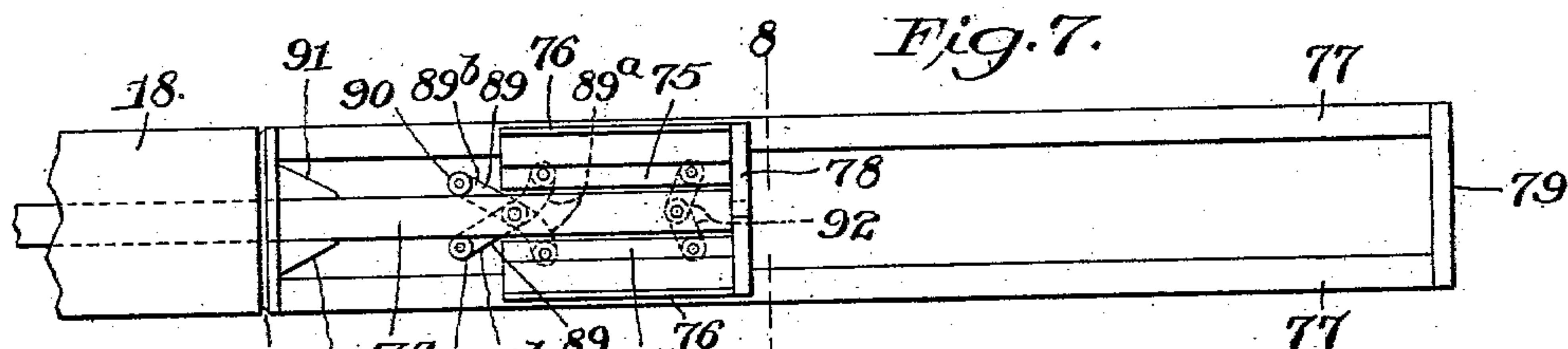
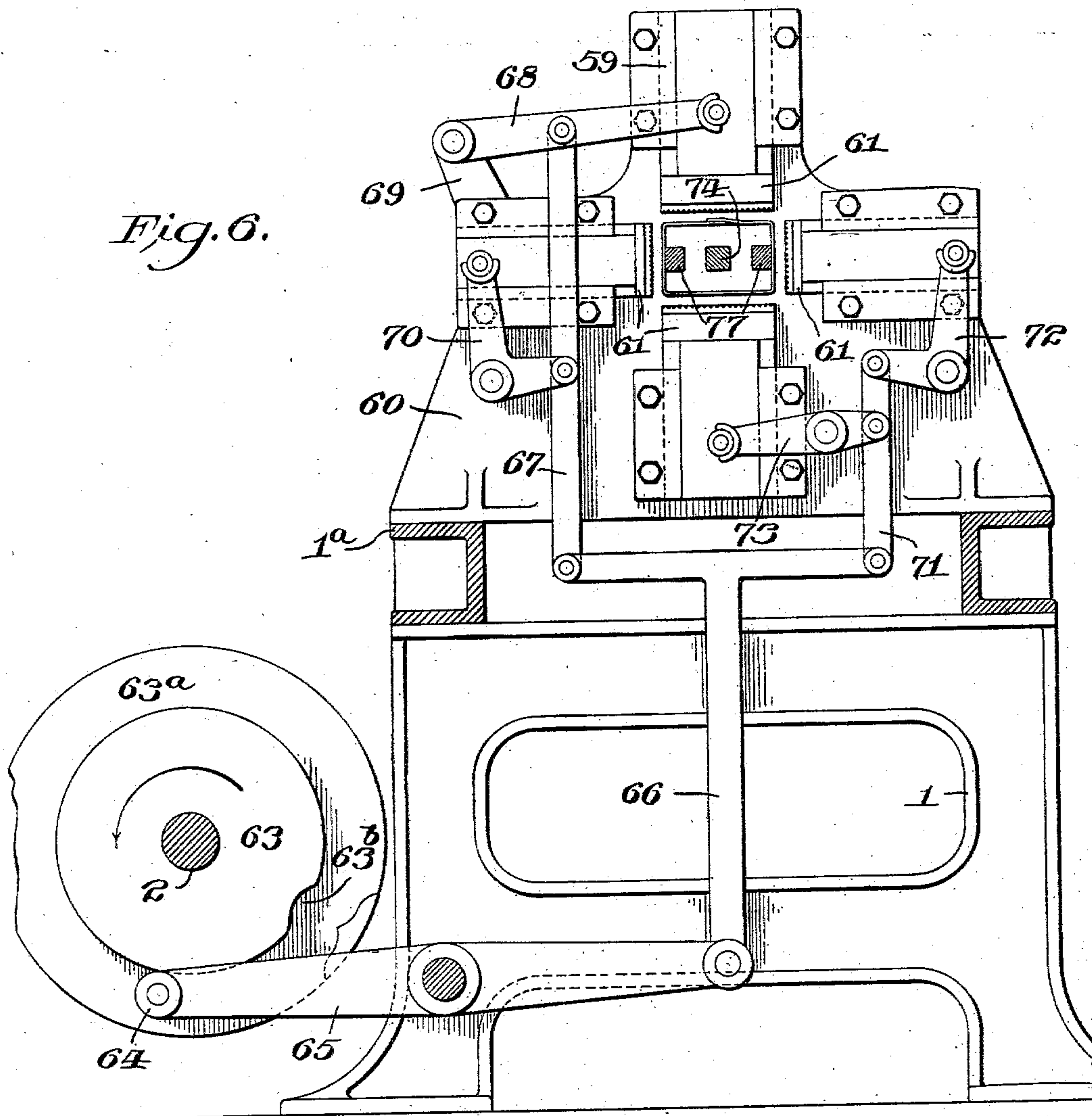
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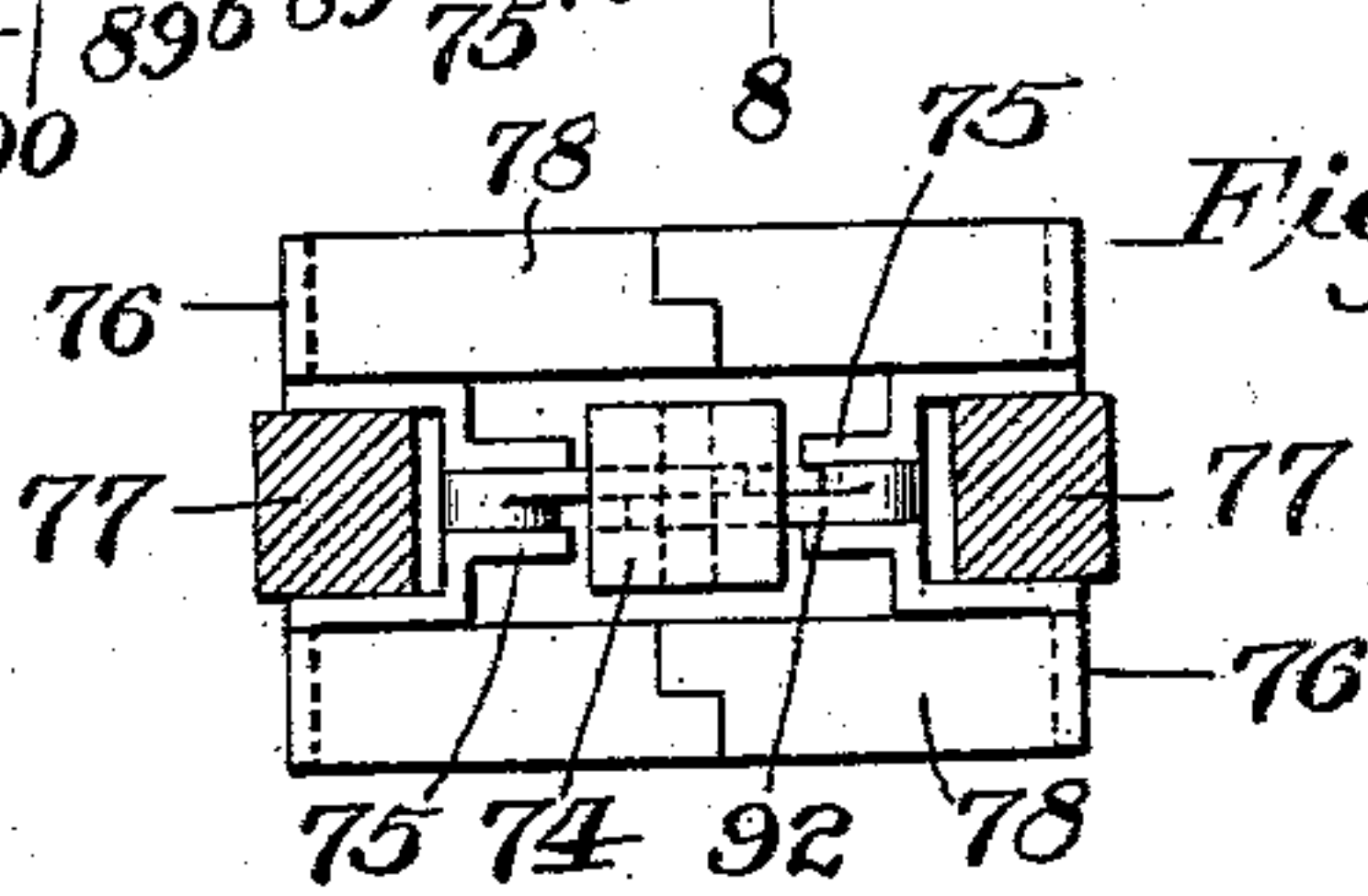
(Application filed July 11, 1901.)

9 Sheets—Sheet 4.

(No Model.)



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9 Sheets—Sheet 5.

(No Model.)

Fig. 10.

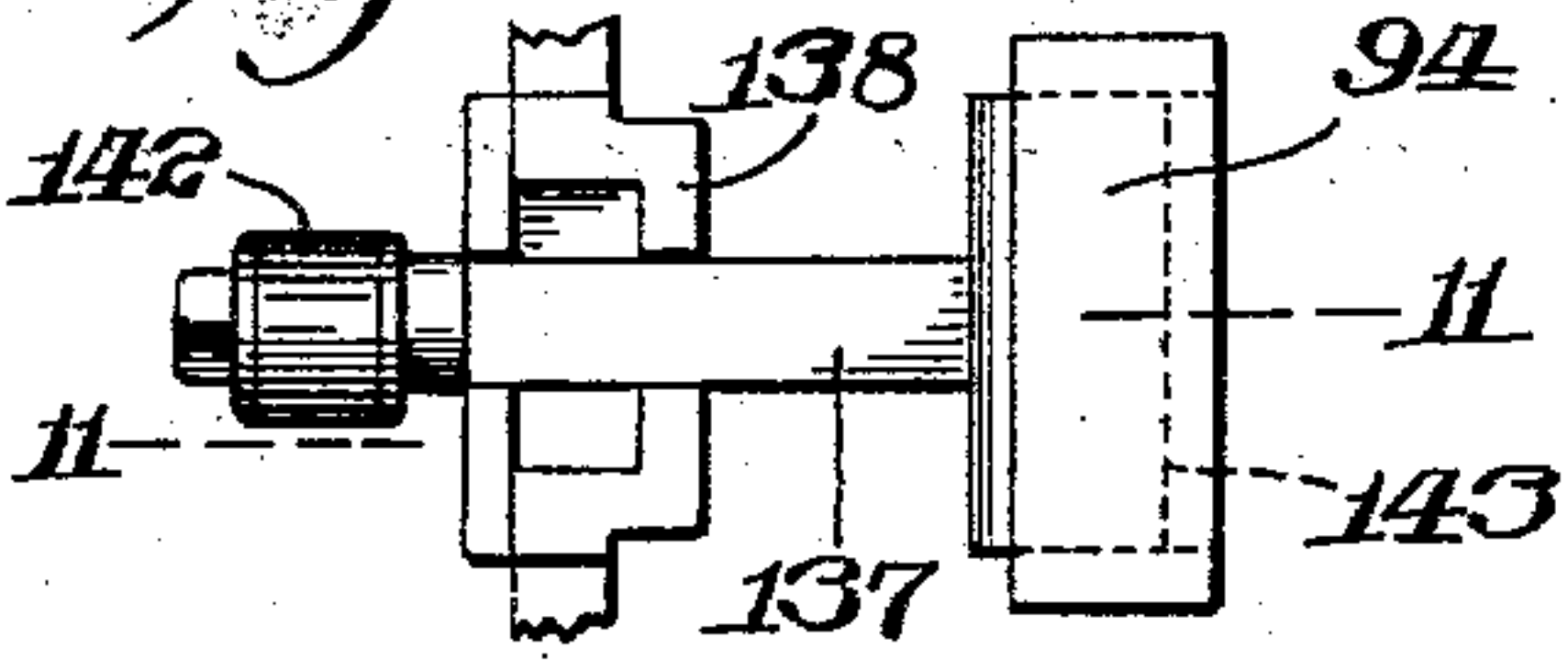


Fig. 11.

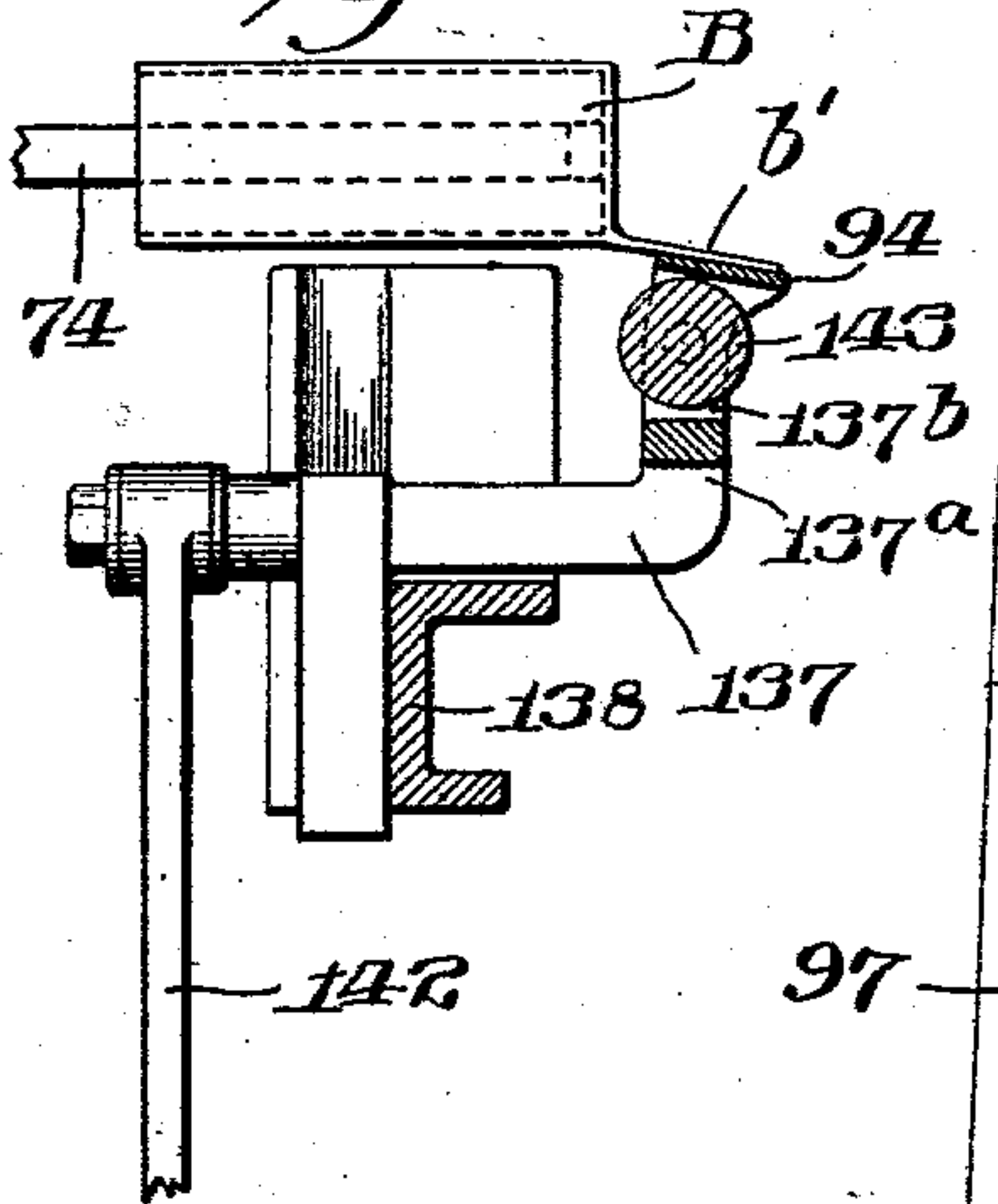
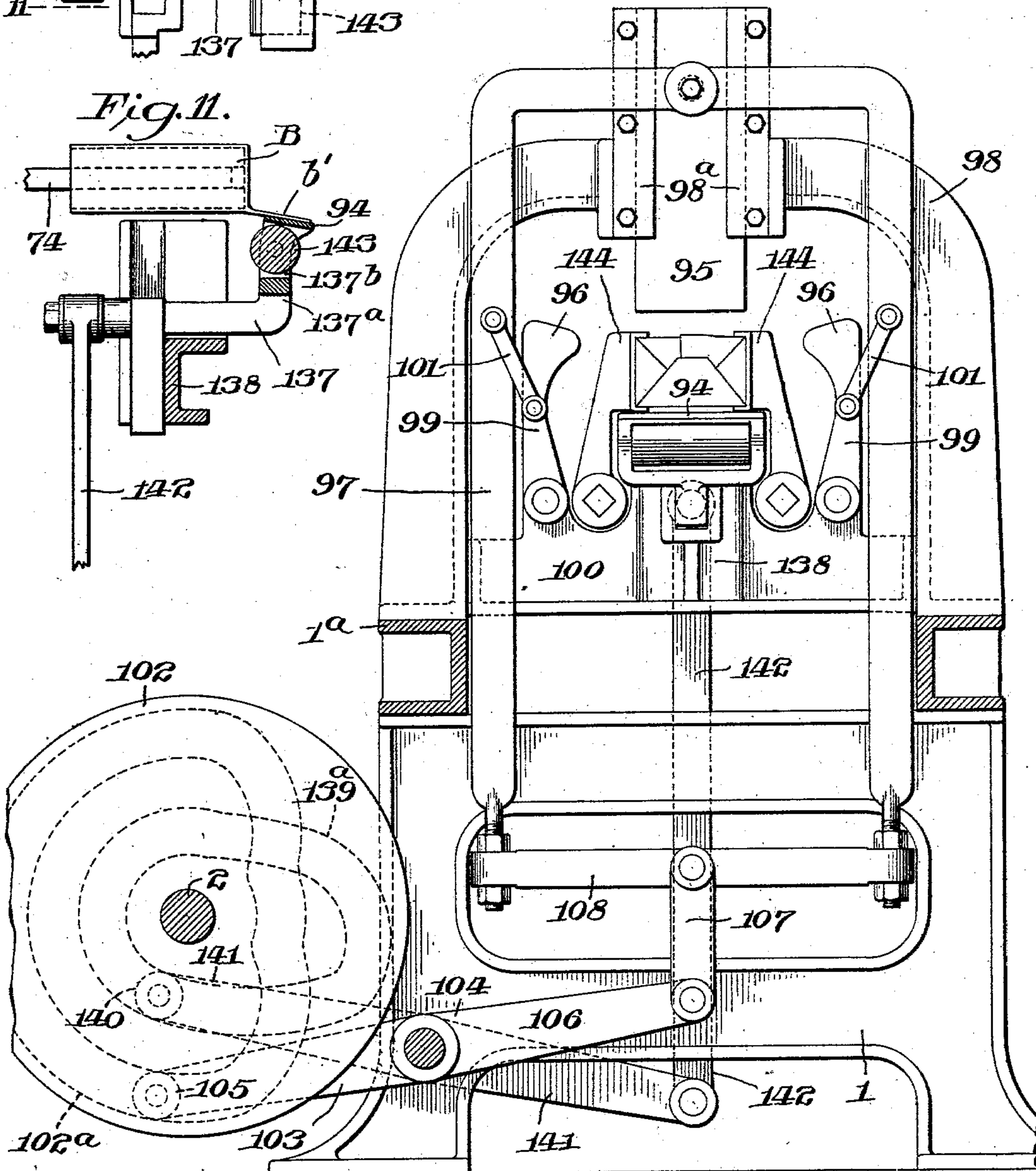


Fig. 9.



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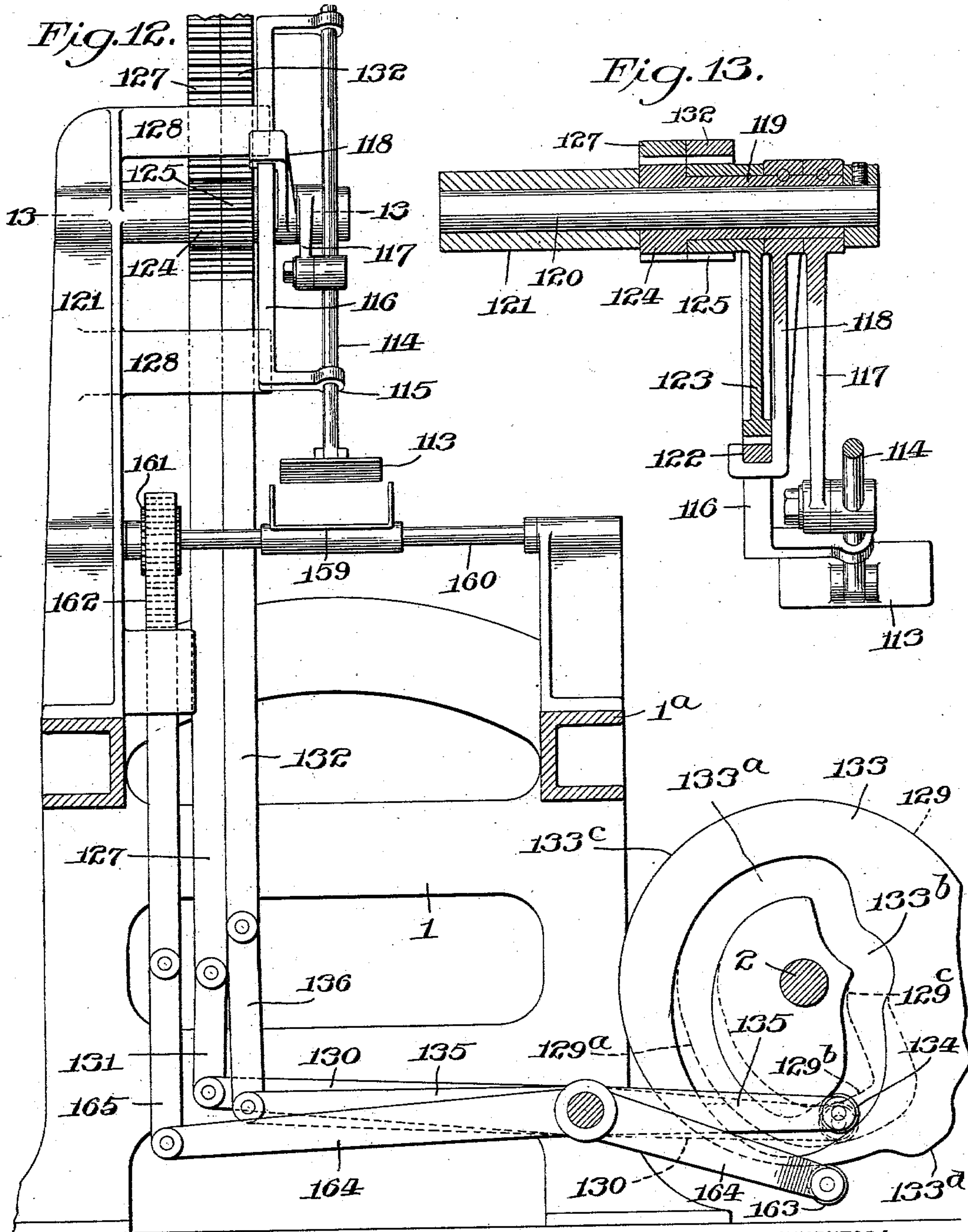
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9 Sheets—Sheet 6.



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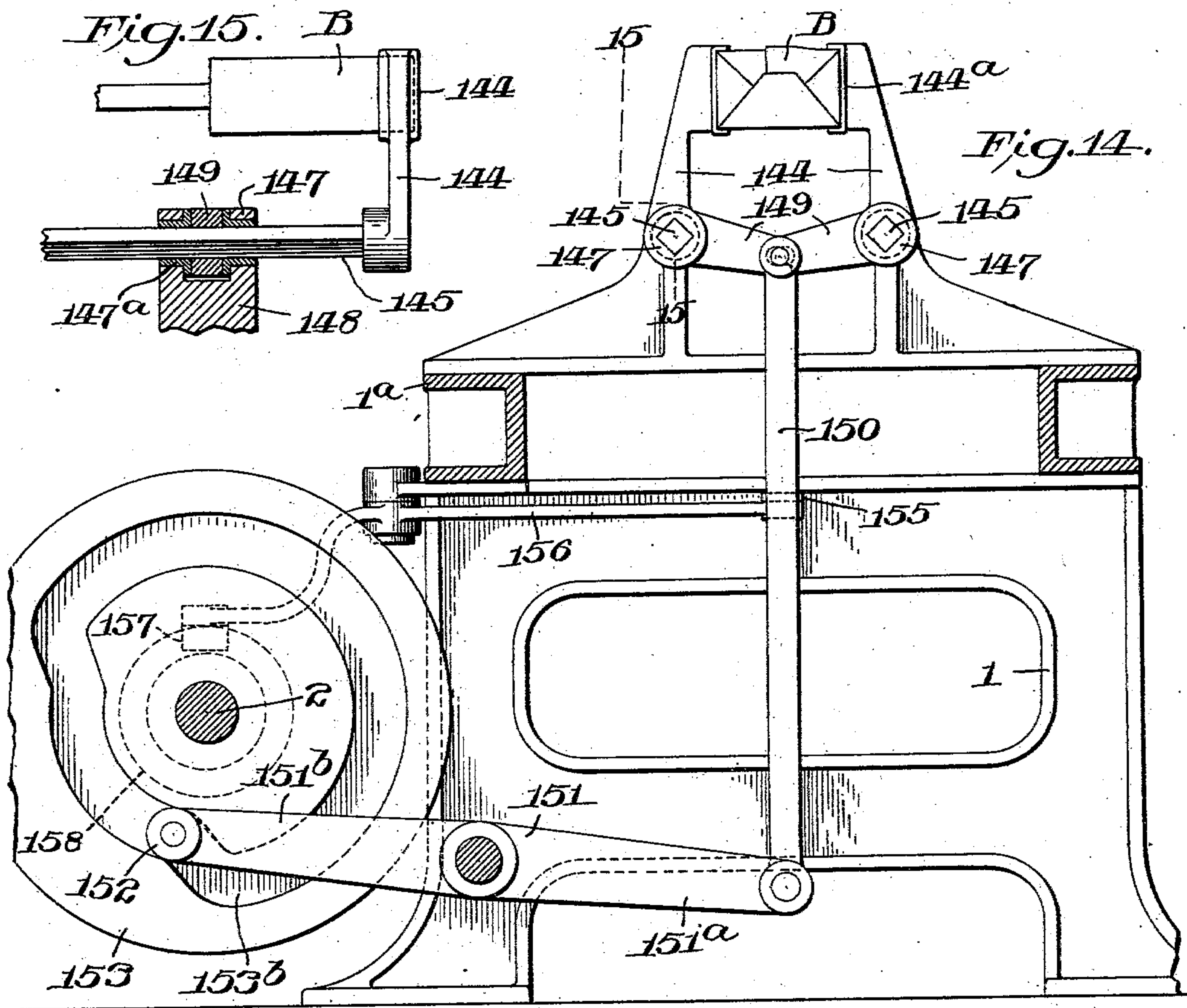
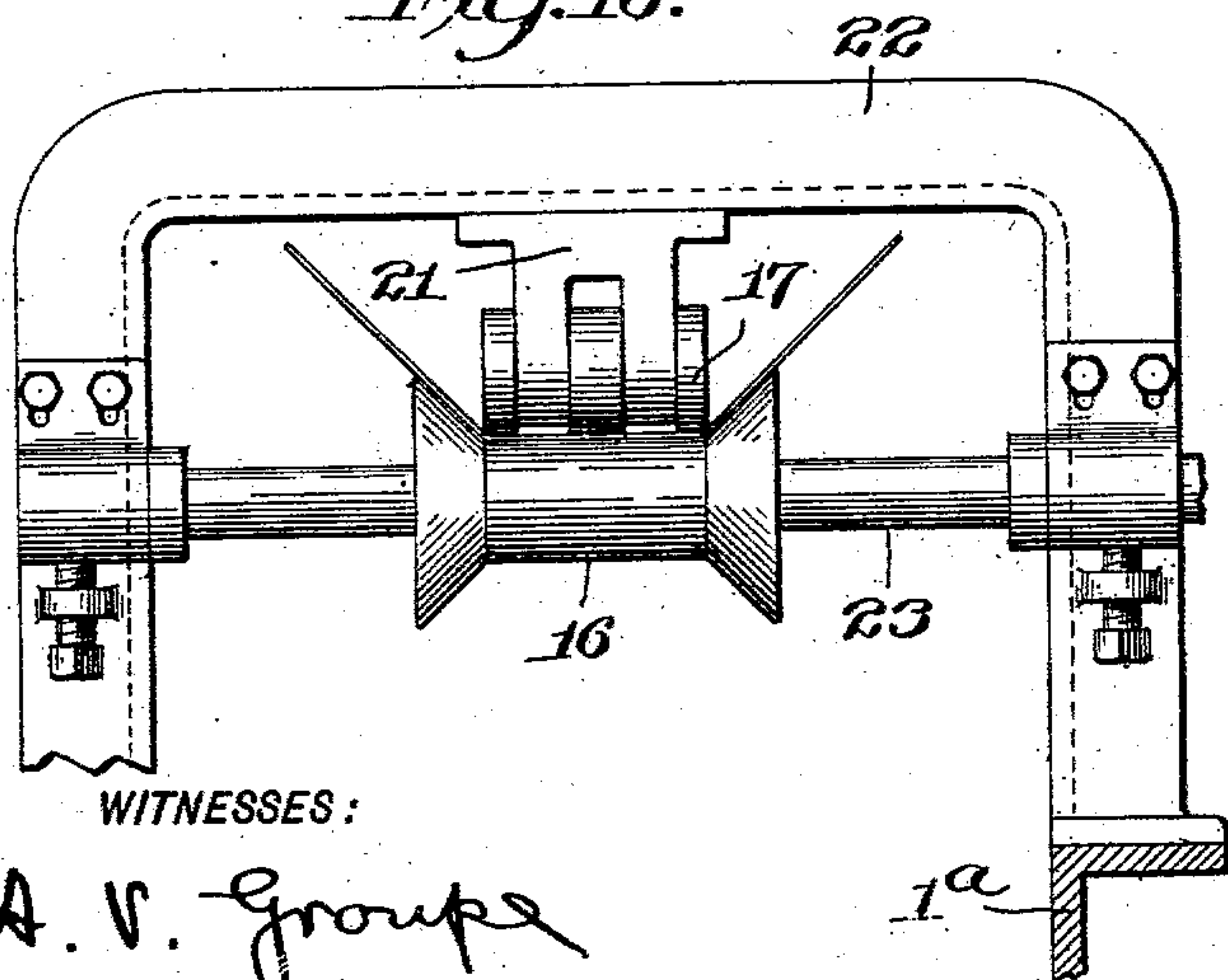


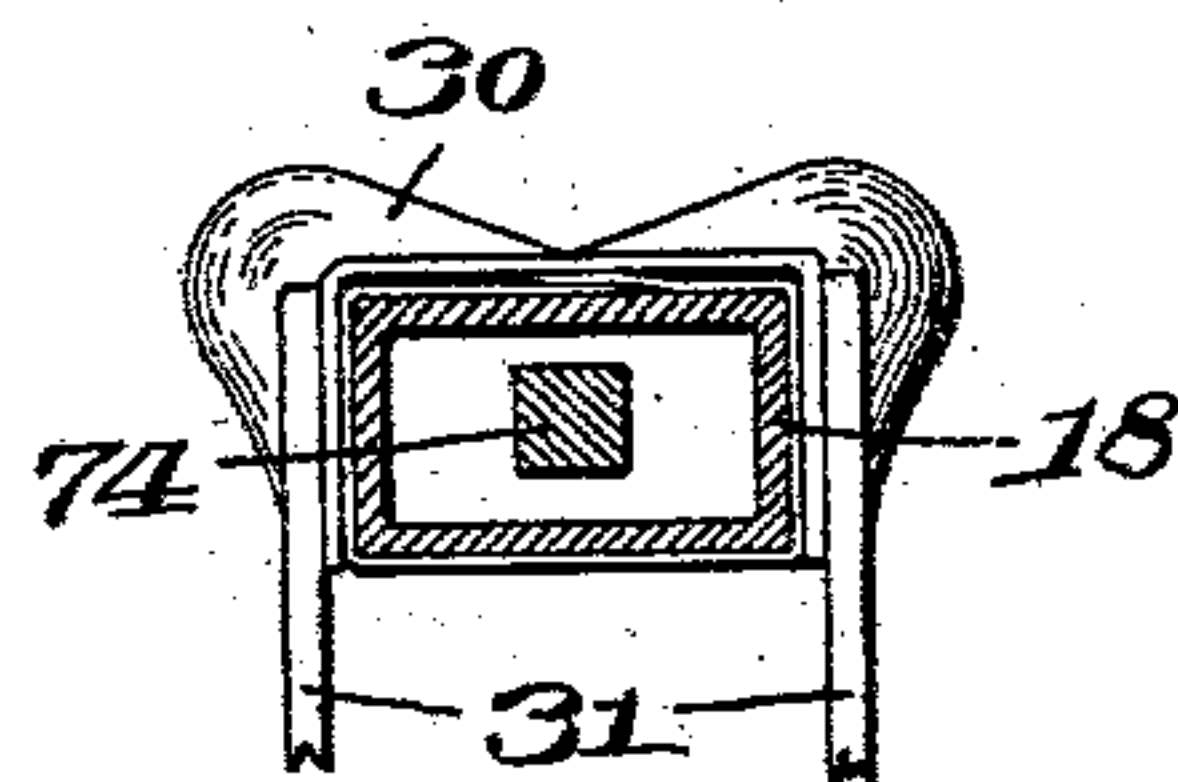
Fig. 16.



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Fig. 17.



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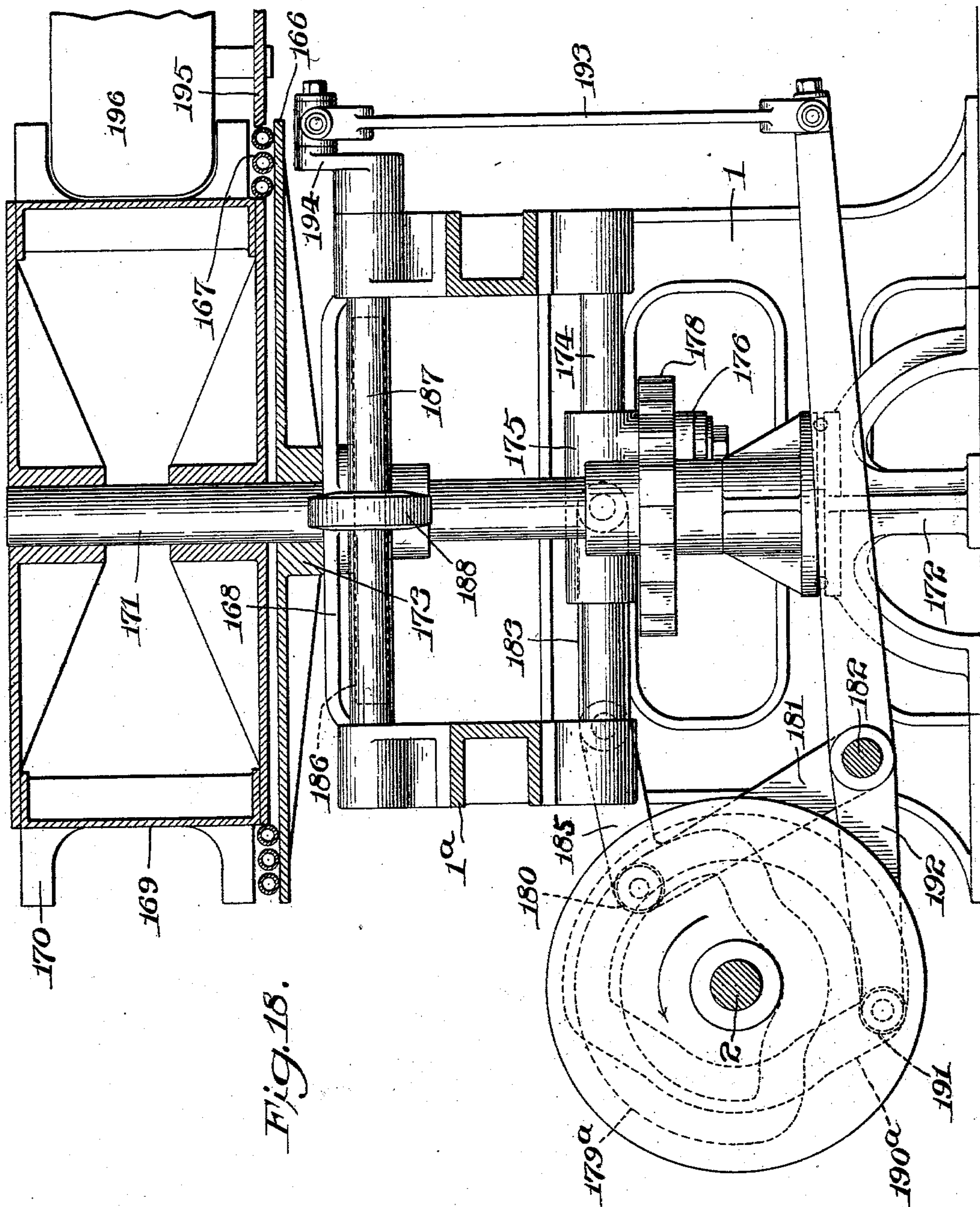


Fig. 18.

WITNESSES:

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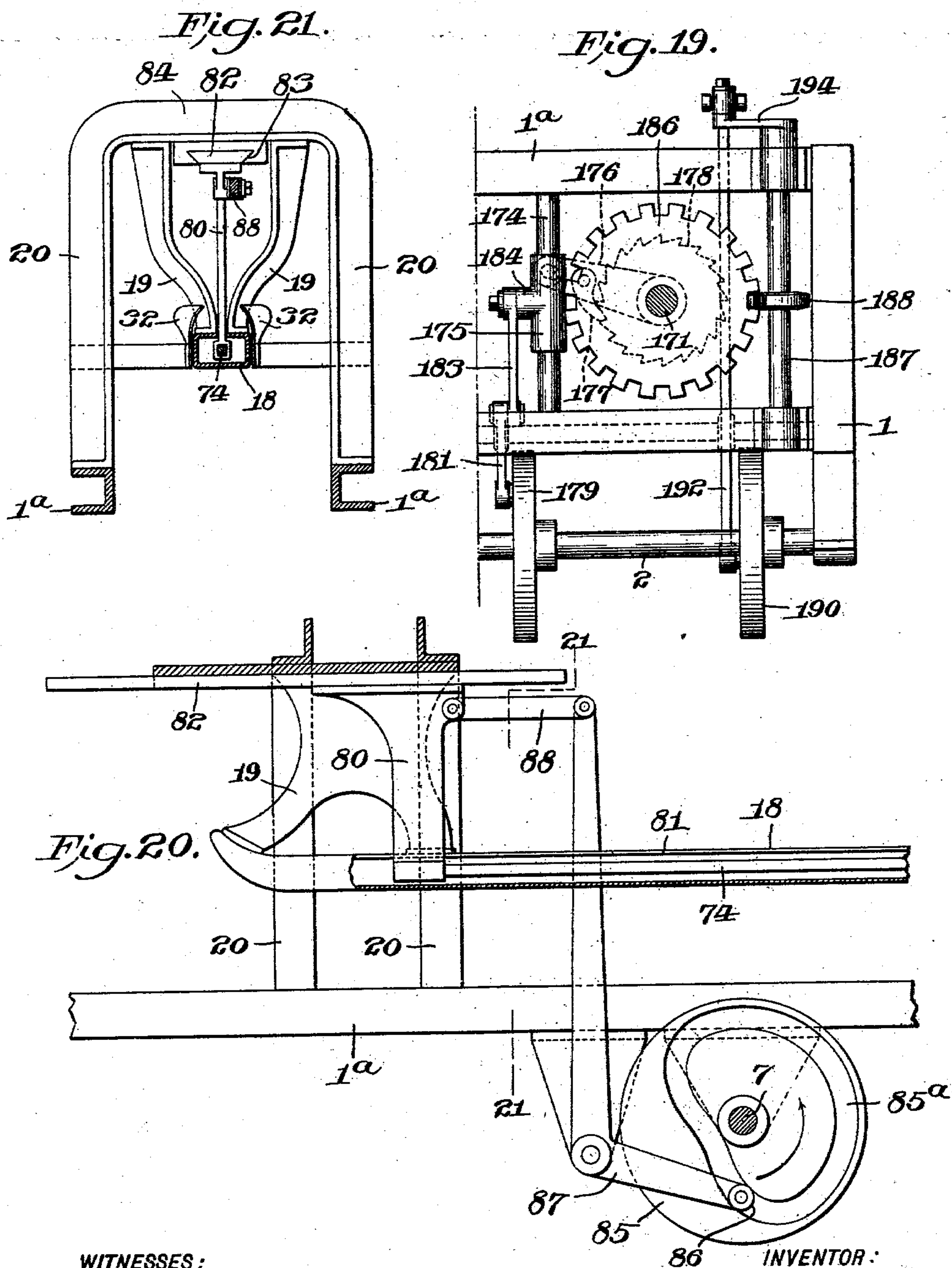
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9 Sheets—Sheet 9.



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UNITED STATES PATENT OFFICE.

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PAPER-BAG-MAKING MACHINE.

SPECIFICATION forming part of Letters Patent No. 704,807, dated July 15, 1902.

Application filed July 11, 1901. Serial No. 67,878. (No model.)

To all whom it may concern:

Be it known that I, CHARLES F. KELLNER, a citizen of the United States, residing in the city and county of Philadelphia, State of Pennsylvania, have invented certain new and useful Improvements in Paper-Bag-Making Machines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, of which—

10 Figure 1, Sheet 1, is a plan view. Fig. 2, Sheet 2, is a side elevation. Fig. 3, Sheet 3, is an enlarged section on line 3 3, Fig. 2. Fig. 4 is an enlarged section on line 4 4, Fig. 3. Fig. 5 is a section on line 5 5, Fig. 3.

15 Fig. 6, Sheet 4, is an enlarged section, as on line 6 6, Fig. 1, showing the cut-off devices in elevation. Fig. 7 is a plan view of the expansible carrier, which carries the bag forward from the cut-off to the bottom-closing

20 devices, also showing the forward end of the former and adjuncts. Fig. 8 is an enlarged section, as on line 8 8, Fig. 7. Fig. 9, Sheet 5, is an enlarged section on line 9 9, Fig. 2, showing the bottom-closing mechanism in

25 elevation. Fig. 10 is a detail in plan of a portion of the bottom-closing mechanism. Fig. 11 is a section on line 11 11, Fig. 10, showing a bag-blank in position to be folded. Fig. 12, Sheet 6, is a section, as on line 12 12,

30 Fig. 2, showing the mechanism for applying paste to the final fold during the bottom-closing operation. Fig. 13 is a section on line 13 13, Fig. 12. Fig. 14, Sheet 7, is an enlarged section, as on line 14 14, Fig. 1,

35 showing part of the devices for transferring the closed bag from the bottom-closing to the drying devices. Fig. 15 is a section on line 15 15, Fig. 14. Fig. 16 is a section, enlarged, on line 16 16, Fig. 2. Fig. 17 is an enlarged

40 section on line 17 17, Fig. 2. Fig. 18, Sheet 8, is an enlarged section on line 18 18, Fig. 2, through the bottom-drying and transfer drum, &c. Fig. 19, Sheet 9, is a horizontal section on line 19 19, Fig. 2, showing the

45 mechanism for imparting the intermittent rotation to the transfer and bottom-drying drum. Fig. 20 is a side elevation, partially in section, of the mechanism for reciprocating the rod which carries at its forward end

50 the expanding carrier for transferring the cut-off bag-blank to the bottom-closing devices. Fig. 21 is a section on line 21 21, Fig. 20.

The nature of this invention is a combination of mechanism and devices whereby bags are made in continuous succession from a roll 55 of paper, the paper being turned over a rectangular former and pasted to form a continuous rectangular tube. The end of such tube projected a suitable distance beyond the forward end of the former is entered by a 60 sliding contractible and expansible head, which supports said projecting part, while the latter is severed transversely by cut-off mechanism and is then advanced by a move- 65 ment to a predetermined position to be operated upon by devices for turning in and pasting one end of said part to form the closed bottom of the bag. The bag is then received by the devices to dry the pasted bottom.

Referring to the accompanying drawings, 70 1 is the general frame of the machine; 2, a shaft, hereinafter termed the "cam-shaft." This shaft is driven in the present instance by a belt (not shown) from a source of power 75 passing over a pulley 3 on a shaft 4, upon which is a gear 5, that engages a gear 6 on a shaft 7, on the end of which is a bevel-gear 8, that engages a like gear 9 on the cam-shaft 2.

10 is a shaft upon which is mounted the roll of paper 11, Fig. 2, from which the bags 80 are to be made by the machine. This shaft is journaled in suitable bearings of side bars 1^a of the frame of the machine. The free end of the paper passes over rollers 12 and 13 and between two rollers 14 and 15, thence between 85 two rollers 16 and 17, whose form and function will hereinafter appear.

18 is the "former," so termed because the paper as it is carried forward is formed over it into tubular shape. This former consists 90 of an elongated tube whose transverse dimensions are those of the bags to be made. It is rigidly maintained in the horizontal position by means of a bracket 19, that depends from supports 20, shaped like an inverted U, whose 95 feet rest upon the side bars 1^a of the frame of the machine.

The before-mentioned roller 16 is, as seen in Fig. 16, of the form of a spool—that is, with end flanges beveled on the inner side at 100 an angle of about forty-five degrees. The length of the plain cylindrical portion—that is, the portion extending between the bases of the beveled flanges—is about equal to the

width of the side of the paper tube to be made. The other roller 17, which is journaled in a bracket 21, depending from an inverted-U-shaped support 22, is of a length
 5 substantially equal to the distance between the bases of the flanges of its coacting roller 16. The latter roller 16 is mounted upon a shaft 23, which is driven from the transverse shaft 7 by means of a chain 24, passing over
 10 sprocket-wheels 25 and 26 on the shaft 7 and shaft 23, respectively.

The end of the paper after having passed between the rollers 14 and 15 is passed between the rollers 16 and 17, by which latter
 15 the side portions of the paper are caused to flare upwardly, as clearly seen in Fig. 16, Sheet 7, preparatory to being turned over the sides and upon the top of the former. On the way from the rollers 14 and 15 to the rollers 16 and 17 a line of paste is applied to the margin of that side of the paper which is to be turned over upon the margin of the other side. This paste line is applied in the present instance by means of a small roller 27,
 20 that is in contact with a roller 28, which is adapted to rotate in a receptacle 29, containing suitable paste, as seen in Figs. 1 and 2.

The turn-over device (seen in Figs. 1, 2, and 17) consists of a structure 30, that is supported by a post 31, rising from the frame of the machine, and which structure surrounds the two sides and top of the former, the inner side of its forward end being in proximity to the former slightly in excess of the
 35 thickness of the paper, while the device curves or flares outwardly to the rear, as shown. One side of the device differs slightly in form from the other in order to insure the turning over of one side of the paper (the unpasted side)
 40 just before the other side is finally turned over.

The end of the paper after passing through the rollers 16 and 17 is directed by hand into the turn-over device 30, which is required to
 45 be done with each roll of paper at the beginning only, or in lieu of the hand I may use a similar turn-over device 32, Figs. 2 and 21, a suitable distance from the rear of the one above described for turning over the paper
 50 sufficiently to direct its free end into the mouth of the first device 30.

In order to dry the line of paste by artificial heat, I provide two rollers 33 34 in advance of the turn-over device 30, whose peripheries are adapted to bear upon the upper surface of the paper tube around the former. These rollers are mounted on the ends of respective shafts 35, that are journaled in brackets 36, Fig. 3, rising from the
 60 frame of the machine, and which rollers are driven from the aforesaid transverse shaft 7 by a chain 37, passing around a sprocket-wheel 38 on the latter shaft and a similar wheel 39 on each of the shafts 35, as seen in
 65 Figs. 1 and 3 and indicated by dotted lines in Fig. 2. The said rollers 33 and 34 and their respective shafts are hollow, as shown, the

outer ends of the latter connecting with pipes 40, leading to a source of steam or other heating agent.

In order to effect a steam-tight joint between the rotatable shafts 35 and the fixed pipes 40, I provide a construction such as that shown in Figs. 3 and 4, in which the shaft 35 has secured on its free end a flanged ring 41,
 75 in which is the flanged head 42^a of a pipe 42, that is connected with the steam-pipe 40. The ring 41 is screwed to a similar flanged ring 43, between which and the ring 41 is a suitable packing 44. The pipe 42 thus remains stationary, while the shaft 34 rotates with the connected rings.

Below the rollers 33 and 34 and bearing against the under side of the former is an idler pressure-roller 45, which serves to aid
 85 in supporting the former and between which and small idler-rollers 46, journaled within the hollow former and whose peripheries extend through slots in the bottom wall thereof, the paper tube is adapted to pass, all as
 90 seen in Fig. 3.

In order to further positively insure the advance of the tube of paper, I employ a horizontal roller 47, Figs. 1, 3, and 5, on each side of the former in connection with corresponding small rollers 48, Fig. 5, on the inside of the former. These latter rollers project through slots in the former, so that their peripheries may come into contact with the inner surface of the paper tube, while the out-
 100 side rollers 47 come into contact with the outer surface of the tube—that is, that part of the tube is in the bite of said two rollers. The large rollers 47 are positively driven, they being mounted on vertical shafts 49,
 105 journaled, respectively, in laterally-adjustable brackets 50 of the frame of the machine. Each of these shafts has a bevel-gear 51 on its lower end that engages a bevel-gear 52 on a horizontal shaft 53. This latter shaft is
 110 driven from the shaft 7 by an oblique shaft 54, having a skew-gear 55 on its upper end that engages with a skew-gear 56 on shaft 53 and having a like gear 57 on its lower end that engages a skew-gear 58 on the shaft 7.

In the operation of my invention it is necessary at fixed intervals to cut off from the end of the paper tube a suitable length preparatory to forming the same into a bag. The cutting-off operation takes place at the time
 120 when a certain part of the paper tube projects beyond the forward end of the former, and the length so cut off is equal to that of the length of the bag to be made plus the portion to be folded in to form the bottom of
 125 the bag.

The mechanism for cutting off the paper tube into bag lengths is as follows, reference being had to Figs. 1, 2, and 6, more particularly to the latter figure: Mounted in guide-
 130 ways 59 of a support 60, that rests upon side rails 1^a of the frame of the machine, are four knives 61, with saw-toothed cutting edges, two of them being vertically disposed

and adapted when reciprocated inwardly to sever the top and bottom of the tube, respectively, and the other two being horizontally disposed to sever the sides of the tube.

5 The said knives are located so that their plane of movement coincides with a circumferential groove 62, Fig. 7, sunk in the walls of the former adjacent to the forward end thereof, into which groove the knives are respectively adapted to enter and sever the paper tube. The said knives are actuated by a cam-wheel 63 on the cam-shaft 2, having a groove 63^a in the side thereof, the major part of which is concentric with the axis of rotation of the cam, but with an inward depression 63^b. (Clearly seen in Fig. 6.) A roller 64 on the end of one arm of a rock-lever 65 engages the cam-groove, and pivoted to the other arm of said lever is a T-shaped arm 66. To one limb of the T is pivoted a vertical arm 67, to the upper end of which is pivoted a lever 68, the outer end of which is pivoted to a projection 69 of the supports 60, and the inner end of which lever is pivotally connected to the upper one of the vertical knives 61. There is also pivoted to the arm 67 a limb of a bell-crank lever 70, the other limb of which latter is pivotally connected with the one of the horizontal knives 61 on that side. To the other limb of the T-shaped arm 66 is pivoted an arm 71, to the upper end of which is pivoted an arm of a bell-crank lever 72, similar to the aforesaid bell-crank lever 70, the other arm of which lever is pivotally connected to the knife 61 on that side. There is also pivoted to the arm 71 the outer arm of a rock-lever 73, whose other or inner arm is pivotally connected to the lower one of the vertical knives. When the roller 64 is riding in the concentric part of the groove of the cam-wheel 63, the several knives will be in the outward or retracted position. (Shown in Fig. 6.) As the cam-wheel continues its rotation (in the direction of the arrow in said Fig. 6) the roller 64 will enter the eccentric or depressed portion 63^b of the cam-groove 63^a, whereupon that end of the rock-lever 65 will be elevated with a short quick movement and obviously the other arm of the said lever will be depressed, and consequently the T-shaped arm 66 and the vertical arms 67 and 71. The obvious effect of this downward movement will by reason of the described lever connections between the arms and the several knives be to cause the latter to move inwardly at the same time and finally to enter the groove 62, and so sever the paper tube. The bag length or blank having been thus cut off, it is now to be carried forward in position to be operated upon by the infolding and pasting mechanism for forming the closed bottom of the bag. This carrying operation is accomplished by the following mechanism: Extending within the former 18 is a rod 74, on the outer end of which, beyond the forward end of the former, is secured a device, hereinafter termed the "carrier," whose

width is normally that of the paper tube upon the former. This carrier (marked 75 in the drawings) consists of two independent bars 76, the middle part of each of which is U-shaped, as seen in Fig. 8, and adapted to engage and slide longitudinally upon rigid guide-bars 77, which project from and are secured to the forward end of the former. At the forward end of the bars 76, on the top and bottom thereof, respectively, are secured two transverse bars 78, which are adapted to move endwise to and from each other—that is, to partake of the movements of the bars 76—and the upper side of the one set of bars is in the same plane as that of the upper side of the bars 76 and the under side of the other set is in the same plane as that of the lower side of the said bars 76, as seen in Fig. 8. The outer ends of the bars 77 are connected by a cross-bar 79. The rod 74, and consequently the said carrier 75, is caused to reciprocate to and from a predetermined distance and at predetermined times by the following mechanism, reference being had more especially to Figs. 2, 20, and 21: The rear end of the said rod 74 within the former is connected to a depending bar 80, that passes through a slot 81 in the former. On the upper end of the bar 80 is a head 82, that is adapted to slide in a dovetail groove 83 in a cross-piece 84, connecting the crowns of the inverted-U-shaped supports 20. The required reciprocations of the rod 74 are effected by means of a wheel 85 on the shaft 2, having a cam-groove 85^a of suitable form, as clearly seen in Fig. 20. A roller 86 on the free end of an arm of a bell-crank lever 87 is entered into said groove. The other or vertical arm of this lever is pivotally connected at its upper end with a horizontal arm 88, whose other end is pivoted to the bar 80, that carries the rod 74, as hereinbefore described. In the drawings the rod 74 is shown as having been retracted some distance rearwardly, the carrier 75 moving toward the forward end of the former. When fully retracted, the carrier 75 is entered into the part of the paper tube then projecting beyond the end of the former, the length of which part is that of the length of the bag to be finally made plus the portion to be folded in to form the bottom of the bag. When the said projecting part has been cut off by the mechanism hereinbefore described, the rod 74, and consequently the carrier 75, is moved forward by the action of cam-wheel 85 and carries with it the cut-off portion of the tube to the mechanism for infolding and pasting to form the bottom of the bag.

It is necessary that the carrier 75 shall be capable of being contracted and expanded laterally at predetermined times. To this end I employ two cross-bars 89, Figs. 7 and 8, that are pivoted at their crossing to the rod 74, and their forwardly-extending limbs 89^a are pivoted, respectively, to the carrier-bars 76, while the rearwardly-extending limbs 89^b (toward the end of the former) are pro-

vided with rollers 90. When the carrier-bars 76 and 78 are in their farthest inward or contracted position, as seen in Fig. 7, the said rollers 90 bear, respectively, against the sides 5 of the rod 74. Projecting from the forward end of the former 18 are inclines 91, one on each side of the rod 74, against and upon which the said rollers 90 are adapted to ride as the carrier moves toward the former, and 10 thus the bars 76 and 78 will be forced outwardly until the width of the carrier will equal the width of the paper tube on the former.

In order to maintain the carrier-bars 76 and 15 78 in the expanded position when the carrier is moved forward after having been expanded, I connect the bars 76 by pivoted arms 92, Fig. 7, as hereinafter described, forming a knee-joint, these arms passing slightly beyond the center when the carrier is expanded. 20

The operation of the carrier is as follows: Premising that in the drawings the rod 74 is shown as having been retracted some distance rearwardly, the carrier 75 then moving 25 toward the end of the former 18—that is to say, toward the end of the paper tube then projecting beyond the latter. As the cam-wheel 85 continues its rotation the carrier 75 being in the collapsed or contracted position 30 previously mentioned enters the said projecting end of the paper tube, the bars 76 and 78 being thrown outwardly by the rollers 90, riding upon the inclines 91, and thus the projecting part of the tube-blank will be stretched 35 over and so held by the carrier. At the same time the arms 92 of the knee-joint will straighten out. For a reason soon to appear the length of the carrier and the extent of its entrance within the tube-blank are such that 40 the forward end of the latter will project a certain distance beyond the carrier. In the course of the rotation of the cam 85 the rod 74, and consequently the carrier 75, will be advanced, the latter carrying with and upon 45 it the tube-blank, which has just been cut off by the knives 61. The said end of the blank projecting beyond the end of the carrier is the part that is to be folded in, the extent of projection being sufficient for that end, as 50 hereinafter described, to form the bottom of the bag. When the carrier 75 has reached the limit of its forward movement, the front face of the bars 78 will be in the same vertical plane as the front of the cross-bar 79, the 55 said bars 78 and cross-bar constituting a head against which the projecting end of the bag-blank is folded to form the bottom of the bag.

I shall now describe the mechanism and devices whereby the sides, top, and bottom of 60 the bag-blank are folded in and secured by pasting in order to form the bottom of the bag, particular reference being had to Figs. 1, 2, 9, 10, 11, 12, and 13 of the drawings. At the time the infolding devices are brought 65 into operation the end of the bag-blank B beyond the former projects over a plate 94,

Figs. 2 and 11, that is adjacent to the lower side of the projecting end of the blank.

95, Fig. 9, is the blade for folding in the top part of the blank, and 96 represents the 70 blades for folding in the sides of the same. The blade 95 is fixed to the crown of an inverted U-shaped frame 97 and is adapted to slide vertically in suitable guideways 98^a of brackets 98, that are supported by the side 75 rails 1^a of the frame of the machine. The side-folding blades consist of arms 99, whose lower ends are pivoted to a cross-bar 100, connecting the bases of the brackets 98. They are pivotally connected about midway of their 80 length with the side of the U-shaped frame 97 by a link-bar 101. It will be obvious that if the frame 97 be moved downwardly the blades 96 will be caused to swing inwardly on their pivots, and when the said frame is 85 retracted the several blades will return to the normal or inactive position seen in Fig. 9. The frame 97 is reciprocated at proper times by means of a cam-wheel 102 on the cam-shaft 2, having a groove 102^a therein of the form 90 indicated by the dotted lines in Fig. 9. An arm 103 of a rock-lever 104 has at its free end a roller 105, entered into said groove 102^a. The other arm 106 of the lever is connected by a link 107 with a cross-bar 108, connect- 95 ing the lower end of the U-shaped frame 97. The plane of movement of the said folding-blades is slightly in advance of the front of the cross-bar 79 and the carrier 75 at the time the latter has reached the limit of its forward 100 movement. In the descent of the frame 97 first the vertical blade 95 folds in the top part of the projecting end of the bag-blank against the cross-bar 79 and bars 78 of the carrier and then the blades 96 fold in the sides of the 105 blank. There remains the bottom of the latter to be folded over the three folds that have been made. Before, however, the devices for making this last fold are brought into operation paste is applied to the upper side of that 110 part of the blank by suitable means—such, for example, as by mechanism now to be described.

Mounted upon a support 109, Fig. 2, that rests upon the side bars 1^a of the frame of 115 the machine, is a paste-containing vessel 110, in which is journaled a roller 111, whose periphery is in contact with a small roller 112, whereby paste is transferred thereto by the first-mentioned roller. 120

113, Figs. 2, 12, and 13, is a plate or shoe on the lower end of a bar 114, to which certain movements are imparted by mechanism hereinafter described to cause the said shoe 125 at predetermined times to come into contact with the roller 112, and thereby receive paste therefrom, and then to apply paste upon the upper surface of the bottom of the bag-blank to be afterward brought over and upon the 130 folds previously made by the blades 95 and 96. The mechanism for actuating said shoe is as follows, reference being had particularly

to Figs. 2, 12, and 13: 115 is a rectangular frame, of which a portion of the aforesaid bar 114 constitutes one side and a bar 116 the opposite side. The said frame is sustained by two arms 117 and 118, respectively, that extend from and are fixed to a rotatable sleeve 119 upon a fixed shaft 120, that extends horizontally from a support 121, which rises from a side bar of the machine-frame. The frame-bar 114 (which has at its lower projecting end the shoe 113) passes through a guide-hole in the outer end of the arm 117, and the frame-bar 116 rests in a guide-slot 122 at the outer end of the arm 118, so that the frame 115 may have a longitudinal sliding movement. The forward side of the bar 116 is provided with teeth that engage the teeth of a segment 123. The hub of this segment is sleeved rotatably upon the before-mentioned sleeve 119, to which the arms 117 and 118 are fixed, as more clearly seen in Fig. 13. The sleeve 119 has a gear 124 and the segment-hub a similar gear 125, Figs. 12 and 13. The teeth of gear 124 engage those of a rack-bar 127, Fig. 12, that is adapted to slide vertically in suitable bearings or guideways of arms 128, projecting from the support 121, as seen in said Fig. 12. This rack-bar is actuated at proper times by a cam-wheel 129, Figs. 2 and 12, on the cam-shaft 2, having a suitable cam-groove 129^a, Fig. 12, in which rides a roller on the end of an arm of a rock-lever 130, whose other arm is connected with the lower extremity of the said rack-bar by a pivoted link 131. It will be obvious that the sleeve 119, upon which the arms 117 and 118 are mounted, and the hub of the segment 123 being concentric, a vertical movement imparted to the said rack will tend to cause the frame 115 to swing around in the arc of a circle against the periphery of the segment. The teeth of the gear 125 on the segment-hub are in engagement with the teeth of a rack-bar 132, similar to the first rack-bar 127, which bar 132 is also adapted to slide in guideways of the aforementioned arms 128 of the supports 121. It is actuated at predetermined times by means of a cam-wheel 133 on the shaft 2, having a suitable cam-groove 133^a, Fig. 12, in which is a roller 134 on an arm of a rock-lever 135, the other arm of which is connected with the bar 132 by a link 136. A vertical movement of the said bar 132, assuming the parts to be in the position shown in the drawings, will manifestly tend to rotate the segment 123. As the cam-shaft 2 rotates the roller 134 on the end of the rock-lever 135, that is connected with the rack-bar 132, travels in a depressed portion 133^b of the cam-groove 133^a of the cam-wheel 133, (which portion it has already entered, as seen in Fig. 12.) This causes the said rack-bar to be drawn down, and thus to rotate the gear 125 on the hub of the segment 123, and consequently the latter carries up the frame 115, to which the shoe 113 is connected. At this time the roller on the end of the rock-lever 130, which

is connected with the rack 127, is resting on a high portion 129^b of the cam-groove 129^a of the cam-wheel 129, as indicated by dotted lines in Fig. 12. As the said cam-wheel continues to rotate the roller 134 continues to travel in the depressed part of the cam-groove 133^a, and the roller of lever 130 travels onto a depressed portion 129^c of the cam-groove 129^a, and so draws down the rack 127, thereby rotating the pinion on the sleeve 119. The result of these movements is that the rack carrying the shoe 113 is moved longitudinally upward and at the same time in the arc of a circle concentric with the axis of the shaft 120. When the said rollers reach the projections of the respective cam-grooves 129^a and 133^a, which they do simultaneously, there is imparted to the frame 115 a compound movement—that is to say, it (the frame) is projected longitudinally toward the paste-roller 112 and at the same time downwardly, so that the shoe 113 will be brought against and, so to say, wipe against the said roller 112, thereby taking paste therefrom. As the cam-wheels 129 and 133 continue their rotation the frame 115 is caused to move downwardly (the reverse of the before-described upward movement) until the shoe 113 comes into contact with and applies paste to the final fold *b'* of the bag-blank B then overlying the plate 94. The shoe is then moved up away from the latter by the action of said cams as before. The shoe 113 having been thus retracted out of the way, the bottom of the projecting end of the blank is folded and pressed over and upon the preceding folds by the following-described mechanism and devices, particular reference being had to Figs. 9, 10, and 11: The before-mentioned plate 94 constitutes the expanded top of a vertical limb 137^a of a bent bar 137, that is adapted to slide vertically in suitable guideways of a post or support 138. The required vertical reciprocations of the said bar 137 at the proper predetermined times are effected by means of a cam-wheel 139 (indicated by dotted lines in Fig. 9) upon the cam-shaft 2, having a groove 139^a, in which is entered a roller 140 on the end of one arm of a rock-lever 141, whose other arm is pivotally connected to a rod 142, that is secured to the horizontal limb of the bent bar 137. In a slot 137^b in the expanded vertical limb of this bar immediately below the top of the latter—that is, the plate 94—is journaled a roller 143, the rear of whose periphery is slightly forward of the plane of the front face of the cross-bar 79 and the bars 78 of the carrier 75. The relative timing of the cam 139 is such that as soon as the shoe 113 has moved sufficiently upward after having applied paste to the bottom fold *b'* of the blank, as before described, the bar 137 is caused to ascend, whereby the plate 94 bends up the said final fold, and the roller 143, following, presses and sets the fold firmly against the said cross-bar 79 and carrier-bars 78 or, more exactly, against the previous folds of the blank. The bar 137 now descends as the cam 139 con-

tinues its rotation, and the blank B, now in the form of a satchel-bottom bag, is ready for the next operation, which is the drying of the paste that was applied to the said bottom-fold. The cam 85 and its said connection with rod 74 now causes the carrier 75 to move backward toward the former 18 to take another blank. At the beginning of this rearward movement the blank is released from the hold of the carrier by the rod 74 drawing upon the arms 92, that had kept the carrier distended while the blank was upon it, thereby bending the aforesaid knee-joint, and thus collapsing the carrier. About simultaneously with the starting back of the carrier 75 from the limit of its forward stroke the blank is grasped and held by two suitably-located arms 144, one on each side, having U-shaped inner faces 144^a, that take against the sides and a part of the top and bottom of the blank in the manner shown in Fig. 14. The said arms 144 are mounted at their lower ends upon the forward ends, respectively, of rock-bars 145, whose rear ends are journaled in a cross-head 146, Figs. 1 and 2, and are journaled in suitable bearings 147 of brackets 148, Figs. 1, 2, and 14, extending over from the side rail 1^a of the frame of the machine. The rock-bars 145 are rectangular in cross-section and pass through similar rectangular holes in the hubs of the arms 144, the latter being secured thereto. The bearings 147 are bifurcated, as seen in Figs. 1, 2, and 15. The rock-bars also extend through rotatable circular bushings 147^a, placed within said bifurcations through rectangular holes, in which bushings the bars 145 extend.

The purpose of the construction just described is to permit, for purposes hereinafter explained, a rocking or oscillating motion and also a longitudinal motion of the rock-bars, and consequently corresponding motions of the arms 144.

The rocking movement is effected by the following mechanism: Mounted upon the said rock-bars 145, respectively, and between the bifurcations of the bearing 147 of said bars are arms 149, through rectangular holes in the hubs of which pass freely the said bars. The inner ends of these arms 149, Fig. 14, are pivotally connected to a vertical rod 150, whose lower end is pivoted to the inner arm 151^a of a rock-lever 151, whose outer limb 151^b carries at its free end a roller 152, that runs in a cam-groove 153^a of a cam-wheel 153, that is mounted on the cam-shaft 2. The shape of this groove is such that at predetermined times in the rotation of the cam the bars 145 will be oscillated to cause the arms 144 to oscillate forward or inwardly and grasp the tube-blank B. Depending from the under side of the cross bar or head 146 is a bar 154, that is connected by a link 155 to an arm of a bent rock-lever 156, whose other arm has at its free end a roller 157, that is entered in a cam-groove 158^a of a cam-wheel 158 on cam-shaft 2. It will be quite apparent that

the rotation of the said shaft and cam will cause a longitudinal movement of the rock-bars 145, and with them a like movement of the two blank-grasping arms 144. In front of and its upper surface in substantially the same horizontal plane with the under side of the bag whose bottom has just been formed, as described, is a horizontal plate 159, Figs. 1 and 12, with raised sides at its free end. The forward end of this plate is secured to a transverse shaft 160, that is journaled in bearings of supports rising from the frame of the machine. Near one end of and upon said shaft 160 is a pinion 161, whose teeth engage those of a vertical rack-bar 162, that is actuated at proper times by a cam, which in the present instance is the aforesaid cam-wheel 133 on the cam-shaft 2, against the outer face 133^c of which rides a roller 163 on the end of one arm of a rock-lever 164, whose other arm is connected with the said rack-bar by a link 165, Fig. 12.

The function of the plate 159 is to receive and upend the paper bag—that is, to bring it into such position relative to means or apparatus for drying the paste that has been applied to the last fold.

When making and pasting of the bag-bottom has been done, the plate 159 then being in the horizontal position shown in the drawings, the properly-timed cam 158, that, as hereinbefore stated, actuates the rock-bars 145, carrying the arms 144, then grasping the bag causes the said bars to slide forward a certain distance, thus carrying forward the bag over and upon the said plate 159. The arms 149 are now caused by the action of the cam 153, through the before-mentioned connection, to rock the bars 145 outwardly, and consequently the arms 144, and thus release the bag from the hold of the latter. The bars 145 are then by operation of cam 158 and connections retracted to the normal position. At this moment the shaft 160, carrying the plate 159, is rotated by the action of the projection 133^d of the cam 133 upon the rack-bar 162, engaging the pinion 161 until the plate 159 is brought into the vertical position, thereby upending the bag, the bottom of which will then rest upon the drying apparatus, which latter will now be described, reference being had more particularly to Figs. 1, 2, and 18 of the drawings.

Resting upon a circular bed 166, near the outer margin thereof, is a series or coil of pipes 167, through which steam or other heating agent is allowed to flow. This bed is supported by a cross-piece 168 of the frame of the machine.

169 is a horizontally-disposed wheel or drum having in its periphery a predetermined number of vertical pockets 170, open at the top and bottom. These pockets are immediately over the steam-pipes 167, as seen in Fig. 18. The said drum is mounted on a rotatable vertical shaft 171, whose lower end is suitably journaled in a step-bearing 172 of

the frame of the machine. It is also in the present instance journaled in a bearing of the hub 173 of the bed 166. Intermittent or step-by-step rotary movement is imparted to the drum 169 in such manner that the pockets 170 are successively brought into position and there retained at prescribed intervals opposite to the bag that has been deposited on the plate 159, so that when the bag is upended, as described, it will enter the pocket. The required movement of the drum is effected by the following mechanism, reference being had to Figs. 2, 18, and 19: On a horizontal bar 174, that is fixed to a part of the machine-frame, is a longitudinally-slidable sleeve 175, to which is pivoted the outer end of an arm 176, (indicated by dotted lines in Fig. 19,) whose other end or hub is rotatable on the shaft 171 of the drum 169. Said arm 176 carries a pawl 177, that is adapted to engage teeth of a ratchet-wheel 178, that is mounted on the drum-shaft 171. The sleeve 175 is caused to reciprocate upon the bar 174 a prescribed distance by means of a cam-wheel 179 upon the cam-shaft 2, having a groove 179^a, (indicated by dotted lines in Fig. 18,) in which groove rides a roller 180 on the end of an arm 181, whose lower end is pivoted on a shaft 182. The upper end of this arm is connected to a bar 183, that is pivoted to a stud 184 of the sleeve 175 by a link 185. The parts are so correlated that at each complete rotation of the cam 179 the drum 169 will be turned a distance equal to that between the vertical central lines of adjacent ones of the drum-pockets 170, so that a pocket will at each impulse given to the drum come into position ready to receive the bag to be upended. In order to lock the drum when a pocket is in that position, I secure to the shaft 171 a toothed wheel 186, (shown in Figs. 2 and 19,) and I mount opposite to the edge of the wheel 186, upon a rock-shaft 187, which is journaled in suitable bearings of the machine-frame, a disk 188, having a peripheral notch 189, Figs. 2 and 19, whose width is somewhat in excess of the thickness of the wheel 186, the thickness of the disk being slightly less than the space between adjacent teeth of said wheel. Normally the part of the disk not notched is entered between two of the teeth of the wheel, thus locking the latter, and so preventing any rotative movement of the drum 169. When, however, the time comes when it is necessary to rotate the drum, the disk 188 is rotated to bring its notch 189 in line with the wheel 186. The necessary movement of the disk 188 is effected by means of a properly-timed cam-wheel 190 on the cam-shaft 2, as follows: In a cam-groove 190^a of the said wheel 190 (indicated by dotted lines in Fig. 18) rides a roller 191 on the end of an arm of a rock-lever 192, to the end of the arm of which lever is pivoted a connecting-rod 193, Fig. 19, whose upper end is connected to a crank 194 on the end of the shaft 187 of the notched disk 188. As the drum rotates step by step the bags

then within the pockets 170 are carried around, their bottoms in contact with the drying-pipes 167. The bags may be removed by hand from the pockets or carried therefrom by suitable devices to a machine for automatically filling the same and closing them after having been filled.

I have devised automatic means for causing the bags to leave the pockets at a certain point in the rotation of the drum 169. This means is as follows, reference being had to Figs. 1 and 18: The sides of the pockets 170 are cut away, as seen in Fig. 18. At any suitable point adjacent to the periphery of the drum 169 is located a fixed table 195, having a raised deflecting-plate 196, preferably curvilinear, as seen, on the side toward the direction of rotation of said drum, the inner end of which plate 196 is in line with the said cut-away portion of the pockets 170. In the rotation of the drum the bags within the pockets successively come into contact with the plate 196 and are thereby deflected by the latter out of the pockets, their bottoms resting upon the said table 195, from which latter they are removed from time to time.

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

1. In a machine for making paper bags, the combination of the rectangular former, means for turning a sheet or strip of paper over and overlapping the margin of the same upon said former to form the sheet into a rectangular tube, means for applying paste to one of said margins before the same are overlapped, means for drawing forward the said paper tube upon the said former, means for severing the forward end of the said paper tube into suitable bag-blanks, devices for folding in the end portion of said blanks to form a bottom, means for pasting together the folds, and means for carrying the said blank from the former to the said folding and pasting devices, substantially as set forth.

2. In a machine for making paper bags, the combination of the rectangular former, means for turning over a sheet or strip of paper and overlapping the margins of the same upon the former to impart to the sheet the form of a rectangular tube; means for applying paste to one of said margins before the same are overlapped, means for drawing forward the said tube of paper upon the former, means for severing the forward end of said tube into suitable bag-blanks, devices for folding in the forward end portion of said blanks to form the bag-bottom, means for pasting together the folds of the latter, the drum having the series of pockets in its periphery, means for imparting a predetermined intermittent rotation to said drum, the drying-pipes, or the like, beneath the said pockets, means for carrying forward the bag from the infolding and pasting devices to a pocket of said drum and means for upending the bag in said pocket, substantially as and for the purpose set forth.

3. In a machine for making paper bags, the combination of the rectangular former, means for turning a sheet or strip of paper and overlapping the margins thereof upon the said former, to impart to the sheet the form of a rectangular tube, means for applying paste to one of said margins before the same are overlapped, means for drawing forward the said paper tube upon the former, mechanism for severing the end portion of said tube into bag-blanks, the carrier for the latter, the folding devices, means for reciprocating said carrier with relation to the former and the folding devices, means respectively for collapsing and expanding said carrier at the predetermined times recited, means for applying paste to the folds of the bag-blank made by said folding devices, means for pressing together the pasted folds, and means for drying the paste thereon, substantially as set forth.

4. In a machine for making paper bags, the combination of the hollow rectangular former, devices for turning a sheet or strip of paper and overlapping the margins of the same upon said former to impart to the same the form of a rectangular tube, means for applying paste to one of said margins before the same are overlapped, means for drawing forward the said paper tube upon the former, the cutting-blades, and means for actuating the same at predetermined times to sever the forward end of the paper tube into bag-blanks, the rod extending within said former, the carrier connected to said rod, having the transversely-movable side bars, the bars upon which the same are adapted to slide, the cross-bars pivoted to the said rod and having their forward ends pivoted respectively to the said side bars of the carrier, the inclines adjacent to the forward end of the former against which the free ends of said cross-bars are adapted to ride, the knee-joint connection between said side bars of the carrier, consisting of the bars pivoted respectively to the latter and to the said rod, mechanism for imparting longitudinal reciprocations to said carrier, the series of folding-blades, and means for actuating the same at predetermined

times, means for pasting together the folds made by said blades, devices for drying the paste, and means for carrying the bag from the pasting to the drying devices, substantially as set forth.

5. In a machine for making paper bags, the combination of the rectangular former, means for turning upwardly side portions of a sheet or strip of paper, consisting of the positively-driven roller, having the outwardly-beveled end flanges, located beneath and adjacent to the rear end of the former, and the superposed roller coacting with said first roller, the devices for turning over and overlapping the margins of the paper, means to the rear of said rollers, for applying a marginal line of paste to the said strip of paper, means in advance of said turn-over devices, for drawing forward the paper tube upon the former, means for cutting off the forward end of said tube to form bag-blanks, the folding devices for folding the forward end of the blank, the collapsible and expansible carrier, means for imparting longitudinal reciprocations of said carrier at predetermined times whereby the bag-blank is caused to be conveyed from the former into position to be operated upon by the folding devices, means for applying paste to the folds, the horizontal, intermittently-rotatable drum having the series of pockets in its periphery, steam drying-pipes or the like below and adjacent to said pockets, the rotatable plate located in advance of the folding and pasting devices, and means for actuating said plate to bring the same into a horizontal position to receive the folded and pasted bag and to upend the same within one of the pockets of said drum, together with means for carrying forward the bag into position to be received upon said plate, substantially as set forth.

In testimony whereof I have hereunto affixed my signature this 29th day of May, A. D. 1901.

CHARLES F. KELLNER.

Witnesses:

ANDREW V. GROUPE,
WALTER C. PUSEY.