(No Model.) 7 Sheets—Sheet 1.

E. E. CLAUSSEN.

PAPER BAG MACHINE.

No. 574,020. Patented Dec. 29, 1896.

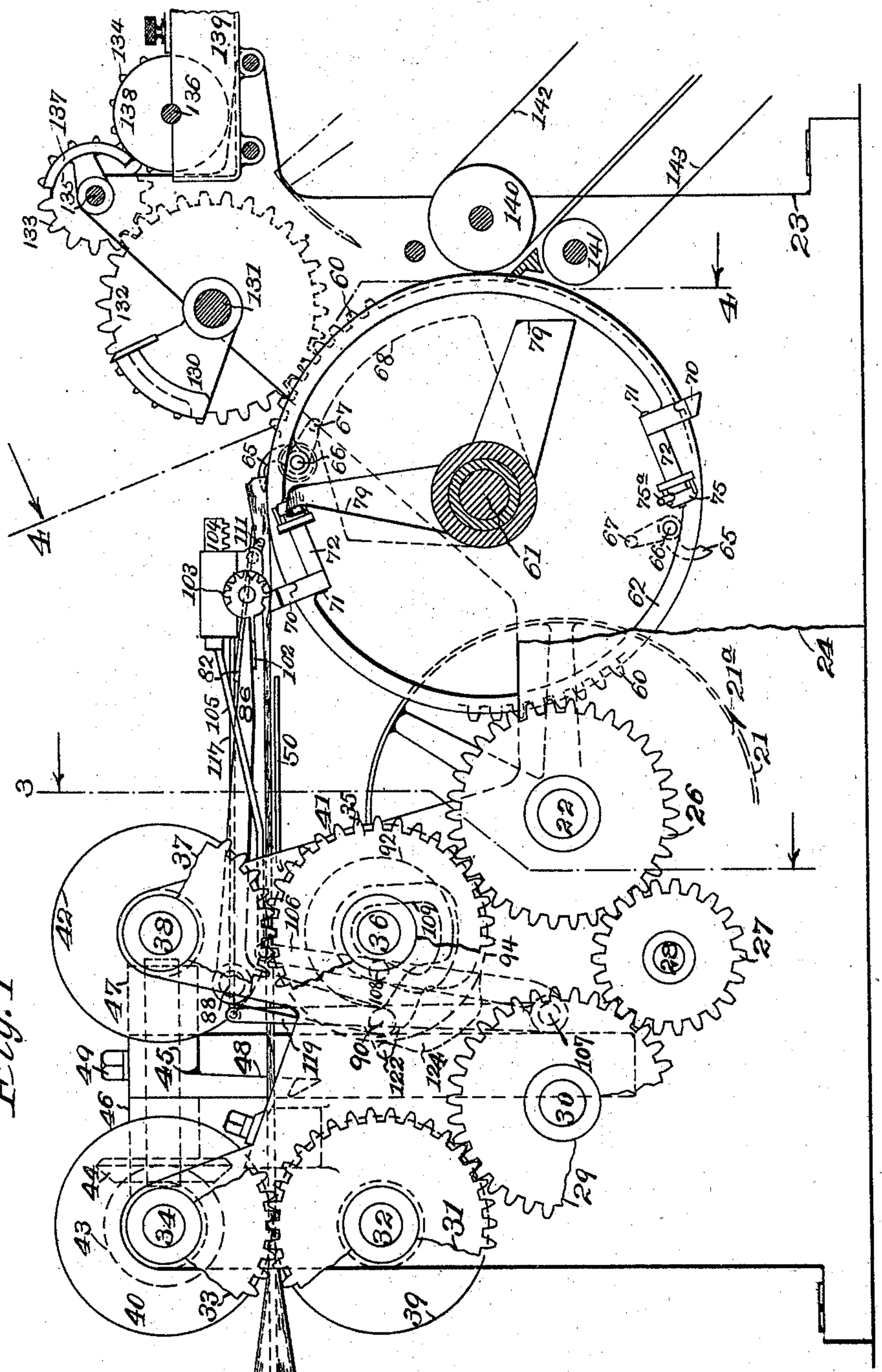

Fig. 1.

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Inventor:
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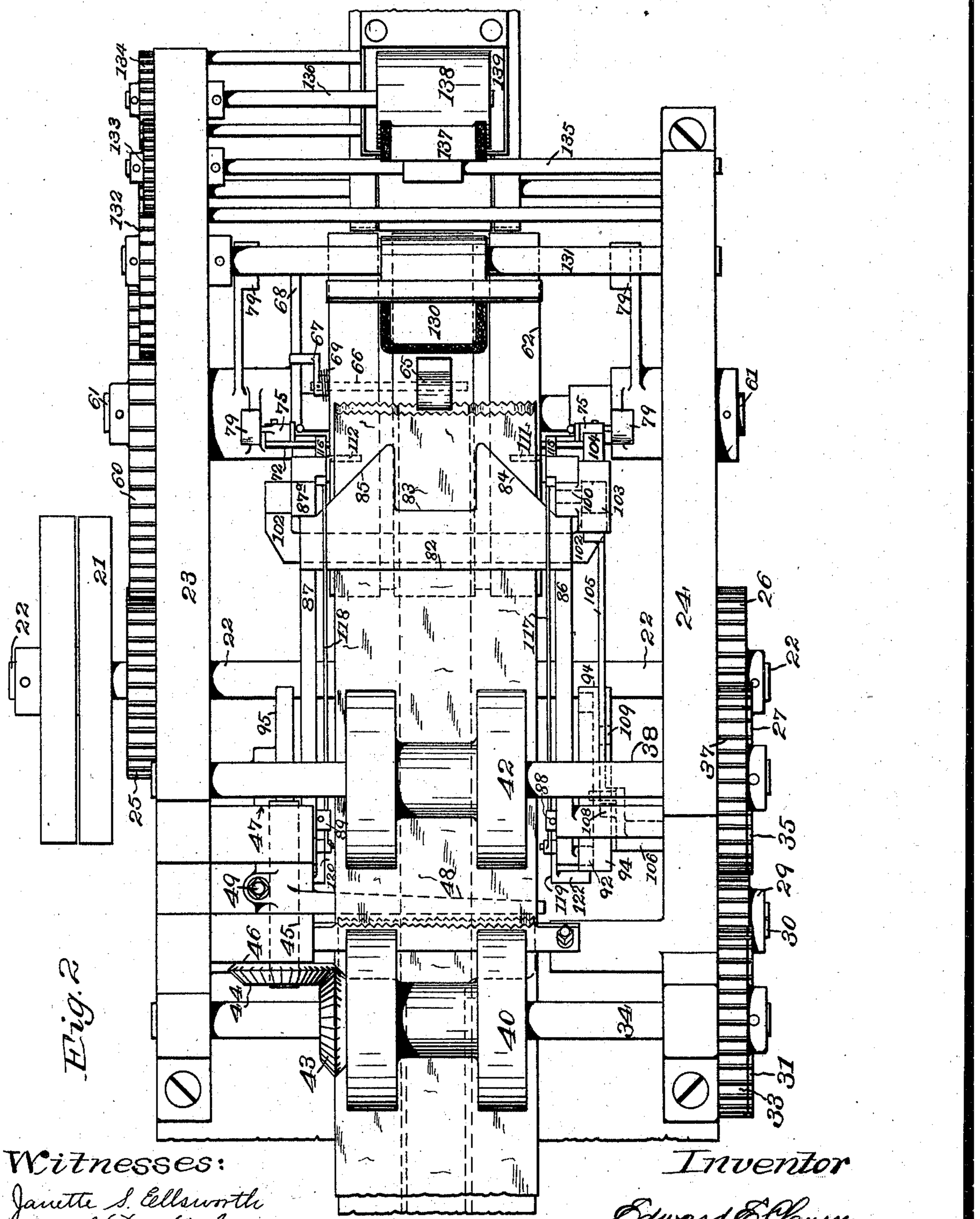

Fig. 2

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Fig. 3.

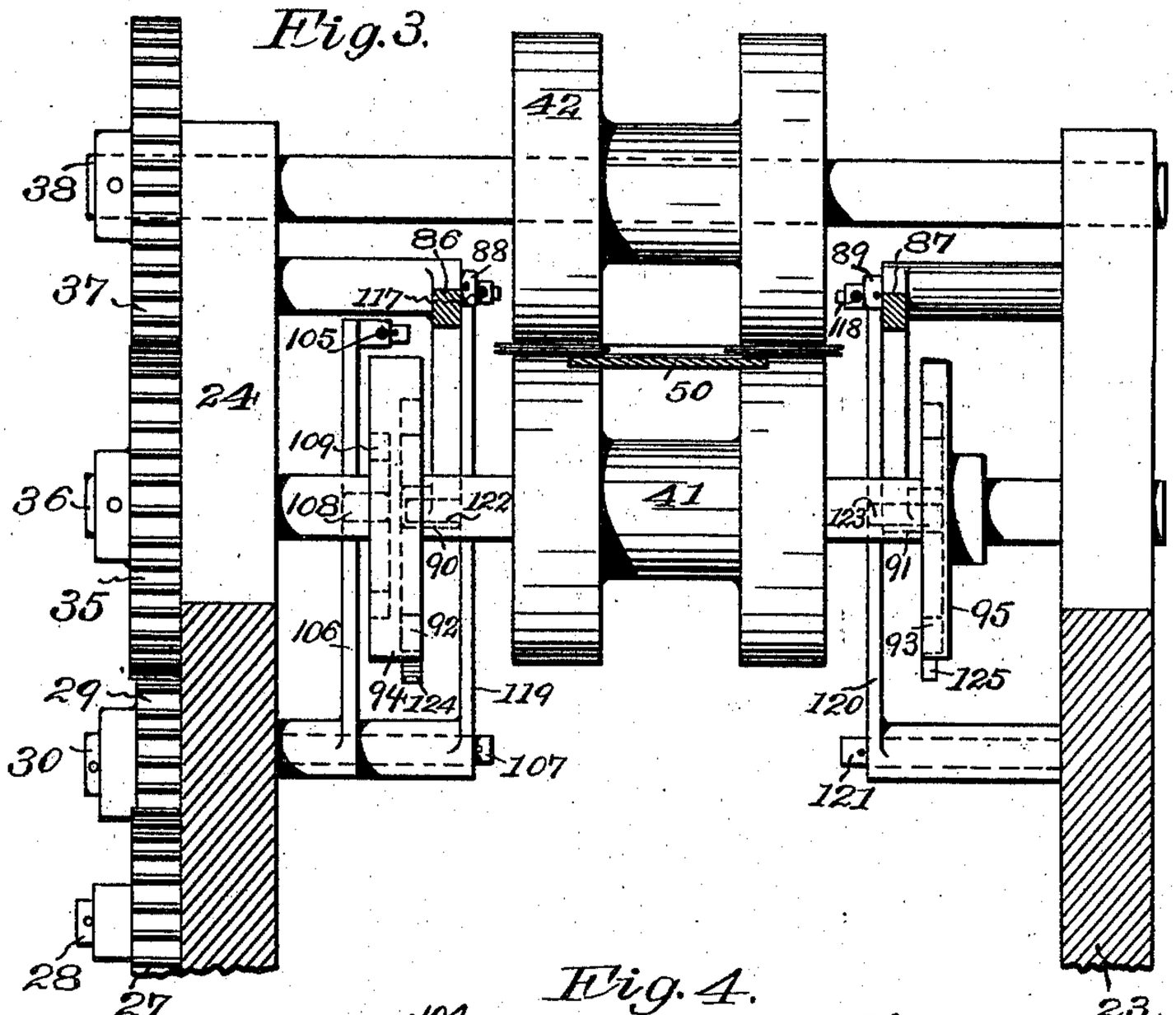
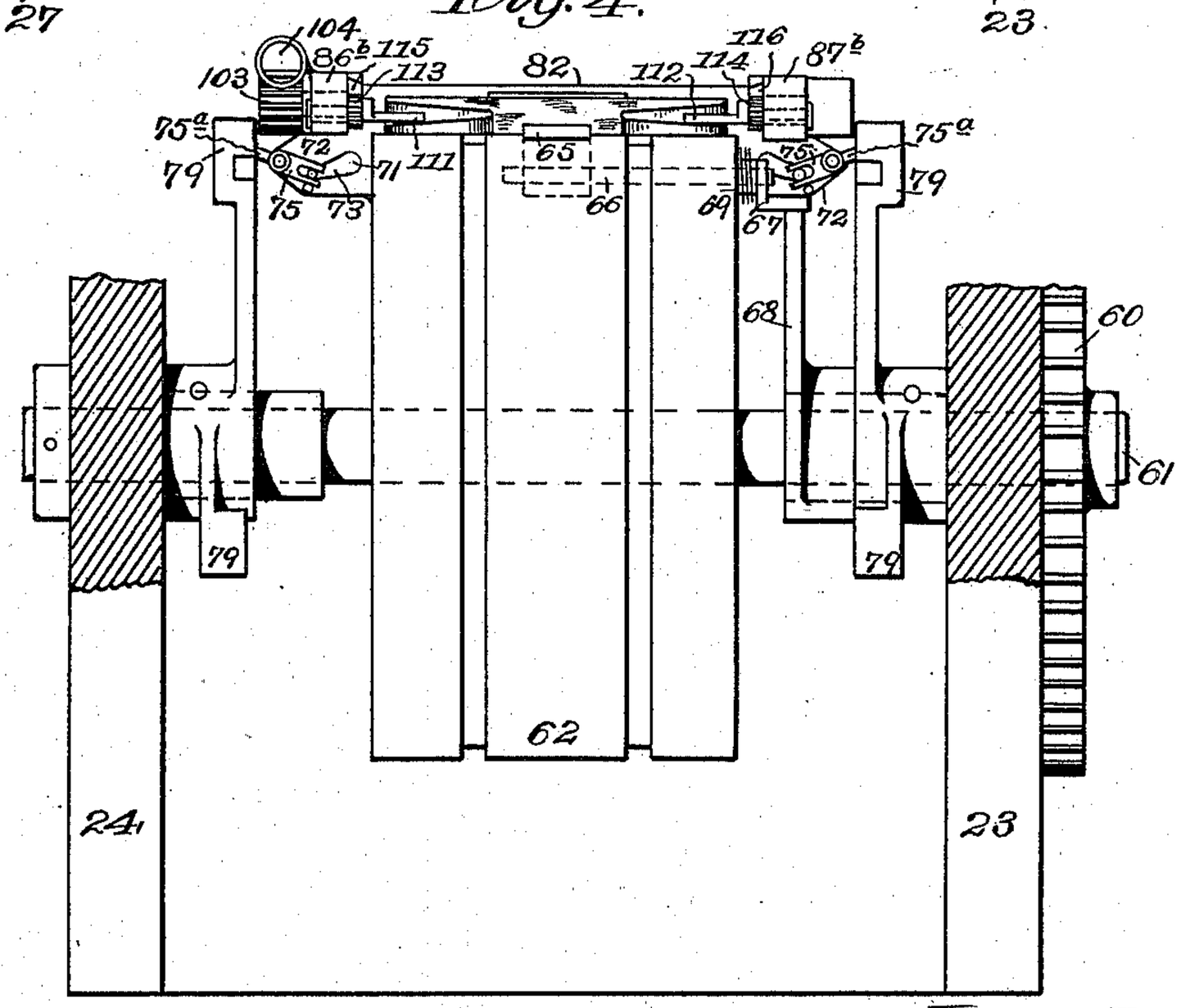


Fig. 4.



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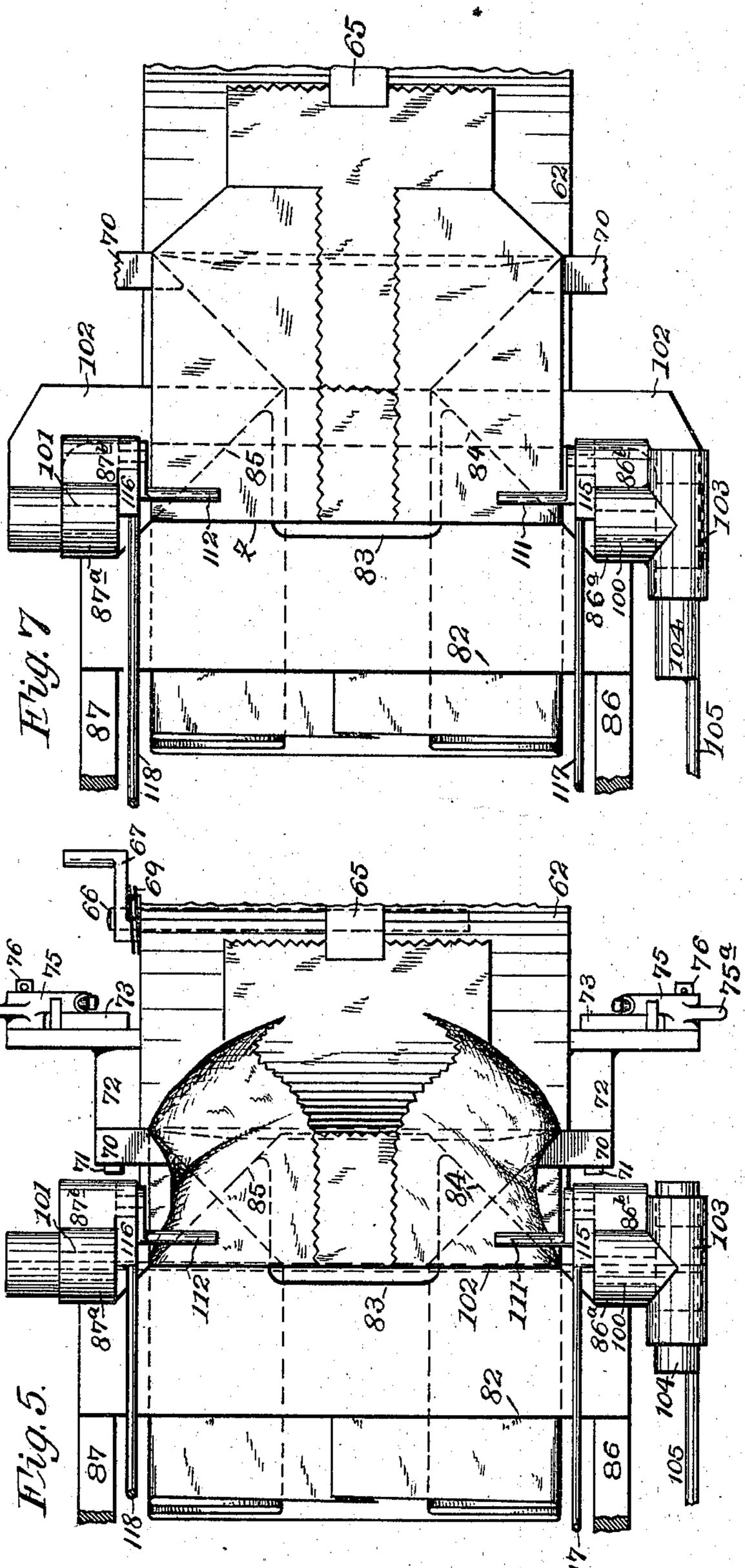

Fig. 7

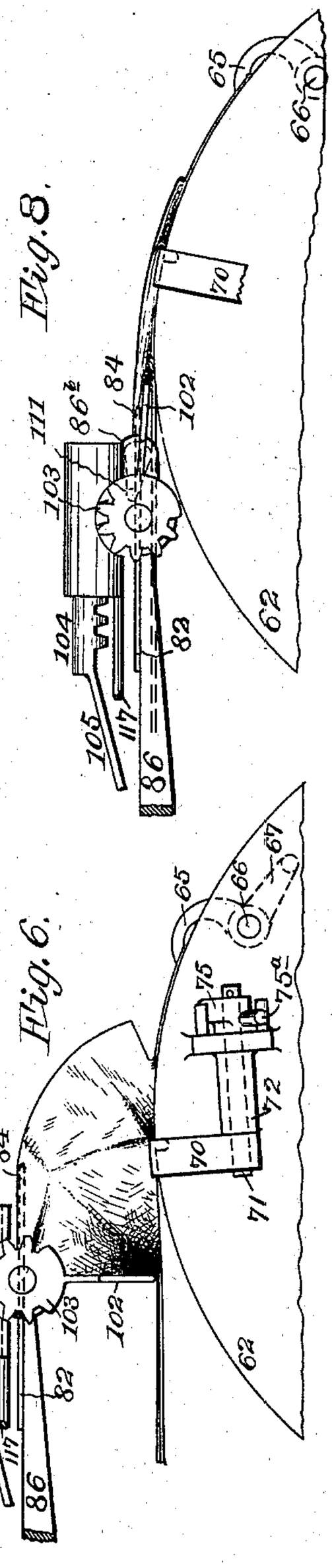

Fig. 8.

Fig. 5.

Fig. 6.

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Fig. 9

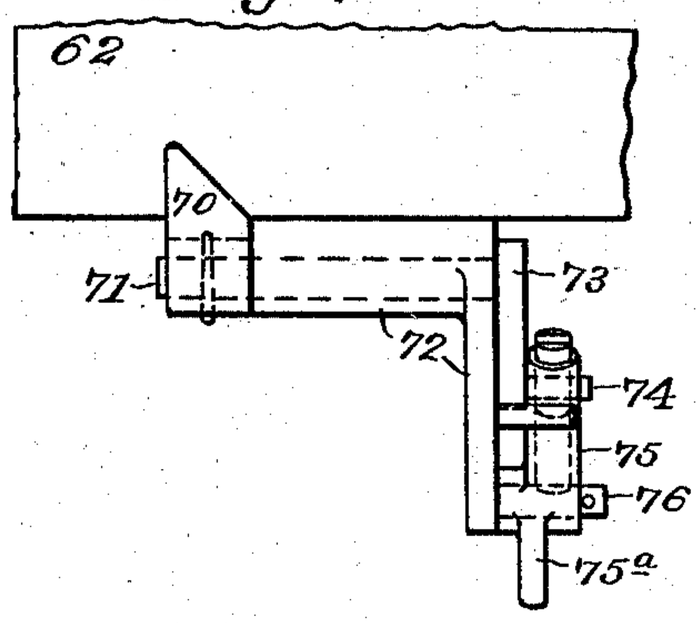

Fig. 10

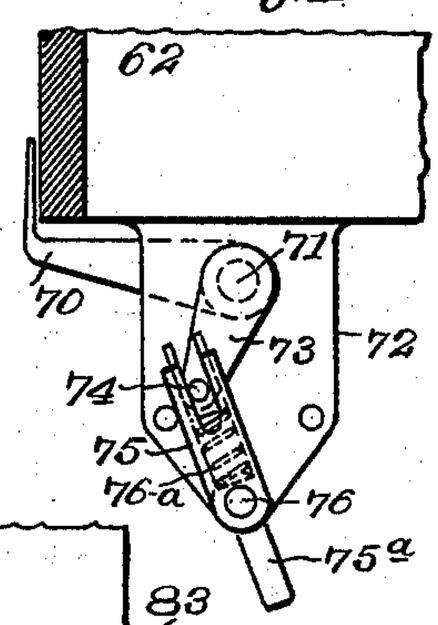

Fig. 11.

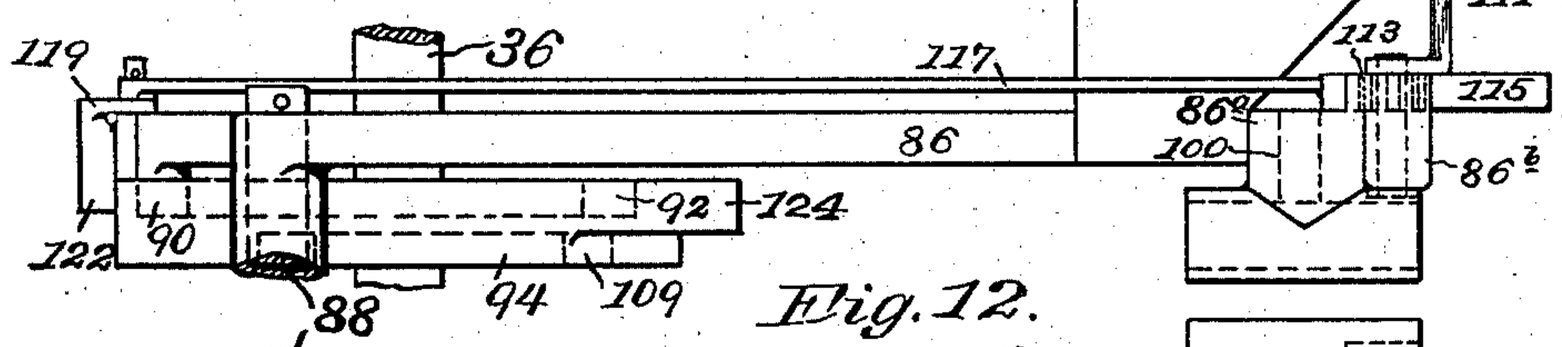

Fig. 12.

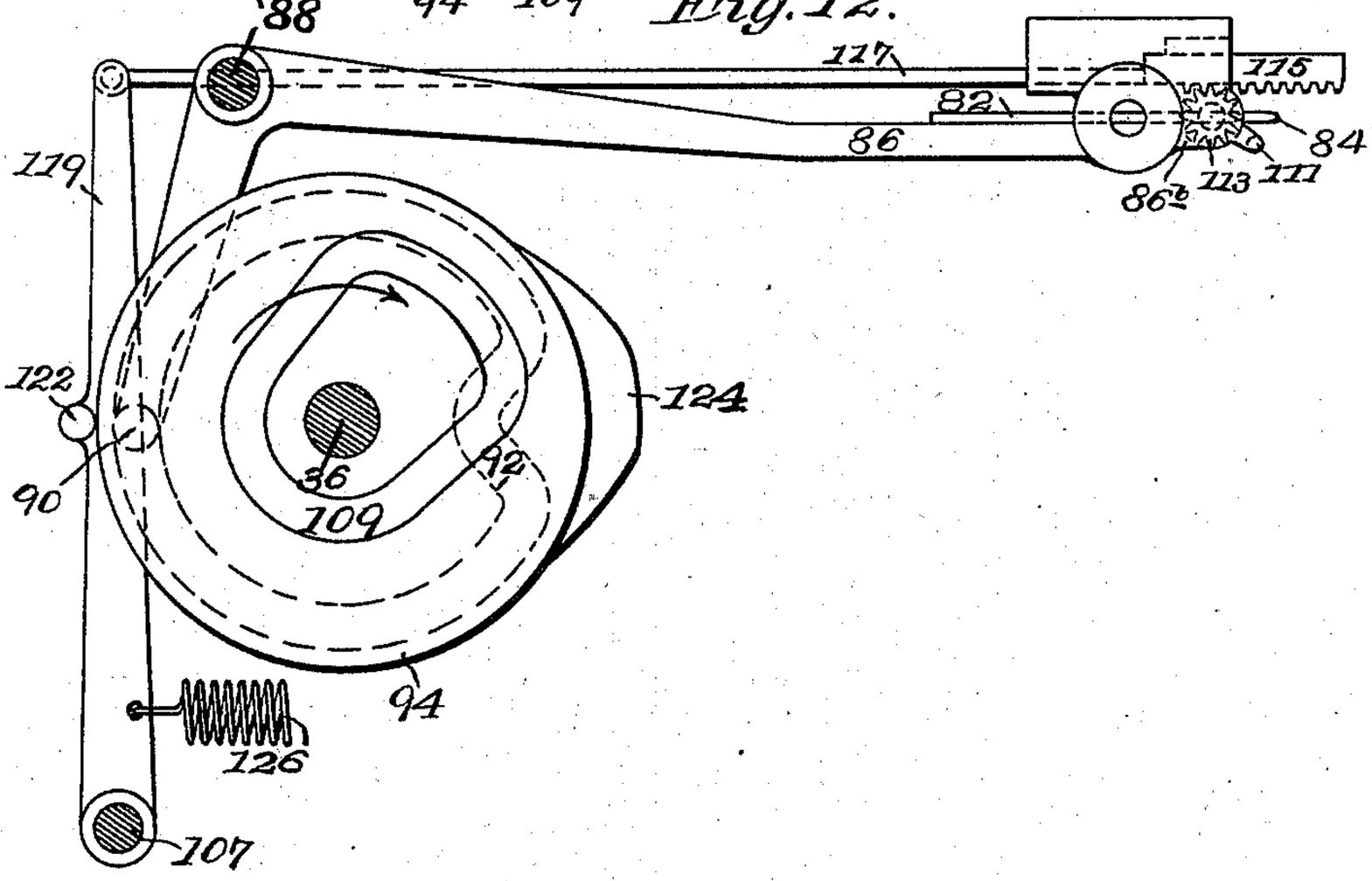

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Fig. 13.

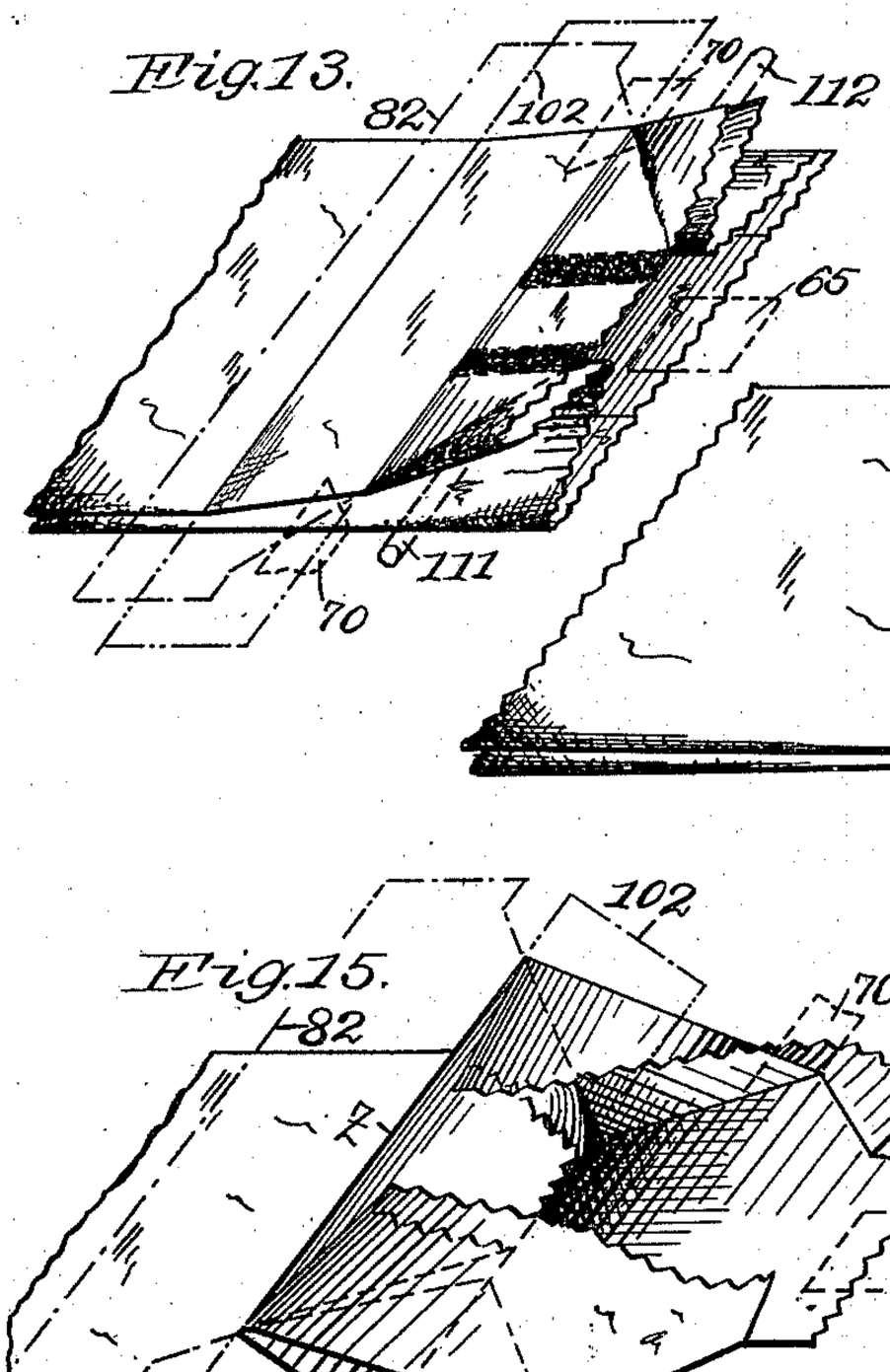


Fig. 14.

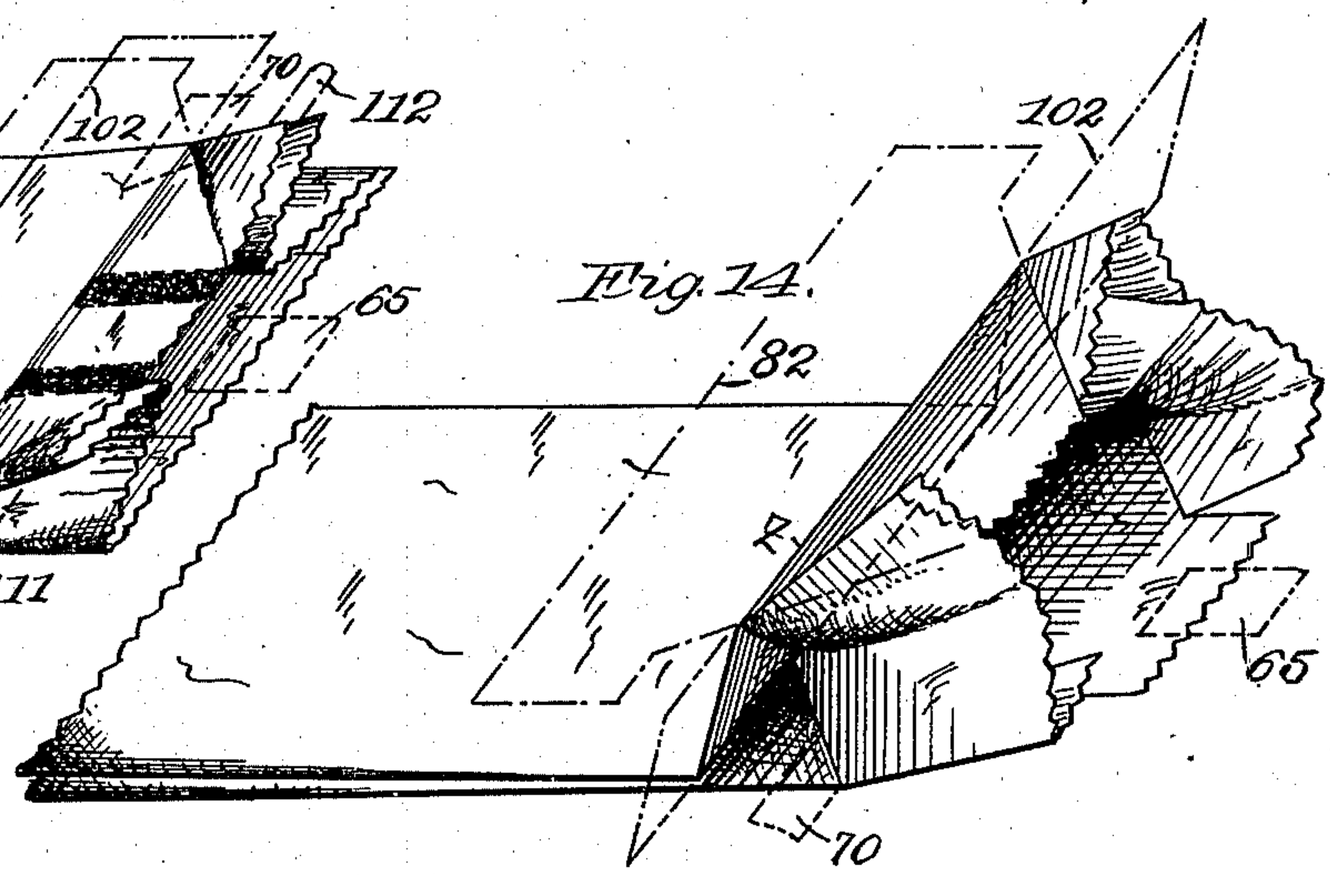


Fig. 15.

Fig. 16.

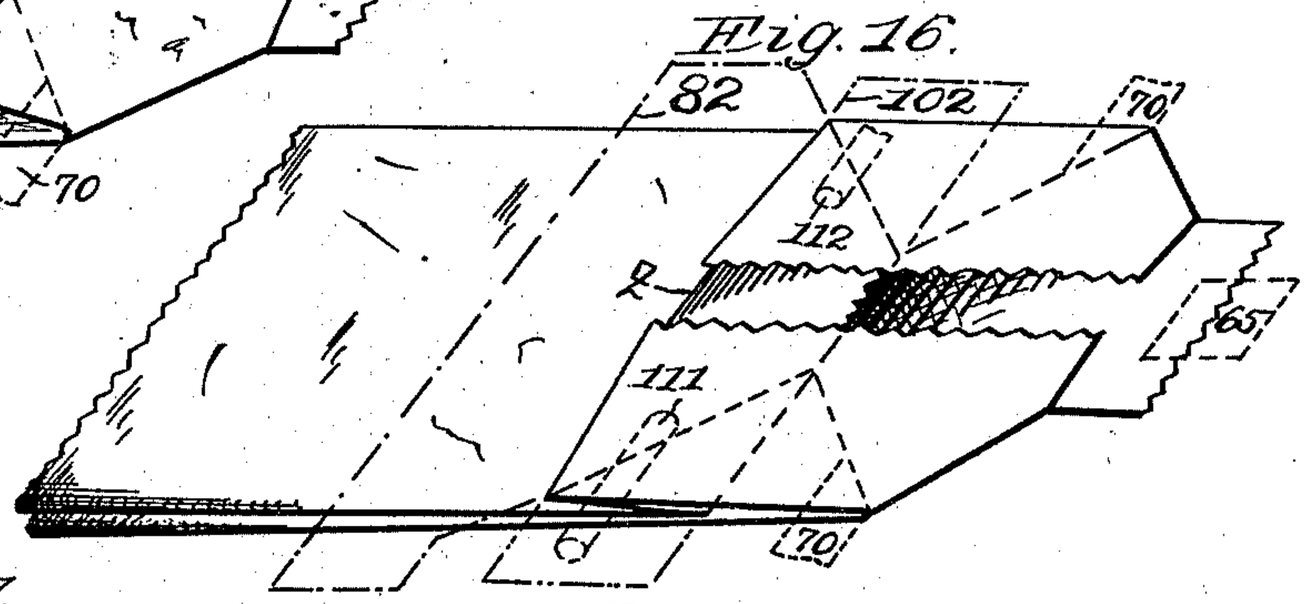
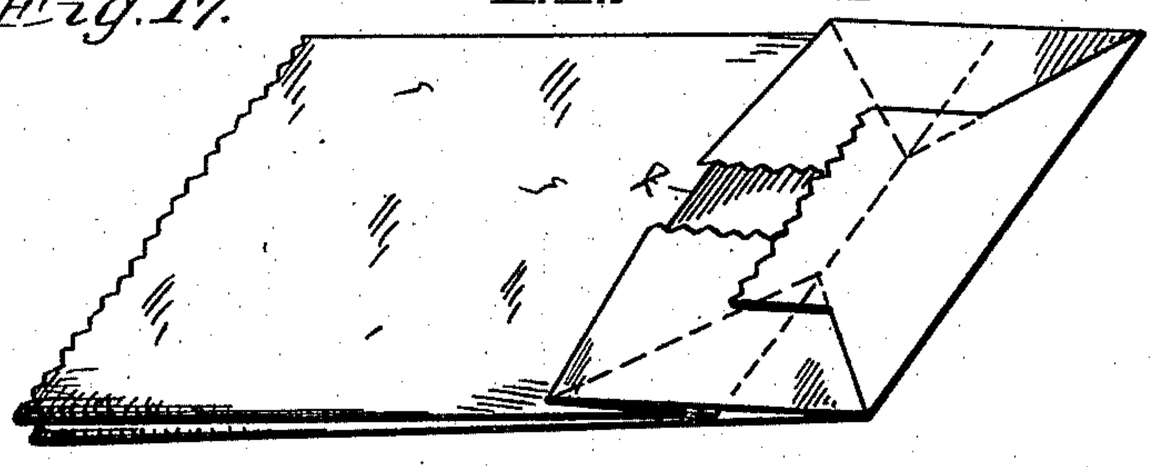


Fig. 17.



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(No Model.)

7 Sheets—Sheet 7.

E. E. CLAUSSEN.

PAPER BAG MACHINE.

No. 574,020. Patented Dec. 29, 1896.

Fig. 19.

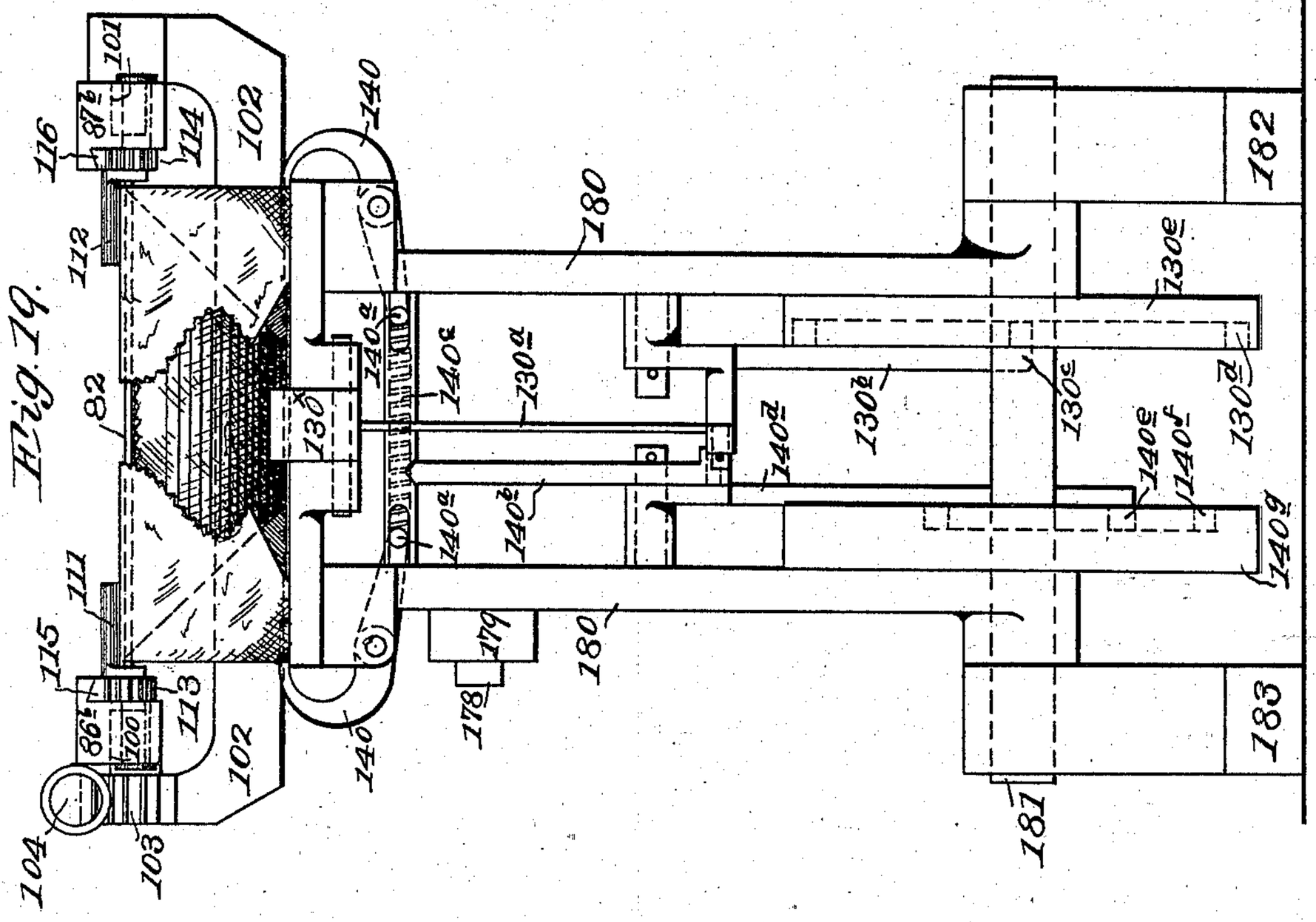
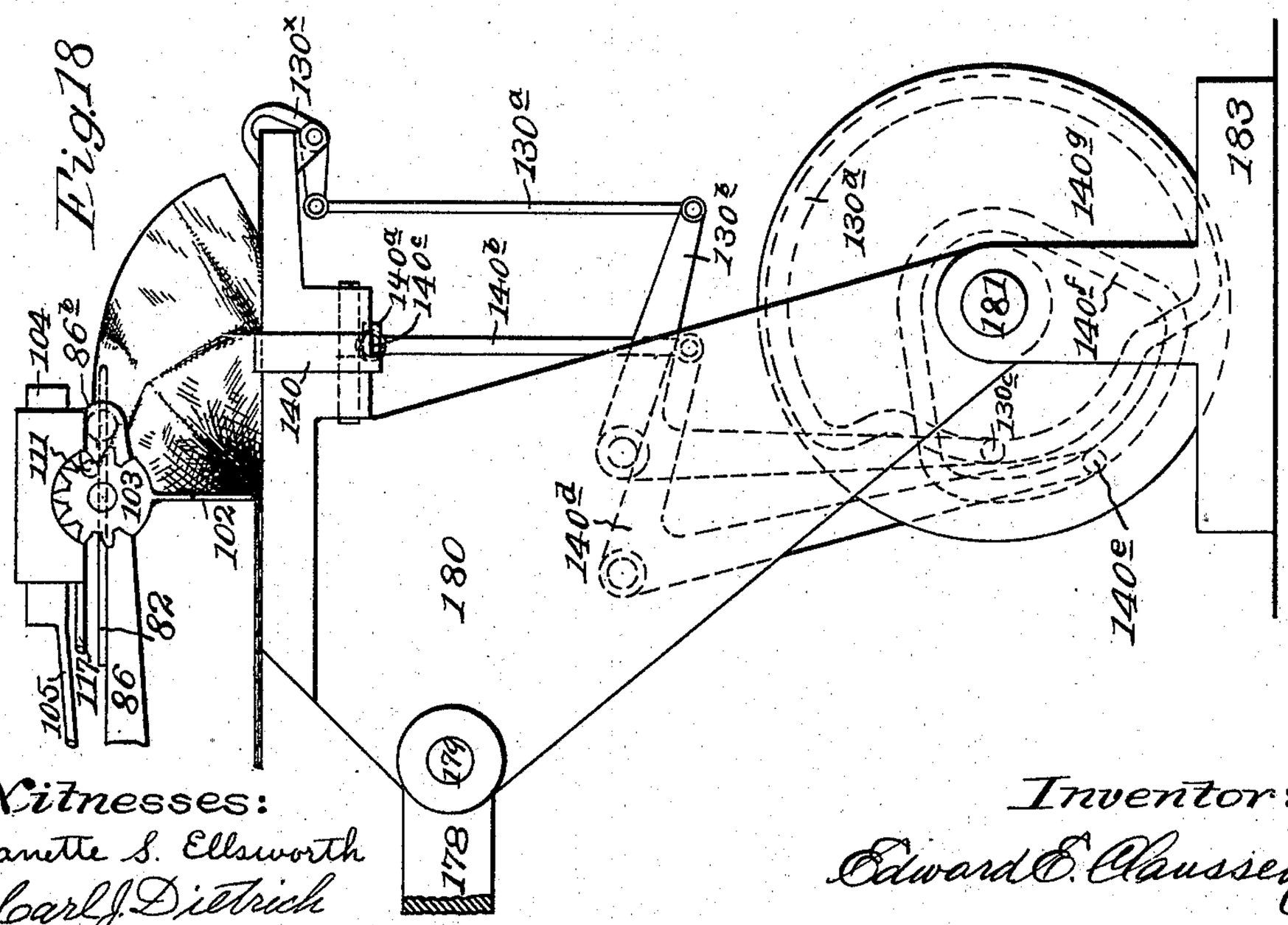


Fig. 18.



Witnesses:
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Carl J. Dietrich

Inventor:
Edward E. Claussen.

UNITED STATES PATENT OFFICE.

EDWARD E. CLAUSSEN, OF HARTFORD, CONNECTICUT.

PAPER-BAG MACHINE.

SPECIFICATION forming part of Letters Patent No. 574,020, dated December 29, 1896.

Application filed July 18, 1896. Serial No. 599,609. (No model.)

To all whom it may concern:

Be it known that I, EDWARD E. CLAUSSEN, a citizen of the United States, residing at Hartford, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Paper-Bag Machines, of which the following is a full, clear, and exact specification.

This invention relates to an improved machine for automatically manufacturing square-bottomed paper bags from tucked-paper tubing. The mechanisms herein shown and described represent this invention in its adaptation to that class of machines in which the traveling folding-bed that carries the tube or blank onward is represented as a rotating carriage or cylinder, and also shown in its adaptation to machines having a reciprocating or oscillating folding-bed.

The object of this invention is to provide simple and rapid means for forming the truncated diamond on tucked-paper tubing and then pasting and cross-folding the front flap and completing the bag. In my present invention I accomplish these objects as follows: The tucked-paper tube as it is drawn from the former is guided into the bite of a pair of drawing-rolls, severed into bag-blank lengths, and guided into the bottom-forming mechanisms for forming the diamond folds in bellows-sided tubing, consisting of an oscillating V-plate to which is vibratorily mounted the swinging tucker-plate, and a traveling folding-bed provided with a front clip which clamps the lower ply to the folding-bed, and a pair of bevel-edged side clips which enter into the tucks of the tube and press the lower plies of the tucks to the folding-bed. The blank is held in these bottom-forming mechanisms as follows: Above and superimposed on the blank is placed the tucker-plate, which has a vibratory motion and is hinged to the V-plate and having its rear edge extending back up to where the characteristic primary transverse fold-line is to be made in the blank. Superimposed on the tucker-plate is the V-plate, provided with the bevel edge, against which the projecting corners of the upper ply and the upper plies of the tucks are turned and held. The V-plate is then caused to swing away from the traveling folding-bed, and at the same time the swinging tucker-plate is vibrated forward, the two coacting to fold and form the primary transverse folding-line, and simultaneously the traveling folding-bed, with its clips, carrying the blank forward to allow for the distending of the triangular folds and the formation of the truncated diamond. The tube is then drawn from the V-plate, the paste applied, and the front flap folded and pressed and the bag completed.

The invention will best be understood as described in connection with the drawings, in which it is illustrated, and in which—

Figure 1 is a side view of my improved machine, partly in section, showing the drawing-rolls that draw the tubing from the tube-forming mechanisms, it being understood that the same is produced by any of the well-known methods. The blank in the machine is represented in a position to be severed from the continuous tube and being clamped by the front clip to the rotating cylinder and ready to have the subsequent folding operations performed thereon, also showing at the left end of the machine a part of the broken-away former. Fig. 2 is a plan view of that which is represented in Fig. 1. Fig. 3 is a cross-sectional view taken on line 3 3 of Fig. 1 in the direction of the arrows. Fig. 4 is a sectional end view taken on the broken line 4 4 of Fig. 1 in the direction of the arrows. Figs. 5 and 6 are respectively a plan and a side view, in an enlarged scale, of the folding mechanisms in a position where the truncated diamond is about one-half completed. Figs. 7 and 8 are respectively a plan and a side view of that which is shown in Figs. 5 and 6, in a still farther advanced position and having the truncated diamond completed, ready to be drawn from the V-plate, and paste applied thereto. Figs. 9 and 10 are respectively a plan and an end view of the side clips that hold the lower plies of the tucks to the traveling folding-bed or cylinder. Figs. 11 and 12 are a plan and a side view of the V-plate and turning-fingers with their mechanisms for operating the same drawn in an enlarged scale. Fig. 13 is a perspective view of a blank, showing the front triangular corner-flaps partly turned over and that portion of the tube that is to be folded forward partly raised and beginning to indicate where the characteristic primary

transverse folding-line is to be located, showing also the tucker-plate, the V-plate, and the clips in their respective operative position. Fig. 14 is a perspective view of the blank, showing the front triangular corner-flaps still more folded over and also showing the part of the tube that is to be tucked under in an advanced position, also indicating the respective positions of the bottom-forming mechanisms. Fig. 15 is a perspective view of the blank in a still more advanced stage, showing the truncated diamond nearly completed. Fig. 16 shows a perspective view of the blank when the truncated diamond is completed, with the bottom-forming mechanisms in their relative positions. Fig. 17 is a perspective view of the completed bag ready for commercial use or to be packed and shipped. Fig. 18 is a side view of a modification of the machine in its adaptation to a reciprocating carriage, showing the blank partly folded into the truncated diamond. Fig. 19 is an end view of that which is shown in Fig. 18.

A description will first be given of the construction and operation of each section of the machine, and afterward their combined mode of operation will be described.

Power is communicated to the machine by the pulley 21 in the direction of the arrow 21ª and is fastened to the shaft 22, which is journaled in the frames 23 and 24 and carries on each end the gear 25 and 26. The gear 26 meshes into the intermediate gear 27, journaled on the stud 28, which is fastened on the outside to the frame 24. Said gear 27 meshes into the gear 29, rotatably mounted on the stud 30, and gear 29 meshes into the gear 31 on the shaft 32, meshing into the gear 33 on shaft 34. The gear 26 also meshes into the gear 35, fastened on the shaft 36, which again meshes into the gear 37 on shaft 38. The shafts 32, 34, 36, and 38 are all journaled in the frames 23 and 24 and have securely fastened thereto the drawing-rolls 39, 40, 41, and 42, respectively, as illustrated in the drawings in Figs. 1, 2, and 3, which draw the tubing into the machine. The shaft 34 carries rigidly connected thereto on the left-hand side next to the drawing-roll 40 the miter 43, which meshes into the miter 44, fastened on the shaft 45, journaled in the projecting hubs 46 and 47 of the frame 23. The striker-arm 48 is clamped to the shaft 45 by the clamp-screw 49 and revolves in union therewith.

The gears 39, 40, 41, and 42 are so geared in relation to the striker-arm 48 that to each revolution of the striker-arm a length of tubing is drawn forward of sufficient length to make the body and the bottom-forming end on the bag-blank. 50 is a supporting-plate that supports the bag-blank as it travels from the drawing-rolls 41 and 42 to the cylinder 62.

The gear 25 meshes into the gear 60, which is fastened to the shaft 61, which is journaled in the frames 23 and 24 and which carries the cylinder 62. The cylinder is provided with two sets of front and side clips adapted to hold the paper-tube to the cylinder, as will be more fully explained hereinafter. The front clips 65 are fastened to shafts 66 and are journaled in the cylinder 62, the outer ends of which are provided with cam-arms 67, and as the cylinder revolves, and carrying the cam-arms along therewith, they engage the stationary cam 68, which is fastened to the hub of the bracket 23. Springs 69 keep the clips in the normally open position. The timing of the cam 68 in relation to the rotation of the cylinder and the severing of the blank by the rotation of the striker-arm is such that the front clip 65 is caused to close against the pressure of the spring 69 as the leading end of the tube advances and holds the lower ply of the tube thereto, as shown in Fig. 1, and to carry the same onward and to release the same again when the truncated diamond is completed. Coacting with each front clip is a pair of bevel-edged side clips 70, which are fastened to shafts 71, pivotally mounted in bosses 72, adjacent and integral to the sides of the cylinder 62. The projecting free ends of the shafts 71 are provided with arms 73, having the stud 74 projecting therefrom and engaging a slot in the spring-casing 75, which is pivotally mounted on the hubs 72 on the pivot 76 and bearing the extensions 75ª. Springs 76ª, held in the casings 75, press upon the studs 74 and keep the clips in the closed or open position, as the case may be, as best shown in Figs. 9 and 10. The extensions 75ª are operated by the stationary cams 79, mounted on hubs of the stationary frames 23 and 24. The cam 68, which operates the front clips, and the cams 79, which operate the bevel-edged side clips as the cylinder revolves, are so shaped in relation to the rotation of the cylinder that the same are opened when advancing into the position of Fig. 1, and then close, when in position of Fig. 1, to clasp the lower ply of the tube and the plies of the lower tucks onto the cylinder and carry the blank along until the truncated diamond is formed, as shown in Figs. 5, 6, 7, and 8.

The V-plate 82 consists of a flat plate having the central opening 83 and the two forty-five-degree edges 84 and 85 and fastened to the arms 86 and 87, pivoted to studs 88 and 89, and carrying at their lower ends the projections 90 and 91, which engage the cam-grooves 92 and 93 of the cams 94 and 95, respectively, and fastened to the shaft 36, giving a vibratory motion to the V-plate. The timing of the cam-grooves 92 and 93 in relation to the rotation of the cylinder and the clips carried thereby is such that the V-plate is caused to be carried away from the cylinder directly after the clips enter or while they are entering the tucks of the tube, and then bring the same back to its normal position, as shown in Figs. 1 to 8, inclusive.

The arms 86 and 87 are provided with hubs 86ª and 87ª, in which are pivoted in trunnions 100 and 101 the tucker-plate 102, the right

side of which has fastened the gear 103, engaging the rack 104, to which is attached the connecting-rod 105, the rear end of which is pivotally connected to the arm 106, swinging on the stud 107. The arm 106 carries the projection 108, engaging the cam-groove 109 in the cam 94, and thus the tucker-plate 102 is rotated through an arc of a circle of about one hundred and eighty degrees. The center line of the trunnions 100 and 101 passes through the two intersecting points formed by the forty-five-degree edges of the V-plate and the edges of the tube, and also corresponds with the rear edge Z, as shown in Figs. 7, 14, 15, 16, and 17.

The timing of the cam-groove 109 in relation to the V-plate is such that the tucker-plate is caused to swing forward through an arc of a circle of about ninety degrees and adapted to travel with and define the primary transverse fold as the V-plate rises away from the cylinder and continues and finishes its stroke as the V-plate descends toward the cylinder, as is clearly shown in the drawings in Figs. 1, 2, 5, 6, 7, and 8.

The arms 86 and 87 are also provided with the lugs 86^b and 87^b, into which are fastened the pivots upon which the fingers 111 and 112 are pivotally mounted, the hubs of which are provided with teeth forming a part of a gear, as at 113 and 114, respectively, into which mesh the racks 115 and 116, connected to the rods 117 and 118. The other ends of the rods 117 and 118 are pivotally attached to the cam-arms 119 and 120, pivoted on the studs 107 and 121 and provided with the projections 122 and 123, engaging the cam projections 124 and 125 of the cams 94 and 95, respectively, the springs 126 always keeping the projections 122 and 123 up against their respective cams. The cam projections 124 and 125, which cause to operate the fingers 111 and 112, are of such shape in relation to the rotation of the cylinder and the entering of the bottom-forming end of the bag-blank between the V-plate and the cylinder that the fingers are in the lower position, so that the fingers may enter the tucks of the tube while the same is entering between the V-plate and the cylinder and be vibrated immediately back over to the V-plate, carrying the front triangular corners against and over the forty-five-degree edges of the V-plate and clamp the same thereto, as shown in Figs. 1, 2, 5, 6, 7, and 8.

Paste is applied to the truncated diamond by means of the paste-sector 130, mounted on the shaft 131, to which is fastened the gear 132, meshing into the cylinder-gear 60. The gear 132 also drives the train of gears 133 134, fastened to shafts 135 136, which have fastened thereto the paste-quadrant 137 and paster-roll 138, respectively, which turns in the paste-box 139. The gears 132 and 133 are geared with relation to the cylinder-gear 60 in such a manner that the face of sector 130 is presented to the cylinder twice to every one revolution of the cylinder, and in this manner the paste is deposited at regular intervals to the bag as it passes along. The front flap is folded in the well-known manner and the bag delivered between the delivery-rolls 140 and 141 and taken from the machine by the bands 142 and 143 in the well-known manner.

In Figs. 18 and 19 I have represented this invention in its adaptation where the traveling folding-bed is represented as an oscillating or reciprocating carriage in place of the rotating cylinder, as has been used in this class of machines, and is applicable to such a paper-bag machine as that shown in Letters Patent of the United States No. 444,727, of January 13, 1891, granted to me.

The connecting-rod 178 is worked by a crank (not shown in the drawings) and is pivoted by the stud 179 to the rocking carriage 180, and that carriage rocks upon the shaft 181 in brackets 182 and 183. The operations of the V-plate 82, the swinging tucker-plate 102, and the fingers 111 and 112 are identical with the foregoing description, and therefore need no further explanation. The operation of the front clips and side clips, which clamp the lower ply of the tube and the lower plies of the tucks upon the oscillating carriage, is as follows: At the front end of the carriage is pivotally mounted the front clip $130^\times$, pivotally connected to the connecting-rod 130^a, the lower end of which is connected to the cam-arm 130^b, provided with the projection 130^c, engaging the groove 130^d of cam 130^e, which is fastened to the shaft 181. The timing of the cam-groove in relation to the oscillation of the carriage is such that the clip is caused to close upon the bag-blank as the same is presented to the carriage and opened when the truncated diamond is completed.

The bevel-edged side clips 140 are pivotally mounted in lugs on each side of the carriage and have projections 140^a, engaging slots of the sleeve 140^b, which is provided at its upper end with a hollow transverse cross-bar adapted to receive a spring 140^c, pressing upon the side-clip projections 140^a and keeping them in the closed position and pressed on the carriage as a means for allowing for wear in the parts of the mechanisms and slight irregularities which may occur in the cam. The lower end of the sleeve 140^b is connected to the cam-arm 140^d, provided with the projection 140^e, engaging the cam-groove 140^f of cam 140^g. The timing of the cam-groove in relation to the oscillation of the carriage is such that the side clips are caused to swing into the tucks of the tube and clamp the lower plies of the tucks upon the carriage when the tube enters the same and to open and release when the truncated diamond is completed.

The operation of the machine is as follows: The paper is taken from a roll and folded by any well-known mechanisms (not shown in this application) into a tucked tube and drawn between the rolls 39 and 40 under the serrated knife into the machine and the

blanks severed from the continuous tube by the striker 48 revolving across the path of the tube and forcing it against the serrated knife and severing the blank therefrom at each revolution. The drawing-rolls are so geared with relation to the revolution of the striker as to feed through a suitable length for each revolution thereof. The leading end of the bag-blank is guided between the cylinder and the revolving tucker-plate pivotally mounted to the V-plate. The lower supporting surface or cylinder is provided with the front clip and the bevel-edged side clips.

The tube is supported from beneath in its travel from the drawing-rolls to the cylinder by the supporting-plate 50, and as the bottom-forming end of the tube approaches the cylinder the fingers 111 and 112 are in their lowest position, so that as the tube advances the fingers enter the tucks and the front clip 65, being held open by the spring 69, is guided into the bite of said clip. The front clip is then closed, being carried forward by the cylinder and by virtue of the cam 68. The side clips 70 are then closed by means of the cams 79, thus holding the lower part of the tube firmly upon the cylinder simultaneously. The fingers 111 and 112 are caused to vibrate and turn over on top of the V-plate by means of the cams 124 and 125 and carrying with them the front projecting triangular corners against the forty-five-degree edges of the V-plate and press and hold same in that position. As the cylinder continues to rotate the V-plate is elevated by means of the cam-grooves 92 and 93, and simultaneously the swinging tucker-plate 102 is caused to be swung forward by the cam-groove 109, the folding edge forming the characteristic primary transverse folding-line across the tubular blank and unfolding and forming the well-known inside triangular folds passing from the positions as shown in Figs. 13, 14, 15, and 16, inclusive. Then the truncated diamond, as shown in Fig. 16, is drawn off from the V-plate, the fingers 111 and 112 having been elevated a little to release the same. The blank then is presented to the paste-sector to have the paste applied, and then the front flap is turned over and pressed to the bag bottom and delivered to the bands 142 and 143 to be dried and then packed.

I claim as my invention—

1. In a paper-bag machine the combination of a traveling folding-bed, of the V-plate provided with bevel edges, the oppositely-disposed turning-fingers adapted to enter the tucks of a paper-bag blank and fold the projecting corners of that bag-blank against the bevel edges, and devices coöperating with the V-plate to effect the unfolding of the blank substantially as described.

2. In a paper-bag machine the combination of a traveling folding-bed, the V-plate provided with the beveled edges, the oppositely-disposed turning-fingers adapted to enter the tucks of a paper-bag blank and fold the projecting corners of the bag-blank against the bevel edges and press and hold them upon that V-plate, and devices coöperating with the V-plate to effect the unfolding of the blank substantially as described.

3. In a paper-bag machine the combination of a traveling folding-bed, of a V-plate provided with the forty-five-degree edges and adapted to receive an oscillatory motion to carry the same away and toward the folding-bed, the oppositely-disposed turning-fingers adapted to enter the tucks of a paper-bag blank and fold and press the projecting corners of that blank upon that V-plate and devices to coöperate with the V-plate to effect the unfolding of the blank substantially as described.

4. In combination with means for supporting a blank of tucked-paper tubing, means for forming the characteristic right-angled triangular folds in the side tucks thereof, consisting of a V-plate adapted to be vibrated, the turning-fingers with means for turning the same to fold the projecting triangular corners against the forty-five-degree edges of the plate, the tucker-plate with means to vibrate the same on an axis passing through the apexes formed by the edges of the V-plate and the edges of the tubing, combined and operating substantially as described.

5. In combination with means for supporting a blank of tucked-paper tubing, means for forming the characteristic right-angled triangular folds in the side tucks thereof, consisting of a V-plate adapted to be vibrated, the turning-fingers with means for turning the same, and to fold the projecting corners against the forty-five-degree edges of the V-plate the tucker-plate arranged to travel with the V-plate and having its folding edge adapted to travel with and define the primary transverse fold, all parts combined and operating for the purpose set forth.

6. A paper-bag machine comprising the supporting-bed for the tucked-paper tube with means for clamping the same thereto, the V-plate mounted above the paper-bag blank and adapted to be vibrated, means for clamping the projecting triangular corners of the blank to the V-plate, the tucker-plate mounted to the V-plate, means to vibrate the same, all combined and operating for unfolding and opening the tucked paper tube into the truncated diamond while the bag-blank is carried forward substantially as described.

7. In a paper-bag machine the combination of the revolving cylinder provided with one or more front clips, and the oppositely-disposed bevel-edged side clips, the V-plate provided with the beveled edges and adapted to receive an oscillatory motion, means for turning the projecting corners of the bag-blank against the beveled edges of the V-plate and hold them in substantially that position, the tucker-plate adapted to define the transverse folding-line across the blank, all combined

and operating for unfolding and opening the tucked-paper tube into the truncated-diamond form while the bag-blank is carried forward.

8. In a paper-bag machine the combination of a revolving cylinder provided with one or more front clips and the oppositely-disposed side clips and means for operating the same at predetermined intervals, the V-plate provided with the forty-five-degree edges and means for imparting a vibratory motion to said V-plate, turning-fingers pivotally mounted on the V-plate with means for imparting an oscillatory motion, the revolving tucker-plate pivotally mounted on the V-plate with means for imparting an oscillatory motion thereto, all parts combined and operating to unfold and open the tucked-paper tube into the truncated-diamond form while the bag-blank is being carried forward.

9. In combination with means for supporting a blank of tucked-paper tubing, the V-plate 82 provided with the edges 84 and 85 forming substantially ninety degrees with one another and mounted on arms to which is imparted a vibratory motion by means of a cam, a set of oppositely-disposed turning-fingers operatively connected and oscillating with said V-plate and adapted to swing from a position below, to a position above and on top the V-plate, the tucker-plate, the center of rotation of which is in line with the top of the V-plate and the distance from that center to its folding edge substantially equal to the depth of the tucks of the paper tube substantially as described.

10. In combination with means for supporting a blank of tucked-paper tubing, the V-plate provided with the forty-five-degree edges 84 and 85, forming substantially ninety degrees with one another and mounted on arms, to which is imparted an oscillatory motion by means of a cam, a set of oppositely-disposed turning-fingers operatively connected and oscillating with said V-plate and adapted to swing from a position below, to a position above and on top of the V-plate, the tucker-plate provided with trunnions pivoted on both sides of the V-plate in substantially such a position, that the center of rotation is in line with the top of the V-plate, the distance from that center to its folding edge is substantially equal to the depth of the tucks of the paper tube, and means for having said folding edge travel with the bag-blank for the purpose of defining the primary transverse folding-line.

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