

No. 822,618.

PATENTED JUNE 5, 1906.

W. A. LORENZ & J. MERRITT.

PAPER BAG MACHINE.

APPLICATION FILED JUNE 10, 1903.

4 SHEETS—SHEET 1.

Fig. 1

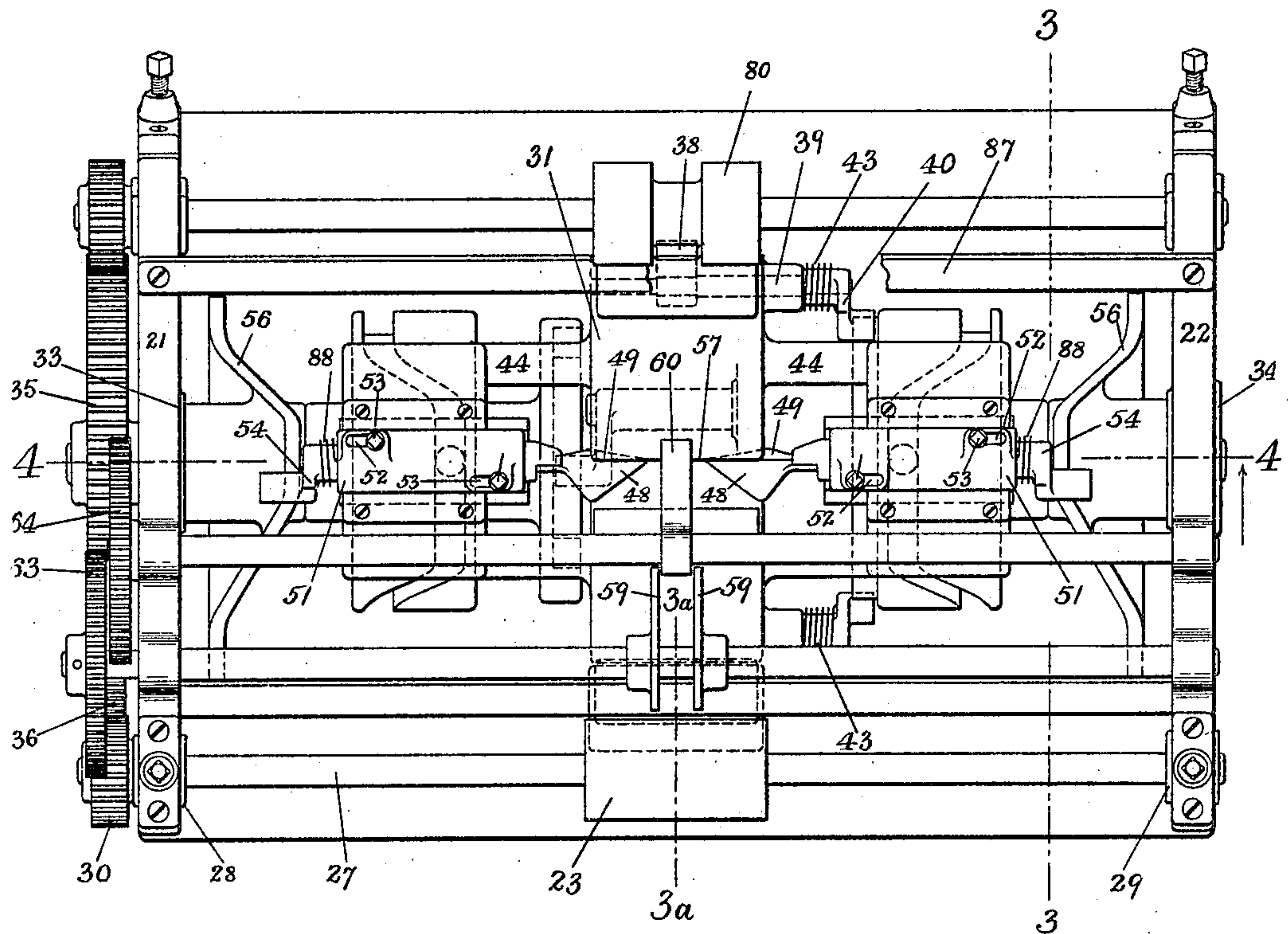


Fig. 15

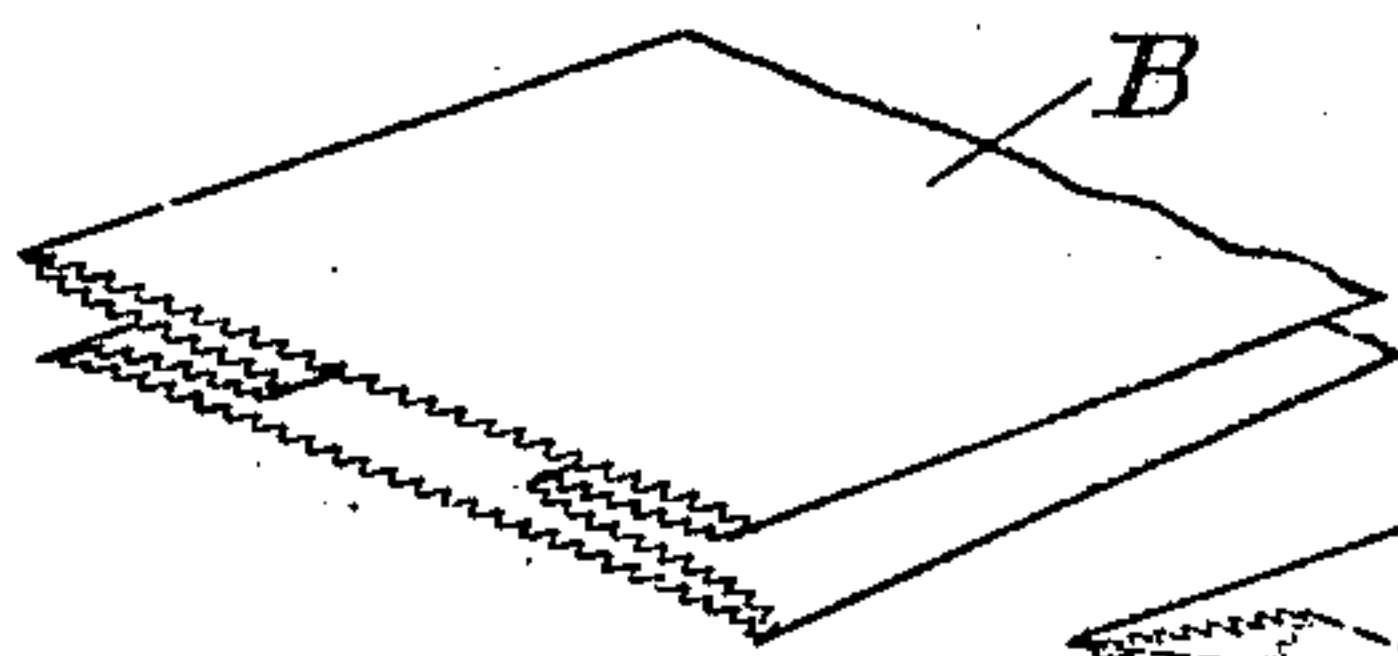


Fig. 17

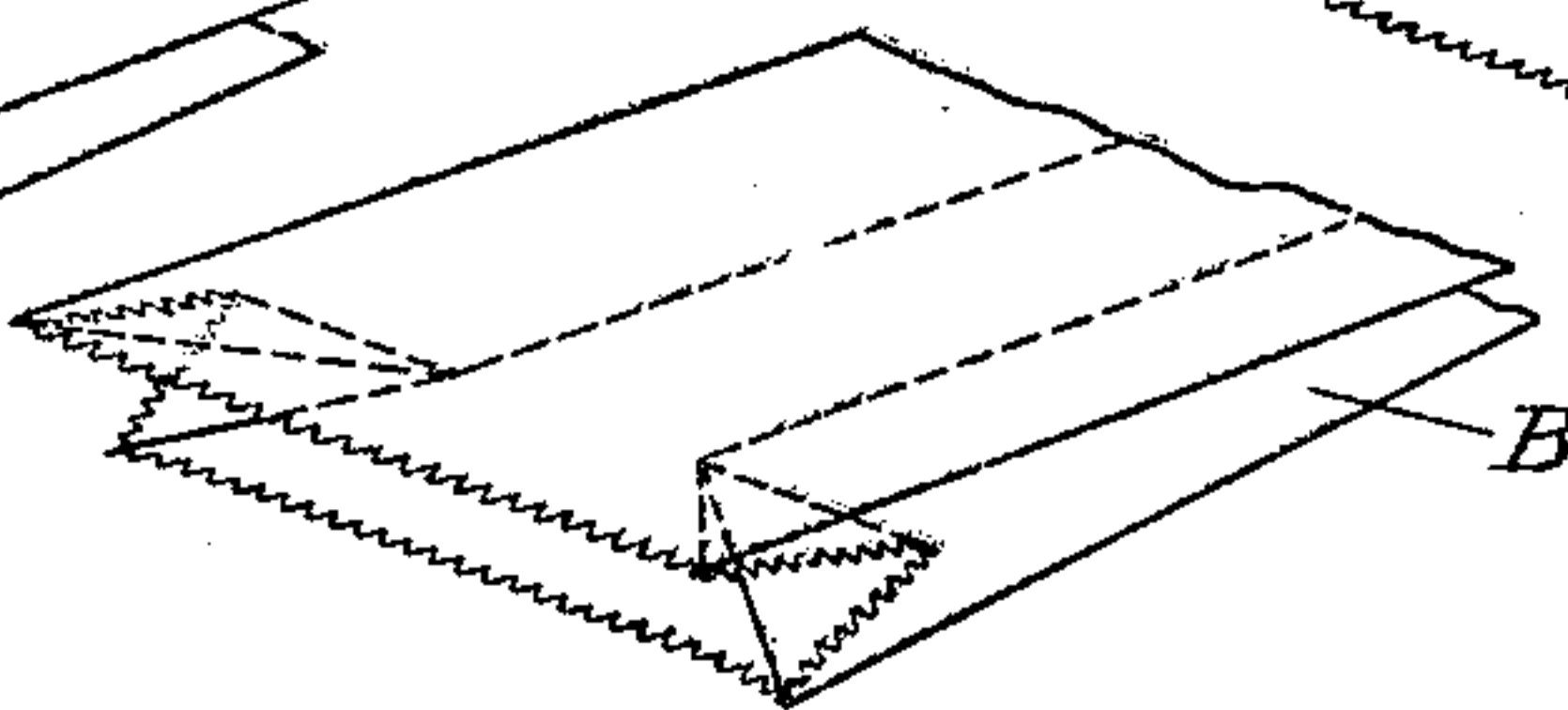
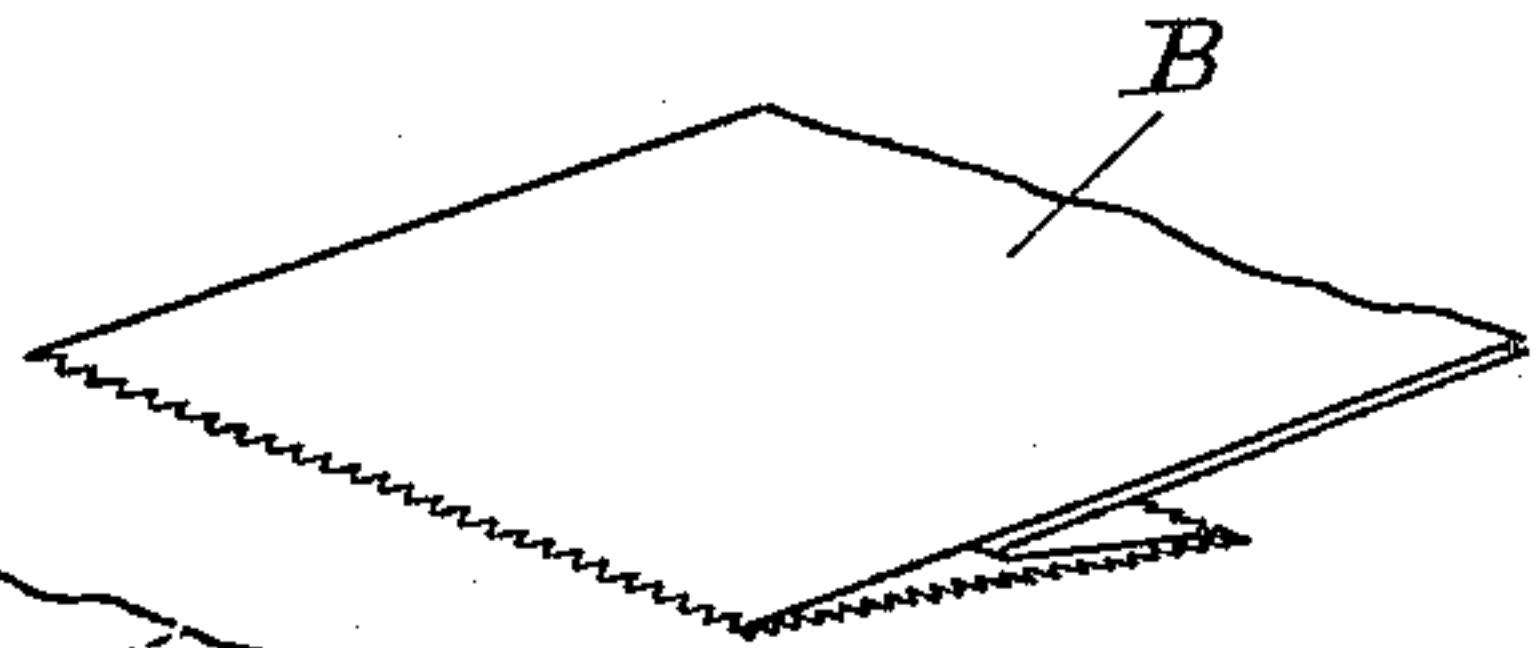


Fig. 16



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4 SHEETS—SHEET 2.

Fig. 2

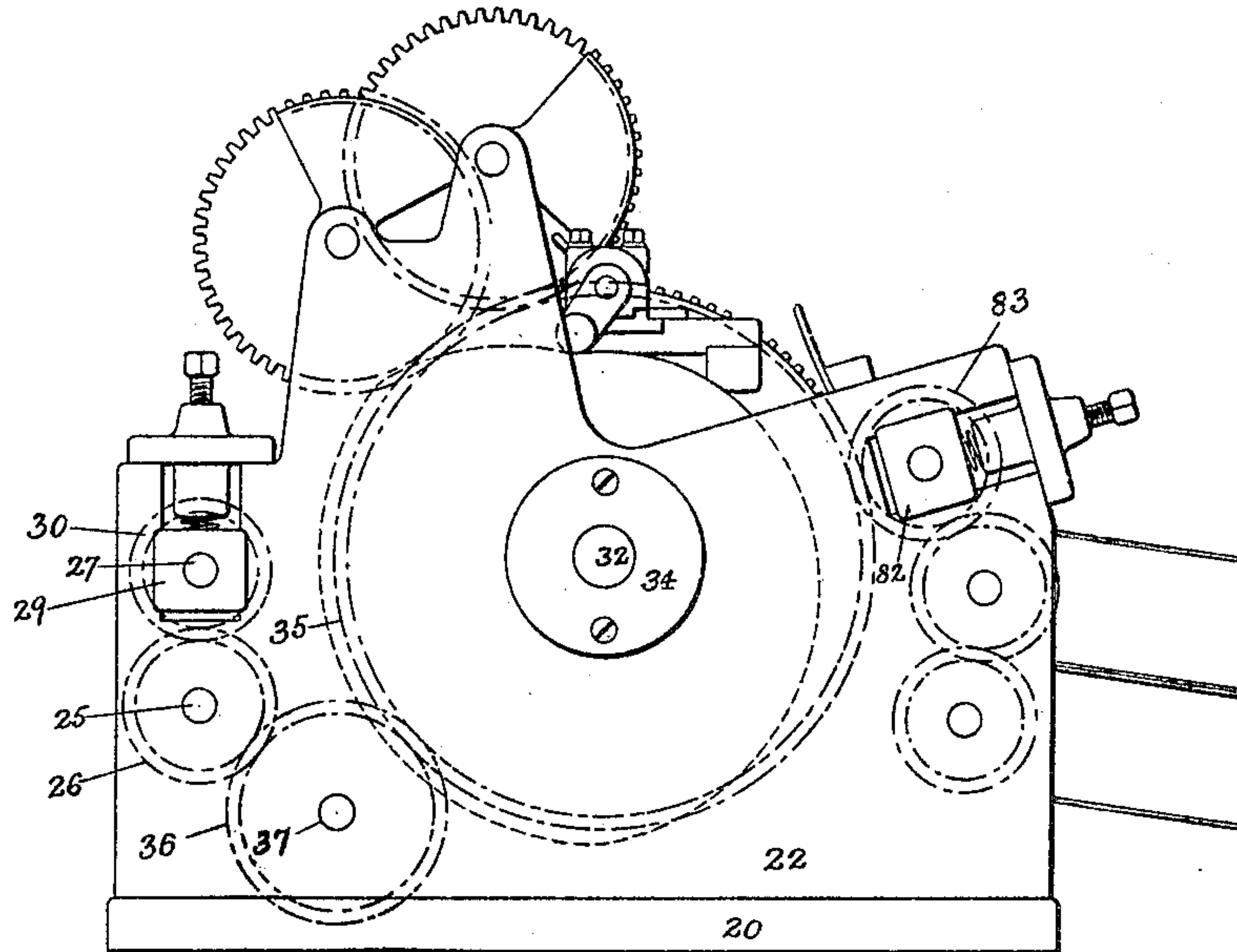
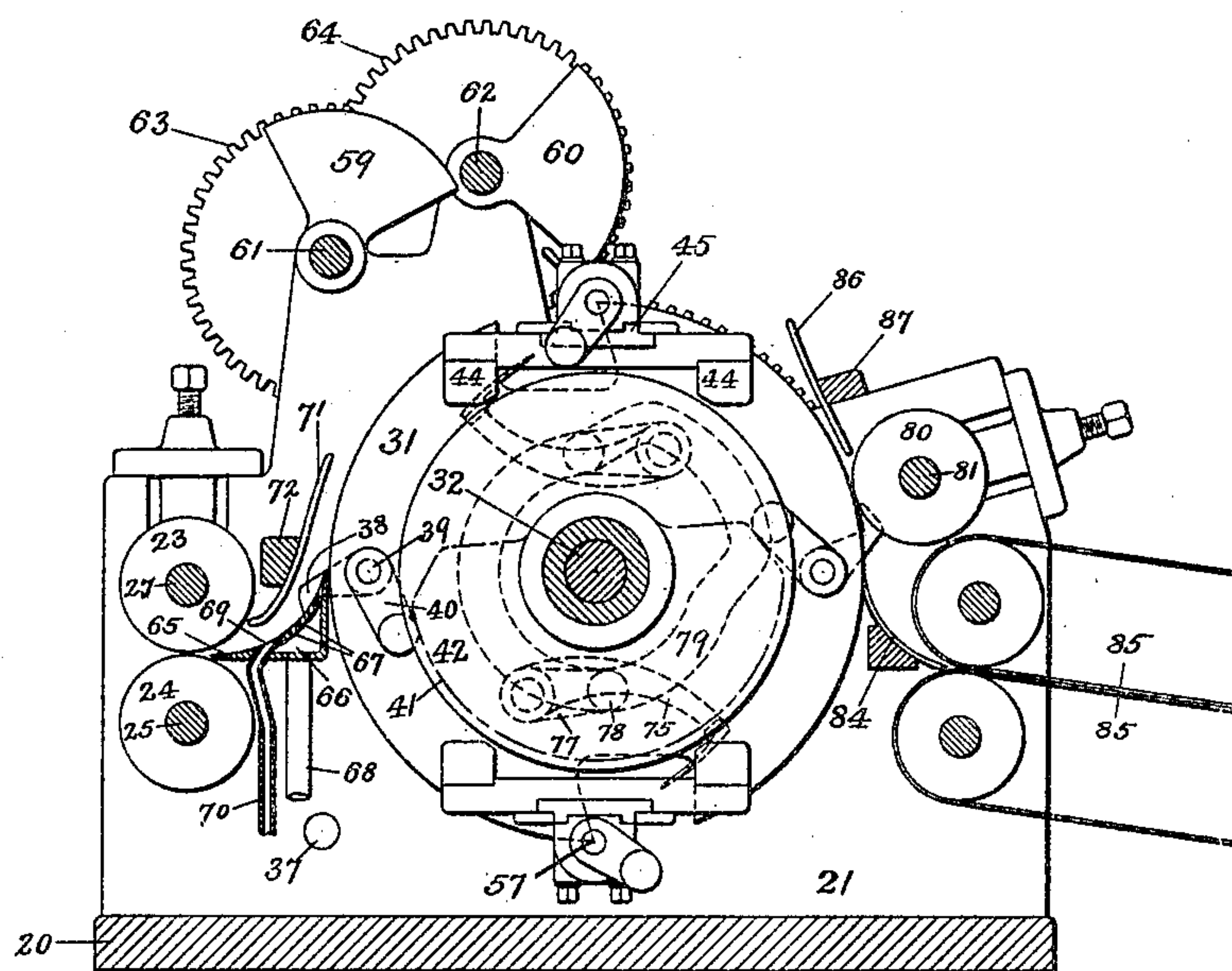


Fig. 3



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4 SHEETS—SHEET 3.

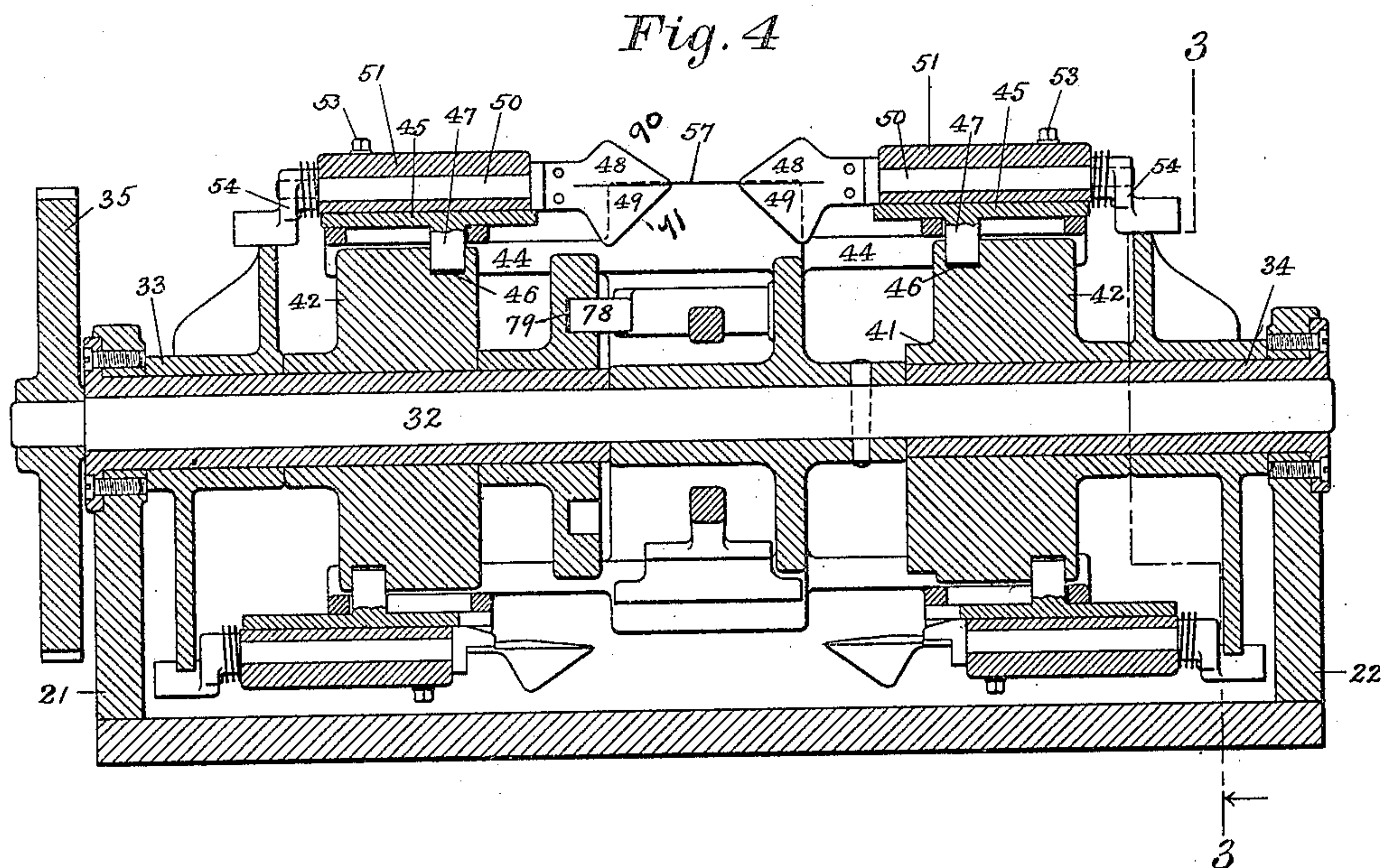


Fig. 13

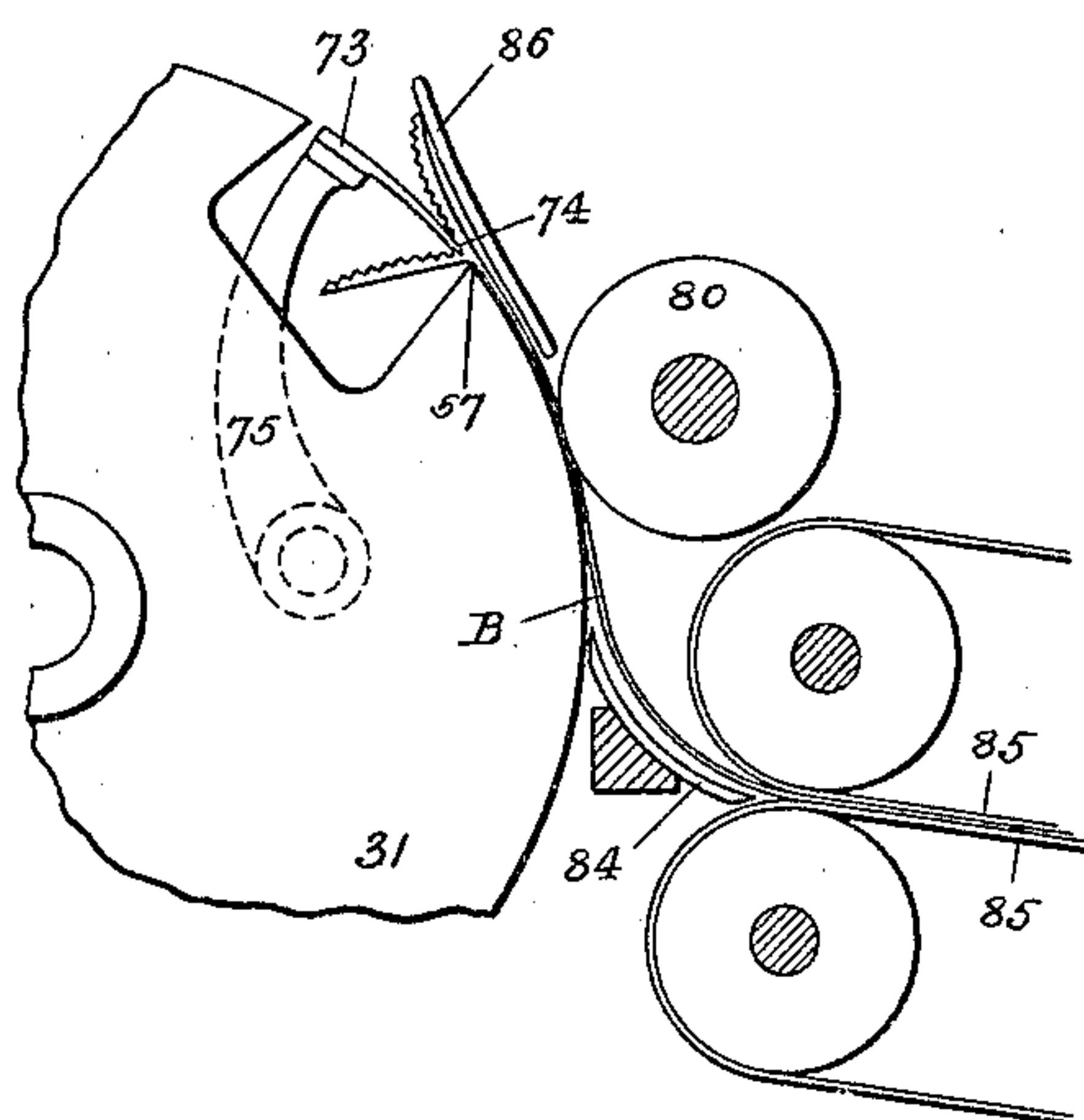
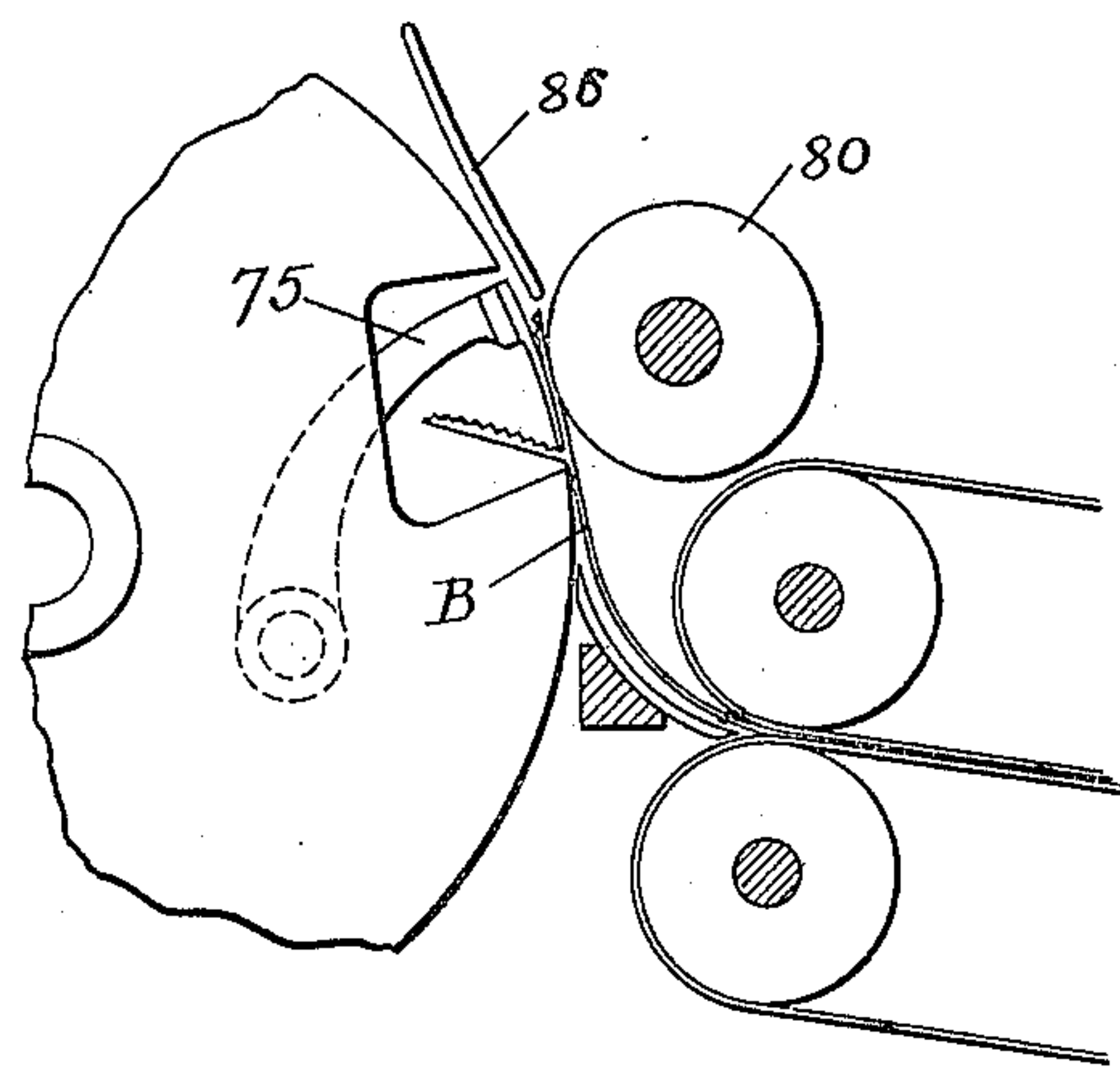


Fig. 14



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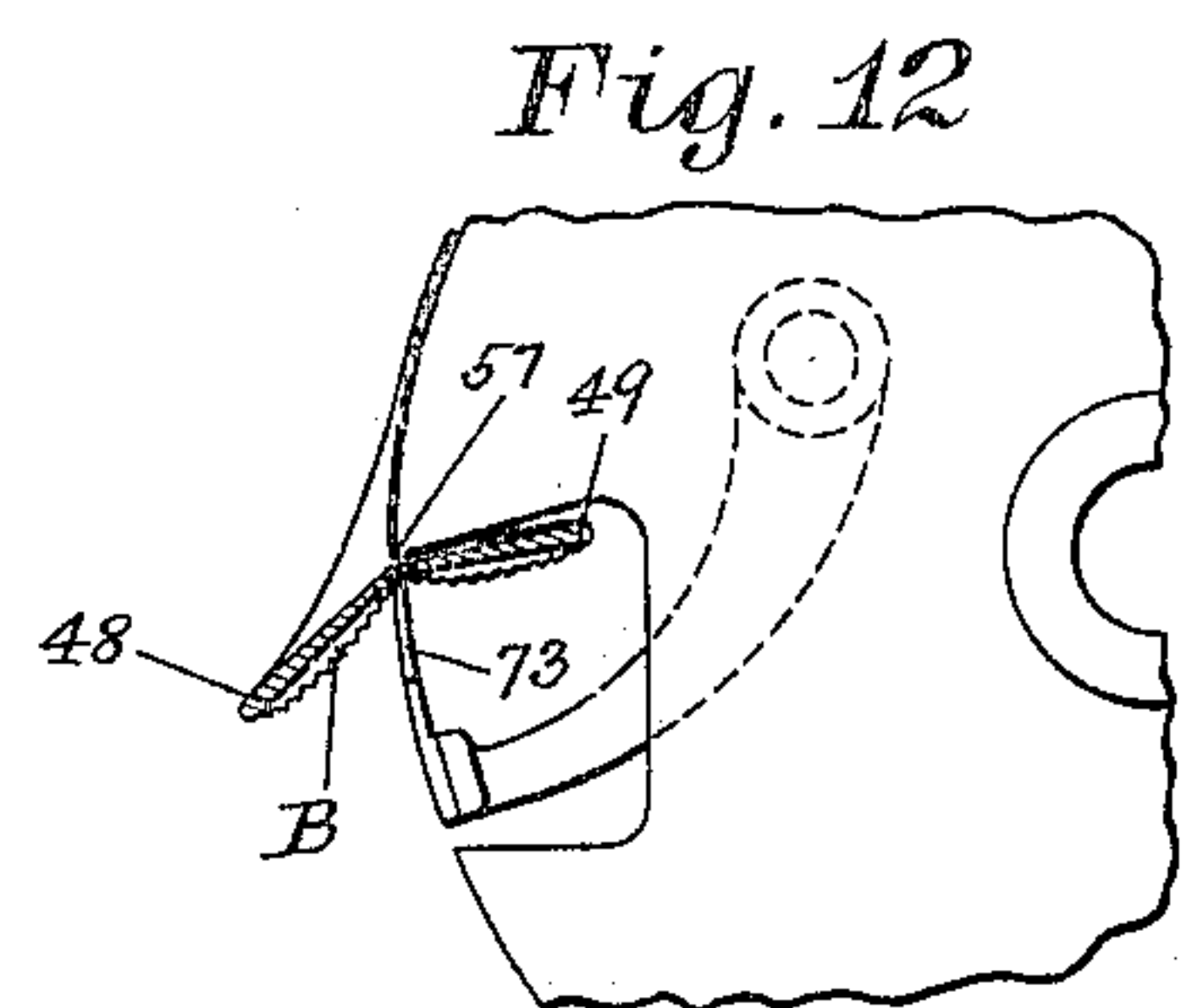
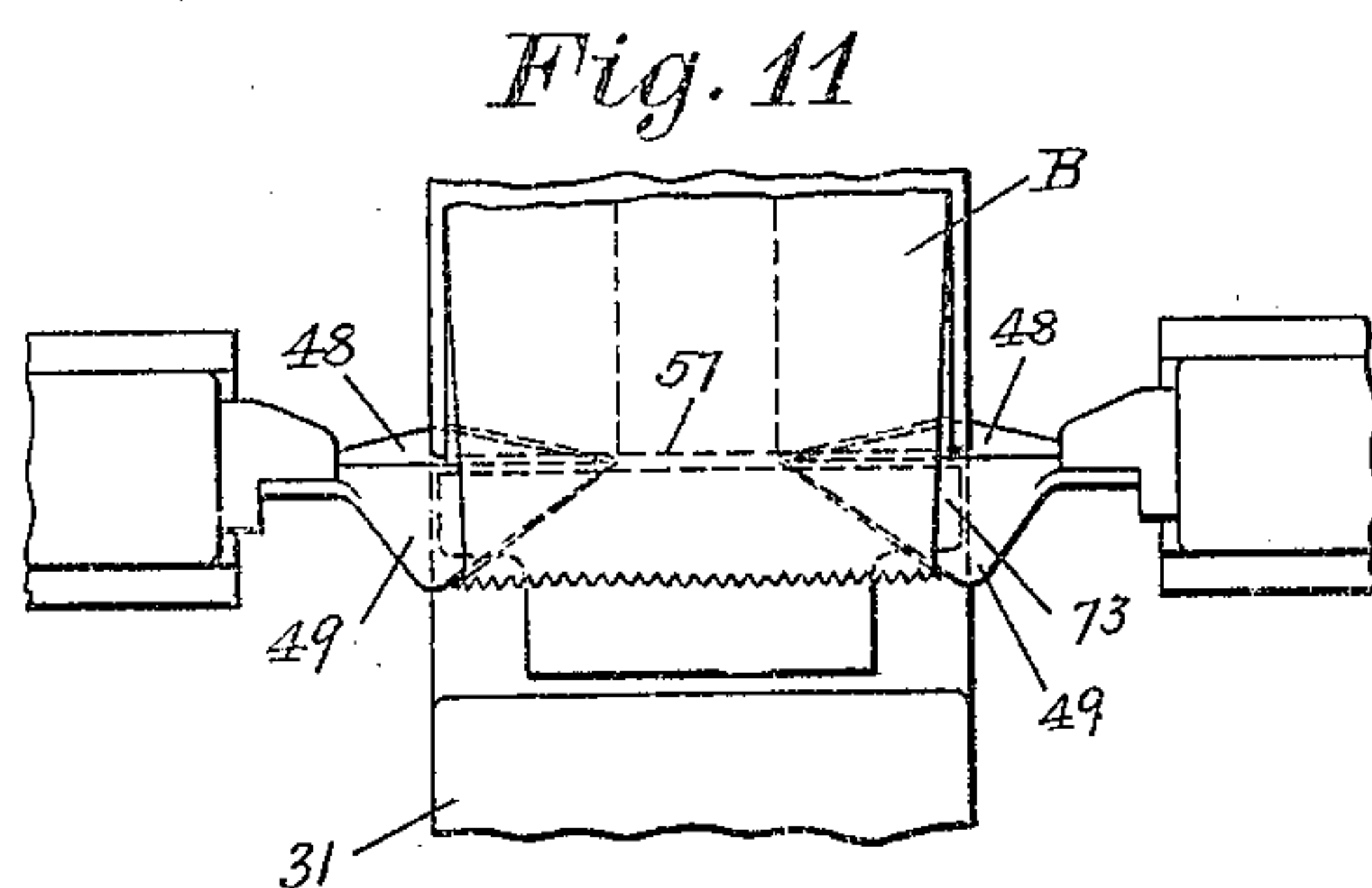
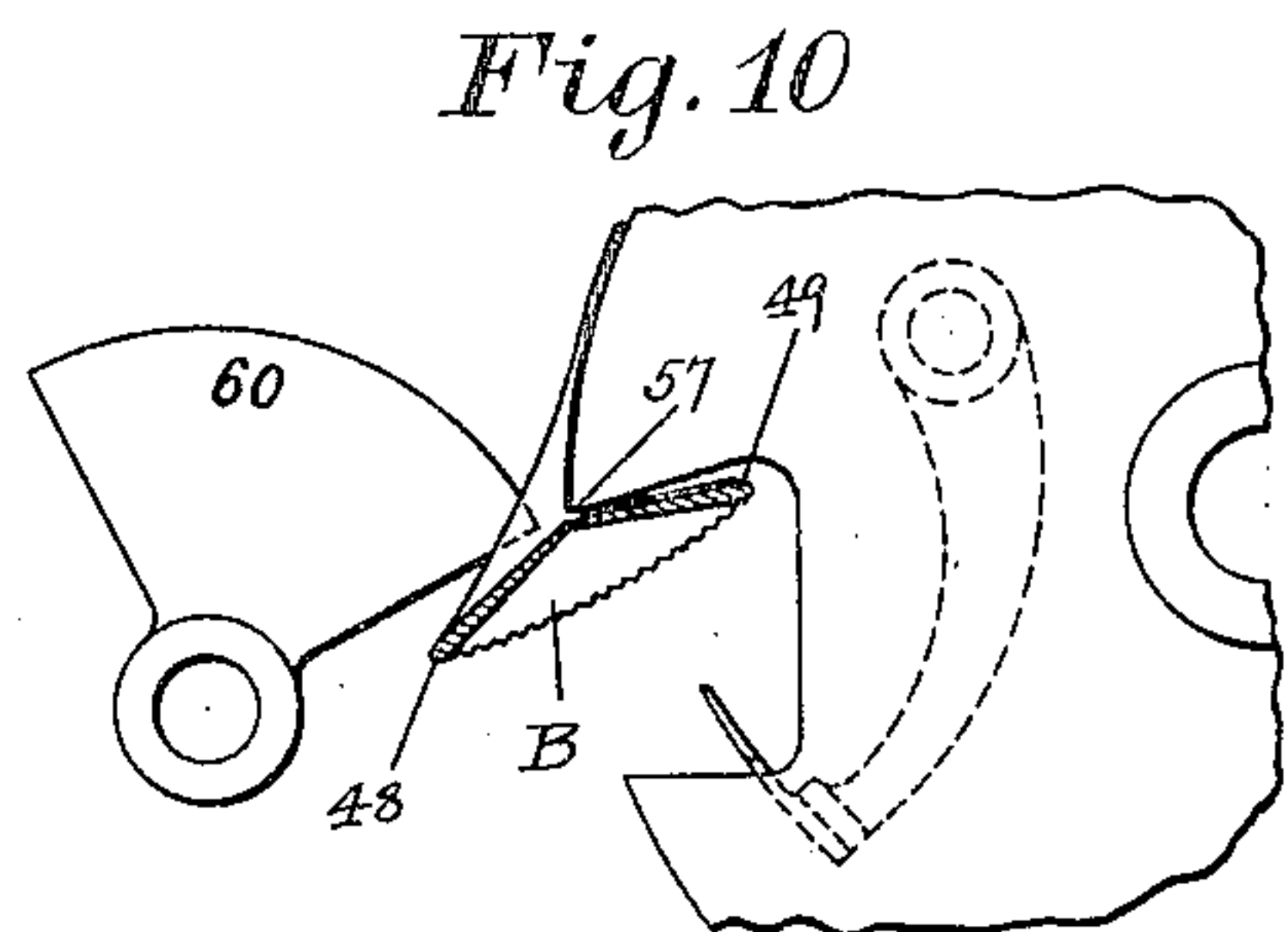
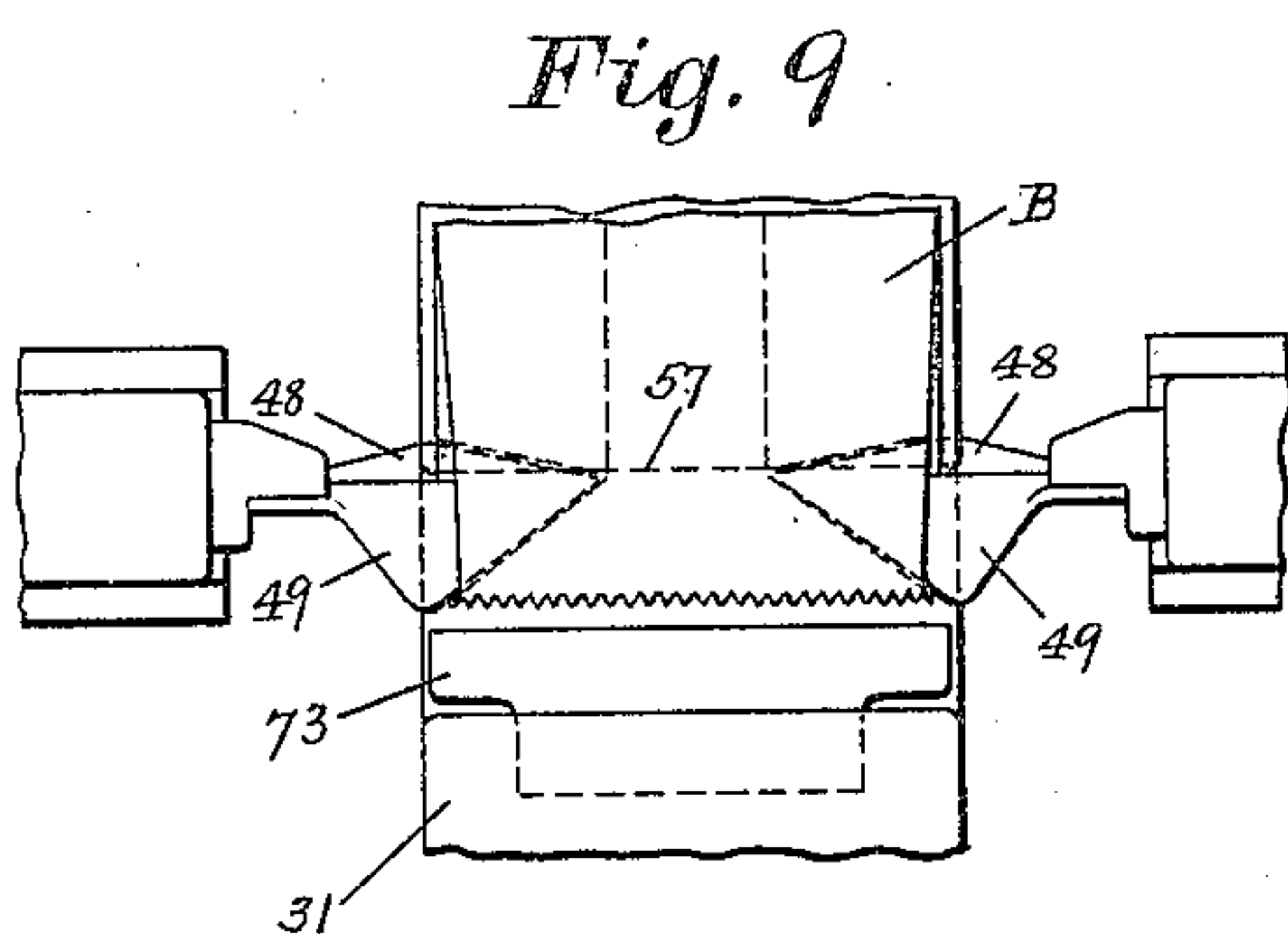
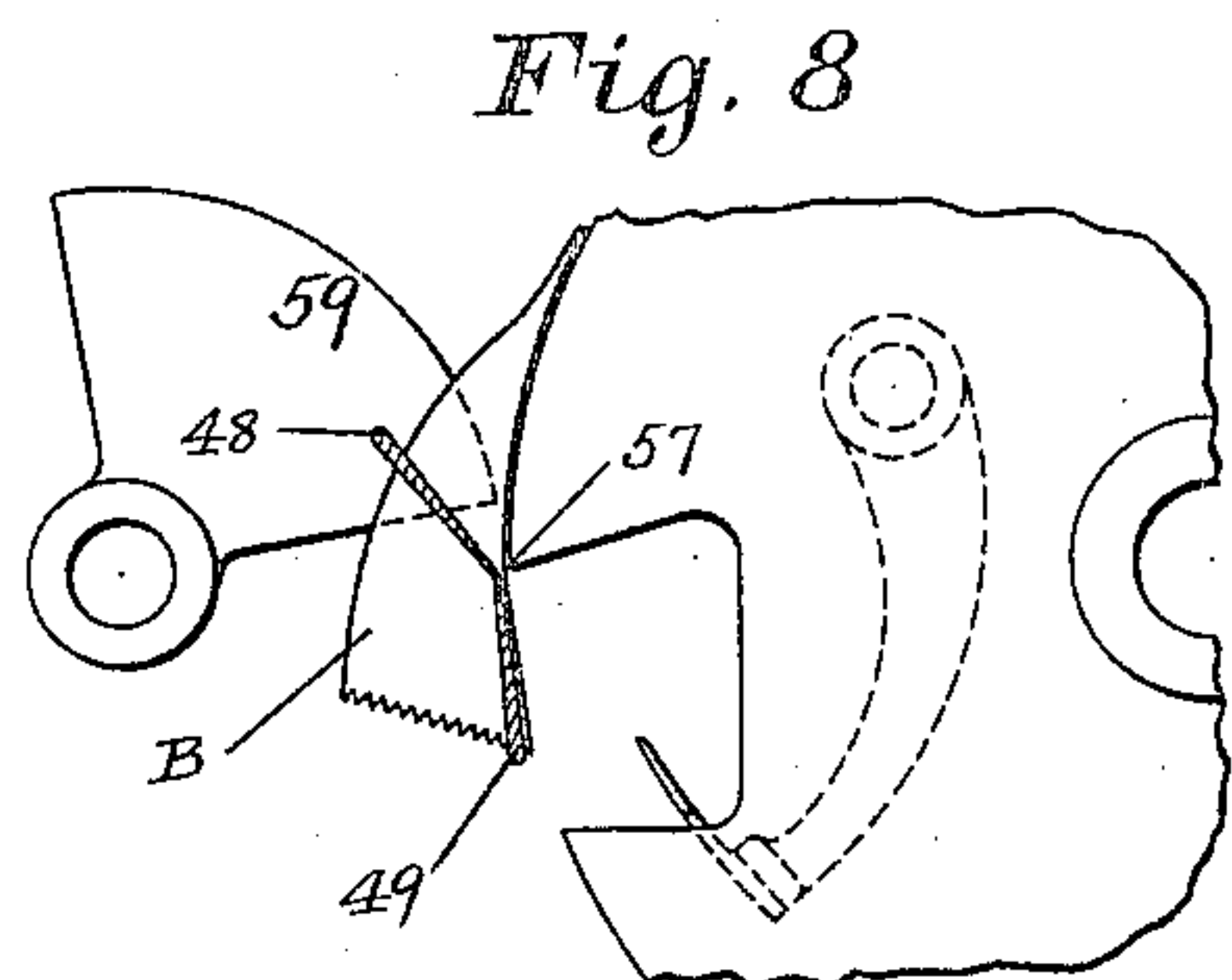
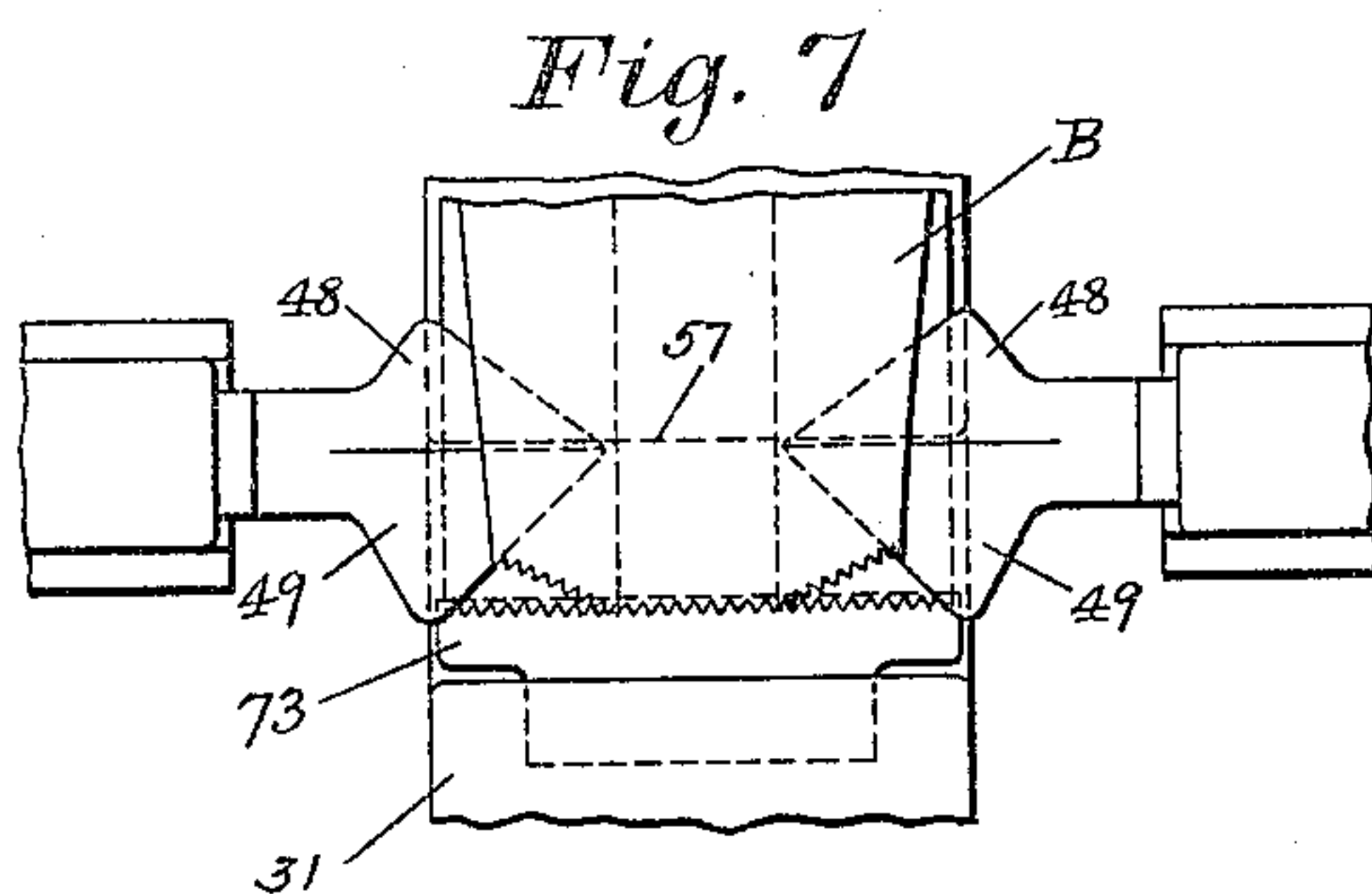
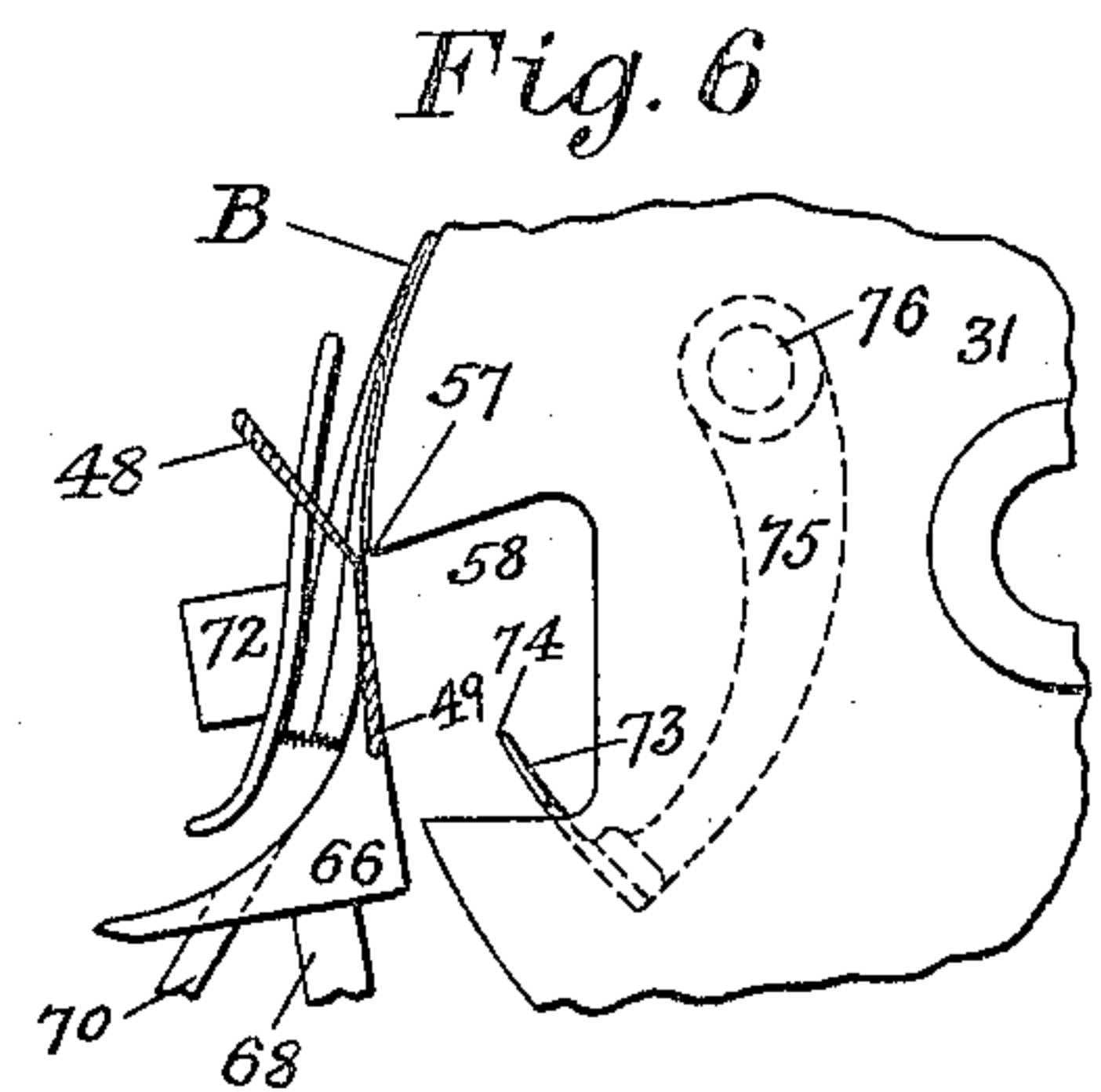
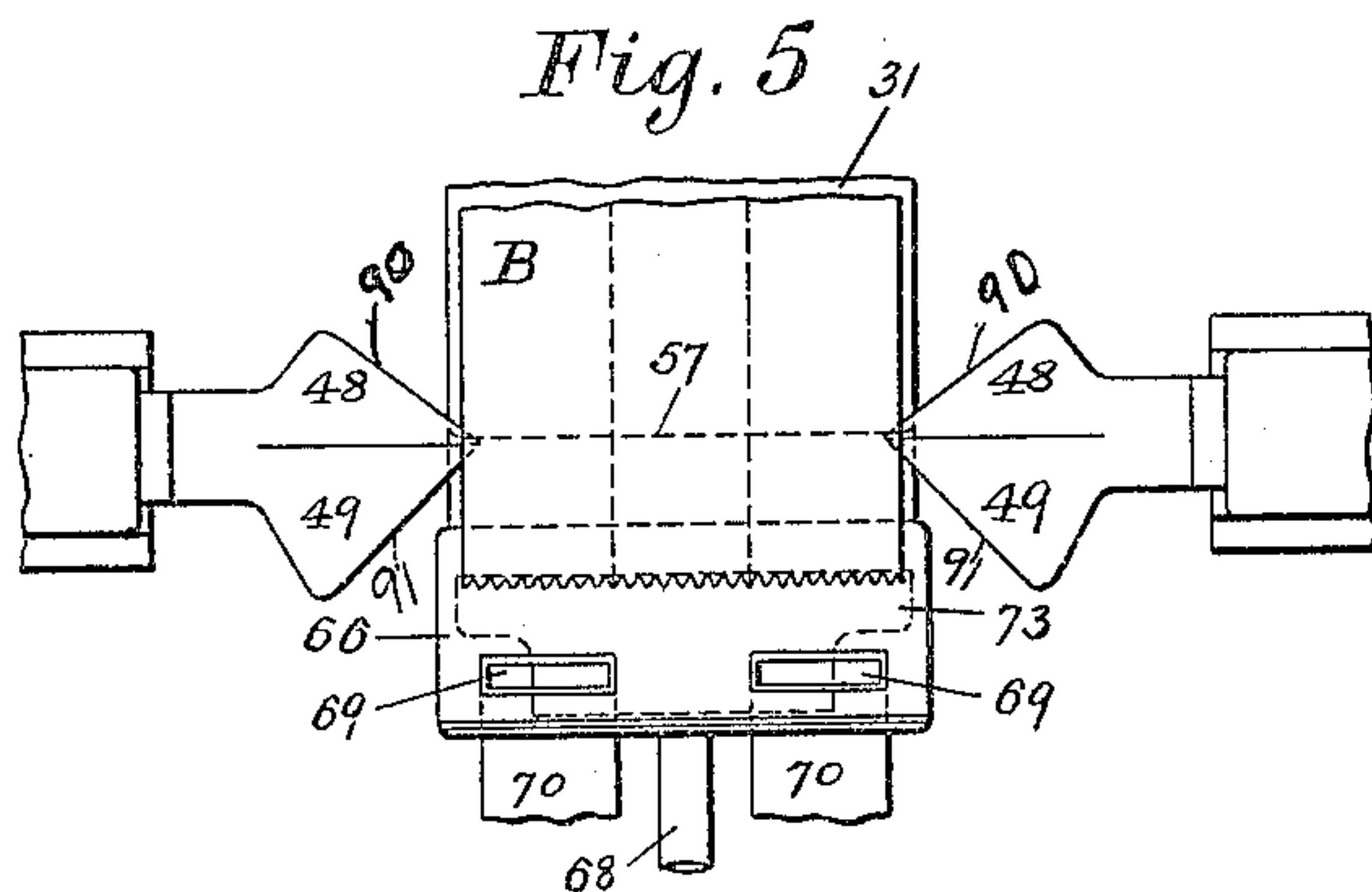
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APPLICATION FILED JUNE 10, 1903.

4 SHEETS—SHEET 4.



Witnesses:

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Inventors:

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UNITED STATES PATENT OFFICE.

WILLIAM A. LORENZ AND JOSEPH MERRITT, OF HARTFORD, CONNECTICUT, ASSIGNORS TO UNION PAPER BAG MACHINE COMPANY, OF PHILADELPHIA, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

PAPER-BAG MACHINE.

No. 822,618.

Specification of Letters Patent.

Patented June 5, 1906.

Application filed June 10, 1903. Serial No. 160,812.

To all whom it may concern:

Be it known that we, WILLIAM A. LORENZ and JOSEPH MERRITT, citizens of the United States, and residents 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.

10 The principal 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 reverse folds, which are shown
15 and described in Letters Patent of the United States to H. M. Farnsworth, No. 355,010, so that when the bag is opened for use these particular folds will turn outwardly instead of inwardly, and thus present a funnel-shaped
20 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 lines being reversed and swung outwardly to positions approximately ninety degrees from their former positions.
30 Another object of this invention is to provide improved means whereby the bellows sides near the mouth end of the bag or blank are partially distended to facilitate the entrance of the spreading devices into the
35 tucks, these means including an air-blast to open out the tucked sides of the blank to the required extent and also a device whereby the inflation of the blank may be limited in order to retain the latter in proper position
40 for the operation of the spreaders.

Our invention also comprises an improved organization of devices which includes a blank-support having a defining edge around which the ply adjacent said blank-support
45 may be folded back upon itself to transform the bellows sides into flat triangular folds and a device having a folding edge cooperating with the defining edge, over which these folds may be doubled upon themselves to
50 complete the funnel folds.

This invention may be embodied in an in-

dependent machine for treating completed bags or blanks; but we deem it preferable to operate the mechanism in conjunction with a machine whereby the bags themselves
55 are produced from a paper web, thus embodying in a single organization a machine for manufacturing bellows-sided paper bags having these funnel folds. The mechanism shown and described herein is adapted to be
60 attached to many of the well-known forms of paper-bag machines, and the feed-rolls shown are therefore considered as equivalents or substitutes for the delivery-rolls of such paper-bag machines.
65

Figure 1 of the drawings is a top view of a mechanism embodying our invention. Fig. 2 is an end view thereof looking from the right of Fig. 1. Fig. 3 is a side view in section taken partly on the line 3 3 and
70 partly on line 3^a 3^a of Fig. 1. Fig. 4 is a transverse section on line 4 4 of Fig. 1. Figs. 5 to 14 are detail views, in larger scale, of the fold-forming devices in successive positions. Figs. 15, 16, and 17 are perspective views of
75 the mouth end of a bag or blank in successive stages of the funnel-mouth-folding operation. Fig. 15 shows the bellows sides slightly distended to permit the spreaders to enter. Fig. 16 shows the lower ply folded
80 back to the position in which the flat triangular folds are formed; and Fig. 17 shows the funnel-mouth folds completed, but still slightly distended in order to enable the character of the folds to be more clearly
85 seen.

In the drawings, 20 is a base-plate to which is secured a pair of uprights 21 22, in which the several components of the mechanism are journaled or otherwise supported.
90 The blanks are fed into the machine by a pair of feed-rolls 23 24, the lower one 24 of which is mounted on a shaft 25, journaled in the side frames and carrying at one end thereof a gear 26, which is driven from any
95 suitable gear of the paper-bag machine with which the present mechanism may be connected. The roll 23 is mounted on a shaft 27, journaled in spring-pressed boxes 28 29, supported in the side frames 21 22, respectively, and carries a gear 30, meshing with
100 the gear 26.

The paper bag or blank after passing between the feed-rolls 23 24 is delivered to a rotating blank-support 31 approximately cylindrical, which is mounted on a shaft 32, journaled in bearings 33 34 and having a gear 35 driven from the gear 26, through an intermediate 36, turning on a stud 37, appurtenant to the frame 21. The blank-support 31 is herein shown of a size suitable for receiving two blanks during each rotation and is therefore provided with two sets of blank holding or folding devices which operate alternately on the succeeding blanks. These two sets of devices being similar in construction and operation, the following description of one set will answer for both. As the blank passes from the rolls 23 24 to the blank-support 31 its leading end is gripped to the latter by a clip 38 on the shaft 39, journaled on the blank-support. On the shaft is an arm 40, engaging with the cam-face 41 of a stationary cam 42, which is preferably secured to the bearing 34, a spring 43 serving to close the clip upon the blank. As the blank is carried forward by the support 31 its bellows sides or tucks are entered toward the rearward or mouth end of the blank by a pair of oppositely-disposed spreading devices which are rotated when in their inward positions to fold the lower plies with the lower side wall of the blank around the defining edge 57 of the blank-support, thereby forming a flat triangular fold in the end of each of the bellows sides of the blank. In their preferred construction herein shown the blank-engaging portion of each of these spreaders comprises a triangular or spear-shaped blade having two wings 48 and 49, which are joined in an integral piece and stand at an angle to each other in planes meeting substantially along the line of rotation of the spreader, as best shown in Figs. 6 to 12, inclusive.

The outer inclined edges 90 and 91 are the principal agents for spreading the plies of the blank and defining the angles of the inner fold line of the primary triangular folds. Hence the angular relation of these edges to their common axis of rotation should be suitable for the formation of those fold-lines. When, as in the case shown herein, the axis of rotation is at right angles with the blank, the edges 90 and 91 should be approximately in axial symmetry about forty-five degrees from the axis.

The wings 48 and 49 are herein shown to be inclined at an angle with each other, Figs. 6, 8, 10, 12; but this is not an essential condition, since the blade may be nearly or quite flat, with its wings 48 and 49 lying in the same plane on opposite sides of the axis. Moreover, the blades may be formed of wire bent in the contour of the inclined edges 90 and 91 or may be otherwise formed in an open construction instead of the solid or blade-like

construction shown herein, although the latter form is preferred.

The spreaders are mounted on the shafts 50, which are journaled for rotation in the bearings 51, secured to the slides 45, which are mounted on the brackets 44 on opposite sides of the blank-support. A reciprocating movement is imparted to these slides by the cam-groove 46 in the stationary cams 42 engaging the projections 47 of the slides. These grooves are established so as to carry the spreaders toward and from each other into and out of the opposite bellows sides of the blank. In order to enable these devices to operate upon blanks of different widths without increasing this lateral movement of the spreaders, the bearings 51 are slotted at 52, Fig. 1, to permit them to be properly positioned on the slides to suit blanks of different widths, the bearings being secured in their adjusted positions by means of the bolts 53. The outer end of each of these shafts 50 has fixed upon it an arm 54, held in engagement with a cam 56 by a spring 88, whereby the spreaders are rotated at the proper time on an axis which is substantially in alinement with the defining edge. The lower plies of the blank are folded to form the flat triangular folds, the blank-support 31 being cut away at 58 to permit the respective movements of the spreaders and of the reversing-blade to be hereinafter described. The cam-engaging portion of the arm 54 is extended in order to enable the bearings 51 to be adjusted toward and from the blank-support without leaving the cam 56.

As the operation of the spreaders has a tendency to raise the entire width of the upper ply away from the lower ply, and thus interfere with the proper formation of the folds, means are provided which engage with and hold down the central longitudinal portion of the blank between the spreaders, thus preventing that portion from rising from the blank-support during the entrance and turning movement of the spreaders. To enable the holding down means to follow the traveling movement of the blank, it is composed of sectors 59 and 60, which in turn, as shown in Figs. 8 and 9, travel in engagement with the blank. The sector 60 is disposed so as to permit the end of the blank to rise behind it, as shown in Fig. 10, to facilitate the proper formation of the primary triangular folds. The sector 59 is made in two parts, so that it will straddle the sector 60 when their positions interlap. The sectors 59 60 are mounted upon shafts 61 62, journaled in the side frames 21 and 22 and carrying gears 63 64, respectively, both of which are in engagement with the gear 35.

In order to facilitate the entrance of the spreaders into the tucks, the upper and lower plies of the blank are made to separate

slightly at the mouth end as the spreaders approach by means of a blast of air operating in conjunction with a suction-box 66, the upper wall of which forms the guide-plate 65 over which the blank passes on its way to the carrier. That upper wall is provided with perforations 67, leading to the suction-box, and the air is exhausted through the pipe 68 and controlled by suitable mechanism. (Not here shown.) While the pressure over the perforations causes the lower ply to adhere closely to the guide-plate, the upper ply is separated from it by an air-blast directed into the mouth of the blank through the open ends 69 of the pipes 70, which extend through the suction-box and have suitable mechanism (not here shown) for controlling the blast. The separation of the two plies is limited by a guard-plate 71, secured to a bar 72, held between the side frames 21 22.

In order to produce a symmetrical form of funnel-mouth, the flat triangular folds should be doubled upon themselves along their transverse center line, which was originally a part of the inner or bottom fold-line of the bellows sides of the blank, the particular portion of this fold-line which crosses the flat triangular folds being reversed and forming the line upon which the triangular folds are doubled upon themselves. In order to insure that the reversing and doubling of the triangular folds shall take place along this line, we preferably employ a reversing-blade 73, which is brought against the flat triangular folds across this transverse fold-line, as shown in Figs. 11 to 14, during the folding operation. The reversing-blade 73 is secured upon an arm 75, which is pivotally supported upon a stud 76 of the blank-support 31 and is provided with an arm 77, Fig. 3, having a projection 78 in engagement with a cam-groove 79 of the cam 89, the blade having a swinging movement toward and away from the defining edge 57 of the blank-support timed to coöperate with the spreaders 48 49, so as to engage the blank when its triangular folds are opened flat and before the turned-over lower ply is turned back.

Means are preferably provided for pressing the funnel folds together to flatten and define them more completely after they are formed. The flattening-plate 86 is secured to the cross-bar 87 adjacent to the blank-support and the funnel folds are drawn under this plate while still held by the reversing-blade 73. The roll 80 is secured upon a shaft 81, journaled in spring-pressed bearings 82, supported in the side frames 21 22, the shaft being provided with a gear 83, meshing with the gear 35. The roll 80 is pressed against the blank-support 31 and carries the blank forward over the stripper 84, which guides it to the carrying-belts 85, to be delivered where desired.

The operation of this machine as a whole is as follows: The blank B passes between the feed-rolls 23 24, which push it between the guide-plate 71 and the suction-box 66 toward the blank-support 31, and its leading end is then gripped to the cylinder by the clip 38. When the mouth end of the blank is over the perforations 67 of the suction-box 66, a vacuum is established in the box, thus causing the lower ply to adhere to the plate 65. At the same time an air-blast from the openings 69 drives the upper ply against the upper guide-plate 71, thus distending the bellows sides of the blank. The spreaders then move from their outward position (shown in Figs. 5 and 6) toward each other to the position shown in Figs. 7 and 8, into the tucks of the blank, the sectors 59 and 60 meanwhile engaging the blank along its central longitudinal line. The shafts 50 are now rotated sufficiently to bring the spreaders to the position shown in Fig. 10, thereby folding the lower ply around the defining edge 57 and transforming the mouth ends of the bellows sides into the flat triangular folds, whereupon the reversing-blade 73 advances its edge 74 adjacent to the defining edge 57, as shown in Fig. 12. The spreaders are then withdrawn from the blank, after which the latter passes under the flattening-plate 86 and beneath the presser-roll 80, the funnel folds being thus more sharply defined and flattened. The blank is then guided from the blank-support by the stripper-plate 84 in completed form to the delivery-belts 85, with its mouth end presenting substantially the appearance shown in Fig. 17.

The terms "upper," "lower," and similar terms denoting relative position are herein used in their relative and not their absolute sense, inasmuch as many of the parts may be reversed, inverted, or transposed in many ways that will be obvious to the mechanic or designer.

The mechanism herein shown and described may be modified as to dimensions, amplitude of movement, and in many other obvious ways to suit different sizes of bags or to suit various conditions of service.

We claim as our invention—

1. A spreader for opening the tucks of bellows-sided bag-blanks, comprising a member mounted for rotation, having blank-engaging edges disposed at an angle with each other on opposite sides of the axis of rotation, and inclined to that axis.

2. A spreader for opening the tucks of bellows-sided bag-blanks, comprising a member mounted for rotation, and provided with wings extending in planes which intersect substantially along the line of the axis of rotation.

3. A spreader for opening the tucks of bellows-sided bag-blanks, comprising a member

mounted for rotation and provided with blade-like wings disposed at an angle with each other, in planes which intersect substantially along the line of the axis of rotation.

4. A spreader for opening the tucks of bellows-sided bag-blanks, comprising a spear-shaped member mounted for rotation, and having folding wings disposed at an angle with each other on opposite sides of the axis of rotation, and meeting substantially along the line of that axis.

5. A spreader for opening the tucks of bellows-sided bag-blanks, comprising a member mounted for rotation, and having wings disposed at an angle with each other, with their outer edges inclined to the said axis.

6. A spreader for opening the tucks of bellows-sided bag-blanks, comprising a member mounted for rotation, provided with blade-like wings disposed at an angle with each other in planes which intersect substantially along the line of the axis of rotation, the outer edges of the said wings being inclined to each other, and to the said axis in lines which intersect substantially in the line of said axis.

7. A spreader for opening the tucks of bellows-sided bag-blanks, comprising a member mounted for rotation, provided with wings disposed in planes which are inclined to each other, and which meet substantially along the line of said axis, the outer edges of the said blades being inclined at substantially equal angles with the axis, in lines which intersect substantially in the line of said axis.

8. The combination, in devices for opening the tucks of bag-blanks, of a blank-support having a defining edge, a spreader mounted for rotation on an axis substantially in alinement with said defining edge, and provided with wings, the outer edges of which are inclined at substantially equal angles with the axis, in lines which intersect substantially in the line of said axis.

9. The combination, in devices for forming the described triangular folds in the tucked sides of paper-bag blanks, of a blank-support having a defining edge, a spreader mounted for rotation on an axis substantially in alinement with said defining edge, and provided with wings having blank-engaging edges substantially defining the lines of the two inner sides of the said triangular folds.

10. The combination, in devices for forming the described triangular folds in the tucked sides of paper-bag blanks, of a blank-support having a defining edge, a spreader mounted for rotation on an axis substantially in alinement with said defining edge, and provided with wings having blank-engaging edges substantially defining the lines of the two inner sides of the said triangular

folds, means for moving the wings into the tucked side of a blank, and means for rotating the spreader to open the tucked side, and to define the said lines therein by means of the said edges.

11. The combination, in devices for forming the described funnel folds in the tucked sides of paper-bag blanks, of a blank-support having a defining edge, a spreader mounted for rotation on an axis substantially in alinement with said defining edge, and provided with wings having blank-engaging edges for substantially defining the lines of the two inner sides of the preliminary triangular fold, and means for doubling the said triangular fold to form said funnel fold.

12. The combination, in devices for opening the plies of a bellows-sided bag-blank, of a blank-support, suction devices for holding down one side of the bag-blank, and means for directing an air-blast into the end of the blank.

13. The combination, in devices for opening the side tucks of a bellows-sided bag-blank, of a blank-support, a suction-box adjacent thereto, and having a perforated wall over which the blank passes to the support, and means for directing an air-blast against the end of the blank, while the lower ply thereof is drawn down by the suction from the suction-box.

14. The combination, in devices for opening the tucks of bag-blanks, of a blank-support, suction devices for holding down one side of the bag-blank, means for directing a blast of air at the end of the blank to expand it, and means for limiting the opening movement of the other side of the blank.

15. The combination, in devices for opening the side tucks of a bellows-sided bag-blank, of a blank-support, suction devices for holding down one side of the bag-blank, means for directing a blast of air at the end of the blank, to expand it, and a plate for limiting the opening movement of the other side of the blank.

16. The combination, in devices for forming the described funnel folds in paper-bag blanks, of a rotatable blank-support, means for entering and spreading the side tucks of the mouth portion of the blank as it is carried by the carrier, and means for engaging with the middle longitudinal zone of the blank near the mouth portion while permitting the entire mouth portion to be distended.

17. The combination, in devices for forming the described funnel folds in paper-bag blanks, of a rotatable blank-support, means for entering and spreading the side tucks of the mouth portion of the blank as it is carried by the support, and a sector-shaped holding-roll for engaging with the middle longitudinal zone of the blank beyond the

mouth portion, while permitting the mouth portion to be distended.

5 18. The combination in devices for forming the described funnel folds in paper-bag blanks, of a rotatable support, means for spreading the mouth ends of the side tucks of the blank as it is carried by the support, and a plurality of sector-shaped holding-rolls revolving in overlapping circles, to permit
10 the mouth end of the blank to open while

holding down the middle zone of the blank beyond the mouth portion.

Signed at Hartford, Connecticut, in the presence of two subscribing witnesses.

WILLIAM A. LORENZ.
JOSEPH MERRITT.

Witnesses:

WM. H. HONISS,
JAS. W. GREEN.