

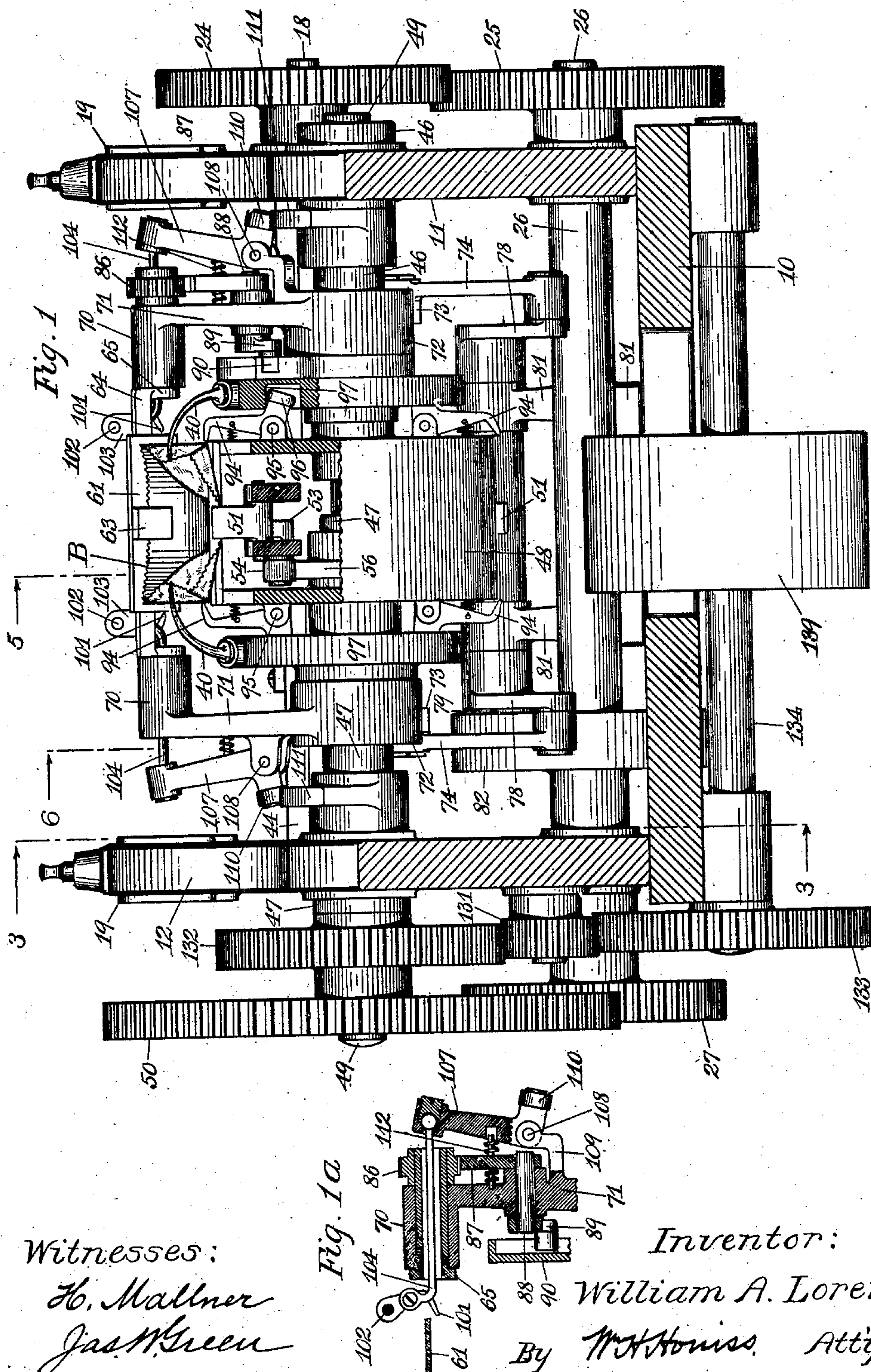
No. 860,040.

PATENTED JULY 16, 1907.

W. A. LORENZ.  
PAPER BAG MACHINE.

APPLICATION FILED OCT. 29, 1904.

6 SHEETS—SHEET 1.

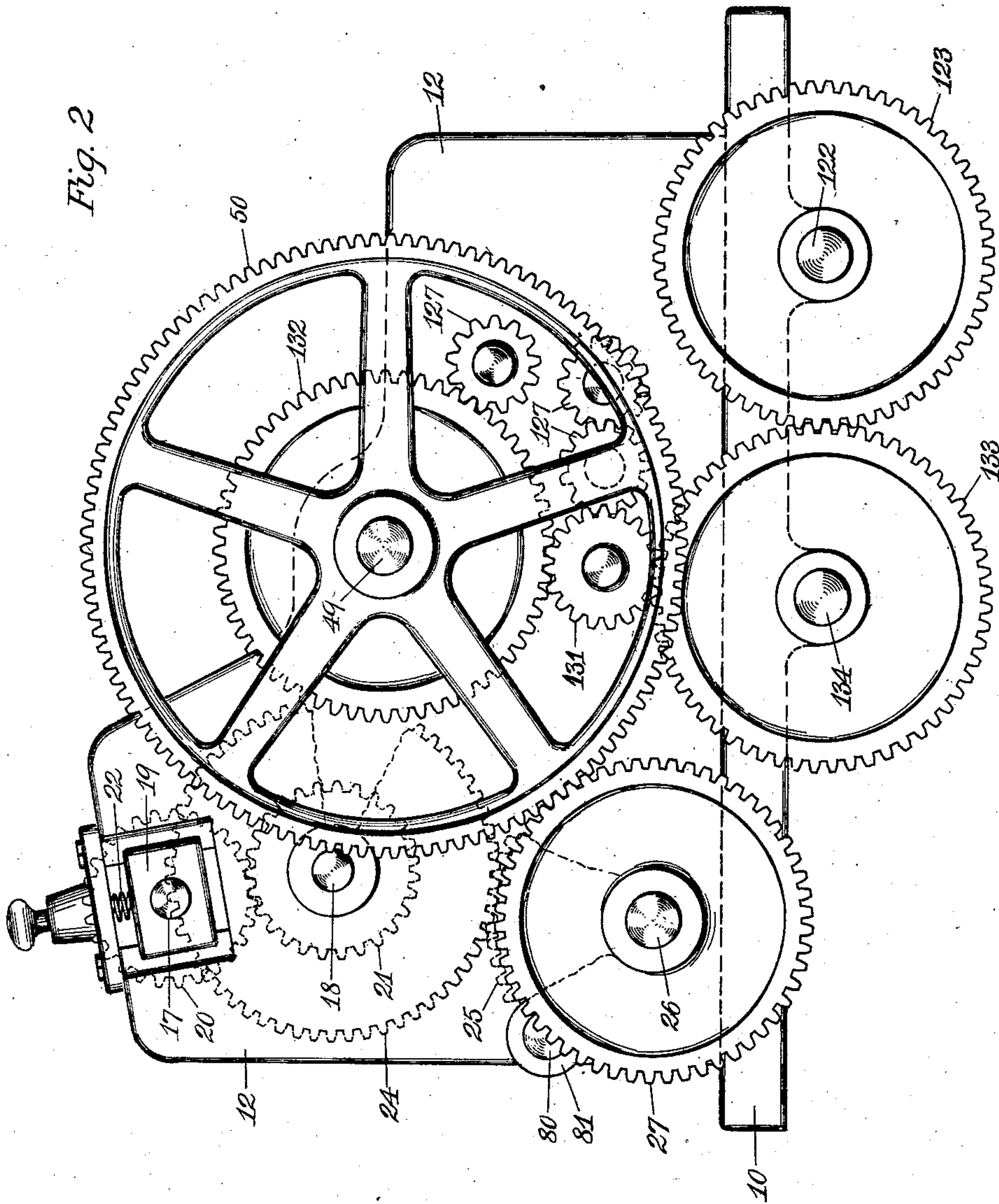


No. 860,040.

PATENTED JULY 16, 1907.

W. A. LORENZ.  
PAPER BAG MACHINE.  
APPLICATION FILED OCT. 29, 1904.

5 SHEETS—SHEET 2.



Witnesses:

H. Mallner  
Jas. Green

Inventor:

William A. Lorenz  
By W. H. Morris. Atty

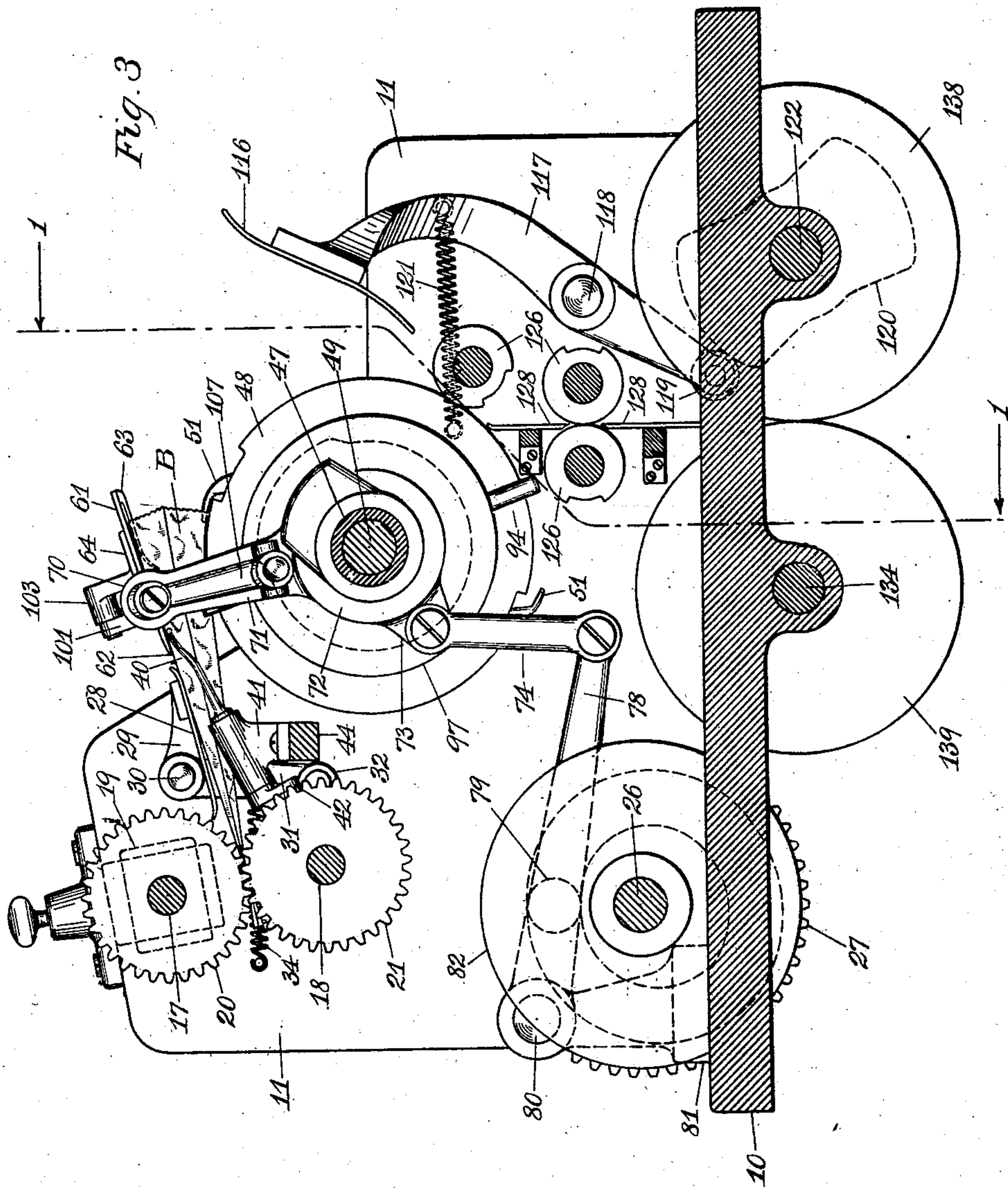


No. 860,040.

PATENTED JULY 16, 1907.

W. A. LORENZ.  
PAPER BAG MACHINE.  
APPLICATION FILED OCT. 29, 1904.

5 SHEETS—SHEET 3.



Witnesses:

H. Mallner  
Jas. Green

Inventor:

William A. Lorenz  
By W. H. Honiss, Atty

No. 860,040.

PATENTED JULY 16, 1907.

W. A. LORENZ.  
PAPER BAG MACHINE.  
APPLICATION FILED OCT. 29, 1904.

5 SHEETS—SHEET 4.

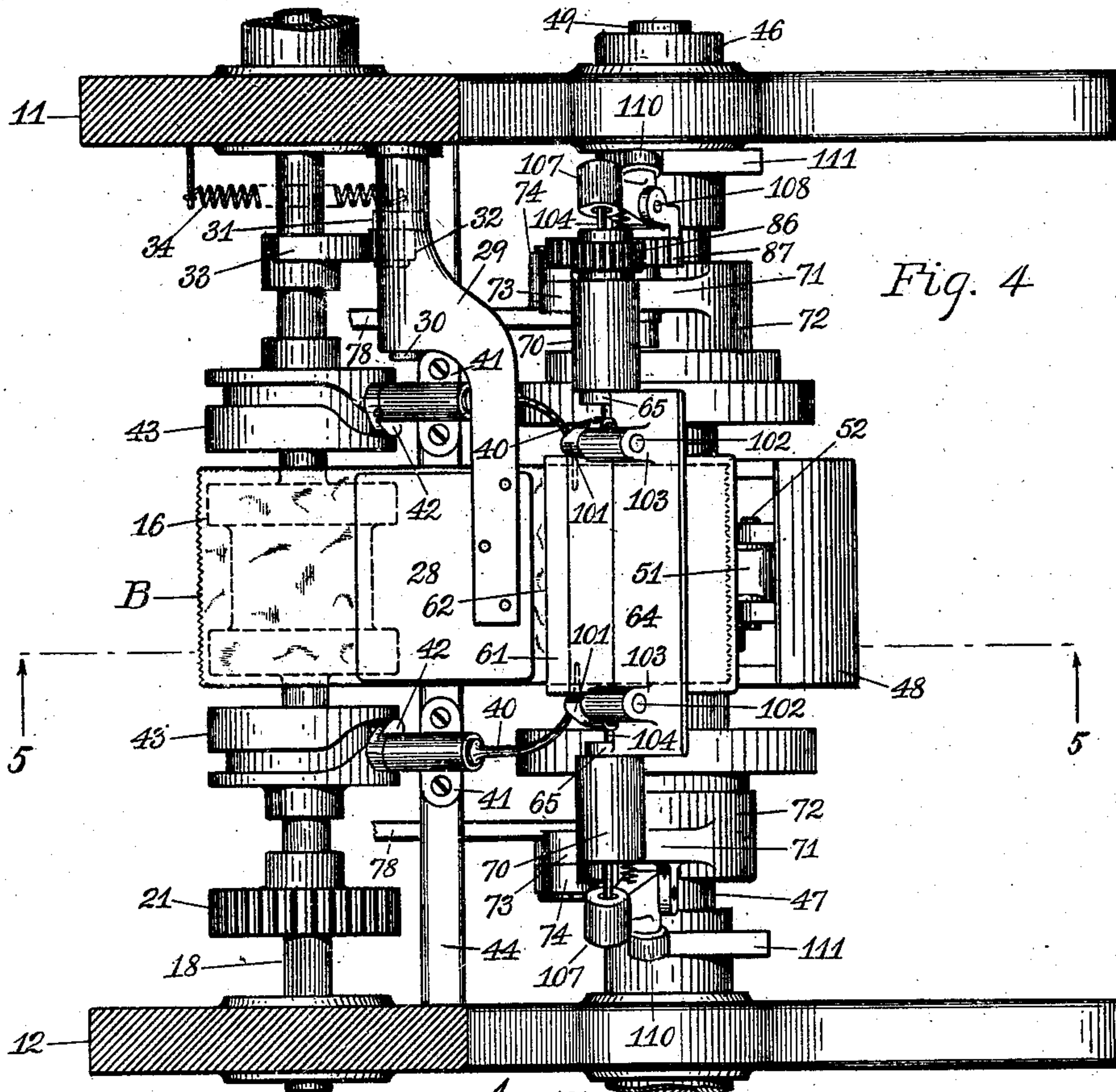


Fig. 4

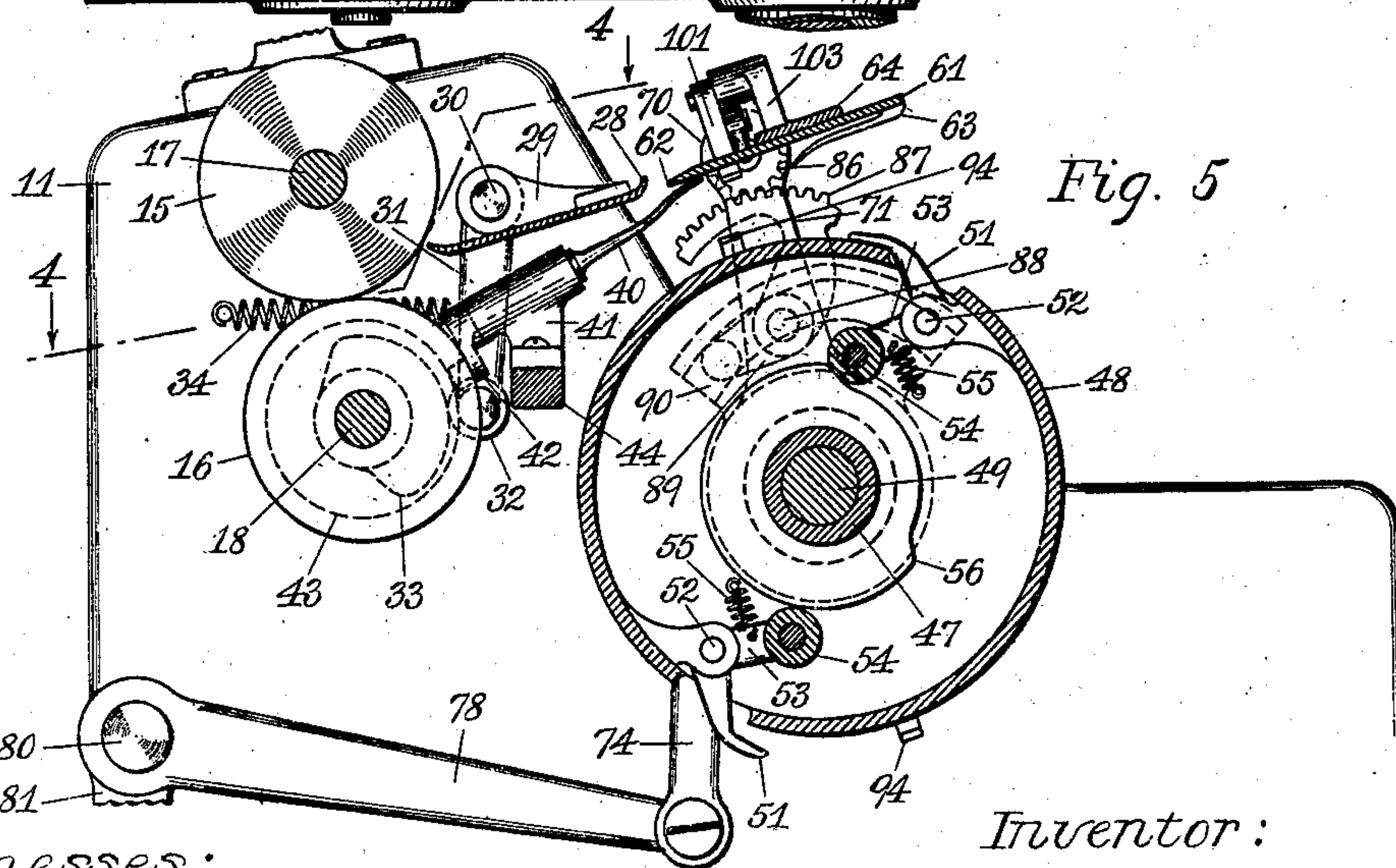


Fig. 5

Witnesses:

H. Maller  
Jas. Green

Inventor:

William A. Lorenz

By W. H. Horner. Atty

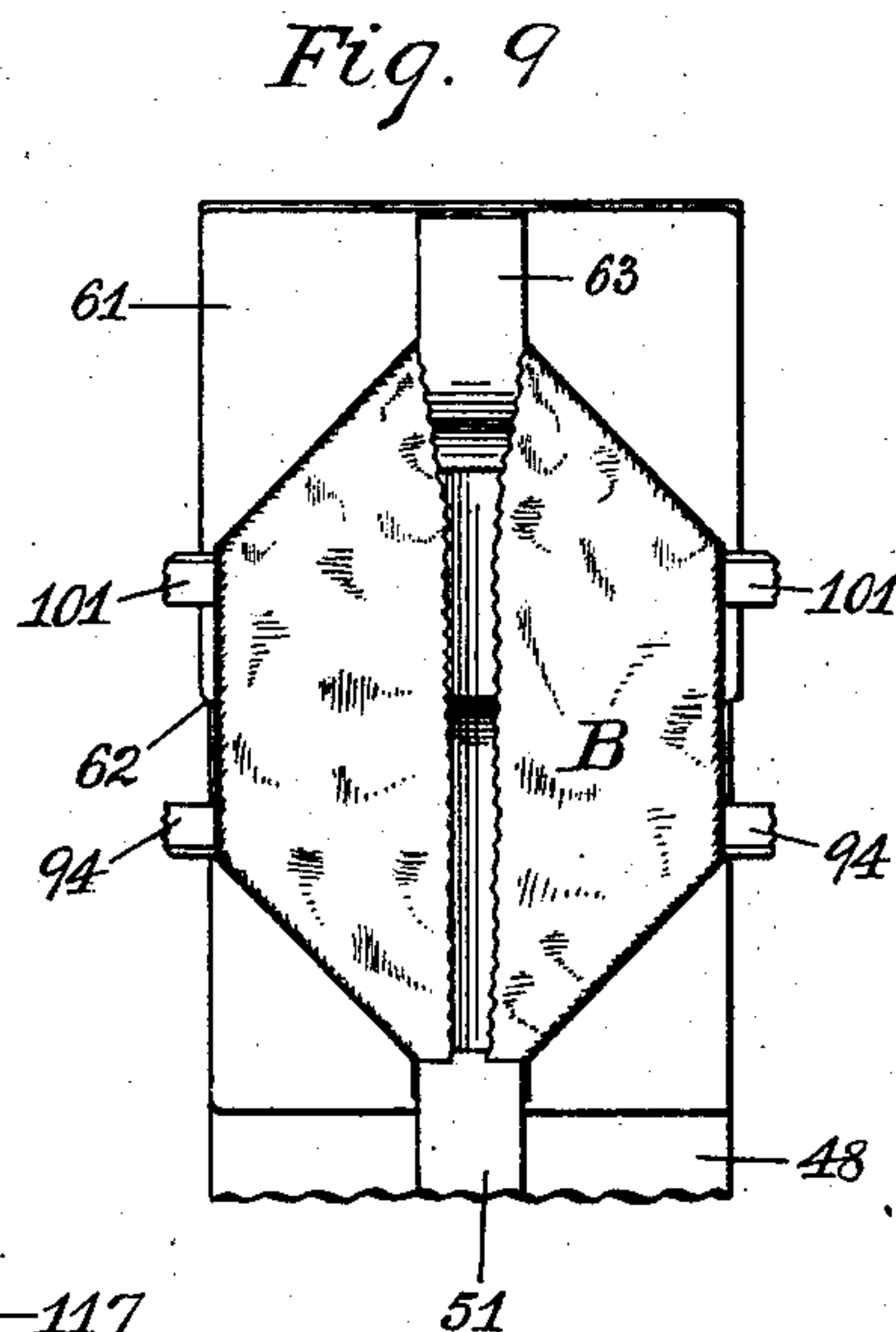
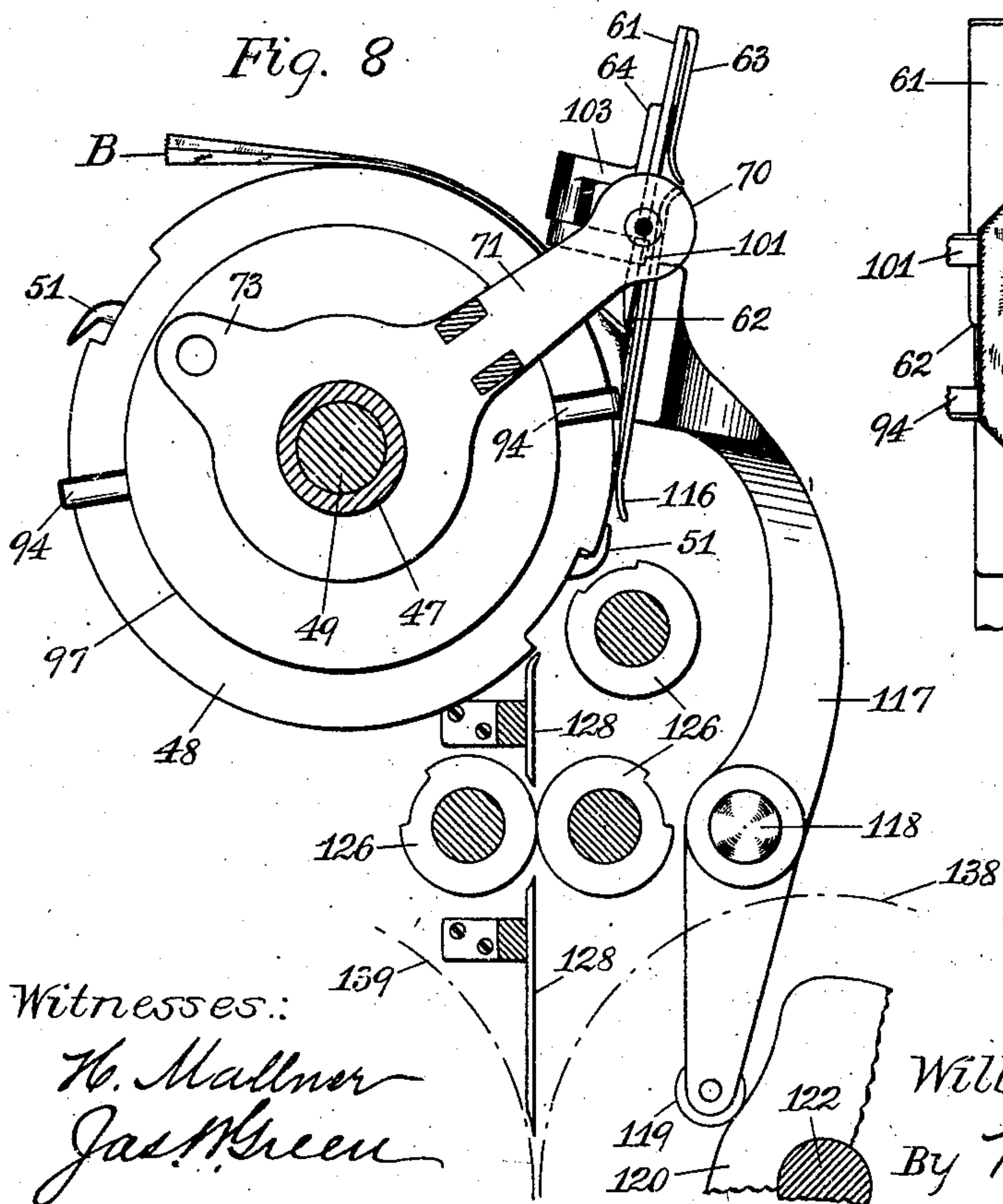
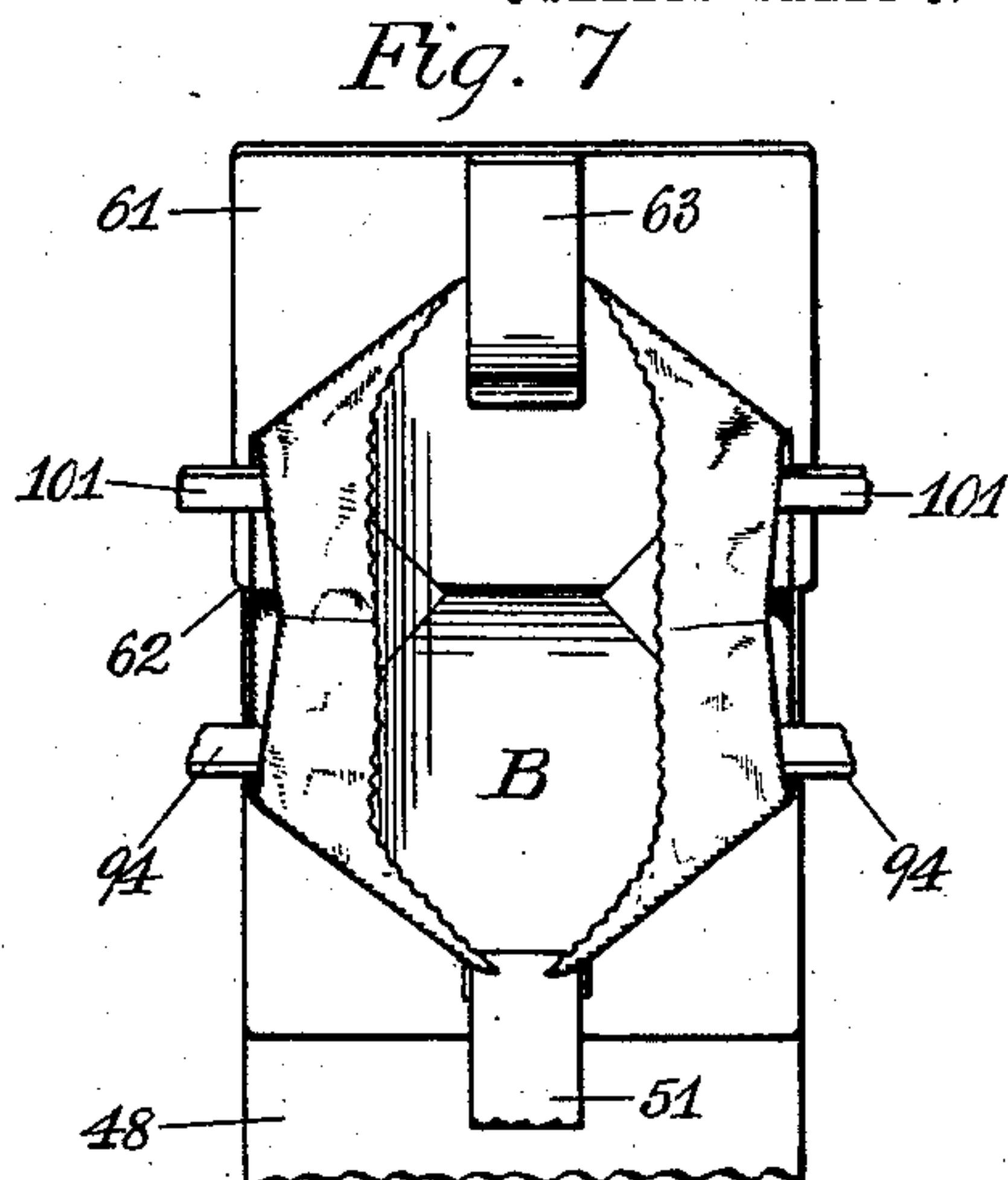
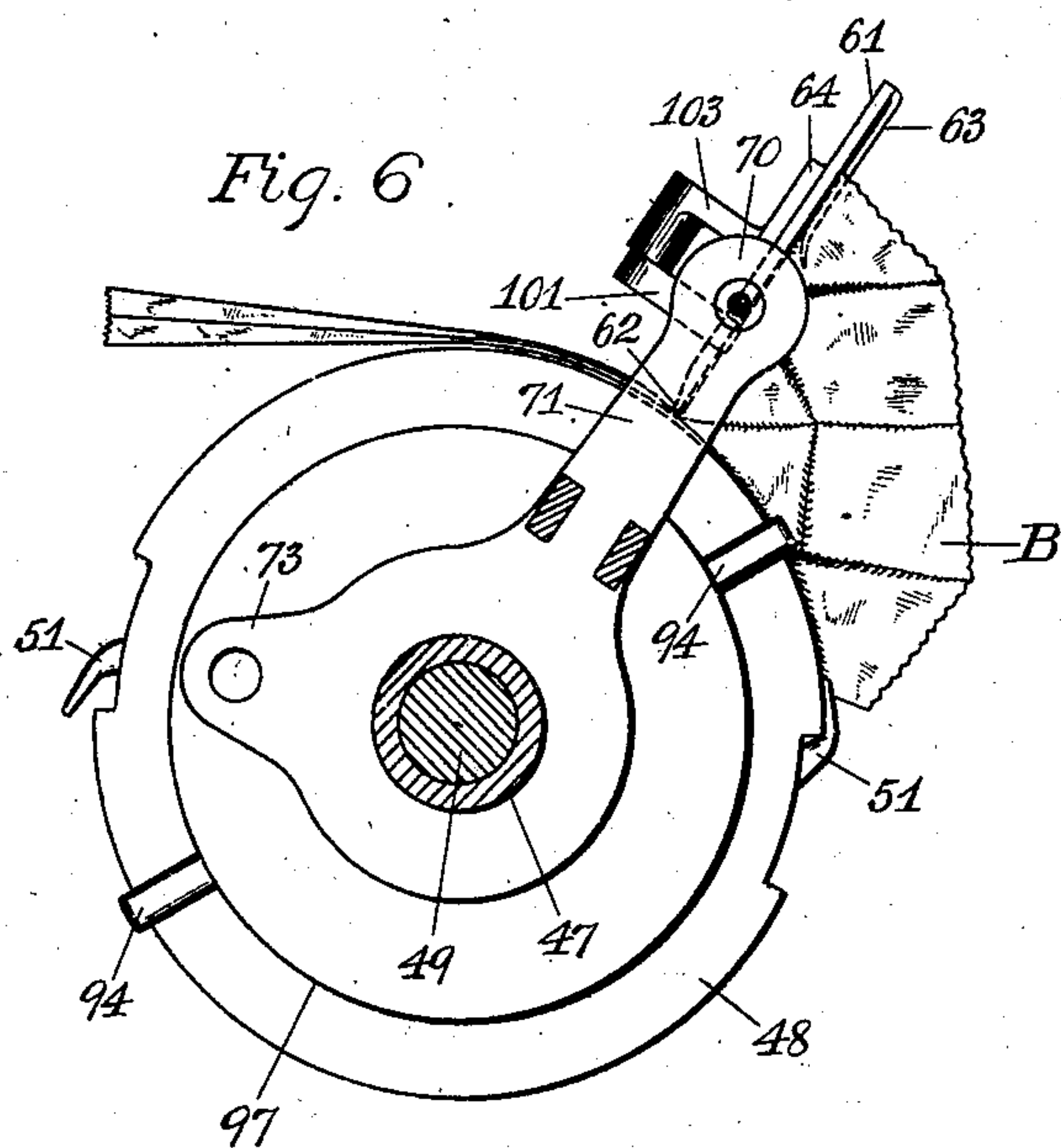


No. 860,040.

PATENTED JULY 16, 1907.

W. A. LORENZ.  
PAPER BAG MACHINE.  
APPLICATION FILED OCT. 29, 1904.

5 SHEETS—SHEET 5.



Witnesses:

H. Mallner  
Jas. Green

Inventor:

William A. Lorenz  
By W. H. House, Atty



# 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.

No. 860,040.

Specification of Letters Patent.

Patented July 6, 1907.

Application filed October 29, 1904. Serial No. 230,518.

*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 manufactures square-bottomed bags from bellows-sided tubes or blanks, and particularly relates to that section of such a paper bag machine which performs what is well-known as the diamond folding operation.

Many machines of this class employ an oscillating folding plate provided with a defining edge over which one of the plies of the blank is folded to form the diamond, while the blank is held on a suitable traveling support.

In the particular type of machine to which the present invention most nearly relates, the folding plate is mounted for oscillation upon an axis which is considerably remote from the said defining edge, but comparatively close to the surface of the blank support, so that in order to permit the defining edge of the folding plate to swing clear of the blank support during the oscillations of the folding plate, extra mechanism was required for imparting a separating movement, either by carrying the axis of the plate away from the blank support at the proper time, or the separating movement was imparted to the blank support either by moving the support bodily away from the folding plate, or by so moving only the necessary portion of the surface of the blank support.

All these constructions are expensive to manufacture and troublesome to maintain.

It is the object of the present invention to provide a construction utilizing the advantages of an oscillating folding plate having its axis remote from its edge, while avoiding the necessity of the aforesaid extra separating mechanism for enabling the plate to swing clear of the blank support.

Another object of this invention is to provide means for moving the folding devices forward in conformity with the travel of the blank while it is being operated upon.

Heretofore, the rapid production of bags in machines of this class has been more or less interfered with or obstructed by the necessity of delaying the blank in its passage through the machine in order to give the folding mechanism time to operate. By the present invention much of this delay is avoided and an increase in the production of the machine thereby effected.

Figure 1 of the drawings is a front view of a machine

embodying this invention, in section taken on the line 1—1 of Fig. 3. Fig. 1—a is a fragmentary front view showing one of the box holders and its operating devices. Fig. 2 is a view of the left hand side of the machine. Fig. 3 is a side view in section taken on the line 3—3 of Fig. 1. Fig. 4 is a plan view in section taken 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 side view showing the position of the folding devices when the diamond is partially formed. Fig. 7 is a front view of Fig. 6. Fig. 8 is a view similar to Fig. 6 and shows the position of the holding devices on the completion of the diamond. Fig. 9 is a front view of Fig. 8.

The bellows-sided blank cut to proper length is fed between the rolls 15 and 16 (Fig. 5) from any suitable tube forming and cutting-off apparatus. The rolls are mounted on the shafts 17 and 18 journaled in bearings supported in the uprights 11 and 12, the bearings 19 of the upper shaft 17 being pressed towards the shaft 18 by springs 22 (Fig. 2). The shaft 17 is driven by the gear 20, which meshes with the gear 21 on the shaft 18. Secured to the shaft 18 is the gear 24 which meshes with the gear 25 secured to the driving shaft 26, the latter being driven by any suitable means as for instance a pulley on one end of it.

Disposed adjacent to the feed rolls 15 and 16 and just above the path of the blank as it moves forward from the rolls, is the guide plate 28 (Figs. 4 and 5) secured to the arm 29 mounted to swing on the stud 30 supported in the upright 11. The arm 29 is provided with a cam arm 31 which carries a roll 32 held in contact with the cam 33 by the spring 34. The cam 33 is secured to the shaft 18. On each side of the plate 28 and adjacent thereto are the guide fingers 40. Each of these is mounted on a bearing 41 secured to the bar 44, supported by the uprights 11 and 12. Each finger 40 has an arm 42 which is worked by the cam 43 secured to the shaft 18. It is the function of these guide fingers to lift the upper ply of the blank into engagement with the folding plate 61.

The rotating blank support 48 to which the blank passes from the feed rolls 15 and 16 and which holds and sustains the blank during the diamond forming operation, is secured to the shaft 49, journaled in bearings 46 and 47 (Fig. 1) supported in the uprights 11 and 12 respectively. Motion is imparted to the shaft 49 by means of the large gear 50 which meshes with the gear 27 on the left hand end of the driving shaft 26. The blank support is provided with one or more sets of diamond and tuck holders which rotate with it and operate alternately upon the successive blanks to hold the tucks and front end of the diamond in the lower ply of the blank for the turning back of the upper ply. Two sets



of these gripping devices are shown in the drawings, and as they are similar in construction and operation only one set will be described.

The diamond holder 51 (Fig. 5) is mounted on the shaft 52 appurtenant to the blank support 48 and has an arm 53 provided with a roll 54 held in engagement with the stationary cam 56 by the spring 55. The cam 56 is secured to the bearing 47. The two tuck holders 94 (Fig. 1) are pivoted at 95 on lugs appurtenant to the blank support 48 and have rolls 96 held in engagement with the stationary cams 97 by springs. The cams 97 are secured to the bearings 46 and 47.

The oscillating folding plate 61 is disposed adjacent to the blank support 48 and in such position that the blank will pass beneath it from the guide plate 28. The folding plate 61 is secured to the bar 64 mounted for oscillation in the bearings 70 by means of the trunnions 65. The rear edge of the plate 61 forms a defining edge 62 over which the blank is turned backwardly to form the bag bottom, the edge 62 thus defining the primary cross fold of the diamond.

The trunnion bearings 70 are formed on the ends of the arms 71, the other ends of the arms forming hubs 72 which are mounted for oscillation on the bearings 46 and 47. The hubs 72 have lugs 73 connected by the links 74 to the levers 78 secured to the rock shaft 80. The latter is journaled in the two arms of the bracket 81 secured to the base 10. The left hand lever 78 has a cam roll 79 which runs in a groove formed in the face of the cam 82, which is secured to the driving shaft 26. The outside of the bearings 46 and 47 where they fit the hubs 72 are concentric with the shaft 49. The movement of the cam 82 therefore rocks the trunnion bearings 70 on an axis coincident with the axis of rotation of the blank support. The contour of the cam 82 is formed to advance the axis of the defining plate 61 in the direction of the travel of the blank, thus lengthening the time during which the folding devices may operate upon the blank.

The axis of the trunnions 65 is placed at some distance from the defining edge 62 and also far enough from the adjacent surface of the blank support 48 to permit the edge 62 to clear the blank support as the plate oscillates on the trunnions. (Fig. 5). By this arrangement the axis of oscillation may be placed at a fixed distance from the blank support without requiring any compensating or extra movement of the blank support to permit the defining edge to pass clear. The oscillation of the folding plate 61 is effected by means of the pinion 86 secured to the right hand trunnion 65. A segment gear 87 meshes with the pinion 86 and is secured to the shaft 88 journaled in the left hand arm 71. The shaft 88 has secured to it an arm 89, the end of which travels in the fixed cam 90 during the oscillation of the arm 71. The cam 90 is secured to the bearing 46.

The two box holders 101 (Figs. 1 and 1-a) are placed on opposite sides of the folding plate in position to enter the side tucks of the blank and grip the upper ply against the plate 61. They are pivoted at 102 in the lugs 103 appurtenant to the bar 64, and have connected to them rods 104 which pass through the centers of the hollow trunnions 65 and are connected with the tops of the levers 107 by means of ball and socket joints which permit the rods to turn on the trunnion axis while being moved endwise. The levers 107 are pivoted at 108

in lugs 109 appurtenant to the arms 71, and have cam rolls 110 which engage the fixed cams 111 secured to the bearings 46 and 47. Springs 112 hold the rolls 110 against the cams 111.

Disposed near the blank support and in position to press the diamond against the folding plate and the blank support at the completion of the forward movement of the arm 71, is the flattening plate 116 (Fig. 3) secured to the lever 117. The latter is pivoted on the stud 118 appurtenant to the upright 11 and is provided with a cam 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 base 10 and receiving its motion from the gear 123 (Fig. 2) which meshes with the gear 133. Below the flattening plate 116 are driving rolls 126 (Fig. 3) driven by pinions 127 and adapted to carry the blank forward over the deflecting plates 128 to the delivery rolls 138 and 139 secured respectively to the shafts 122 and 134, the pinions 127 being driven by the gear 132 and the pinion 131.

The consecutive operation of the machine as a whole is as follows: The blank B properly formed and cut to length is fed between the rolls 15 and 16 (Fig. 3) and by them carried forward beneath the guide plate 28 which at that time occupies its lowest position in order to hold the forward end of the blank from opening out sufficiently to encounter the defining edge 62 in the latter's return movement. As the blank moves forward the plate 28 rises and allows the end of the blank to spring open. The fingers 40 are now turned on their axes by the cam 33 and swing into the tucks on either side of the blank their continued movement carrying the upper ply of the blank against the folding plate 62 and causing the forward edge of the upper ply to pass into the flap holder 63, the diamond holder 51 closing about the same time and gripping the blank to the blank support 48. The tuck holders 98 now close upon the lower edges of the tucks, while the arms 71 swing on the axis of the shaft 49 so as to advance the defining edge 62 in substantial conformity with the forward movement of the blank support. The swinging movement of the arms 71 also causes the folding plate 61 to oscillate; and the box holders 101 to close and grip the blank to the folding plate. This action of the folding plate and its coöperating devices carries the blank from the position shown in Figs. 1 and 3 through that of Figs. 6 and 7 where the diamond is opened out to the so-called "box-form", to the position shown in Figs. 8 and 9, where the diamond is fully opened out and is flattened against the folding plate 61 and the blank support 48 by the plate 116. The box holders 101 now release their hold and the blank passes forward to the deflecting plate 128 where the diamond holder 51 and the tuck holders 94 release their hold and permit the blank to pass to the delivery rolls 138 and 139 which carry it to suitable pasting and finishing mechanism not here shown. The advance movement given to the defining plate 61 to carry it bodily forward in the direction of the rotative motion of the blank support is specially advantageous in connection with the making of small bags. The time commonly allowed for the folding of the diamond in small bags is necessarily short, and therefore any increase in that time will result in an improvement of the output both in quality and quantity. With large bags, however, there is more



time for the folding devices to perform their functions and the advancing feature may therefore be dispensed with in certain cases.

In my prior applications Serial No. 27,864, filed Aug. 23, 1900, Serial No. 32,123, filed Oct. 5, 1900, Serial No. 35,086, filed Nov. 1, 1900, and Serial No. 36,177, filed Nov. 12, 1900, I have shown, described and claimed certain combinations which are shown and described but not claimed in this application. In so far as this application shows novel features in common with said prior applications, it is to be regarded as subordinate to said prior applications.

I claim as my invention:—

1. In a paper bag machine, the combination of a traveling blank support having tuck holders, a blank folding member having a defining edge and mounted for oscillation on an axis situated substantially in the plane of said member and remote from said edge, means supporting and moving the said axis forward and back in the general direction of travel of the blank supporting surface, and at a distance therefrom not less than the distance from the defining edge of the blank folding member to its axis.
2. In a paper bag machine, the combination of a traveling blank support having tuck-holders, a blank-folding member having box-holders and a defining edge, and mounted for oscillation on an axis situated substantially in the plane of said folding member and remote from said edge, means for supporting said axis at a distance from the blank support not less than the distance from the defining edge of the blank-folding member to its axis, and means for oscillating the blank folding member during the diamond-forming operation.
3. In a paper bag machine, the combination with a traveling blank support having tuck holders, a blank folding member having a defining edge and mounted for oscillation on an axis remote from said edge, means for supporting said axis at a distance from the surface of the blank support not less than the distance from the defining edge

of the blank folding member to its axis, and means for lifting the upper ply of the blank into engagement with the folding member.

4. In a paper bag machine, the combination of a traveling blank support having tuck holders, a blank folding member having a defining edge and mounted for oscillation on an axis situated substantially in the plane of said member and remote from said edge, means for supporting and moving the said axis forward and back in a path substantially parallel with the direction of travel of the blank supporting surface of the blank support, and at a distance from said surface not less than the distance from the defining edge of the blank folding member to its axis of oscillation.

5. In a paper bag machine, the combination of a rotary blank support, having tuck holders, a blank folding member having a defining edge and mounted for oscillation on an axis situated approximately in the plane of said member and remote from said edge, and means for supporting and swinging the said axis in substantially concentric relation to the center of rotation of the blank support and at a distance from the surface of said support not less than the distance from the defining edge of the blank folding member to its axis.

6. In a paper bag machine, the combination of a rotary blank support having tuck holders, a blank folding member having a defining edge, arms mounted to swing in substantially concentric relation to the rotary blank support and supporting the said blank folding member for oscillation upon an axis situated substantially in the plane of the folding member and remote from said edge, and means for moving the arms to carry the said axis in a curved path above the surface of the blank support and at a distance therefrom not less than the distance from the defining edge of the blank folding member to its axis.

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

WILLIAM A. LORENZ.

Witnesses:

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



It is hereby certified that in Letters Patent No. 860,040, granted July 16, 1907, upon the application of William A. Lorenz, of Hartford, Connecticut, for an improvement in "Paper-Bag Machines," an error appears in the printed specification requiring correction, as follows: In line 6 of heading, the date of patent, "July 6, 1907," should read *July 16, 1907*; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 15th day of October, A. D., 1907.

[SEAL.]

EDWARD B. MOORE,

*Commissioner of Patents.*