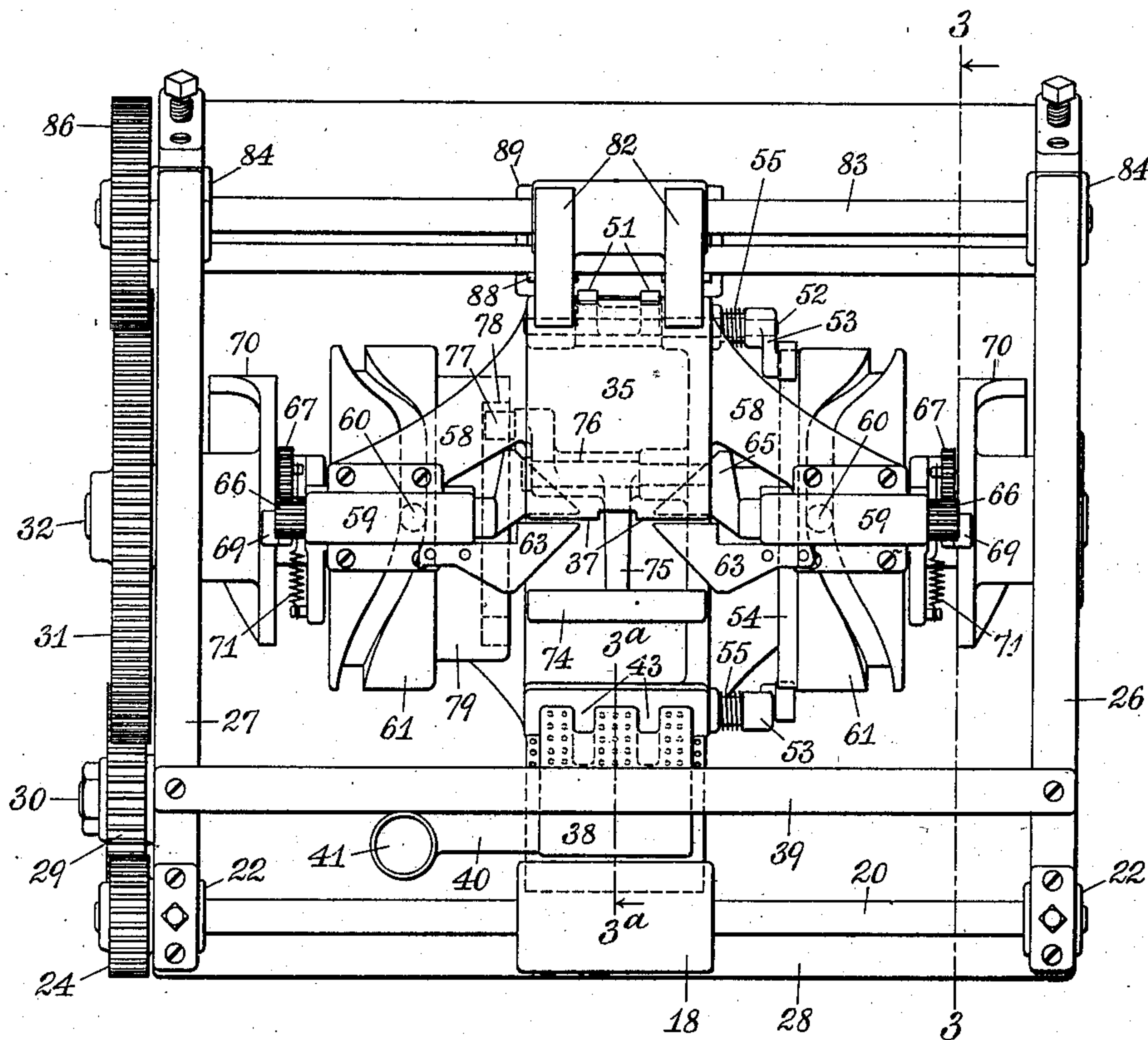
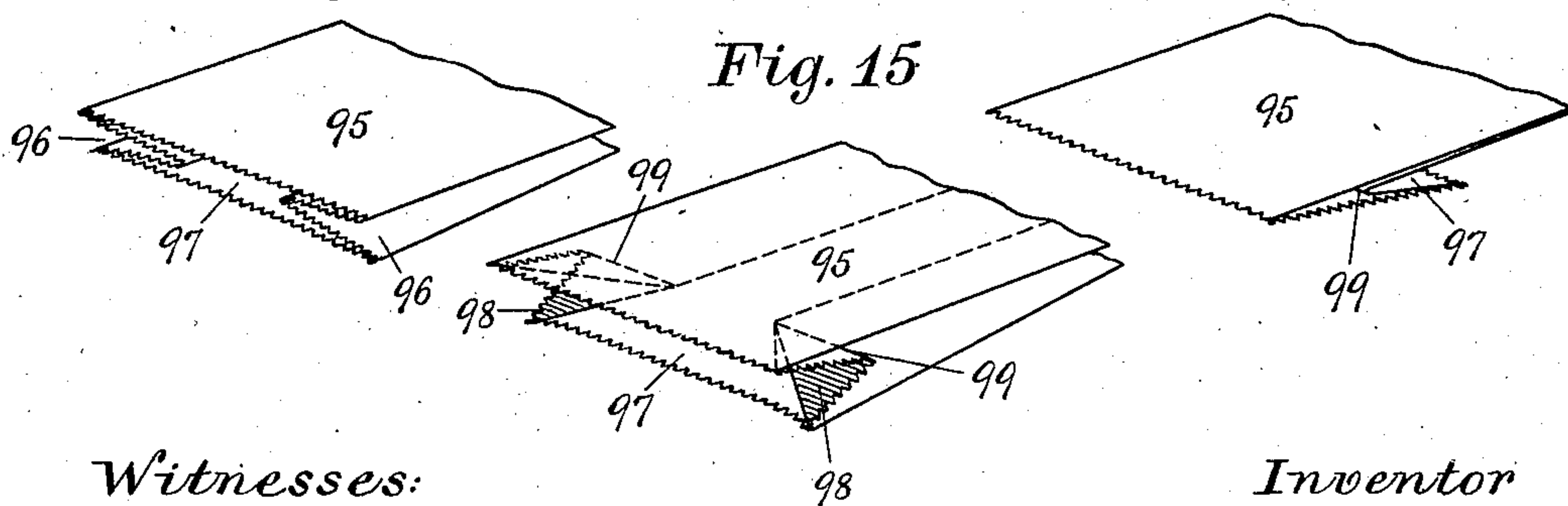


W. A. LORENZ.
PAPER BAG MACHINE.

APPLICATION FILED JAN. 26, 1903.

NO MODEL.

3 SHEETS—SHEET 1.

Fig. 1*Fig. 13**Fig. 14**Fig. 15*

Witnesses:

H. Mallner
Joseph Merrill

Inventor

William A. Lorenz
By W. H. Norris Att'y.

No. 742,204.

PATENTED OCT. 27, 1903.

W. A. LORENZ.
PAPER BAG MACHINE.

APPLICATION FILED JAN. 26, 1903.

NO MODEL.

3 SHEETS—SHEET 2.

Fig. 2

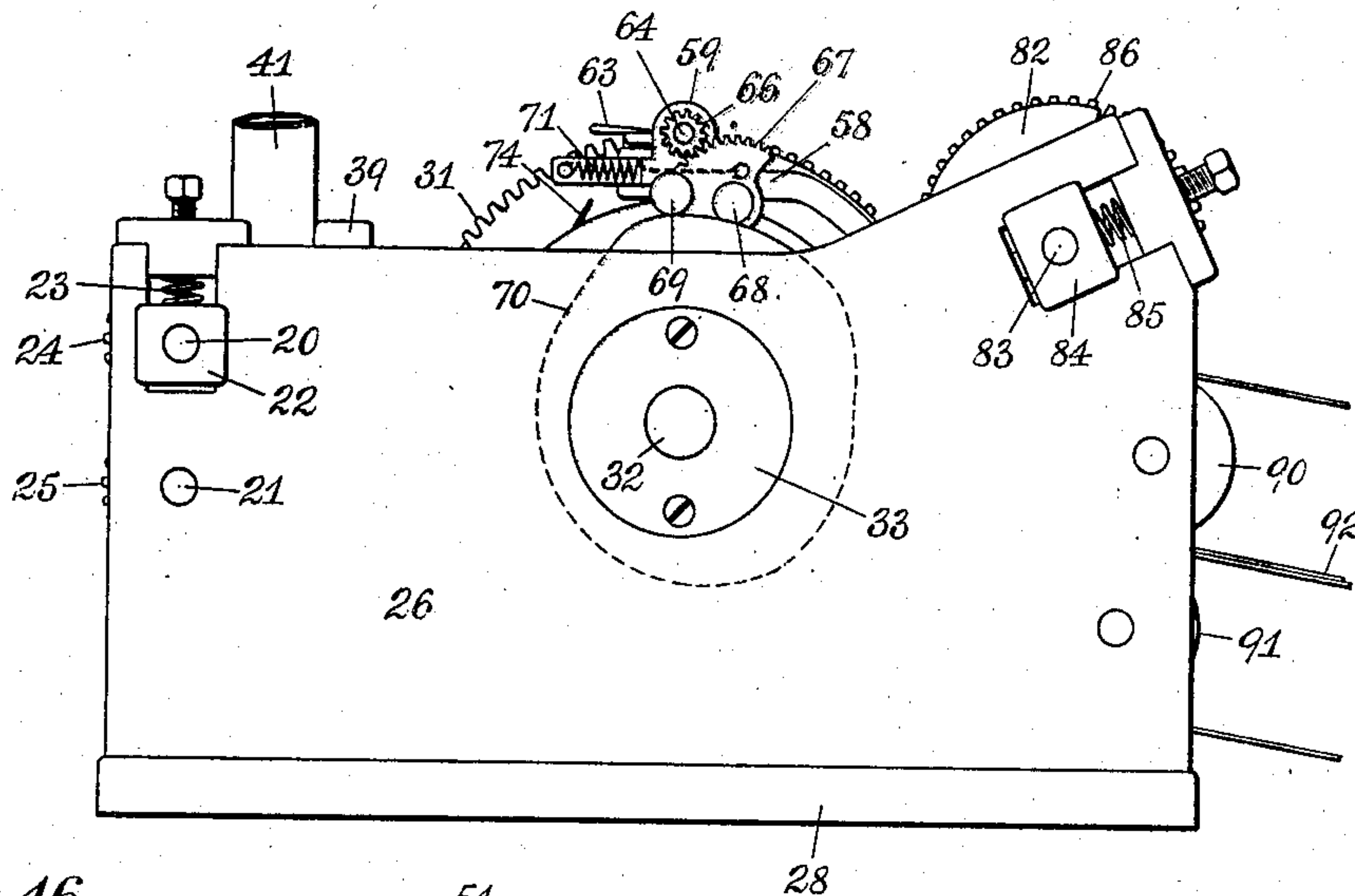


Fig. 16

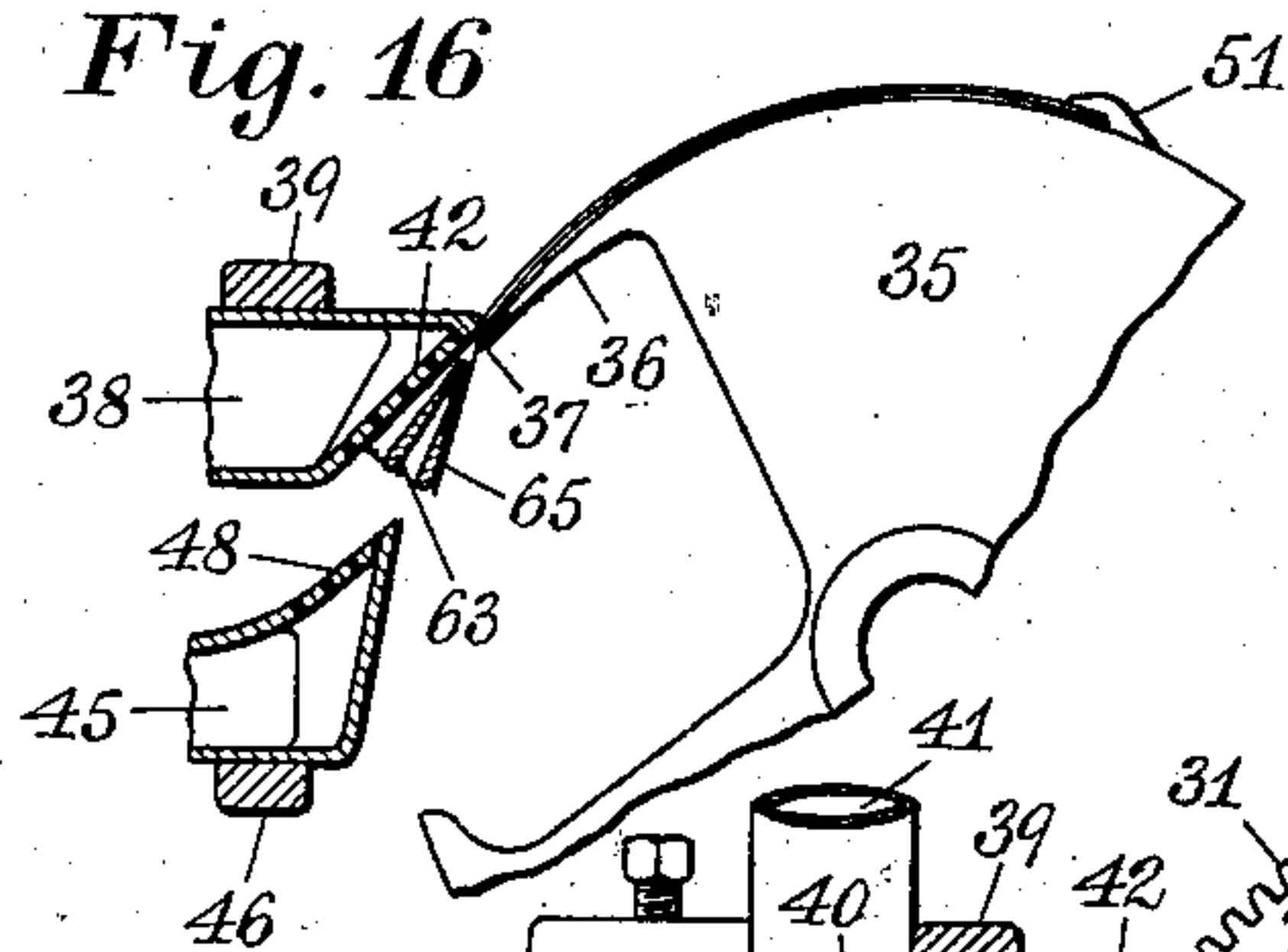
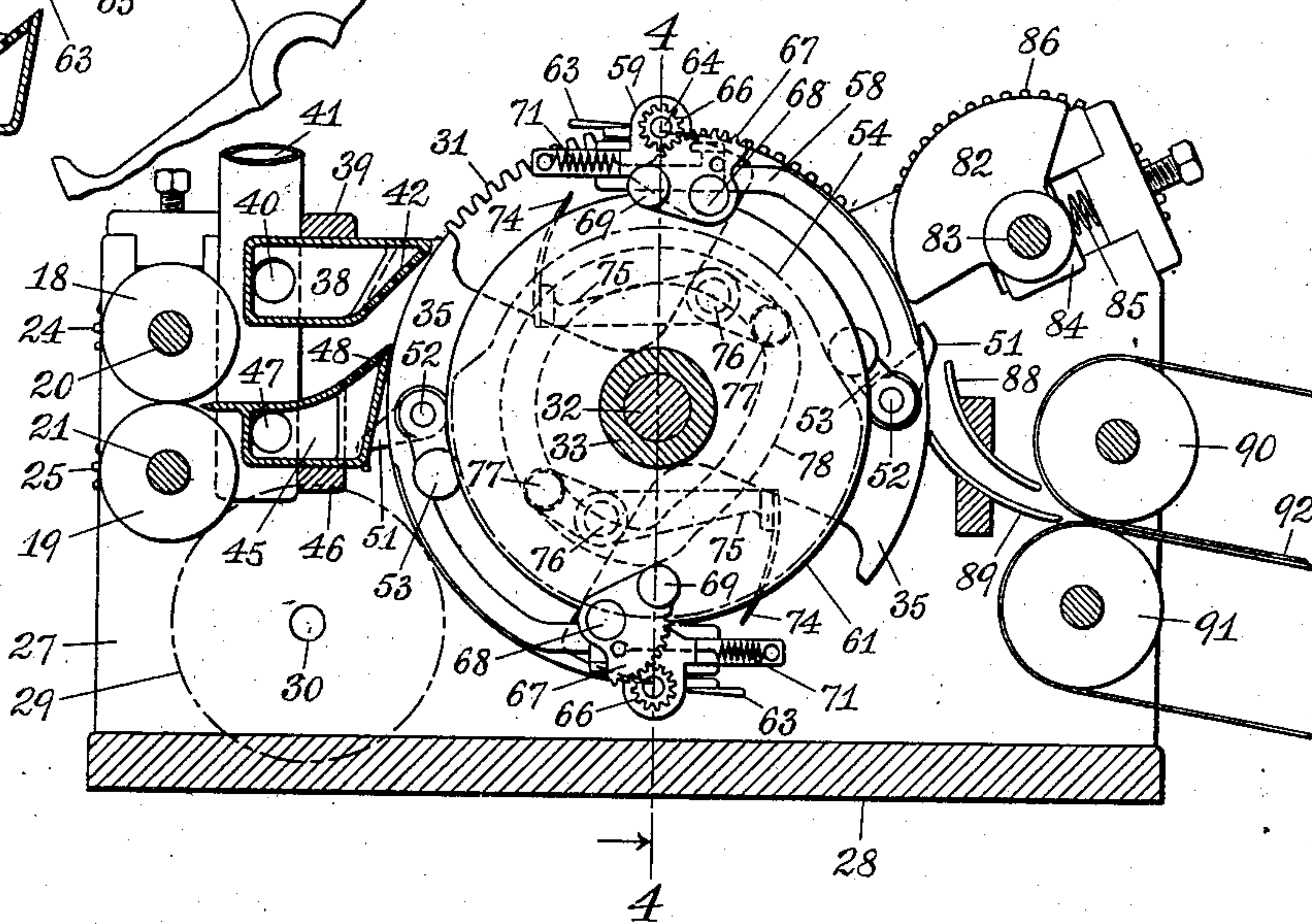


Fig. 3



Witnesses:

H. Mallner
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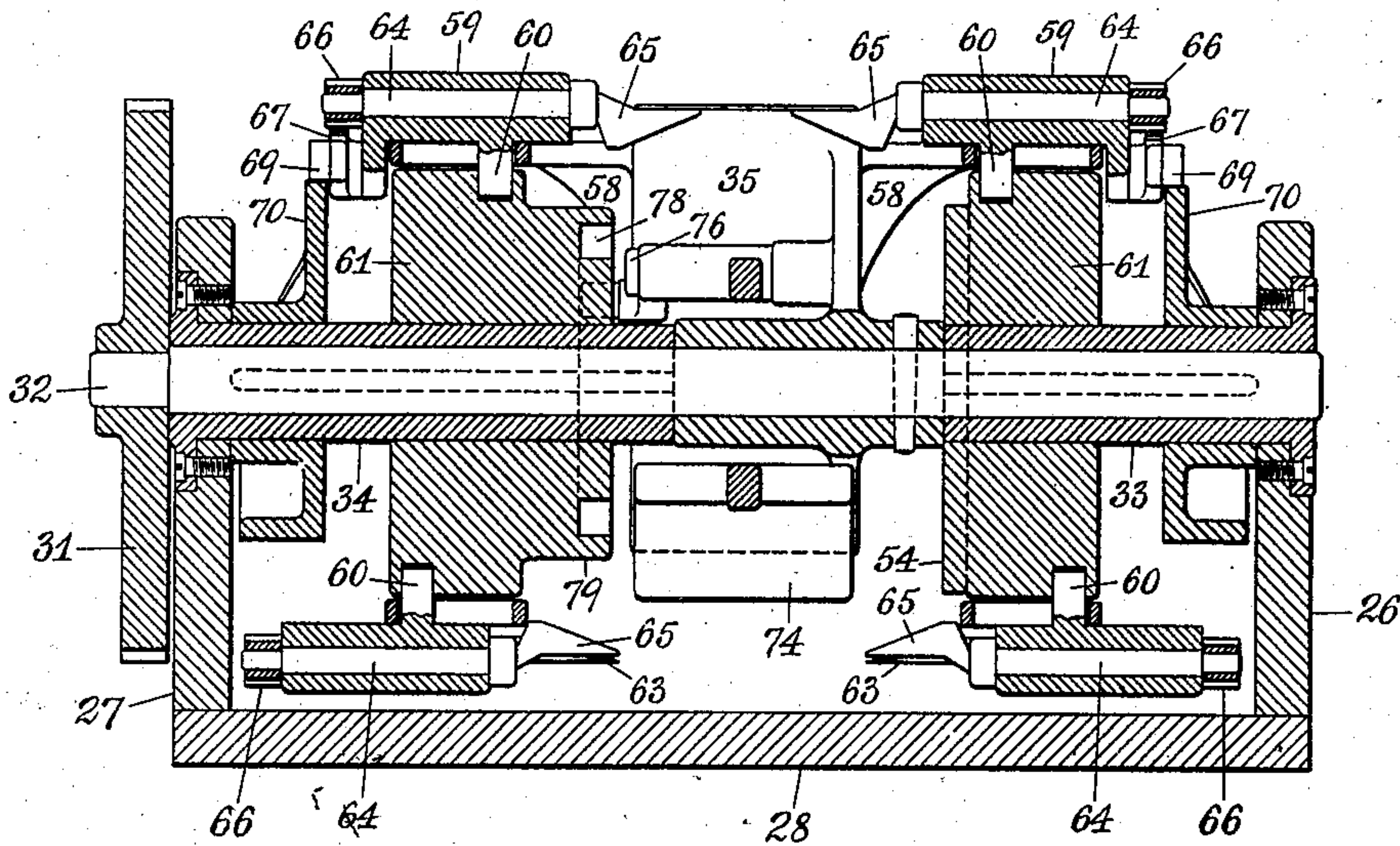
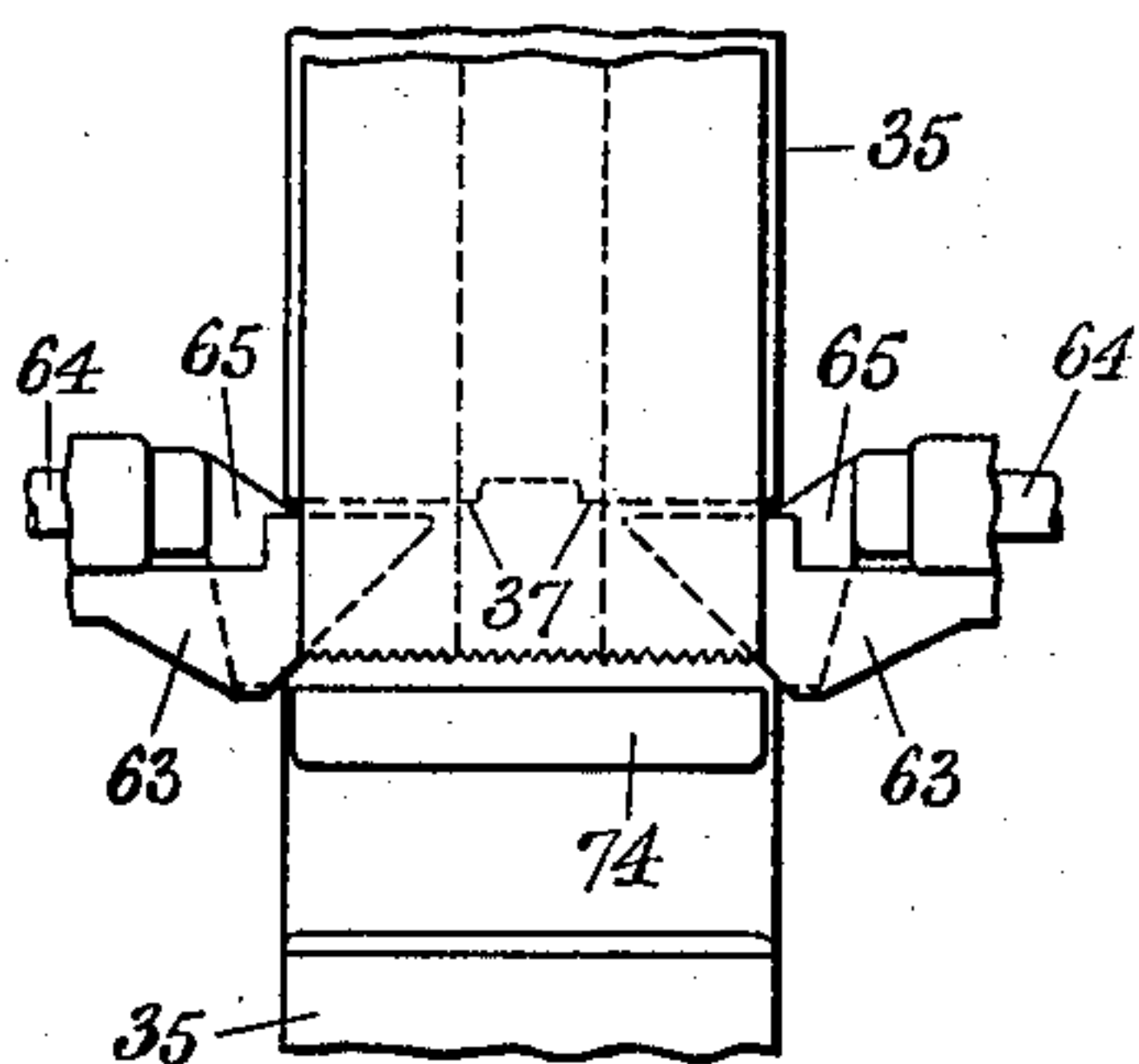
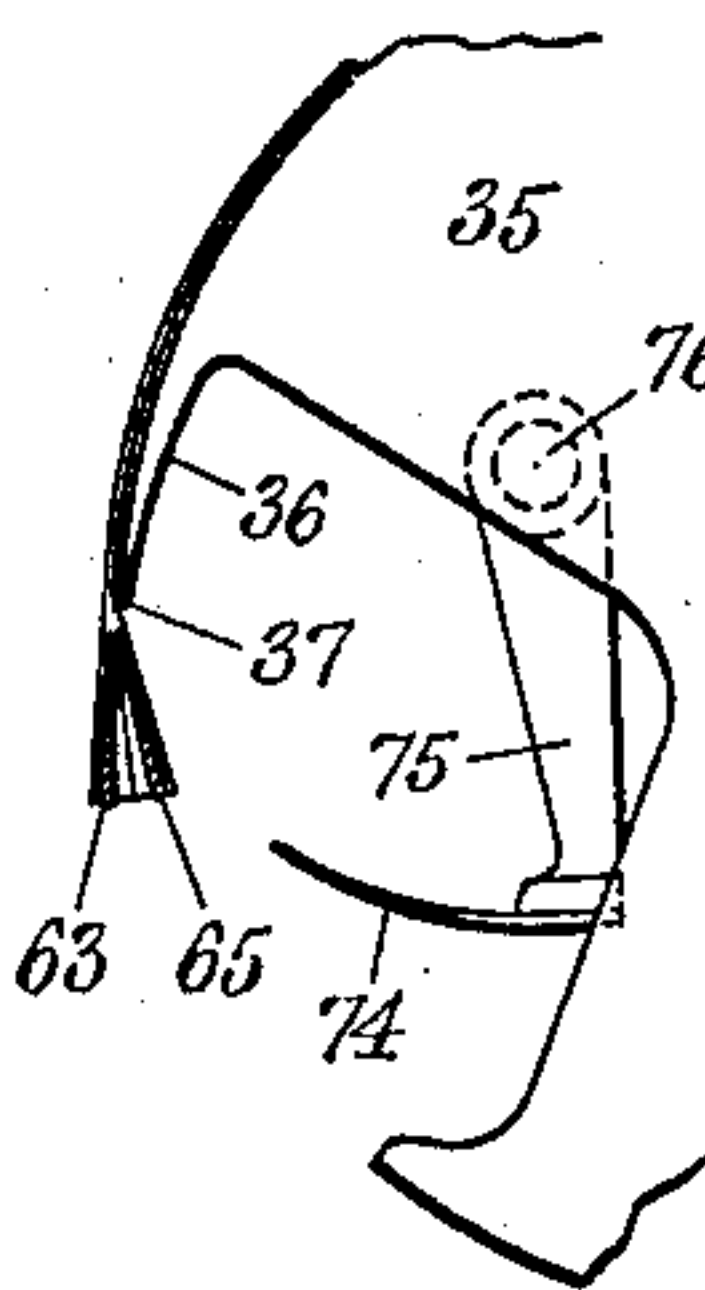
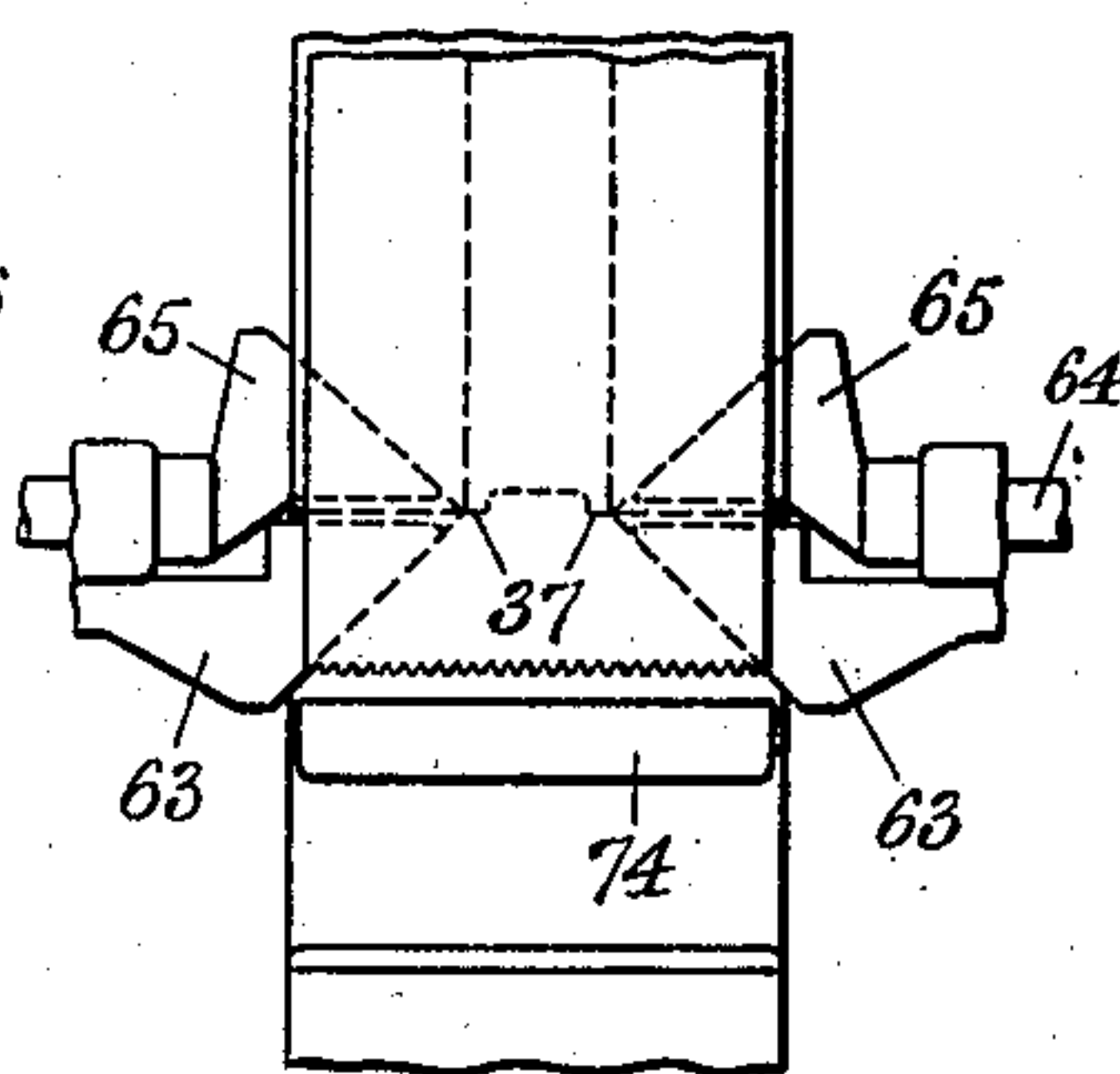
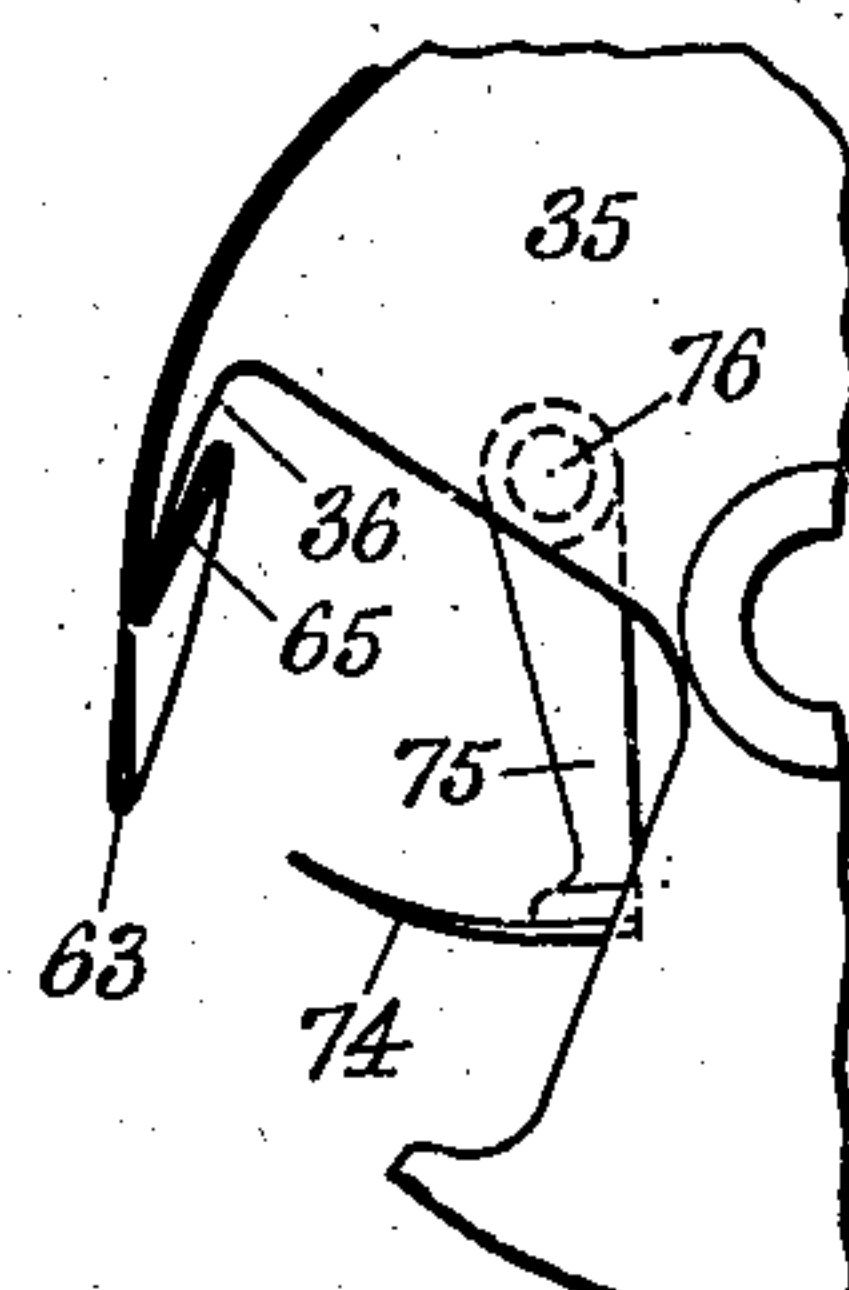
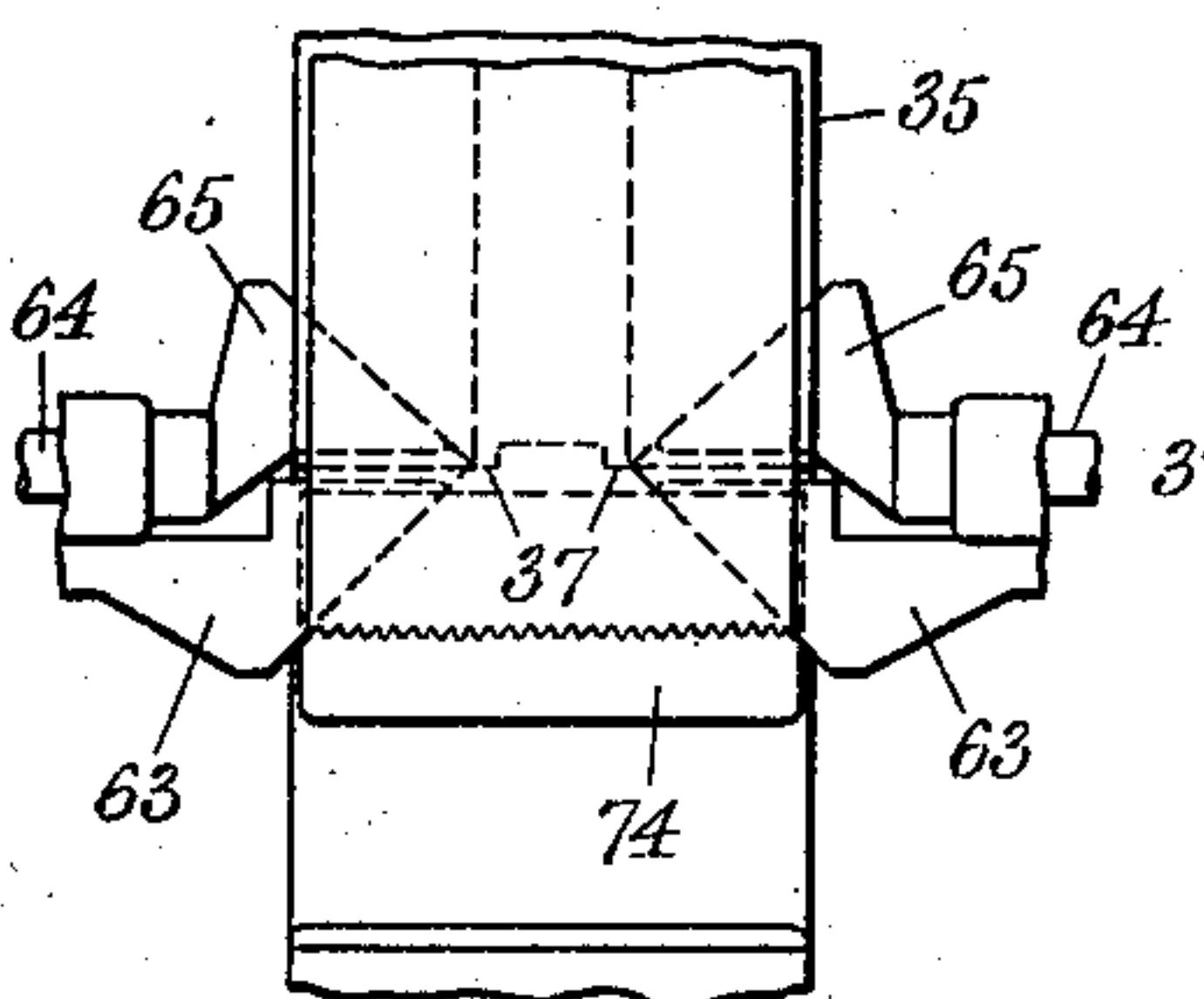
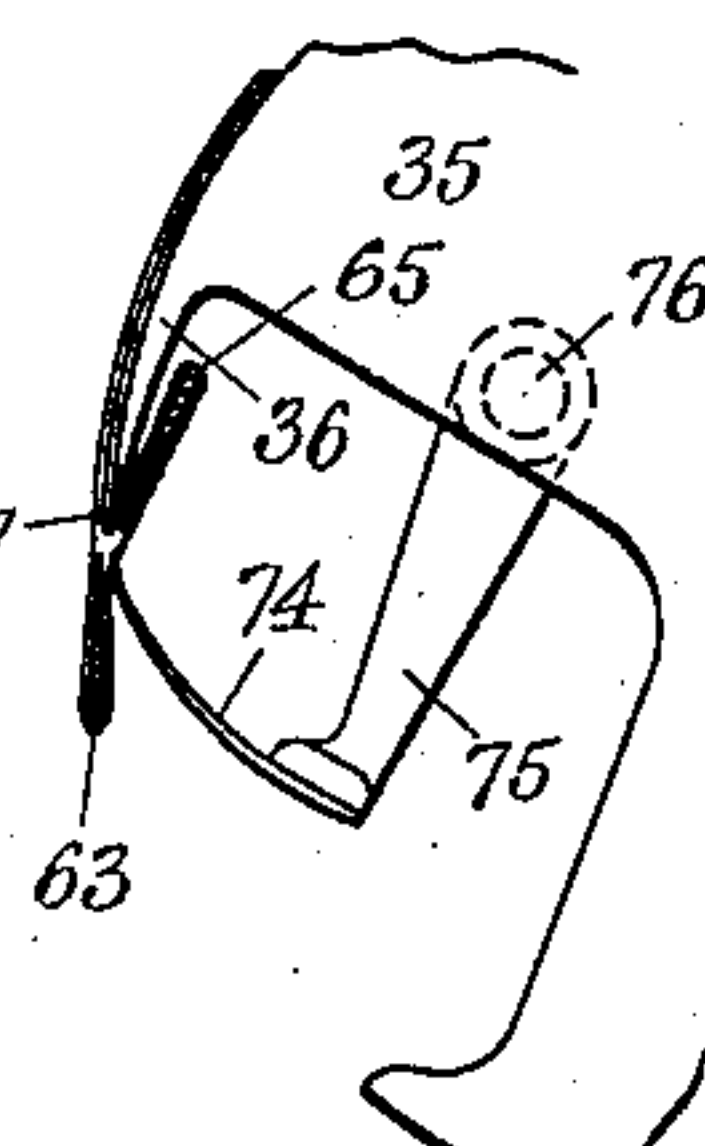
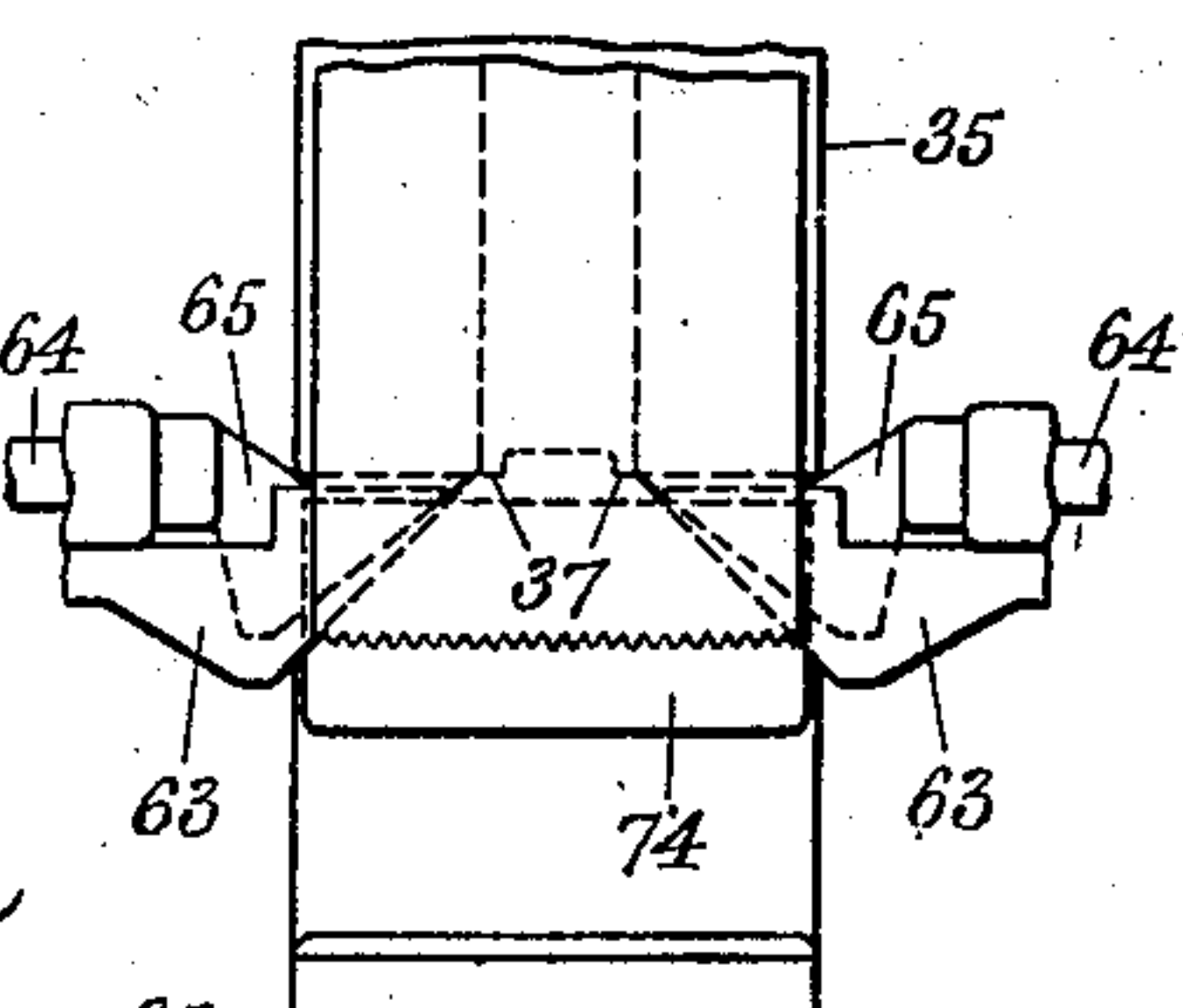
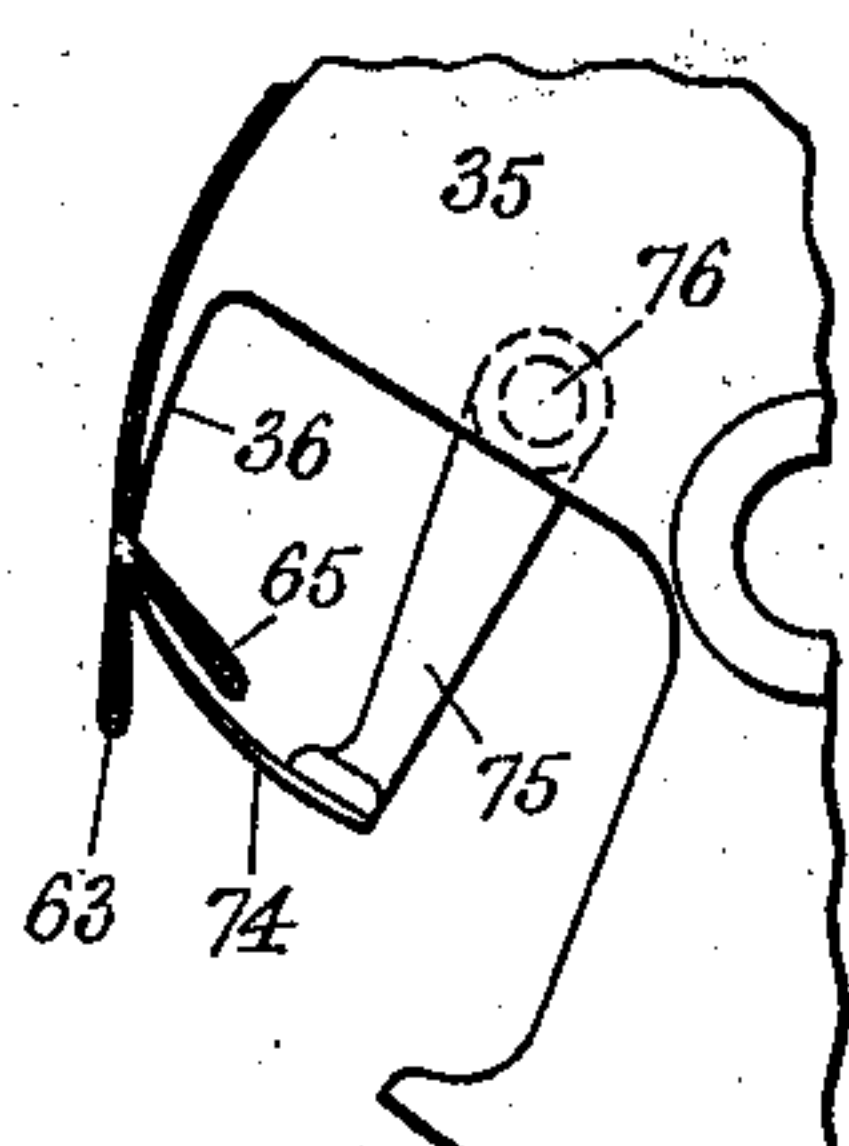
William A. Lorenz

By W. H. Honiss. Atty.

W. A. LORENZ.
PAPER BAG MACHINE.
APPLICATION FILED JAN. 26, 1903.

NO MODEL.

3 SHEETS—SHEET 3.

Fig. 4*Fig. 5**Fig. 6**Fig. 7**Fig. 8**Fig. 9**Fig. 10**Fig. 11**Fig. 12*

Witnesses:

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Joseph Merritt

Inventor

William A. Lorenz
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UNITED STATES PATENT OFFICE.

WILLIAM A. LORENZ, OF HARTFORD, CONNECTICUT, ASSIGNOR TO UNION PAPER BAG MACHINE COMPANY, OF PHILADELPHIA, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

PAPER-BAG MACHINE.

SPECIFICATION forming part of Letters Patent No. 742,204, dated October 27, 1903.

Application filed January 26, 1903. Serial No. 140,460. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM A. LORENZ, a citizen of the United States, and a resident of 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.

The object of this invention is to provide automatic mechanism for forming in the open or mouth end of the side tucks of bellows-sided paper bags or paper-bag blanks certain reversed folds which are shown and described in Letters Patent of the United States to H. M. Farnsworth, No. 355,010, dated December 28, 1886, so that when the bag is opened for use these particular folds will turn outwardly instead of inwardly, and thus present a funnel-shaped mouth for the more ready reception of the contents of the bag. These folds also assist in maintaining the mouth of the bag in an open condition. For this purpose the upper or mouth ends of the inwardly-tucked bellows plies of the blank are turned outwardly, the innermost bellows fold-line being reversed and swung outwardly to positions approximately ninety degrees from their former positions. The machine of the present invention produces these folds by first turning over one of the flat side walls of the bag or blank over a transversely-disposed defining edge, thereby opening the mouth ends of the tucked bellows-plies into flattened triangular plies. Then a blade, herein designated as the "funnel-defining" blade, is brought against the blank, across the centers of the triangular plies, into approximate coincidence with what were formerly the inner bellows fold-lines, upon which lines each of these triangles is then doubled upon itself by the turning back of the doubled-over side wall, the funnel-defining blade serving to prevent the said fold-line from returning to its original position.

This invention may be embodied in an independent machine by providing it with a suitable driving mechanism and by providing means for feeding the blanks or bags to it in proper sequence and register; but I prefer to embody the invention in a machine

which operates in conjunction with mechanism for folding the bottoms of paper bags from bellows-sided blanks, thus embodying in a single organization an automatic machine for rapidly manufacturing bellows-sided paper bags having these mouth folds. When thus employed in such an organization, the machine of my present invention may perform its operations before the bottom of the bag has been formed, or it may, as herein shown, receive the bags after the bottom-forming mechanism has completed the bottom folds, or both operations may be performed simultaneously.

Figure 1 of the drawings is a plan view of a machine embodying my present invention. Fig. 2 is a side view of the machine of Fig. 1 looking at the right-hand side thereof. Fig. 3 is a side view in section, taken on the line 3 3 of Fig. 1, a portion thereof being taken on the line 3^a of Fig. 1. Fig. 4 is a sectional view of the machine, taken on the line 4 4 of Fig. 3. Figs. 5, 7, 9, and 11 are plan views; and Figs. 6, 8, 10, and 12 are corresponding side views, respectively, showing a portion of the folding devices of the machine in successive stages of operation upon the mouth of a paper bag or blank. Figs. 13, 14, and 15 are perspective views of the mouth of a bellows-sided bag-blank in successive stages. Fig. 13 shows the blank before it has been folded. Fig. 14 shows an intermediate position of the fold, and Fig. 15 shows the completed funnel folds. Fig. 16 is a side view in section, taken through the suction-boxes on the line 3^a 3^a of Fig. 1 and through the sustaining-blade and swinging blade at approximately the edge of the blank.

The organization of mechanism shown and described herein is adapted to be attached to many of the well-known forms of paper-bag machines, the feed-rolls 18 and 19 being considered as equivalents or substitutes for the delivery-rolls of such paper-bag machines. The mechanism herein shown is driven by a train of gears, which may receive their motion from the gear 25 by meshing that gear with a gear on the paper-bag machine to which it is connected. The feed-rolls 18 and 19 are mounted upon the shafts 20 and 21,

journalled in bearings 22 22, and are provided with gears 24 and 25, which mesh together. These shafts and bearings are supported in the uprights 26 and 27, secured upon a base 5 28. The feed-roll 18 is pressed toward the roll 19 by means of springs 23, pressing against the bearings 22. Motion is transmitted by means of the gear 25 to the intermediate gear 29, which runs upon the stud 30 and transmits motion to the gear 31, attached to the shaft 32, running in bearings 33 and 34, attached to the uprights 26 and 27, respectively. The blank-support 35 is approximately cylindrical, having portions cut away 15 in its periphery, and it is carried by the shaft 32.

Between the feed-rolls 18 and 19 and the carrier 35 are two suction-boxes 38 and 45, attached to the bars 39 and 46, supported by 20 the uprights 26 and 27, respectively. The upper box 38 communicates by means of the pipe 40 with the main pipe 41. The end wall 42 of this box is placed at a tangent to the surface of the blank-support 35, and this tangent 25 wall is provided with holes communicating with the interior of the box. This portion of the box is also cut out at 43 in order to clear the grippers 51 of the carrier 35, and this box is made narrower than the blank-support in order that the blades 63 and 65 30 may pass by the box. The lower suction-box 45 communicates by means of the pipe 47 with the main suction-pipe 41. The wall 48 of this box inclines upward toward the surface 35 of the blank-support 35 and is provided with holes communicating with the interior of the box. This box is also provided with recesses to allow of the passage of the grippers 51. The pipe 41 is connected with suitable 40 exhausting apparatus, and this pipe may also be provided with gates for cutting off connection with the boxes 38 and 45 or for allowing communication therewith at suitable intervals during the passage of the blank through 45 the machine, like the devices shown and described in my patent No. 591,175. These suction-boxes serve to draw apart the mouth ends of the two side walls of the blank to permit the certain entrance of the funnel-blades 50 into the side tucks of the blank.

The rotating blank-support 35 carries one or more sets of gripping and folding devices to which suitable movements are imparted as the blank-support rotates. The machine 55 herein shown is provided with two sets of these devices; but I will describe but one of these sets, it being understood that the construction and mode of operation of the second set is similar thereto and that these devices alternate in their operation upon the 60 succeeding blanks.

The gripping device consists of a gripper 51, which may be bifurcated, as shown in Fig. 1, and is attached to a shaft 52, provided with 65 a roller or projection which is held against the fixed cam 54 by a spring 55. The cam 54

is supported by the bearing 33 and may be separate or be integral with another cam, as shown in the drawings.

Each of the two sets or sections of the 70 blank-support 35 is provided with a projecting shelf or ledge 36, having a defining edge 37, which may extend either partially or entirely across the blank-support, but should at least be as wide as the depth of the side tucks 75 of the blank. Adjacent to this edge 37 and on each side of the blank-support 35 is arranged a pair of funnel-folding blades, which rotate with the blank-support and operate in conjunction with the edge 37 to turn over one 80 of the side walls of the blank. These devices comprise the sustaining-blades 63 and the swinging blades 65, which are mounted upon the slides 59, supported by the brackets 58, extending from the blank-support. 85 The sustaining-blades 63 are attached directly upon the slides 59, while the swinging blades 65 are attached to shafts 64, journalled in the slides, the axes of the shafts being in alignment with each other and with the de- 90 fining edge 37, while the outer or fold defining edges of the blades 63 and 65 are substantially at an angle of forty-five degrees with the defining edge 37. Both pairs of blades 63 and 65 are carried into and out of the bel- 95 lows side tucks of the blank, and the sustaining-blades support the upper plies of those tucks, while the swinging blades 65 turn over the rearward end of the lower wall of the blank around the defining edge 37 and be- 100 neath the projecting ledge 36. As a means for moving the blades into and out of the tucks the slides 59 are provided with projections 60, which engage with the cams 61, attached to the bearings 33 and 34, and the os- 105 cillating movement of the swinging blades 65 is effected by means of the pinions 66, which are fixed upon the shafts 64 and mesh with the sector-gears 67, pivotally mounted upon studs 68, attached to the brackets 58. These 110 sectors are provided with rolls or studs 69, which are held, by means of the springs 71, against the cam 70, mounted upon the bearings 33 and 34. Each set or blank section of the blank-support is also provided with a fun- 115 nel-defining blade 74, mounted on an arm 75, which is pivoted on a stud 76, appurtenant to the blank-carrier. The other end of the arm is provided with a roll or stud 77, running in the cam-groove 78 of the cam 79, 120 which is supported upon the bearing 34, and may, as herein shown, be integral with one of the cams 61. The defining edge of the blade 74 is parallel with the defining edge 37 and is mounted to move toward and from 125 that defining edge during the rotation of the blank-support, cooperating with the blades 63 and 65 to form the funnel-mouth folds.

When the blank reaches the position shown in Fig. 3, the front gripper 51 is released to 130 permit the front end of the blank to be delivered from the blank-support between the

plates 88 and 89. At the same time the blank is held to the support by means of the bifurcated pressing-sector 82, fixed to the rotating shaft 83, mounted in bearings in the up-
rights 26 and 27, each bearing being pressed toward the blank-support 35 by a spring 85. Rotary motion is imparted to the sector 82 by the gear 86, meshing into the large gear 31. The completed blank then passes between
the plates 88 and 89 to the delivery-rolls 90 and 91, which may be provided with tapes 92 to carry the blanks away from the machine.

The consecutive operation of this machine is as follows: The blank 95 is delivered to the rolls 18 and 19 in approximately the condition shown in Fig. 13 and passes between the suction-boxes 38 and 45, being deflected upwardly by the inclined wall 48 of the lower box, and thus directed tangentially to the surface of the blank-support 35. The leading end of the blank is gripped to the blank-support by means of the gripper 51. When the rear or mouth end of the blank arrives between the walls 42 and 48 of the two suction-boxes, the suction through the holes in those walls draws the upper and lower walls of the blank apart, thereby opening the side tucks 96 of the blank. The blades 63 and 65 then enter those opened tucks, as shown in Fig. 16 and Fig. 5, the blades 63 supporting the upper bellows plies of the blank. The swinging blades 65 are then turned by their shafts the axes of which are approximately in alinement with the defining edge 37, thus turning downwardly and forwardly the lower wall of the blank around the edge 37, and thereby stretching open the mouth end of the blank, as shown in Figs. 1, 7, 8, and 14. Then the blade 74 is moved forward toward the defining edge 37, as shown in Figs. 9 and 10, against the fold-lines 99 of the blank. While the blade 74 remains in this position the swinging blades 65 are turned back toward the blade 74, as shown in Figs. 11 and 12, thereby returning the lower wall of the blank to its first position, as shown in Fig. 15, and doubling the triangular side folds upon themselves upon the fold-line 99 around the edge of the blade 74, thus reversing the folds upon that line and leaving it in substantial coincidence and alinement with the axes of the swinging blades, and thereby forming on each side of the blank the two V-shaped funnel-plies 98. The blades 63 and 65 are then carried entirely out of the tucks, and the grippers 51 release the forward end of the blank just before reaching the plate 89, which plate guides the blank between the rolls 90 and 91, while the pressing-sectors 82 feed the blank forward. When the mouth end of the blank approaches the plate 89, the funnel-defining blade 74 is gradually retracted, and the funnel-folds are held together by the plates 88 and 89, being finally compressed by passing between the rolls 90 and 91 or the tapes 92 to approximately the condition shown in Fig.

15, in which, however, the blank is opened to a slight extent, so as to represent more clearly the character of the funnel-folds produced by this operation.

I claim as my invention—

1. Means for forming the described funnel-folds in the mouth end of a bellows-sided bag-blank, comprising a blank-support having a defining edge, means for turning over the mouth end of one of the side walls of the blank around the defining edge to open the bellows sides into flat triangular folds, and means for turning the said mouth end back to its first position, and doubling the said triangular folds upon themselves.

2. Means for forming the described funnel-folds in the mouth end of a bellows-sided bag-blank, comprising a blank-support having a defining edge, means for turning over the mouth end of one of the side walls of the blank around the defining edge to open the bellows sides into flat triangular folds, and for turning the said mouth end back again to its original position, and means for reversing the bottom-fold line across the said triangular folds to double the said folds.

3. The combination of a blank-support having a defining edge, a pair of movable blades for turning over the mouth end of one of the side walls of the blank around the defining edge to open the flat sides into flat triangular folds, means for carrying the said blades into the bellows sides of the blank, means for swinging the said blades to turn the said mouth end over and back again, and means for reversing the original bottom-fold lines of the said triangular folds to double each of them upon itself as the side wall of the blank is returned to its original position.

4. The combination of a blank-support having a defining edge, sustaining-blades for supporting the upper plies of the bellows side tucks of the blank, swinging blades for engaging the lower plies thereof, means for moving both of said blades into the bellows side tucks of the blank, and means for moving the swinging blades around the said defining edge as an axis.

5. The combination of a blank-support having a defining edge, sustaining-blades for supporting the upper plies of the bellows side tucks of the mouth of the blank, swinging blades for engaging the lower plies thereof, means for moving the said blades into the bellows side tucks of the blank, and a cam for moving the said swinging blades around the said defining edge as an axis.

6. The combination of a blank-support having a defining edge, funnel-folding blades carried by the blank-support, comprising the sustaining-blades for engaging the upper plies of the bellows side tucks of the mouth of the blank, and swinging blades for engaging the lower plies thereof, means for moving the said folding-blades into the side tucks of the blank, and a cam for moving the swing-

ing folding-blades around the defining edge as an axis.

7. The combination, with a blank-support having a defining edge, of sustaining-blades for engaging the upper plies of the bellows side tucks of the mouth of the blank, swinging blades for engaging the lower plies thereof, means for moving the said blades into the side tucks of the blank, means for moving the swinging blades around the defining edge as an axis, and means for reversing the fold-lines 99 of the mouth of the blank.

8. The combination, with a rotating blank-support having a defining edge, slides mounted upon the opposite sides of and movable toward and from the said blank-support, a sustaining-blade and a swinging blade mounted upon each of the said slides, a cam for moving the said swinging blades around the defining edge as an axis, and a funnel-defining blade movable toward and from the defining edge.

9. The combination, with a blank-support having a defining edge, a pair of sustaining-blades for engaging the upper plies of the bellows side tucks of the mouth of the blank, a pair of swinging blades for engaging the lower plies thereof, means for moving both pairs of blades into the side tucks of the blank, means for moving the swinging blades toward and from the sustaining-blades, a funnel-defining blade for reversing the fold-lines 99 of the mouth of the blank, and means for moving the funnel-defining blade toward and from the defining edge of the blank-support.

10. The combination, with a blank-support having a defining edge, of a pair of sustaining-blades for engaging the upper plies of the bellows side tucks of the mouth of the blank, a pair of swinging blades for engaging the lower plies thereof, means for moving both pairs of blades into the side tucks of the blank, means for moving the swinging blades toward and from the sustaining-blades, a funnel-defining blade for reversing the fold-lines 99 of the mouth of the blank, a cam for moving the funnel-defining blade toward and from the defining-blade, and means for flattening the funnel-folds.

11. The combination, with a rotating blank-support having a defining edge, of slides mounted upon the opposite sides of, and movable toward and from the blank-support, a pair of funnel-folding blades mounted upon each of the slides, comprising a sustaining-blade for engaging the upper ply, and a swinging blade for engaging the lower ply of the bellows side tucks of the mouth of the blank, means for moving each swinging blade toward and from its associated sustaining-blade, a funnel-defining blade movable toward and

from the defining edge, and means for flattening the funnel-folds of the blank.

12. The combination of a rotating blank-support, having a defining edge, two oppositely-disposed pairs of funnel-folding blades carried by the blank-support, means for moving one of the blades of each pair to open and close the mouth of the blank, a funnel-defining blade having a defining edge substantially parallel to the defining edge of the blank-support, and means for moving the funnel-defining blade toward the defining edge of the blank-support to reverse the fold-lines 99 and leave them in substantial alignment with the defining edge of the blank-support.

13. The combination of means for forming the described funnel-folds in a paper-bag blank, comprising a traveling blank-support having a defining edge, means for gripping one end of the blank to the support, means for separating the side tuck-plies of the blank adjacent to its mouth end, oppositely-disposed pairs of funnel folding blades carried by the traveling blank-support and movable into the tucks of the blank, one of the blades of each pair being movable upon an axis at right angles with the blank, and a funnel-defining blade having a defining edge substantially parallel to the said axis for reversing the fold-line 99 between the said blades, and pushing the said fold-line into substantial coincidence with the said axis.

14. The combination of means for forming the described funnel-folds in a paper-bag blank, comprising a traveling blank-support provided with a defining edge, and with means for gripping the leading end of the blank to the blank-support, slides mounted upon opposite sides of and movable toward and from the blank-support, each slide having mounted thereon a sustaining-blade and a swinging blade provided with angular edges, the swinging blade being movable upon an axis in substantial alinement with the defining edge of the blank-support, means for moving the slides toward and from the blank-support, means for moving each swinging blade toward and from its associated sustaining-blade, a movable funnel-defining blade carried by the blank-support and having a defining edge substantially parallel with the defining edge of the blank-support, means for moving the funnel-defining blade toward and from the defining edge of the blank-support, and means for flattening the funnel-folds of the blank.

WILLIAM A. LORENZ.

In presence of—

MAX SCHLEIMER,
EMANUEL HARRIS.