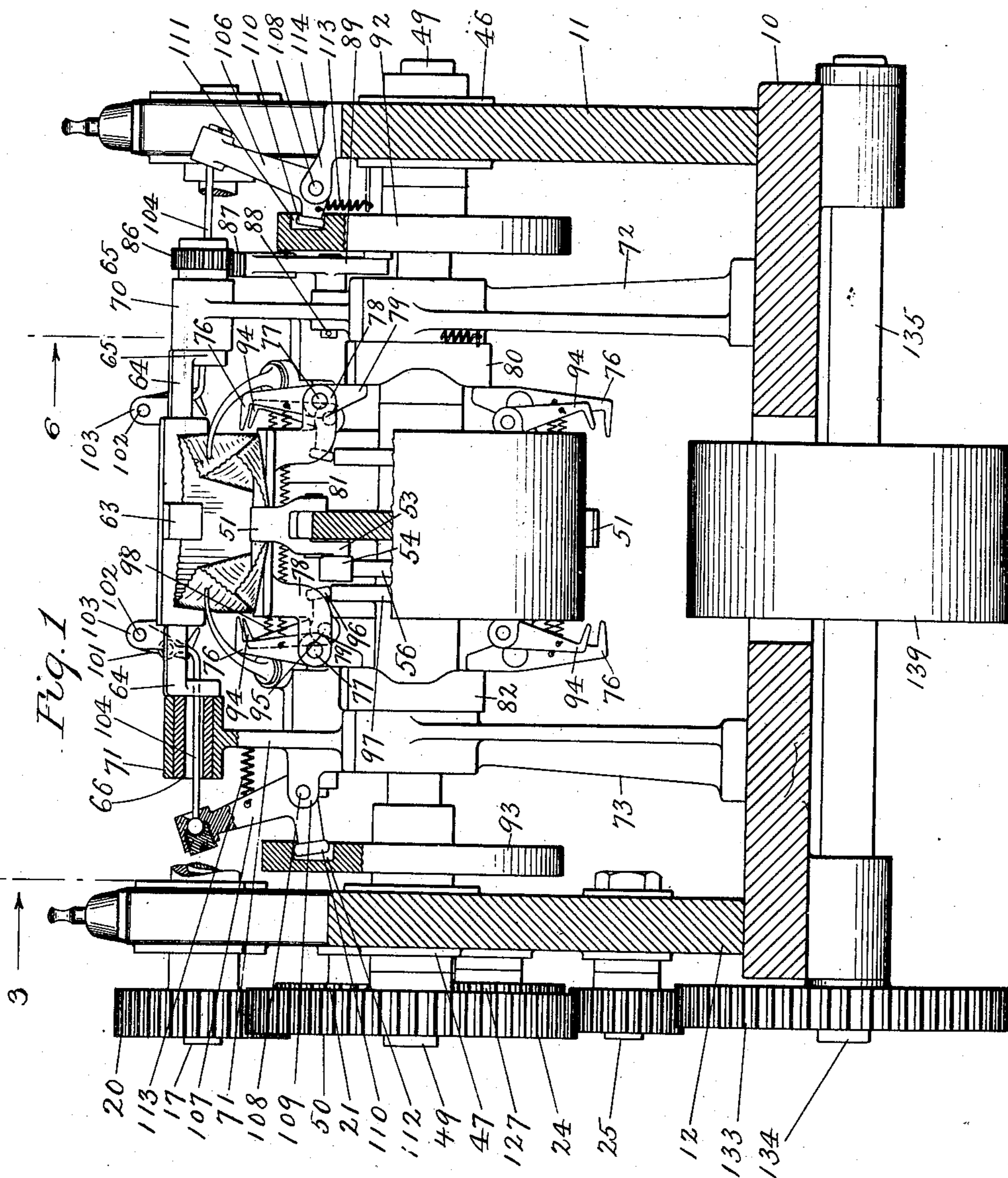


No. 860,041.

PATENTED JULY 16, 1907.

W. A. LORENZ.
PAPER BAG MACHINE.
APPLICATION FILED MAY 31, 1905.

5 SHEETS—SHEET 1.



Witnesses:

Janette P. Ellsworth
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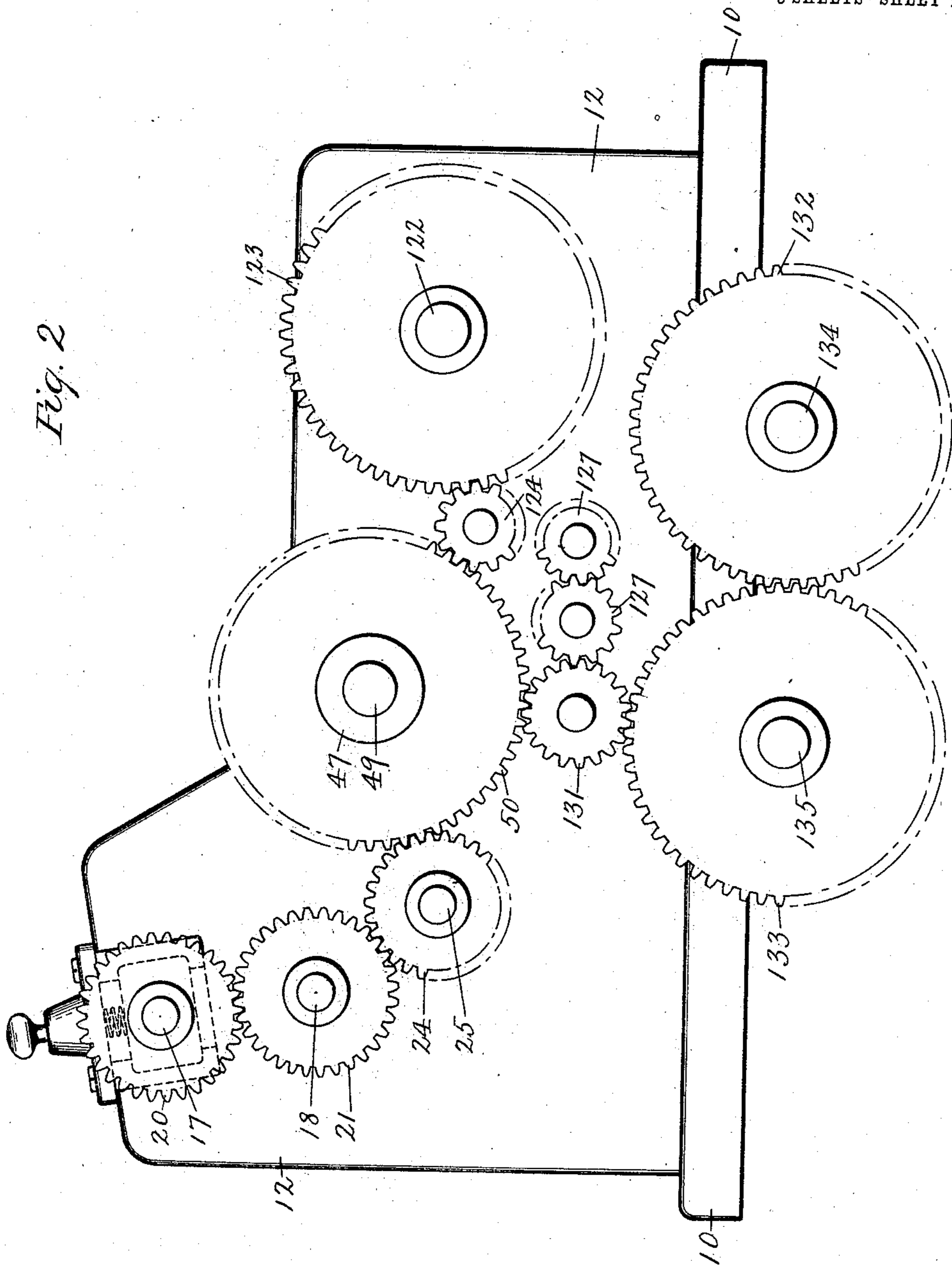
William A. Lorenz
By W. H. Starnes, Atty

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5 SHEETS—SHEET 2.



Witnesses:

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5 SHEETS—SHEET 4.

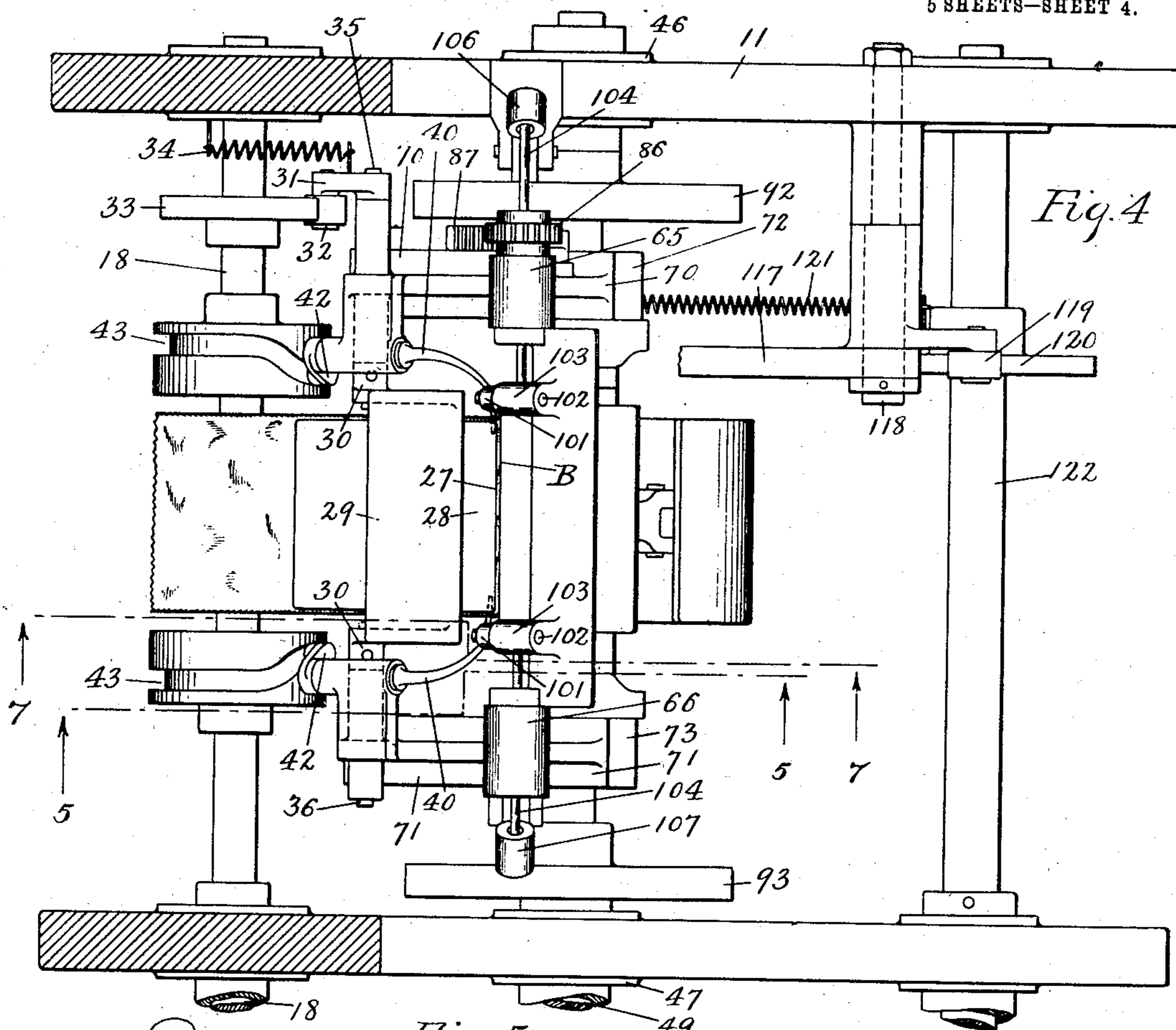


Fig. 4

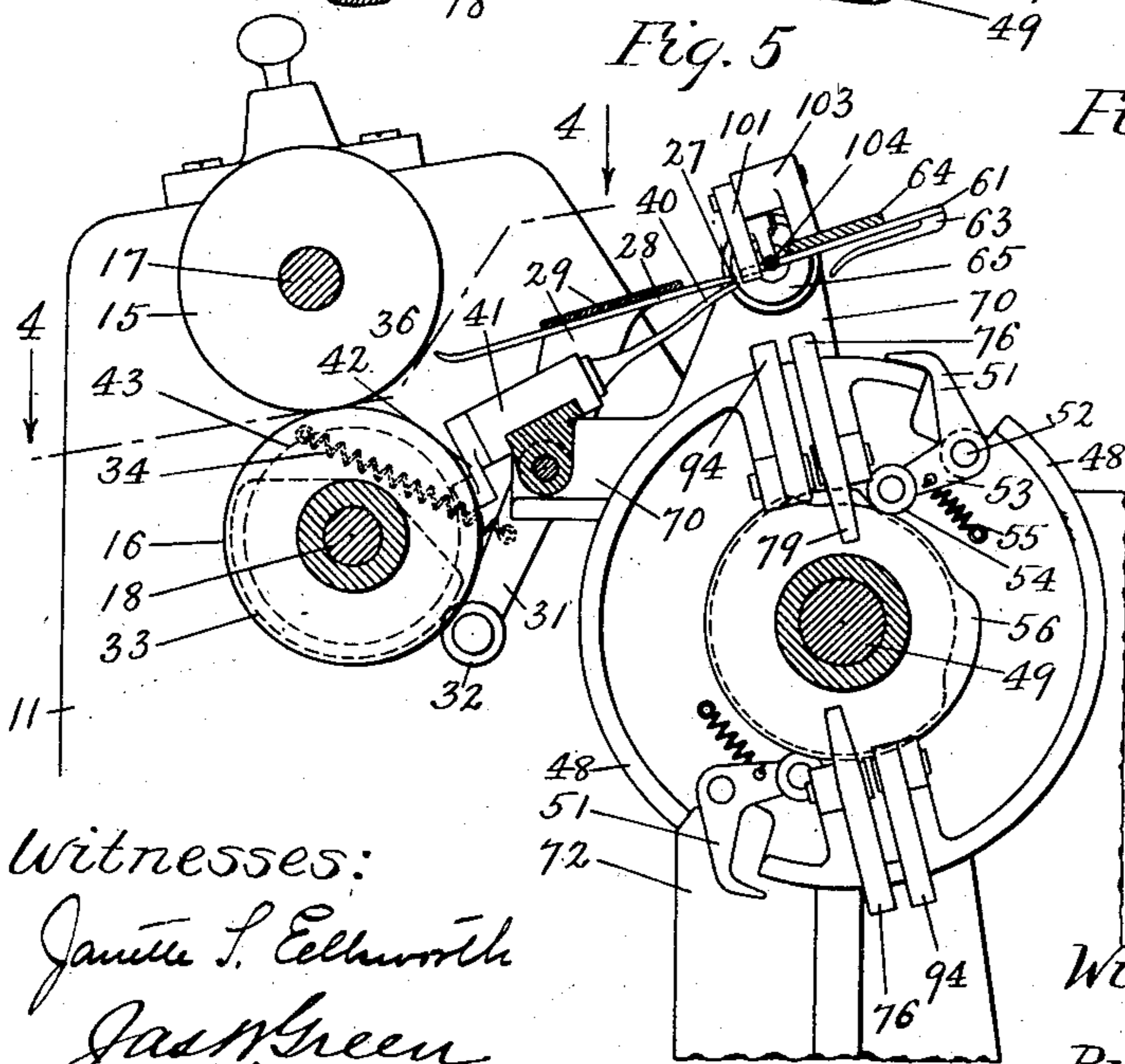
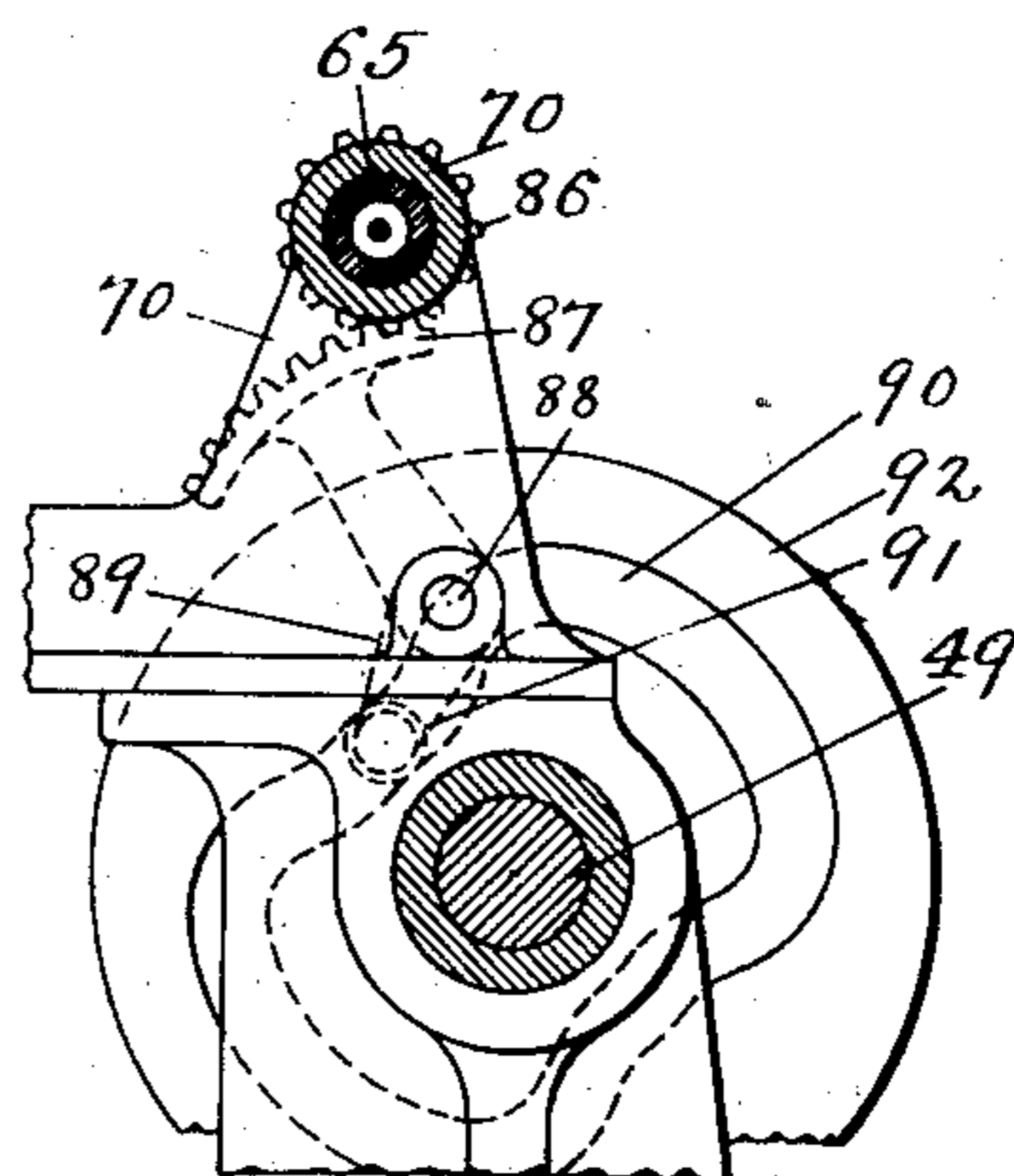


Fig. 5

Fig. 6



Witnesses:

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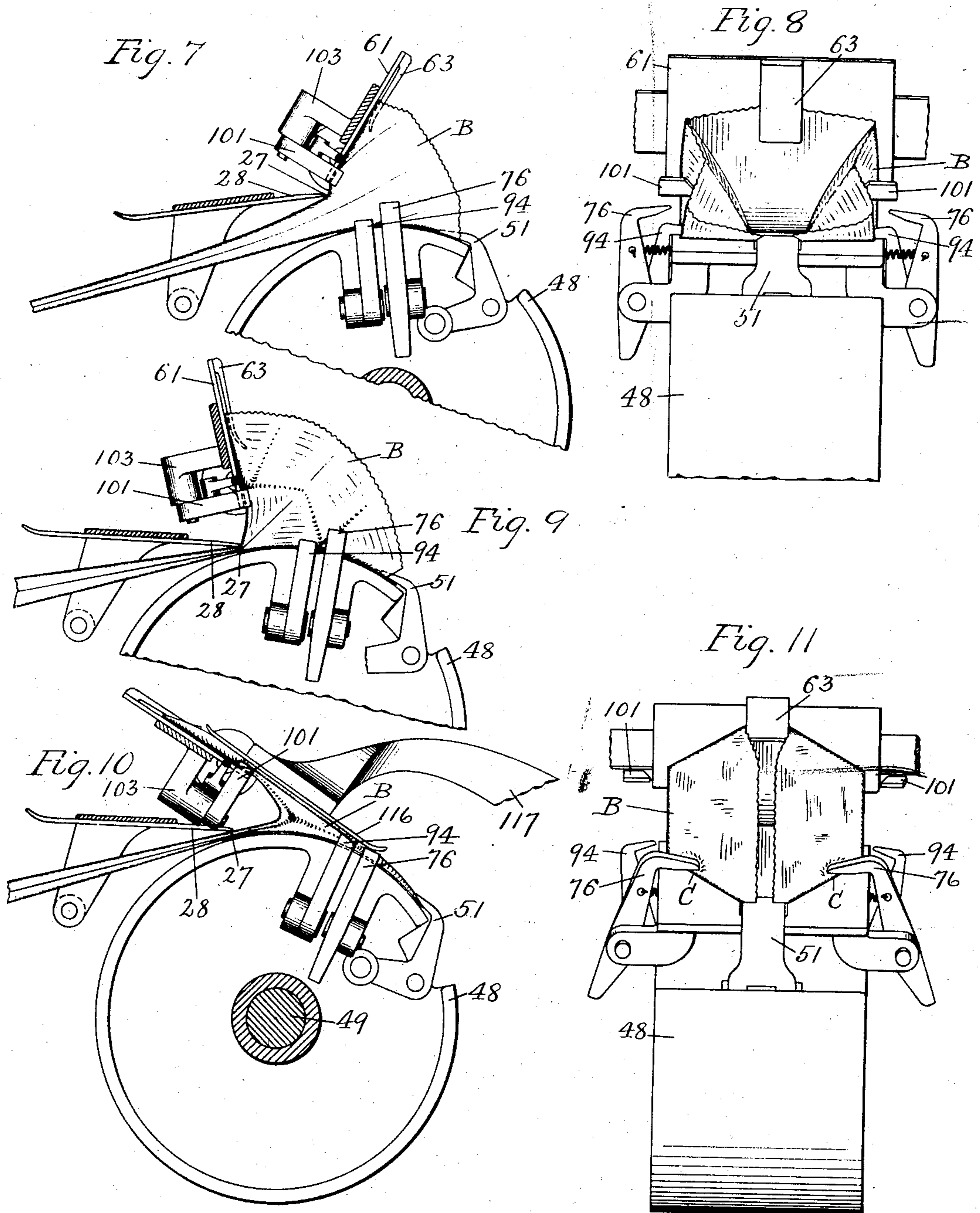
William A. Lorenz
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5 SHEETS—SHEET 5.



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UNITED STATES PATENT OFFICE.

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PAPER-BAG MACHINE.

No. 860,041.

Specification of Letters Patent.

Patented July 16, 1907.

Application filed May 31, 1905. Serial No. 263,026.

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.

This invention relates to paper bag machines of the class which form square-bottom bags from bellows-sided tubes or blanks, and it has to do particularly with what is well known as the diamond forming operation.

The present invention is applicable to that type of machine which forms the diamond by turning backward one of the plies of the blank over a folding plate, while the other ply is suitably gripped upon a traveling support.

It is among the objects of the present invention to provide improved means for gripping and holding the blank on the support and improved coöperating devices in connection therewith, by which the front end of the diamond may be relieved of the strain and the consequent liability to tear to which it is subjected in the folding back of the upper ply.

Figure 1 of the drawings is a front view in section of a machine embodying the present invention, the section being taken on the line 1—1 of Fig. 3. Fig. 2 is a view of the left hand side of the machine. Fig. 3 is a sectional side view on the line 3 of Fig. 1. Fig. 4 is a sectional top view on the line 4—4 of Fig. 5. Fig. 5 is a side view in section on the line 5—5 of Fig. 4. Fig. 6 is a fragmentary view showing the oscillating devices of the folding plate in section on the line 6 of Fig. 1. Figs. 7 and 8 are fragmentary side and front views respectively, of the folding devices in an early stage of the diamond forming operation. Figs. 9 and 10 are side views of two later stages of the operation. Fig. 11 is a front view of Fig. 10.

The machine may receive its motion in any suitable way, as for instance, by means of a pulley on the end of the shaft 18 (Fig. 2). Or it may be driven by any suitable gearing from the other sections of the machine. The blank B, properly formed and cut to length, is received between the rolls 15 and 16 (Fig. 3) from any suitable tube-forming and cutting-off mechanism. The rolls 15 and 16 are secured respectively to shafts 17 and 18 journaled in bearings in the uprights 11 and 12 secured to the base 10. The bearings 19 of the shaft 17 are pressed towards the bearings of the lower shaft 18 by means of springs 22. Gears 20 and 21 (Fig. 2) connect the two shafts.

Disposed adjacent to the two feed rolls 15 and 16 and in such position that the blank as it moves forward will pass beneath it, is the wiping defining plate 28 (Fig. 5) the function of which is to hold the body of the blank

in place and to approximately define the cross fold line during a portion of the time, by wiping along the upper ply while the latter is being turned back. The plate 28 is secured to the bracket 29 having trunnions 30 secured to shafts 35 and 36 (Figs. 3 & 4) journaled respectively in the brackets 70 and 71 which are supported on the standards 72 and 73 secured to the base 10. The trunnion shaft 35 has secured to its outer end an arm 31 (Fig. 4) having a roll 32 held in engagement with the cam 33 by the spring 34. The cam 33 is secured to the shaft 18 and its rotation rocks the plate 28 and carries the wiping edge 27 towards and from the blank support 48. The axis of the trunnions 30 of the plate is preferably placed so that the defining edge 27 of the plate will move forward to some extent with the blank B while the plate is swinging towards the blank support, as shown in Figs. 5, 7, 9 and 10, the wiping edge 27 being brought either close to the surface of the blank support 48 or stopping at a convenient distance therefrom, as preferred. The plate 28 may be trunnioned elsewhere than in the position shown, it being sufficient to carry the edge 27 of that plate toward the blank support 48.

On opposite sides of the plate 28 and adjacent thereto are the two lifting fingers 40 (Figs. 4 & 5). It is the function of these fingers to enter the side tucks of the blank and lift the upper ply toward, and preferably against the wiping edge 27 of the plate 28. The fingers 40 are mounted for oscillation in bearings 41 appurtenant to the brackets 70 and 71. Each finger is provided with an arm 42 which travels in a cam 43 secured to the shaft 18.

The oscillating folding plate 61 which turns back the upper ply of the blank is secured to a bar 64 having trunnions 65 and 66 which are mounted for oscillation in the brackets 70 and 71. A holder 63 is secured to the plate 61 near its outer edge and retains the center of the front end of the upper ply in place. The plate 61 is oscillated by means of the pinion 86 secured to the trunnion 65 and meshing with the segment gear 87 (Fig. 6). The latter is secured to the shaft 88 journaled in the bracket 70 and has an arm 89 provided with a roll which fits in the cam path 90 formed in the inner face of the rotating cam 92 secured to the central shaft 49, journaled in bearings 46 and 47 secured respectively to the uprights 11 and 12. Motion is imparted to the shaft 49 by the gear 50 (Fig. 2) secured to its outer end and meshing with the pinion 24 which in turn is driven by the gear 21, the pinion 24 being mounted on a stud appurtenant to the upright 12.

The folding plate 61 is provided with a pair of box holders 101 (Fig. 1) pivoted at 102 in lugs 103 appurtenant to the trunnioned bar 64. The box holders are operated by rods 104 which extend through holes in the centers of the trunnions 65 and 66, and are connected

at one end to the box holders 101 and at the other end to the levers 106 and 107, by ball and socket joints which permit the box holders 101 to oscillate with the plate 61. The levers 106 and 107 are supported respectively in lugs 114 and 109 by pivots 108, the lug 114 being appurtenant to the upright 11 while the lug 109 is appurtenant to the bracket 71. The levers have cam rolls 110 which fit the cam paths 111 and 112 formed in the rotating cams 92 and 93 secured to the central shaft 49. Springs 113 are preferably provided for the levers 106 and 107 to prevent back-lash.

The rotating blank support 48 which supports the blank and carries it forward during the diamond forming operation is secured to the central shaft 49. The blank support 48 is provided with one or more sets of gripping and holding devices which rotate with it and hold the lower ply of the blank in proper position while the upper ply is being turned back. The present machine has two sets of these devices which operate alternately on the blanks and as the two sets are substantially identical only one set will be described.

The center of the front end of the lower ply of the blank B is held to the blank support 48 by the front diamond holder 51 (Figs. 1 & 3) which is pivoted at 52 to the blank support and has an arm 53 provided with a roll 54 held in engagement by the spring 55 with the stationary cam 56 which, with the cams 97 and 82, referred to later, is secured to the standard 73, the central shaft 49 passing through the center of each of these cams. The tuck-holders 94 (Figs. 1 & 5) which enter the side tucks of the blank and hold the edges of the lower ply to the blank support 48 are pivoted at 95 on opposite sides of the blank support and are provided with rolls 96 which are held in engagement with the fixed cams 97 by the spring 98, preferably extending from one tuck-holder to the other.

Each set of gripping and holding devices of the blank support 48 includes also a pair of diamond angle holders 76 which are disposed on opposite sides of the blank support and operate to close down upon the upper ply along the 45 degree angle lines T of the diamond (Fig. 11) as soon as they can do so. This closing down movement preferably takes place immediately after the blank has reached the position shown in Fig. 9, at which time the danger of pushing the paper back and away from the front diamond holder 51 is passed. By thus gripping the blank on those two lines before the final stretch is put upon the paper, the front end of the diamond is relieved from strain so that the final stretching out may take place without danger of tearing the paper. The diamond angle holders 76 are pivoted at 77 in lugs 78 appurtenant to the blank support, and are provided with tails 79 held in engagement with the fixed cams 80 and 82 by the spring 81.

The flattening plate 116 (Fig. 3) which presses down the diamond after it is opened out to the position shown in Fig. 10 is carried by the lever 117 (Fig. 3) pivoted on the stud 118 secured to the upright 11. The end of the lever is provided with a roll 119 held in engagement with the cam 120 by the spring 121. The cam 120 is secured to the shaft 122 journaled in the uprights 11 and 12 and carrying the gear 123 (Fig. 2) which is driven by the gear 50 through the pinion 124. Rolls 126 (Fig. 3) carry the blank forward after the front diamond holder 51 has released its hold, these rolls

being mounted on shafts supported in the uprights 11 and 12 and driven by the pinions 124 and 127, connection with the gear 50 being made through the intermediate pinion 131, as shown in Fig. 2. Deflecting plates 128 (Fig. 3) are provided to guide the blank away from the blank support 48 to the delivery rolls 138 and 139 which pass it on to suitable pasting and flap folding mechanism. The rolls 138 and 139 are carried by shafts 134 and 135 journaled in the base 10 and driven by gears 132 and 133 the latter of which meshes with the pinion 131 (Fig. 2).

The consecutive operation of the machine is as follows: The blank B properly formed and cut to length is fed between the rolls 15 and 16 (Fig. 3) and passes under the wiping defining plate 28. As it moves forward, the fingers 40 are swung into the side tucks thus lifting the upper ply of the blank to the wiping plate 28 and to the folding plate 61, the front end of the upper ply passing at the same time between the plate 61 and the holder 63, thus establishing connection between the front end and the folding plate. Meanwhile the blank has been gripped to the blank support 48 by the closing of the front diamond holder 51 over the lower ply. The tuck-holders 94 now swing into the side tucks and grip the lower ply of the blank support 48 at the lower inside corners of the diamond, while the box holders 101 also swing into the side tucks and grip the upper ply to the folding plate 61 at the upper inside corners of the diamond. The folding plate 61 now swings on its trunnions from the position shown in Fig. 3, through the positions of Figs. 7 and 9 to that of Fig. 10, carrying the upper ply with it and folding it back as shown in those figures. At the same time the wiping plate 28 wipes along the upper ply from the position of Fig. 3 to that of Fig. 10, thus partially defining the cross fold line which is lifted or rises away from the blank support as shown in Fig. 10. Meanwhile, when the blank is about in the position shown in Fig. 9, the diamond angle holders 76 close down on the outside of the diamond along the angular margins C so as to hold the paper firmly to the blank support 48. The blank is thus held firmly at these two corners, thereby relieving the strain on the paper around the front diamond holder 51 as the plate 61 completes its back-folding of the upper ply. The flattening plate 116 now presses the folds down to place as the blank passes forward. When the blank reaches the first of the small guide rolls 126, the various holders release their hold, and the blank is deflected from the blank support by the plates 128 over which it is carried by the lower rolls 126 to the delivery rolls 138 and 139 which pass it from the machine. The withdrawal of the tuck holders 94 need not take place as early as indicated in Figs. 10 and 11, but may take place at any convenient time before the passing of the blank from the blank holder.

In the operation of moving the wiping plate from the position shown in Fig. 5 to that shown in Fig. 9, and during the turning of the box-holders upon their pivot, the forward or wiping edge 27 of that plate wipes along the upper ply of the blank from near the gripping point of the box-holders to approximately the position of the cross fold line of the diamond fold, and thus practically defines that line, although it does not form any sharp crease. It however prevents the turning back

of the edges of the blank, enabling a smooth fold to be made at this cross fold line, when the blank is finally flattened into the diamond form.

Although the plate 61 is herein shown supporting a holder 63, the latter could be omitted, it being sufficient to employ the oscillating box-holders and the plate. In that case the rear of the diamond will be fully flattened in the final operation by the plate 116. Or the plate 61 and holder 63 may be retained together with the box-holders 101, but it is not essential that the holders 101 shall grip the blank to the plate, provided they are made long enough to reach into the tucks a suitable distance.

In my prior application Serial No. 46,335, filed Feb. 7, 1901, I have shown, described and claimed certain combinations shown and described, but not claimed, in this application. In so far as this application shows novel features in common with said prior application, it is to be regarded as being subordinate to said prior application.

I claim as my invention:—

1. In a bag machine, the combination of a traveling blank support, means for opening the tucked sides of the blank and defining the outer corners of the inner triangular folds, a wiping defining member, and means for wiping the said member against the upper ply between the said corners and the transverse fold line and toward the position of the said fold line, to close the blank and approximately define the said fold line.

2. In a bag machine, the combination with a traveling blank support, means for opening the tucked sides of the blank and defining the outer corners of the inner triangular folds, a defining member mounted to swing upon a fixed axis, means for carrying the said member against the upper ply with a wiping movement in the direction leading from the said outer corners toward the position of the transverse fold line to close the plies of the blank approximately at the said line.

3. In a bag machine, the combination of a traveling blank support, means for opening the tucked sides of the blank, means comprising box holders mounted to swing on a fixed axis for defining the upper corners of the inner triangular folds, a wiping defining member, and means for wiping the said member against the upper ply of the blank, from a position adjacent to the said outer corners, toward the position of the transverse fold line, to close the blank approximately at said line.

4. In a paper bag machine, the combination of a traveling blank support, oscillating box holders, a defining member having a wiping edge, means for carrying the said edge toward the blank support, against the upper ply of the blank and thence away from the box holders toward the position of the transverse fold line; and devices cooperating therewith to form the diamond.

5. In a paper bag machine, the combination of a traveling blank support, a wiping member having a defining edge and mounted to move toward the blank support, means for moving the wiping edge in the general direction of travel of the blank support, and against the blank behind and adjacent to the outer corners of the triangular folds, and thence wiping the said member along the blank to-

ward the position of the primary transverse fold line, and devices including oscillating box holders cooperating with the blank support and the wiping member to form the diamond.

6. In a paper bag machine, the combination of a blank support, devices cooperating with the blank support to form the diamond, and means for gripping the outer side of the front portion of the diamond fold to the blank-support at the diamond angles.

7. In a paper bag machine, the combination of a blank support, tuck holders devices cooperating with the blank-support for folding the diamond, and a pair of grippers for gripping the upper side of the front portion of the diamond in advance of the tuck-holders at the diamond angles of the blank.

8. In a paper bag machine, the combination of a blank support, means carried by the blank support and engaging the upper side of the diamond at the diamond angles for holding the blank to the support, and devices cooperating with the blank support and the holding means, to form the diamond.

9. In a paper bag machine, the combination of a traveling blank support, means for opening the tucked sides of the blank, means for defining the upper outer corners of the inner triangular folds, tuck holders, a defining member, means for moving the said member to close the blank behind said corners by a wiping movement towards the transverse fold line, and devices cooperating therewith to form the diamond.

10. In a paper bag machine, the combination of a traveling blank support, means for opening the tucked sides of the blank, oscillating box-holders, tuck holders, a member having a wiping edge which wipes along the upper ply from the box holders towards the blank support, means for advancing the wiping edge in the direction of movement of the blank support, and devices cooperating therewith to form the diamond.

11. In a paper bag machine, the combination of a traveling blank support, means for opening the tucked sides of the blank, oscillating box holders, tuck holders, a member having a wiping edge which wipes along the upper ply from the box holders towards the blank support, means for advancing the wiping edge in the direction of movement of the blank support, a member for folding back the upper ply, mounted to oscillate with the box holders, and devices cooperating therewith to form the diamond.

12. In a paper bag machine the combination of a traveling blank support, means for opening the tucked sides of the blank, oscillating box holders, tuck holders, a defining member mounted to swing upon a fixed axis means for moving the member against the blank with a wiping movement from the box holders towards the blank support, and devices cooperating therewith to form the diamond.

13. In a paper bag machine, the combination of a traveling blank support, means for opening the tucked sides of the blank, means for defining the outer corners of the inner triangular folds, means for gripping the upper side of the front portion of the diamond fold to the blank support at the diamond angles, and devices cooperating therewith to form the diamond.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

WILLIAM A. LORENZ.

Witnesses:

JANETTE S. ELLSWORTH,
HANS MALLNER.