W. A. LORENZ.

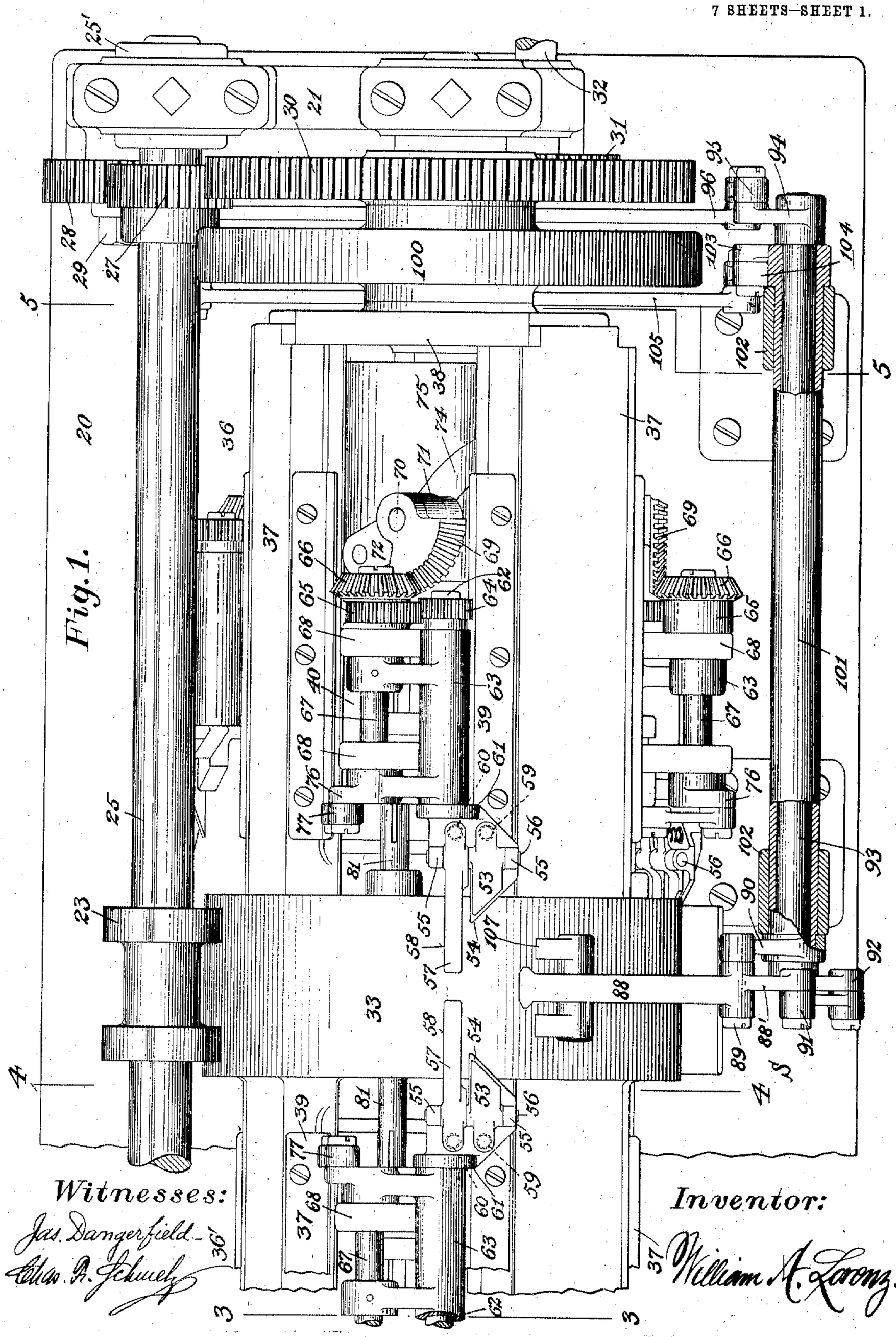
PAPER BAG MACHINE.

APPLICATION FILED FEB. 7, 1901.

995,473.

Patented June 20, 1911.

7 SHEETS—SHEET 1.



Witnesses:

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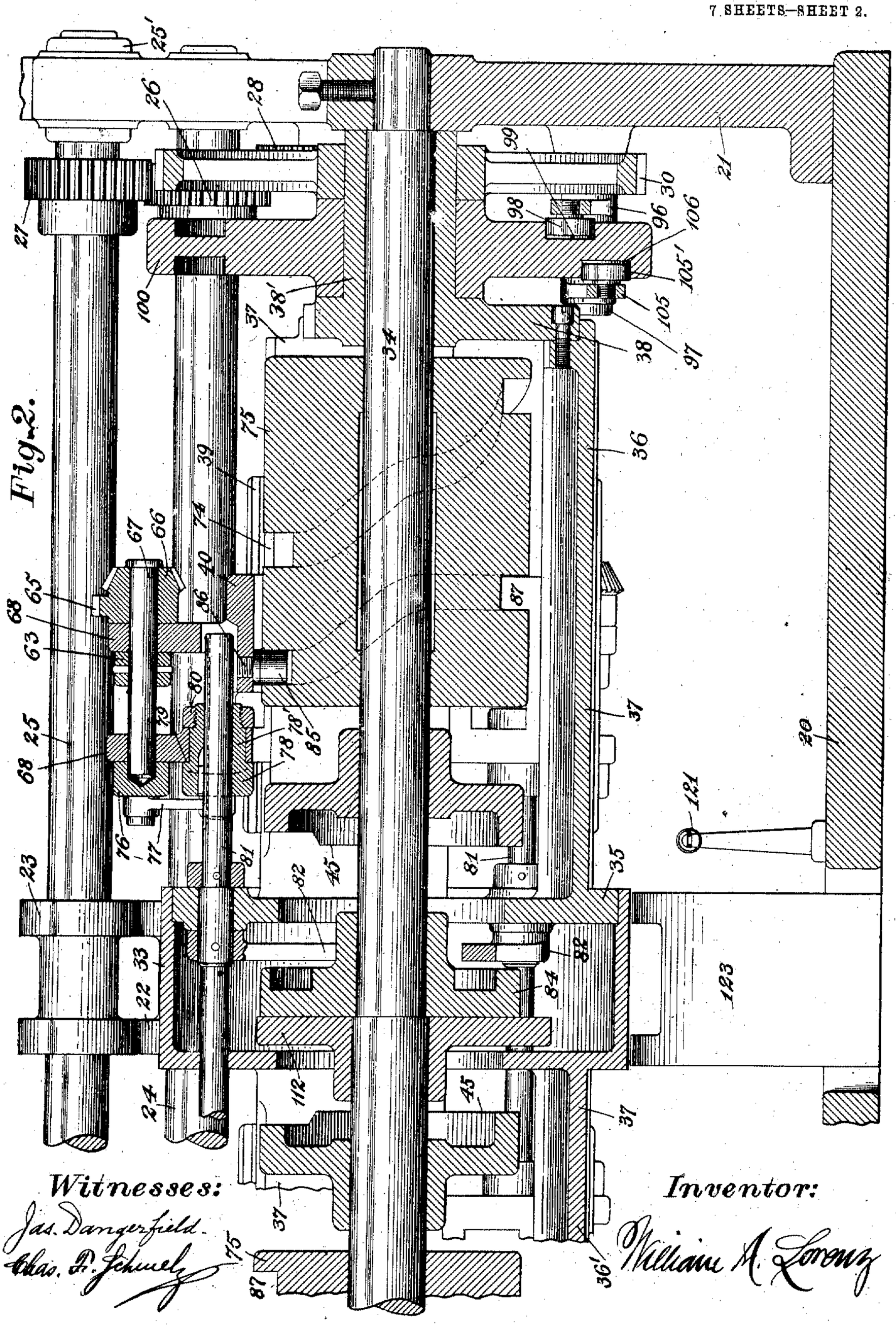
7 SHEETS—SHEET 2.

Fig. 2.



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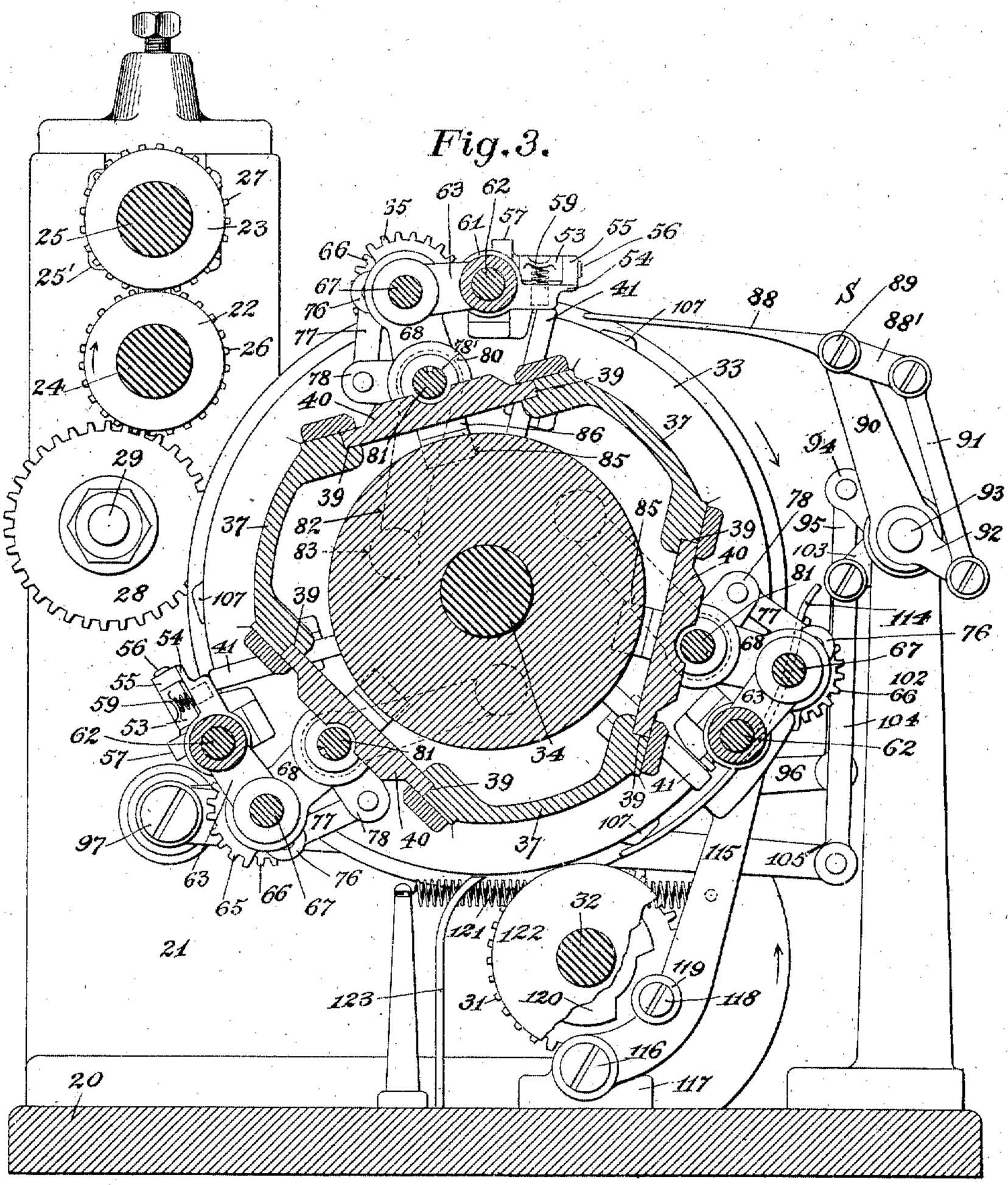
7 SHEETS—SHEET 3.

Fig. 3.



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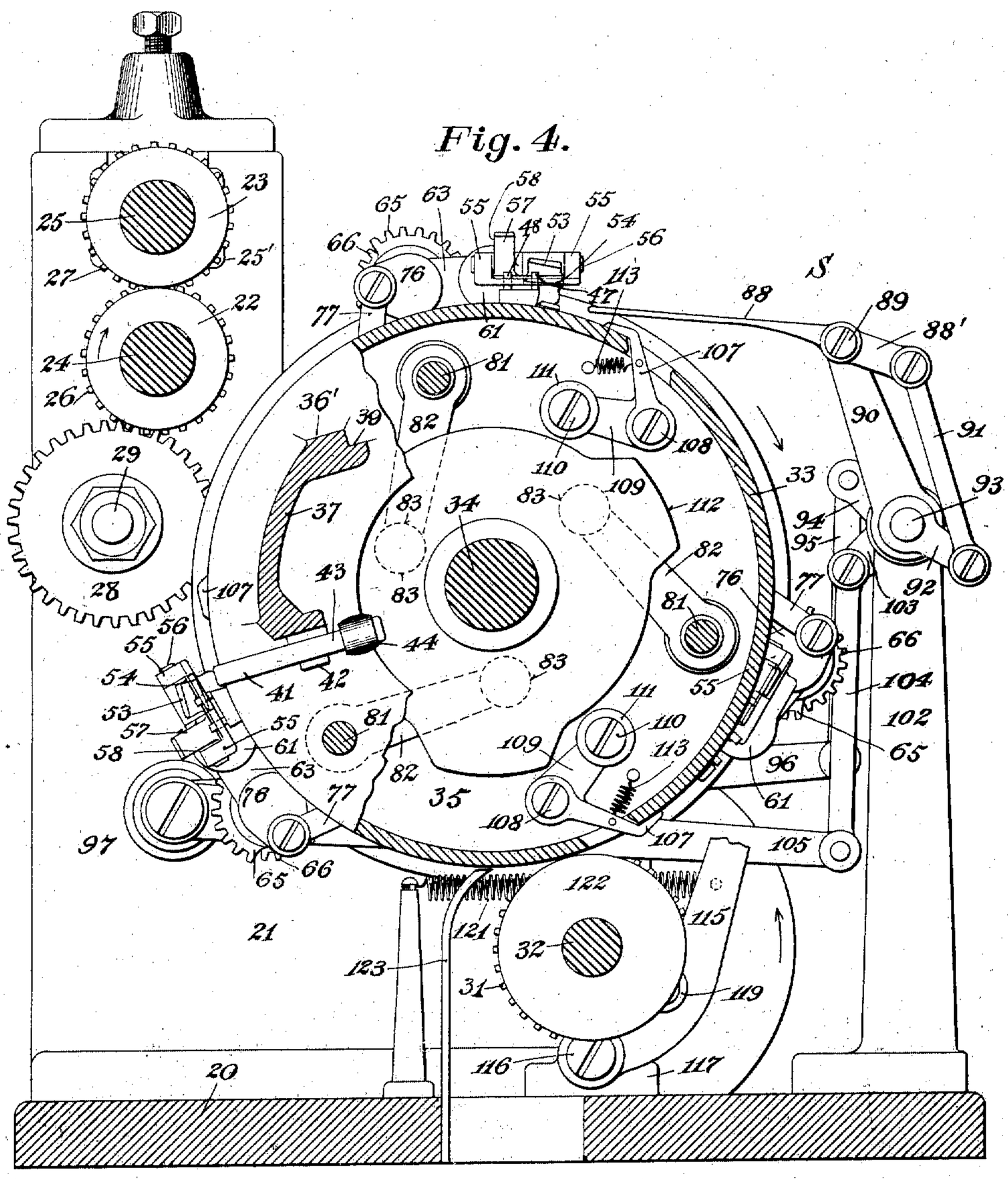
7 SHEETS—SHEET 4.

Fig. 4.



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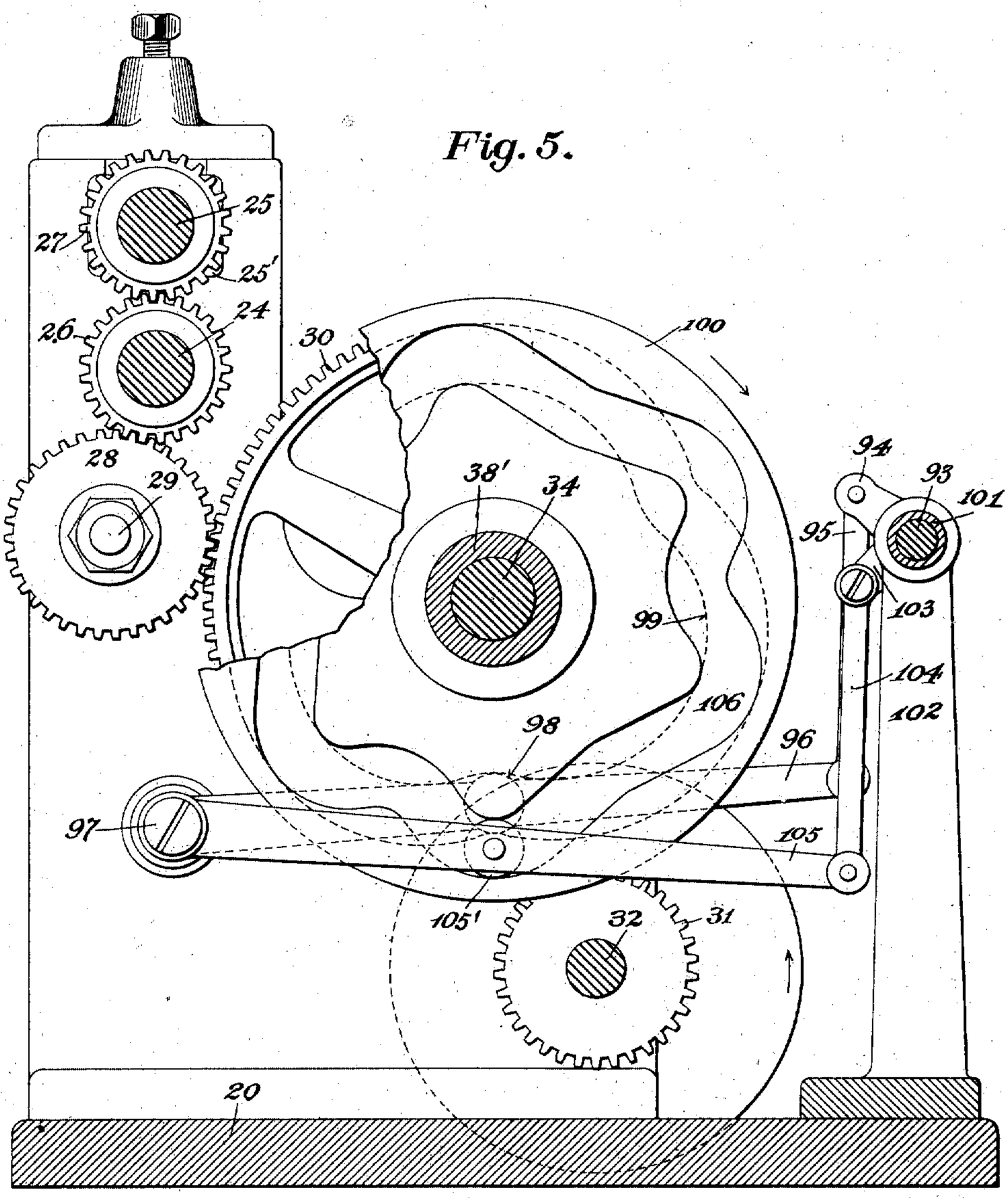
7 SHEETS—SHEET 5.

Fig. 5.



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APPLICATION FILED FEB. 7, 1901.

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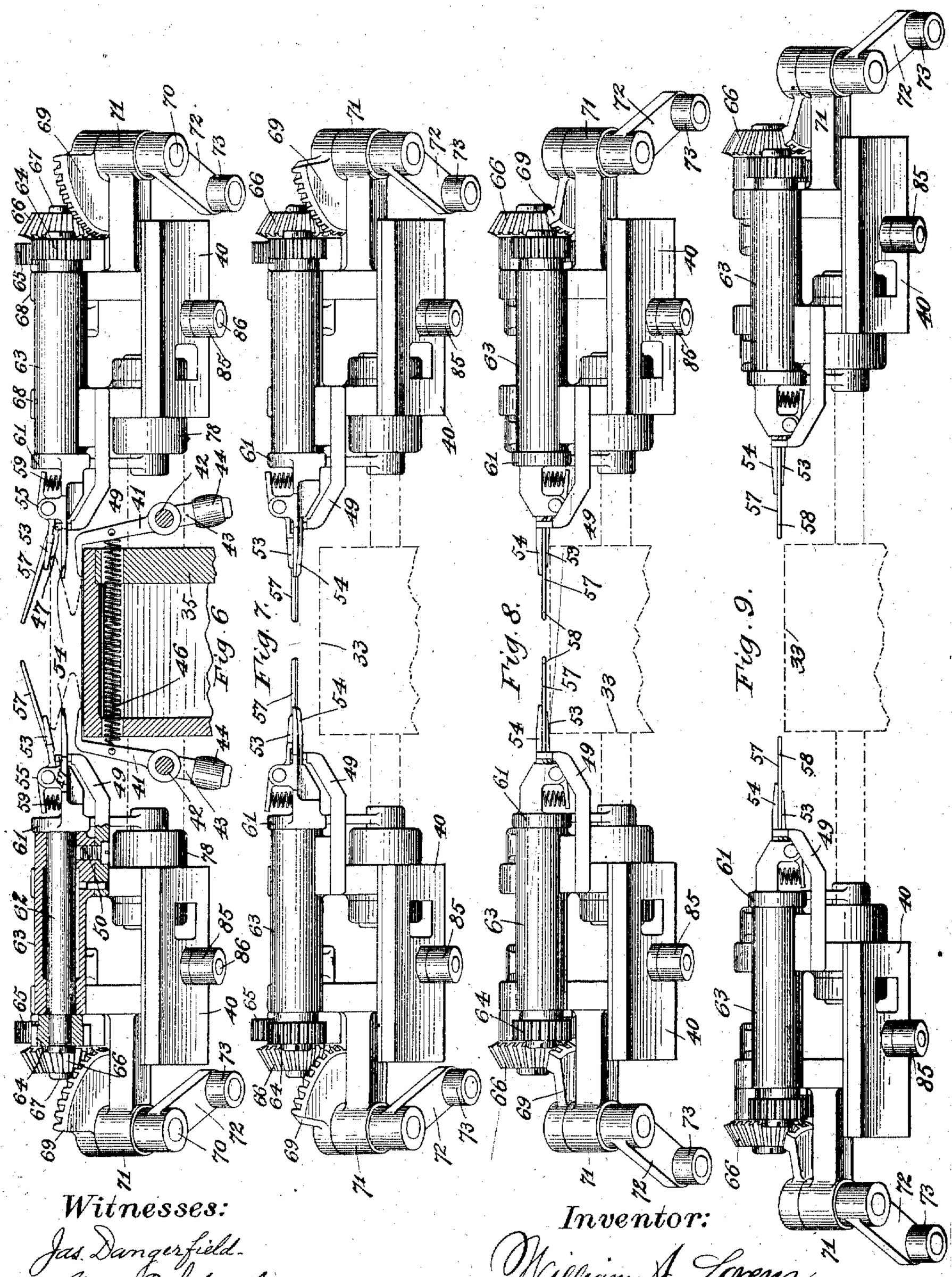
7 SHEETS—SHEET 6.



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APPLICATION FILED FEB. 7, 1901.

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Patented June 20, 1911.

7 SHEETS—SHEET 7.

Fig.11.

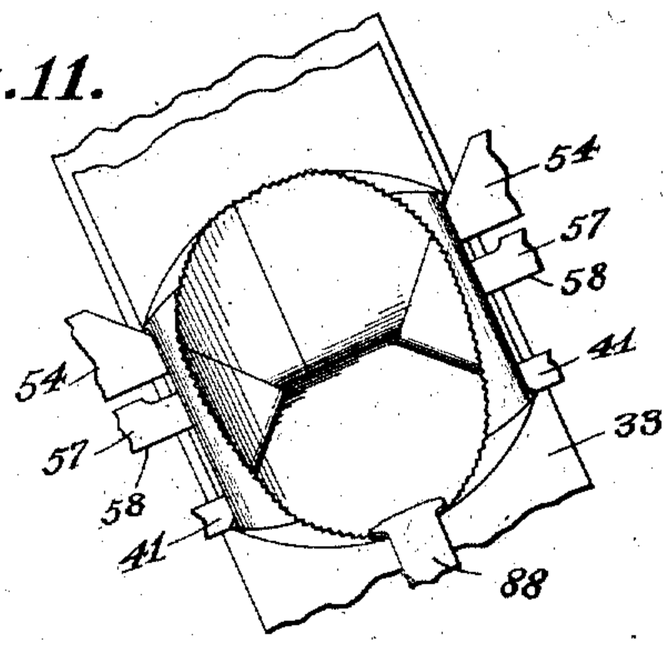


Fig.10.

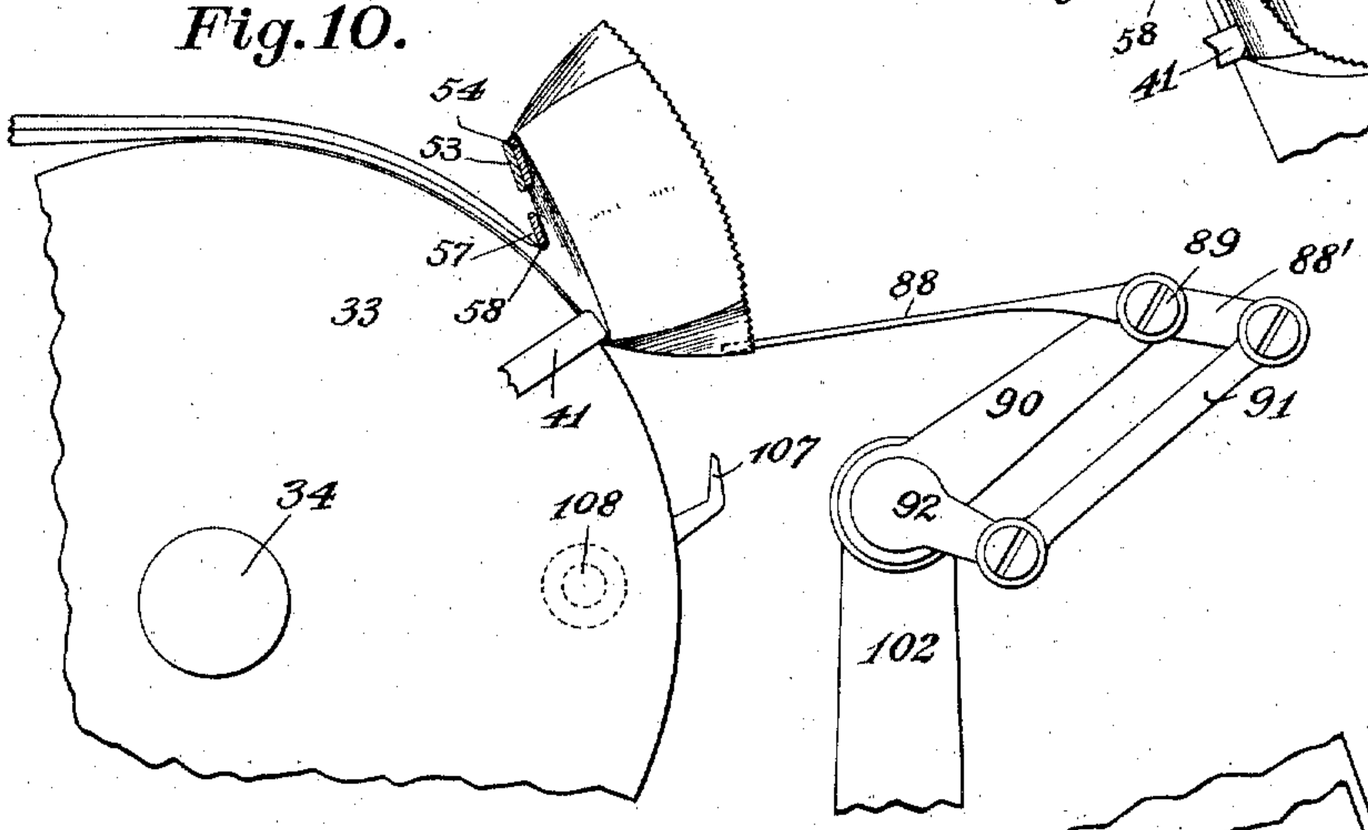


Fig.13.

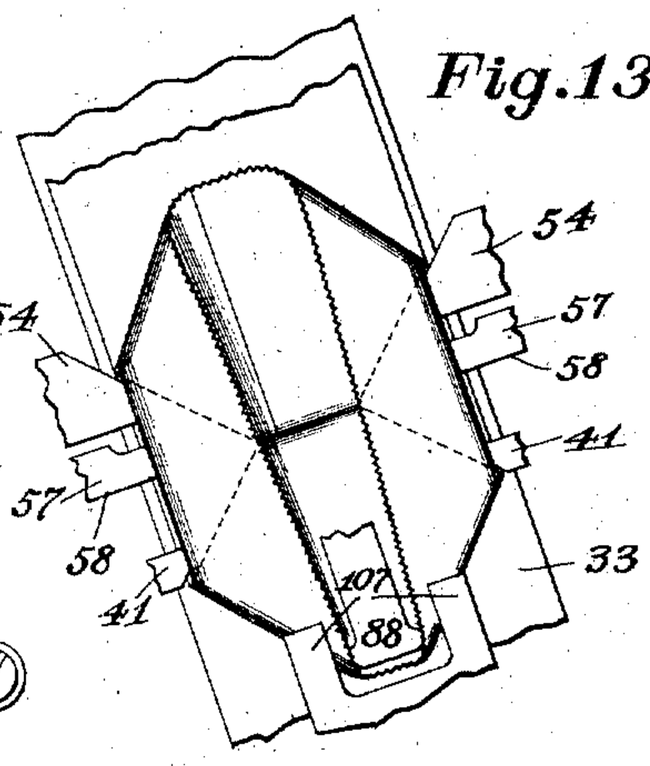
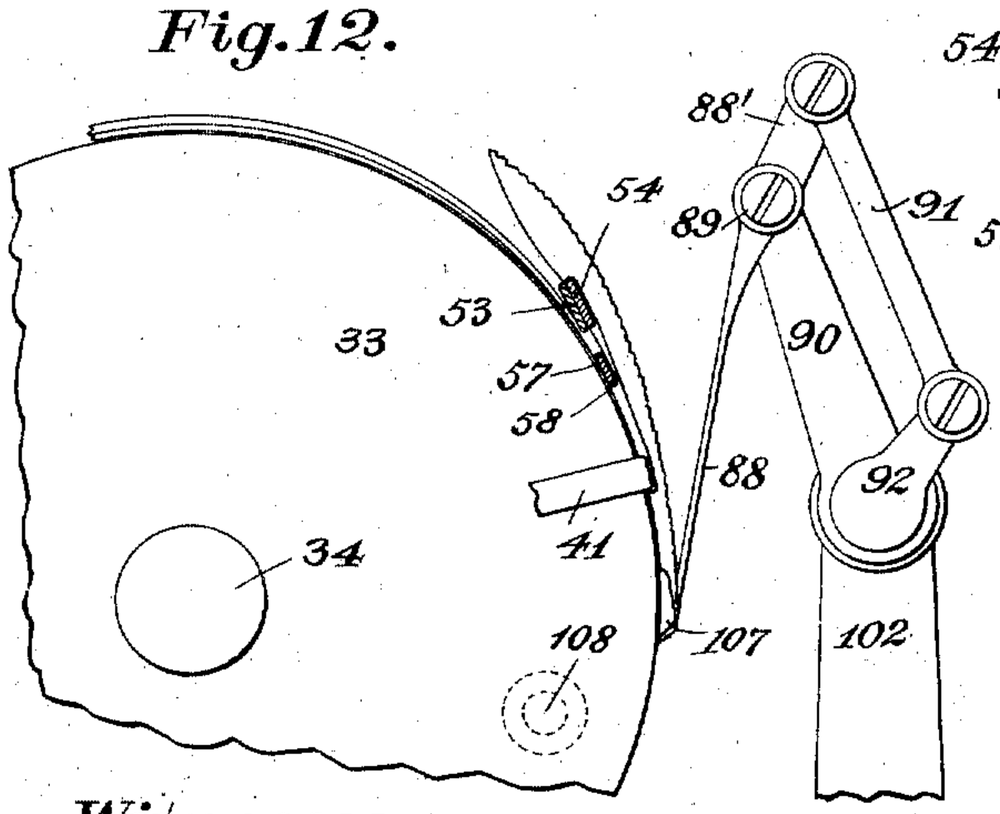


Fig.12.



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UNITED STATES PATENT OFFICE.

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PAPER-BAG MACHINE.

995,473. Specification of Letters Patent. **Patented June 20, 1911.**

Application filed February 7, 1901. Serial No. 46,335.

To all whom it may concern:

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

This invention relates to paper bag machines and more especially to that class thereof in which square bottom bags are formed from bellows-sided or tucked tubing, and it has for one of its objects the provision of a machine of this type whereby the so-called "diamond fold" is formed in an easy and rapid manner preparatory to having its flaps supplied with paste and folded to complete the bag.

My invention comprises as one of its features a blank-folding member having a defining edge which is maintained at a substantial distance from the blank-supporting surface or folding bed of a suitable blank-carrier during the diamond-forming period, so that the machine may be operated at a high rate of speed without liability of wrinkling or otherwise damaging the material, especially at that time when the tucked sides are being pulled out or stretched out by the coaction of the devices whereby the upper and lower plies of the blank are engaged.

My invention has, furthermore, for its object an improved construction of the defining member and its operating mechanism, said member being mounted for revolution around the axis of, and with, a rotary blank-carrier.

My invention comprises blank-folding members coöperative with suitable blank-engaging devices, said members consisting preferably of two parts which are mounted for movement toward and away from each other laterally of the blank carrier, while the edges of said members are movable toward and from the carrier independently of the blank-engaging devices, and into position to serve as a medium around which the blank is opened out and folded into the diamond.

A further object of my invention may be found in the provision of means whereby the front diamond flap is formed and held, and guided in a predetermined path relative to the surface of the blank-carrier so as to relieve the strain upon the material and to deliver the said flap to other devices upon the completion of the diamond. This feature of my invention comprises a sweeper finger or similar device, the blank-engaging point of which is mounted for movement toward and from, and advanceable with, the carrier during the diamond-forming operation.

Further objects of my invention reside in the improved construction and organizations of the various devices whereby the blank is engaged during its manipulation, as will be hereinafter described and particularly pointed out in the claims.

In the accompanying drawings, in which similar characters designate similar parts, only a portion of a machine embodying my invention is illustrated, such portion illustrating the machine sufficiently for a full understanding thereof, and it should be noted here that the blank-carrier and the blank-engaging and folding devices are similar on both sides of the center line so that, in the following specification the description of one side will answer for both.

Figure 1 is a top view of a machine built in accordance with my invention. Fig. 2 is a central longitudinal section thereof. Fig. 3 is a vertical cross section on line 3 3, Fig. 1. Fig. 4 is a similar section taken on line 4 4 of Fig. 1. Fig. 5 represents a similar section on line 5 5 of Fig. 1. Figs. 6 to 9 inclusive are diagrams illustrating in front views the operation in the movements of the folding devices relative to the blank-carrier. Fig. 10 is a fractional side view of the blank-carrier and showing the blank after it has been formed into the "box". Fig. 11 is a front view of the blank shown in Fig. 10. Fig. 12 is a view similar to Fig. 10 and illustrates the blank after the diamond has been substantially completed, and Fig. 13 is a front view of the blank shown in Fig. 12.

In the drawings, 20 designates the bed plate of the machine to which are secured upright side frames 21 in which the several coöperating parts and shafts for driving the various devices are supported. Suitable means are provided for feeding blanks or bellows-sided tubing into the machine such means consisting, in the present instance, of suitable feed rollers 22 and 23 mounted on shafts 24 and 25 respectively, the latter be-

ing journaled in movable boxes 25′ in the side frames. The feed rollers are caused to coöperate with each other by means of gears 26 and 27 mounted on the shafts 24 and 25, respectively, and they are driven through an intermediate 28 which is journaled on the stud 29 held in the side frame 21, such intermediate 28 receiving proper movement from a gear 30 which, in turn, is driven from a pinion 31 mounted on a shaft 32, which constitutes the driving shaft of the machine and to which power may be applied from any ordinary source. From the feed rollers the blank or tube is conducted to a suitable carrier serving as a support and folding bed for the blank during the bottom or diamond-forming operation. Connected for coöperation with the carrier are devices for engaging the upper ply of the tube or blank, while suitable means are provided for holding the lower ply of the tube or blank in place on the carrier, the organization of said devices being such as to open out the open end of the blank and form the diamond as will hereinafter appear. The carrier is, in the present instance, of the rotary type and consists substantially of a cylinder such as 33 mounted for rotation around the axis of a shaft 34 which is preferably stationary in the side frames 21 and upon which a number of movement-imparting devices are supported. The cylinder 33 comprises substantially a cylindrical shell secured to the head 35 of a hub section 36; while said shell 33 is provided with a similar hub 36′, the construction and function of which is the same as that of the hub 36 so that the description of one is applicable to both.

The hub 36 is composed of a plurality of bars 37 the outer and free ends of which are united and held by a spider 38, and which, between each pair of adjacent bars thereof, form ways 39 adapted to receive slides 40 the number of which corresponds to the number of folding beds for the bag blanks to be operated upon during one rotation of the blank-carrier, in the present instance three being shown. The spider 38, just mentioned, is provided with a hub 38′ which is loosely journaled on the shaft 34 and to which the gear 30, above referred to, is secured, so that by rotating said gear 30 in the manner above described, proper movement will be imparted to the carrier 33.

The means for holding the lower ply of the tube on the carrier consists preferably of a pair of tuck-holders 41, journaled at 42 on the carrier, and having roll-receiving portions 43 on which cam-rollers 44 are journaled. These cam-rollers travel in engagement with suitable cams 45 secured upon the shaft 34 which cause said tuck-holders to release the blank on both sides simultaneously and at the proper time; while a spring, such as 46 (see Fig. 6), may be employed for causing said tuck-holders to engage the blank. Organized for coöperation with the tuck-holders 41 are box-holders 54 (Fig. 1) each of which is preferably and coöperatively connected with a clip 53, and has lugs 55 for pivotally receiving a spindle 56 upon which said clip 53 is journaled, and which also carries a member 57 one edge of which, 58, serves as a defining edge, both the defining member 57, and the clip 53 being separately acted upon to close against the box-holder 54 by suitable springs 59 and 60, respectively. The box-holder 54 constitutes a blank-folding member secured to, or forming a part of a head 61 which is secured to a spindle 62 (see Fig. 6), journaled in a frame 63 (see Fig. 1) and the other end of which carries a pinion 64 in engagement with a gear 65 whereby proper movement is imparted to said pinion 64 and which, in turn, is operated by a bevel pinion 66 secured thereto and loosely mounted upon a spindle 67 which is journaled in the lugs 68 of the slide 40 above mentioned. The bevel pinion 66 may be operated by a sector 69 carried on a spindle 70 which is journaled in an ear 71 forming a part of the slide 40 and to which proper oscillatory movement may be imparted through an arm 72 having a cam roller 73 in engagement with a suitable cam groove 74 provided in the cam 75. As has above been mentioned, the main shaft 34 of the machine is stationary in the frames 21, and the cam 75 is preferably mounted on said shaft 34 so that as the spindle 67 in the slide 40 is revolved around the axis of said shaft 34, the sector 69 may be properly actuated by the cam-groove 74, and will oscillate the spindle 62 and consequently the box-holders 54 in the proper manner. By referring to Figs. 4 and 6 it will be seen that the operation of the clips 53 and the defining members 58 is governed by pins 47 and 48 respectively, supported by arms 49 which may be secured to the frames 63, so that when the box-holders 54 are caused to oscillate around the axis of the spindle 62, the springs 59 and 60 will close the clips 53 and the defining members 57 independently of each other and against the blank, moving said parts from the position of Fig. 6 to that shown in Fig. 7. In addition to this oscillating movement the box-holders 54 and the defining member 57 are also organized for a rise and fall movement bodily relative to the blank-supporting surface of the carrier in order to position the box-holders and the defining member properly to receive the blank, and, furthermore, in order to maintain the upper and lower plies of the blank at a distance from each other, or more properly speaking: to preserve the defining edge 58 at a substantial distance from said carrier surface during the diamond-forming op-

eration. This result is obtained by imparting to the frame 63 a swinging movement around the spindle 67 as an axis, said spindle being secured to the frame and carrying at one end an arm 76 the outer end of which may be connected by means of a link 77 with an arm 78 having a hub portion 78′ which is journaled in one of the ears 68, and sidewise movement of which may be prevented by a shoulder 79 and a nut 80, as is clearly shown in Fig. 2. The arm 78 is operated, in the present instance, by a shaft 81, journaled in the head 35 of the carrier casing 33, and having secured thereto a lever 82, the lower end of which carries a roller 83 in engagement with a suitable cam 84 preferably secured to the shaft 34 above mentioned.

From the foregoing it will be seen that each folding member 53, 54 and 57 has, as far as described, two distinct movements, viz.: an oscillatory movement around the axis of the spindle 62 and at the same time a rise and fall movement relative to the carrier surface around the axis of the spindle 67. In addition to these two movements the member 54 has also a movement laterally of the carrier, as may for instance, be seen by a comparison of Figs. 8 and 9, the former of which illustrates said member in its operative or inward position, while the latter shows said member retracted to clear the blank on the carrier. This movement is due to the operation of the slide 40 which, as has been previously stated, is guided in ways 39 formed by each adjacent pair of bars 37. The slide 40 has preferably at its under side a roller 85 journaled on a stud 86 and in engagement with a cam groove 87 also provided in the cam 75, above mentioned; and, in order to allow for this movement of the slide 40, the arm 78 whereby the frame 63 is operated has preferably a spline connection with its operating spindle 81 (see Fig. 2).

One of the features of my present invention resides in the provision of means to form the front diamond flap and hold it in desired relation to the surface of the blank-carrier, during and especially near the end of the diamond-forming operation. These means consist, in the present instance, of a sweeper device, designated in a general way by S, the movement of which relative to the carrier is in a predetermined path, and such that it will engage the flap end during the box and diamond folding operations. By comparison of Figs. 4, 10 and 12, several positions in the operation of the sweeper finger may be clearly seen, the operating mechanism of the device being so organized as to permit the box which is shown in Fig. 10 to be easily formed without any strain being brought to bear upon the front flap; while, as soon as the tucked sides of the tube are fully stretched out, the end of the sweeper finger will form the front flap of the diamond, carry it toward the blank-carrier and to the position shown in Fig. 12, when said flap will be engaged by a device whereby the blank is retained on the carrier and subsequently brought into contact with other devices thereby to be supplied with paste and folded to complete the bag. The sweeper device S consists substantially of a former and holder finger 88 pivoted at 89 on an arm 90 which constitutes a carrier therefor, and which is adapted for oscillation toward and away from the blank-carrier. The finger 88 is provided with a rearward extension 88′, the end of which is connected by a link 91 to a crank arm 92 secured to one end of a shaft 93 the other end of which carries a lever 94 connected by a link 95 with a lever 96. This lever is pivoted on a stud 97 in the side frame 21 and carries a roller 98 in engagement with a cam groove 99 of a cam 100 said cam being mounted on the hub 38′ of the spider 38 above mentioned, and rotating therewith, the shape of the groove being such that the finger 88 is oscillated in its support once during each diamond-forming operation, or in other words, three times during one rotation of the carrier.

In order to guide the end of the finger 88 in the manner above described, the finger carrier 90 is also mounted for oscillation, and in the drawings it is shown as being mounted upon a sleeve 101 which is journaled in bearings or standards 102, while said sleeve itself answers for a bearing for the shaft 93 above referred to. The outer end of the sleeve 101 carries an arm 103, the outer end of which is connected by a link 104 to a lever 105 which is also fulcrumed on the stud 97 and to which proper vibratory movement may be imparted by a groove 106 provided therefor in the side of the cam 100, and engaging a cam-roller 105′, and the shape of said groove is such as to cause two complete oscillations of the arm 90 relative to the blank-carrier surface during each diamond-forming operation, the first oscillation taking place as the finger 88 moves from the position shown in Fig. 4 to that shown in Fig. 12; and the second oscillation being caused during the return stroke of the finger 88 to the position shown in Fig. 4. The path which is described by the end of the finger 88, during the diamond-forming operation, and more particularly when going from the position of Fig. 10 to that shown in Fig. 12, is of such a nature as to cause the flap end of the blank to be gradually carried toward the blank carrier surface without subjecting the blank to excessive strain. It will thus be observed that the operating end of the sweeper finger 88 controls the position of the flap end of the lower ply of the blank during the diamond forming operation while permitting the portions subjected to strain to rise from the blank

supporting surface of the blank carrier, from the position shown in Fig. 4 to that of Figs. 10 and 11, following the backward movement of the upper ply, but more slowly, so as to insure uniformity both in time and extent of the opening movement of the blank into the box-like form, which might otherwise lack that uniformity, due to the plies being matted together, or to differences in the dampness or stiffness or other characteristics of the paper.

The means for holding the front flap of the diamond to the carrier consists, in the present instance, of a front diamond holder 107 pivoted at 108 and having an arm 109, on the outer end of which is a stud 110 pivotally supporting a roller 111 adapted for engagement with a cam 112 which is preferably stationary and also mounted upon the shaft 34 above mentioned. The cam 112 will therefore engage the roll 111 during the rotation of the blank-carrier and open said holder 107, against the action of a spring 113, for receiving a blank flap after the diamond has been substantially completed, and for subsequently releasing the same after the blank has been carried into contact with other devices, as for instance, a drop plate 114, see Fig. 3, whereby the diamond is flattened and which is secured to the end of an arm 115 journaled at 116 in a bracket 117 secured to the base 20 of the machine. The arm 115 carries a stud 118 on which is journaled a roller 119 adapted to be engaged by a cam 120 mounted upon the driving shaft 32 of the machine and whereby said arm 115 is swung outward, while a spring 121 may be employed for forcing the drop plate 114 against the blank on the carrier thereby flattening said blank preparatory to the latter being brought into contact with a presser roll such as 122 mounted on said shaft 32, after which a plate such as 123 may be employed for deflecting the blank which may then have its flaps supplied with paste and folded to complete the bag.

The operation of my improved machine is as follows: Bellows-sided or tucked tubing is introduced into the machine by the feed rolls 22 and 23, and guided into position on the blank-carrier 33. The box-holders 54, the clips 53 and the tuck-holders 41, and also the defining member 57 are then brought into position shown in Fig. 6, viz.: the tuck-holders holding the lower ply of the blank to the carrier; while the box-holders 54 enter the tucks, and the clips 53 and the defining member 57 come to a position above the upper ply of the blank as clearly shown. As the carrier is now rotated, the box-holders 54 are oscillated around the axis of the spindle 62 in the manner above described, the first part of such movement resulting in permitting the springs 59, 60 to actuate the clips 53 and the defining members 57, respectively, properly to engage the blank, as soon as both of said parts have been withdrawn from their engagement with the pins 47 and 48 above referred to. As the rotation of the carrier 33 is now continued, a further oscillation of the box-holders will take place around the spindle 62; while at the same time said spindle will be retained substantially in position so that the defining edge 58, which during its operative position is in alinement with the axis of said spindle 62, may be maintained at a distance from the carrier during the diamond-forming operation, and until the position shown in Figs. 10 and 11 has been reached, at which time the so-called "box" has been formed. At or about the position shown in Fig. 4, the end of the sweeper finger 88 enters the front end of the blank above the lower ply, and controls the movement of the latter, permitting it to follow the turning back movement of the upper ply, but more slowly, to the position shown in Fig. 10. It will generally be found that at this stage the distance between the points of engagement of the blank by the tuck-holders and box-holders is substantially equal to the tucked side which is now in substantially distended condition. The front diamond holder 107 having been opened sufficiently by this time, a further rotation on the part of the blank-carrier 33 and also of the cam 100, will result in actuating the end of the sweeper finger 88 to force the front flap end toward the carrier and into position to be engaged by said front diamond holder 107 as shown in Fig. 12, this movement taking place very gradually so as to avoid all excessive strain on the material. The diamond has now been substantially completed, as shown in Fig. 13, and it will also be noticed that the defining edge has approached the blank-carrier during this time, so that the tube plies are now in closed condition, and the diamond may now be flattened by the drop plate 114. The box-holders 54 with the clips 53, and also the defining edge 57, may now be withdrawn from the blank, this movement taking place during the further rotation of the carrier, when the slides 40 are moved outward by the cam grooves 87 of the cam 75, the other groove 74 of which is so shaped that while said slides 40 are moving outward, the arms 72 actuated by said groove 74 will not change their positions relative to the slides. The box-holders, clips and defining members may, therefore, be withdrawn sidewise from the blank without any oscillatory movement whatever, the operation just described being clearly illustrated in Figs. 8 and 9, the former of which shows the several parts in their inward but reversed position, while Fig. 9 shows the slides and all the parts carried thereby, moved

bodily outward. As soon as the slides 40 have been fully withdrawn, the cam groove 74 becomes effective to return the box-holders 54, with the clips 53 and the defining members 57 carried thereby, into their original position, ready to engage a new blank which may be presented for operation.

The carrier 33 is illustrated in the drawings as having three folding beds and three sets of blank-engaging and folding devices, their number depending, of course, upon the size of the carrier and upon the length of the bag blank to be operated upon, and it is therefore evident that this number of devices may be changed to suit different requirements without in any way departing from the spirit of the invention.

It is also obvious that many changes may be made in the construction and mode of operation of the several devices illustrated, and, therefore, I do not limit myself or confine my invention to the precise form thereof described and shown in the drawings.

Some features of invention shown and described but not claimed herein are claimed in my Patent No. 840,073, granted January 1st, 1907, on an application which was copending with this application. In so far as this application and my said patent show common features of novelty I intend that this application shall be subordinate to said patent.

Having described my invention what I claim as new, and desire to secure by Letters Patent is:—

1. In a paper bag machine the combination with a rotating blank carrier of tuck holders coöperating therewith to hold the lower ply of a bag blank on the carrier, members mounted for continuously advancing movement with the blank carrier and having a defining edge, means for turning the upper ply of a bag blank about said defining edge, and means for maintaining said defining edge at a substantial distance from the lower ply of the blank during a considerable portion of the operation of turning back said upper ply about said defining edge.

2. In a paper bag machine, mechanism for forming diamond folds on bellows sided blanks, having in combination a rotating bag blank carrier for supporting the lower ply of the blank, transverse fold defining members having defining edges, revolving frames for supporting said defining members, means for causing the upper ply of the blank to be turned back about said defining edges, and means for moving the revolving frames toward and from the blank carrier and arranged to maintain the said edges at a substantial distance from said lower ply during a considerable portion of the operation of turning back the upper ply.

3. In a paper bag machine, mechanism for forming diamond folds on bellows sided blanks, having in combination a rotating blank carrier, tuck holders coöperative therewith to hold the lower ply of the blank, two transverse fold defining members mounted for movement over the blank toward and away from each other, means co-acting with said defining members for turning back the upper ply of the blank, and means for maintaining said defining members at a substantial distance from said lower ply during a considerable portion of the turning back operation.

4. In a paper bag machine, mechanism for forming diamond folds on bellows sided blanks, having in combination a rotary blank carrier, tuck holders coactive therewith, two transverse fold defining members, each having a defining edge, means for moving said defining members over the blank toward and away from each other, means coactive with said defining members for turning back the upper ply of the blank to form the diamond fold, frames for pivotally supporting said members, means for oscillating said members in their frames, and means for moving the said frames to maintain the defining edges of the members at a substantial distance from the blank carrier during the diamond forming operation.

5. In a paper bag machine, mechanism for forming diamond folds on bellows sided blanks, having in combination a rotating blank carrier, tuck holders coöperative therewith to hold the lower ply of a bag blank, mechanism for turning back the upper ply of the blank, including cross fold defining means and supporting means for said cross fold defining means mounted for revolution around the axis of the blank carrier, and means for moving said supporting means radially toward and away from the blank carrier during said revolution.

6. In a paper bag machine, mechanism for forming diamond folds on bellows sided blanks, having in combination a rotary blank carrier, tuck holders coacting therewith, frames mounted for revolution with the blank carrier and mounted for swinging movement toward and from the axis of the blank carrier, heads mounted for oscillation on the said frames, and box holders carried by said heads and disposed at opposite edges of the blank.

7. In a paper bag machine, means for forming diamond folds on bellows sided blanks, having in combination a rotating blank carrier, tuck holders co-acting therewith, frames carried by the blank carrier and mounted for swinging movement toward and away from the axis of the blank carrier, cam mechanism for giving said frames such swinging movement, heads pivotally supported in said frames, means for turning said heads in said frames and cross

fold defining members and box holders carried by the heads.

8. In a paper bag machine, mechanism for forming diamond folds on bellows sided blanks, having in combination a rotary blank carrier, tuck holders coactive therewith, frames mounted upon opposite sides of the carrier for revolution therewith, for movement toward and from each other on opposite sides of the carrier, and for rocking movement toward their axis of revolution, box holders mounted for oscillation upon the said frames, and driving means for imparting the designated movements.

9. In a paper bag machine, mechanism for forming diamond folds on bellows sided blanks having in combination a rotary blank carrier, tuck holders, slides mounted for revolution with the blank support, and for movement toward and from each other on opposite sides of the blank support, frames mounted upon the said slides for rocking movement toward and from the axis of the blank carrier, and means carried by the said frames for engaging and turning back the upper ply of the blank to form the diamond folds.

10. In a paper bag machine, mechanism for forming diamond folds on bellows sided blanks, having in combination a rotary blank carrier for supporting the lower ply of the blank, tuck holders, means for turning back the upper ply of the blank, a finger for engaging the front end of the lower ply of the blank, a finger carrier for supporting said finger, means for moving the finger carrier away from and toward the blank carrier in proper time relation to the rotation of the blank carrier, a front diamond holder, and means for causing it to engage the front end of the blank at the conclusion of the diamond forming operation.

11. In a paper bag machine, mechanism for forming diamond folds on bellows sided blanks having in combination a rotary blank carrier for supporting the lower ply of the blank, tuck holders, transverse fold defining members and means coöperative therewith for engaging and turning back the upper ply of the blank, a finger mounted for movement into the mouth of the blank and onto the lower ply thereof, a finger carrier for pivotally supporting said finger, means for moving the finger carrier away from and toward the blank carrier, and means for oscillating the said finger upon its carrier.

12. In a paper bag machine, mechanism for forming diamond folds on bellows sided blanks, having in combination a rotary blank carrier provided with tuck holders, oppositely disposed defining members and means coöperative therewith for turning back the upper ply of the blank, a finger mounted for movement into the mouth of the blank and onto the lower ply thereof, means pivotally supporting said finger for oscillation in the general direction of travel of the blank support, and means for moving said pivotal support to carry the finger toward and from the rotary blank carrier in proper time relation to the rotations thereof.

13. In a paper bag machine, mechanism for forming diamond folds on bellows sided blanks, having in combination a rotary blank carrier for supporting the lower ply of the blank, tuck holders, a front diamond holder mounted on said carrier, means for turning back the upper ply of the blank, and means for engaging the forward end of the lower ply of the blank, while permitting it to rise from the blank carrier during the turning back movement of the upper ply, and for delivering the said forward end to the front diamond holder substantially at the conclusion of the turning back operation.

14. In a paper bag machine, mechanism for forming diamond folds on bellows sided blanks, having in combination a rotary blank carrier for supporting the lower ply of the blank, tuck holders, means for turning back the upper ply of the blank, a front diamond holder appurtenant to said blank carrier, a finger for engaging the forward end of the lower ply of the blank, while permitting it to follow the movement of the turned back upper ply, a finger carrier for moving the finger away from and toward the blank carrier, and a cam and its connections for oscillating the said finger in its carrier.

15. In a bag machine, a traveling folding bed, tuck holders, mechanism coöperating therewith for engaging and turning back the upper ply of a bellows sided bag blank, a finger, means for causing the finger to enter the mouth of the blank to engage the lower ply thereof and control its position during said turning back operation, while permitting parts thereof under strain to rise from the bed, and means for engaging the front end of the blank and pressing it down against the bed at the end of said turning back operation.

16. In a bag machine, a traveling folding bed, tuck holders, mechanism coöperating therewith for engaging and turning back the upper ply of a bellows sided bag blank, a finger, actuating mechanism therefor, arranged to cause the finger to enter the mouth of the blank and engage the lower ply thereof, to control its position during said turning back operation, while permitting parts thereof under strain to rise from the bed, and a clip for engaging the front end of the blank and securing it to the bed at the end of said turning back operation.

17. In a bag machine, the combination of a rotating folding bed, means for holding the lower ply of a bag blank thereon, means for turning back the upper ply of the blank,

and means for controlling the front end of the lower ply, comprising an arm mounted for oscillation toward and from the blank, a finger mounted for oscillation on the said arm, and means for actuating the arm and the finger to carry the finger into the mouth of the bag blank, and on to the lower ply ther of as the blank is carried forward by the folding bed during the diamond folding operation.

18. In a machine for making bags out of bellows sided blanks, a traveling folding bed, means for securing the lower ply of a bag blank thereon, a gripper carried by the bed for the front end of the blank, means for engaging and turning back the upper ply of the blank, a finger, and means for moving said finger relatively to the bed to cause the finger to enter the front end of the blank and engage the lower ply thereof and hold said end in position to be engaged by said gripper at the end of said folding operation.

19. In a bag machine, diamond folding mechanism including a folding bed having a curved surface, tuck holders, mechanism for turning back the upper ply of a blank, a sweeper finger supported independently of the folding bed adapted to engage the upper side of the forward end of the lower ply of the blank, and means for moving the finger relatively to the bed in a curved path approximating the curvature of the curved surface of the folding bed.

20. In a bag machine, diamond folding mechanism, including a folding bed, tuck holders, a front diamond holder on the bed, mechanism for engaging and turning back the upper ply of the blank, a finger, and means for causing the finger to sweep the front end of the blank into the grip of the front holder after the turning back operation.

21. In a bag machine, diamond folding mechanism, including a cylindrical folding bed, tuck holders, a front holder on the bed, folding mechanism for engaging and turning back the front end of the upper ply of a bag blank, a sweeper member, and means for moving said member to sweep the front end of the blank into the grip of the front holder after the turning back operation.

22. In a bag machine, diamond folding mechanism, having in combination a rotating blank carrier having a curved folding bed surface, means for securing a bag blank against said surface, means for turning back the upper ply of the blank, a finger engaging the lower ply of the blank, and means for moving the finger in a curved path approximating the path of the blank on the folding bed to maintain such engagement.

23. In a bag machine, diamond folding mechanism, including a cylindrical folding bed, means for securing the lower ply of the bag blank thereon, a front holder, means for engaging and turning back the upper ply of a bag blank, a finger, and means for moving it into the front end of the blank to engage the lower ply and limit the rising movement thereof while carrying the finger forward in the general direction of the path of the blank on the bed to hold the front end of the blank within reach of the front holder, and means for causing said front holder to engage the front end of the blank after the formation of the diamond folds.

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