

(No Model.)

5 Sheets—Sheet 1.

W. A. LORENZ & E. E. CLAUSSEN.  
PAPER BAG MACHINE.

No. 444,729.

Patented Jan. 13, 1891.

Fig. 1

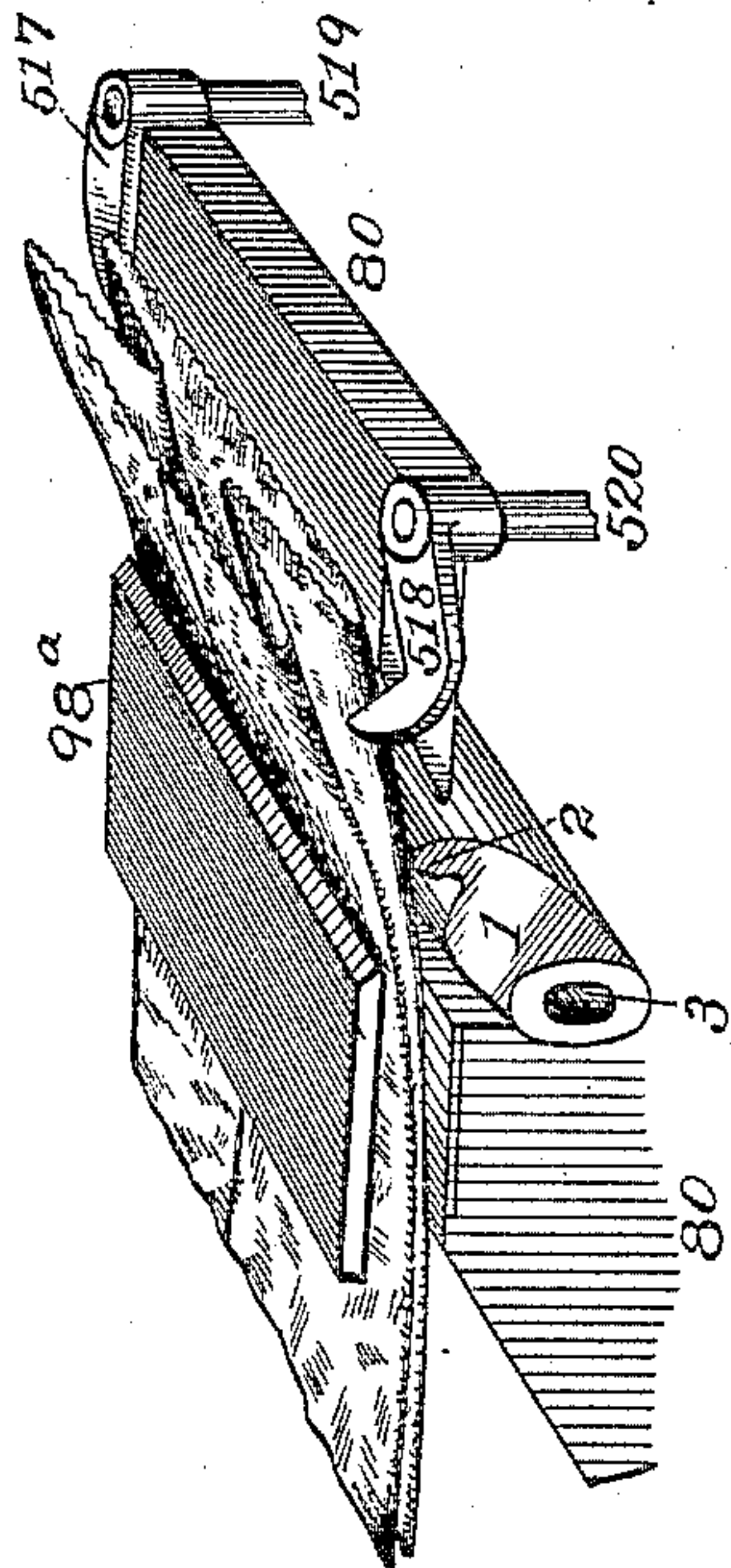
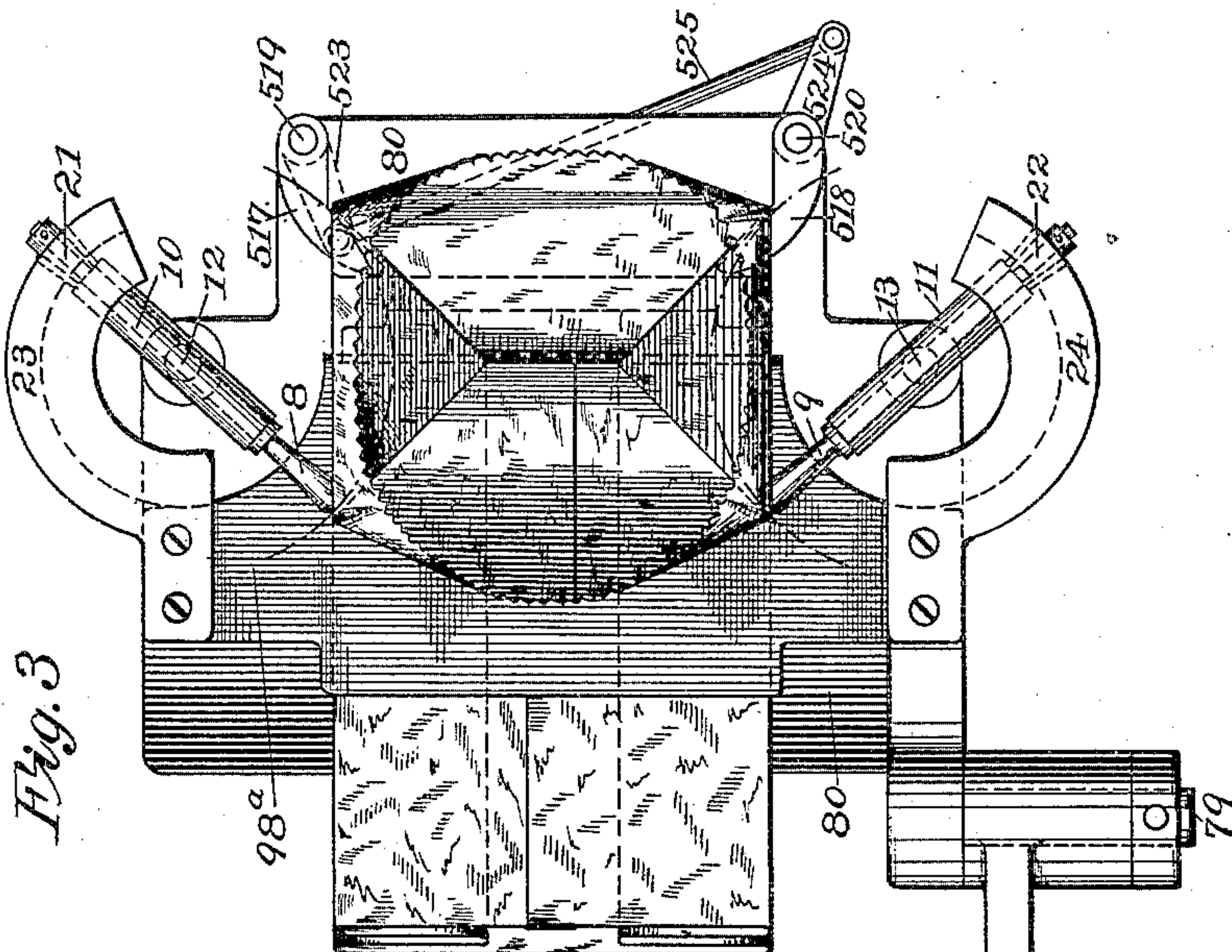
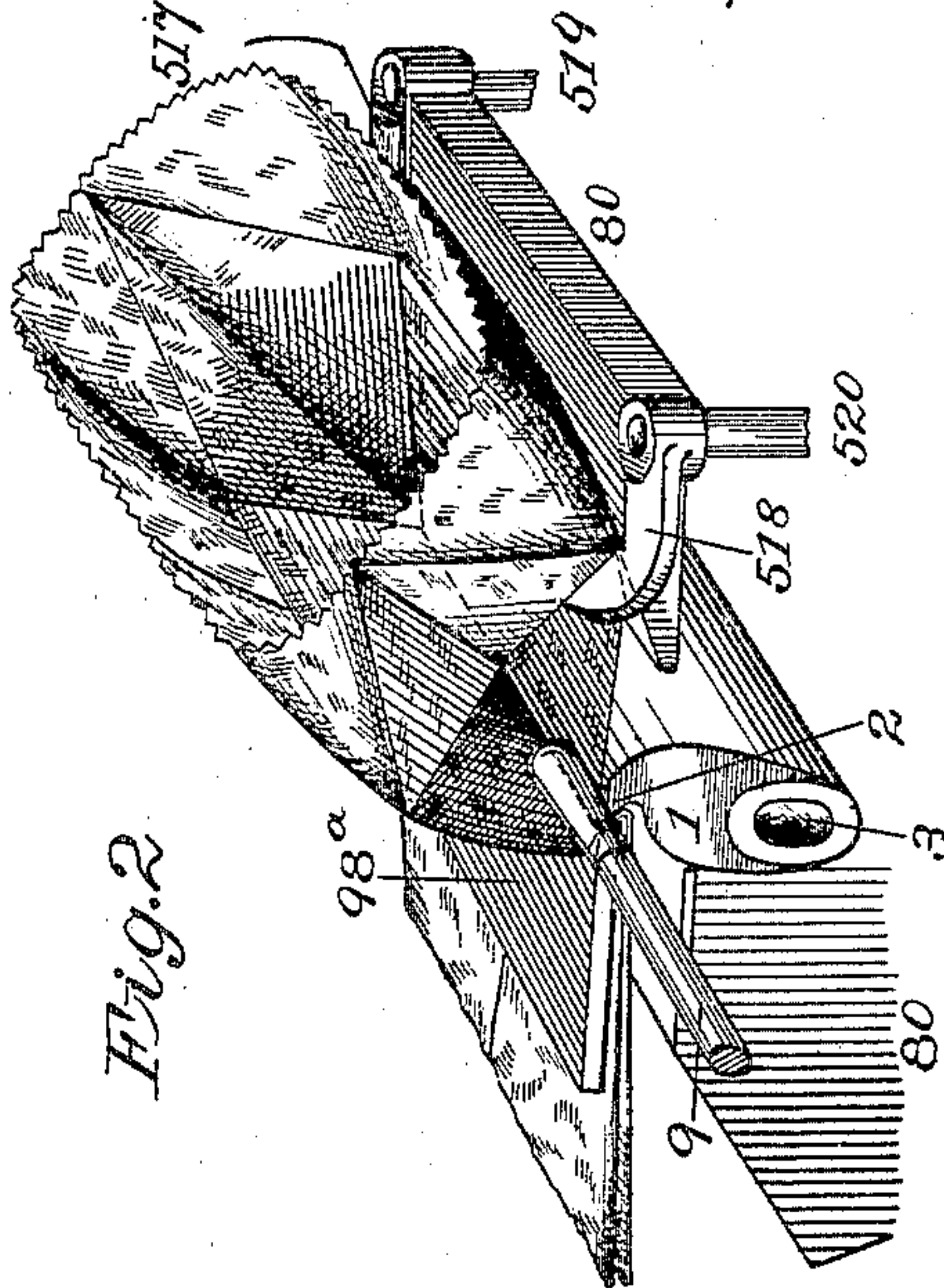


Fig. 2



Witnesses:

C. H. Lorenz.  
John Johnston

Inventors:

William A. Lorenz.  
Edward E. Claussen,



(No Model.)

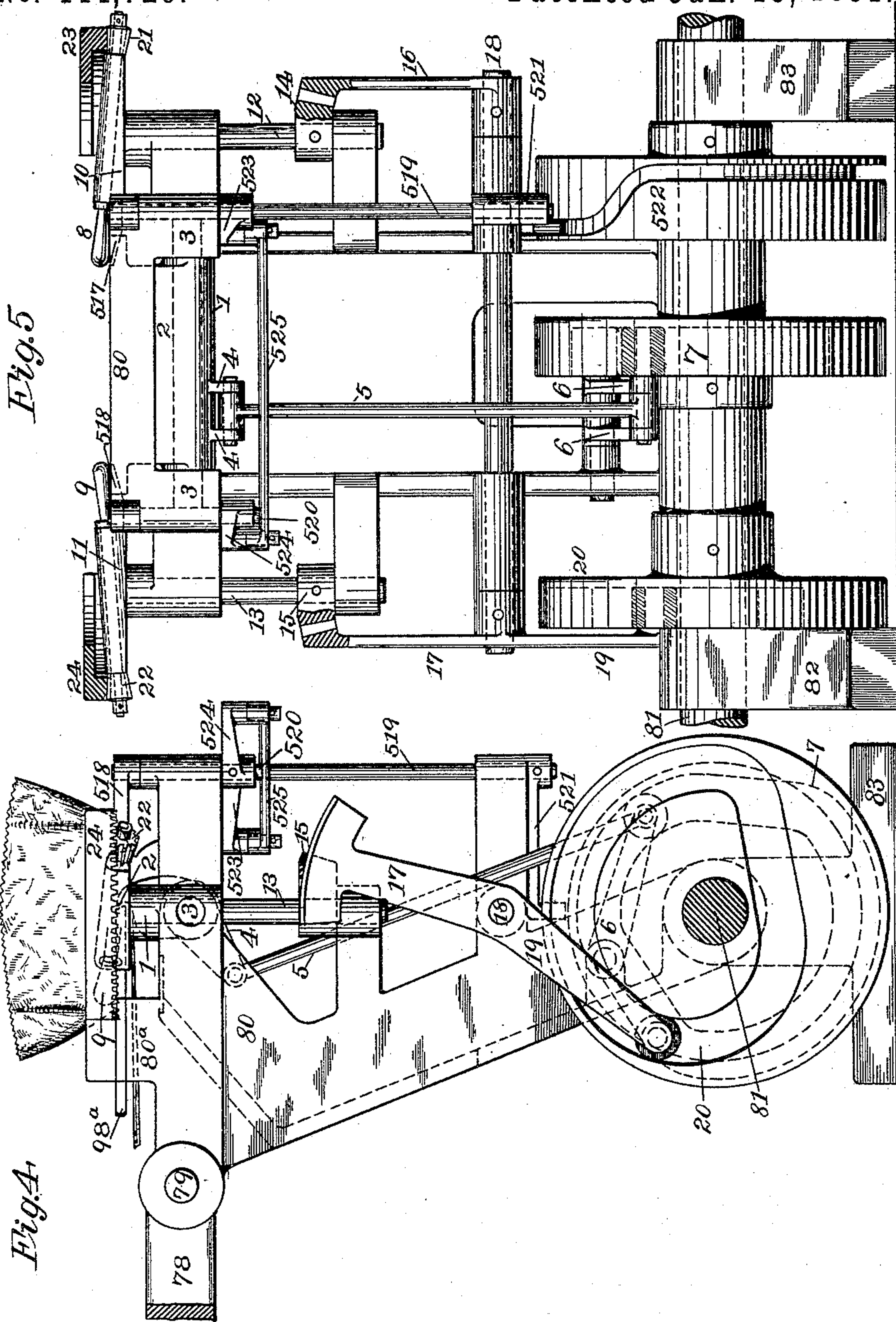
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Fig. 5



Witnesses:  
C. W. Lorenz.  
John Johnston

Inventors:  
William A. Lorenz.  
Edward E. Clausen

(No Model.)

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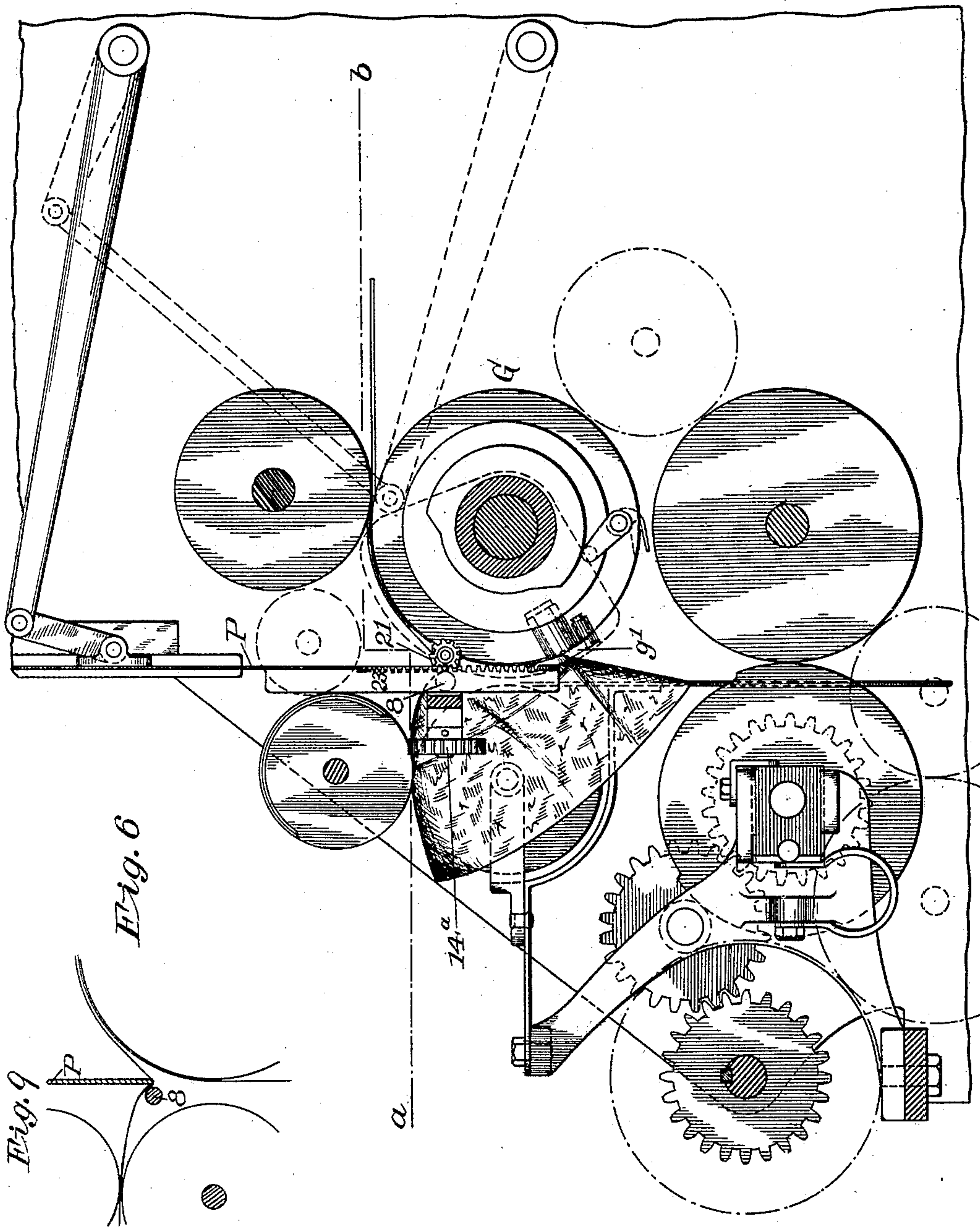


Fig. 9

Fig. 6

Witnesses:

G. W. Lorenz.  
John Johnston

Inventors.

William A. Lorenz  
Edward E. Claussen



(No Model.)

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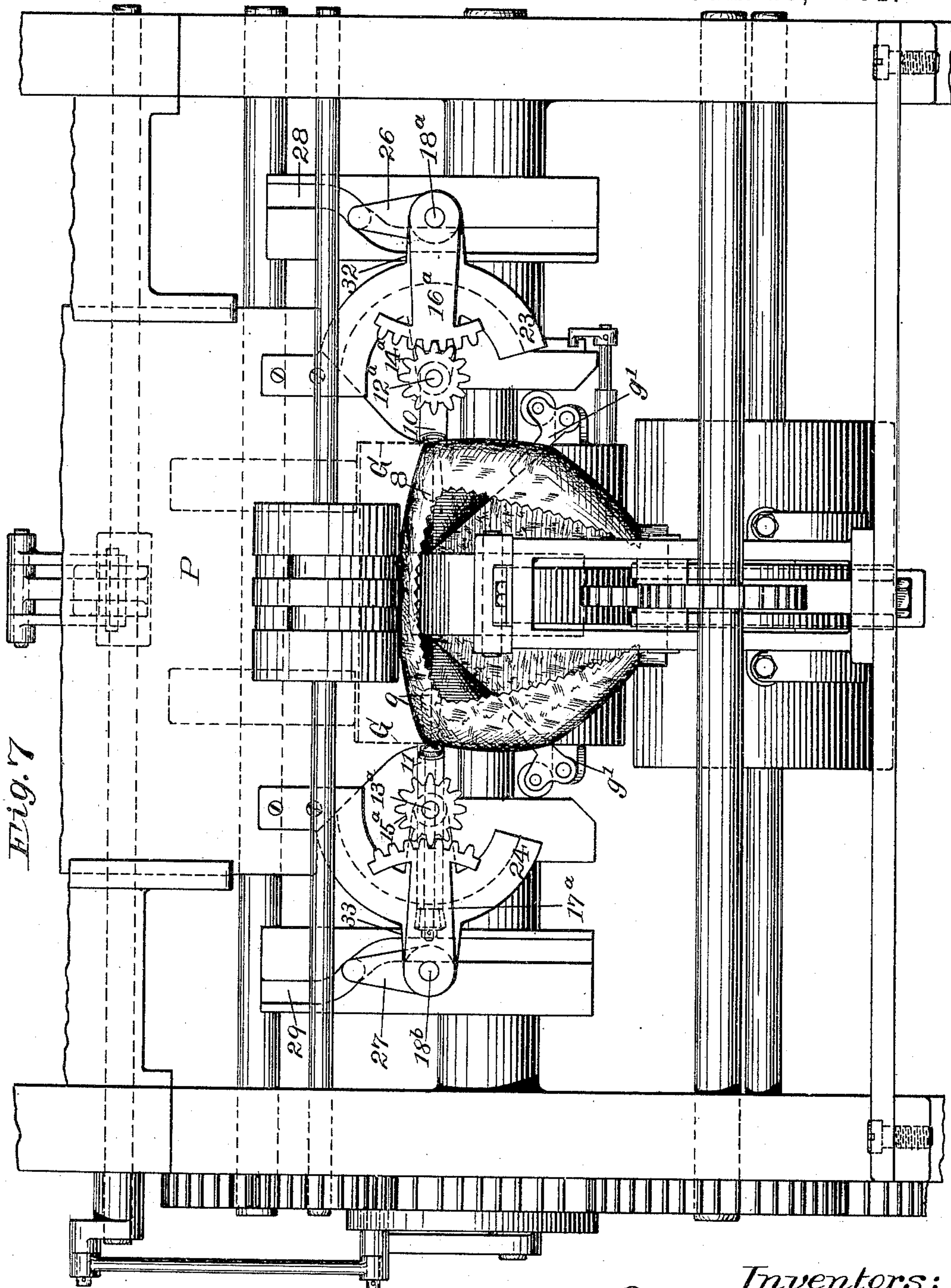


Fig. 7

Witnesses:

W. A. Lorenz  
John Johnston

Inventors:

William A. Lorenz  
Edward E. Claussen

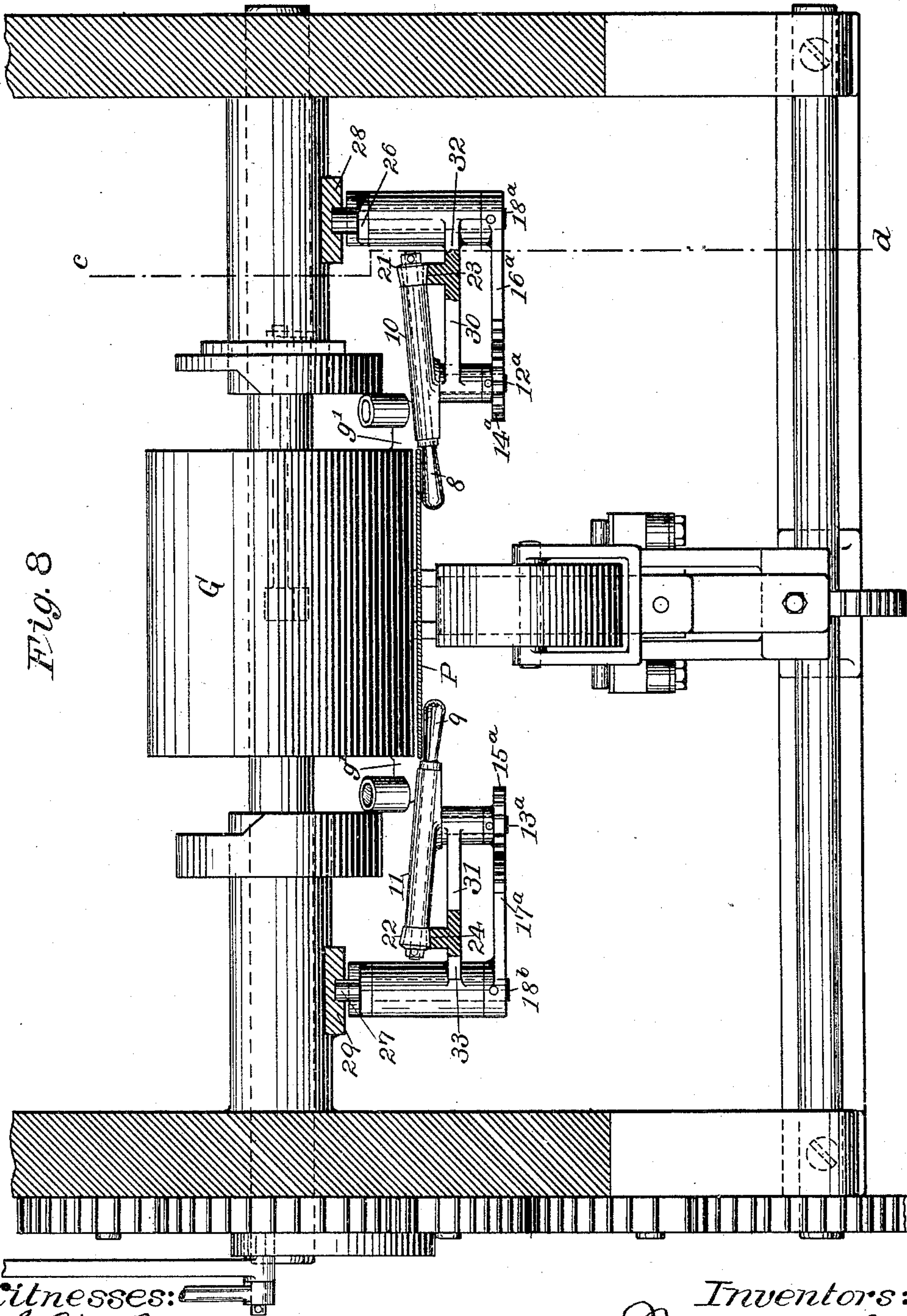
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Witnesses:

G. W. Lorenz.  
John Johnston

Inventors:

William A. Lorenz  
Edward E. Claussen



# UNITED STATES PATENT OFFICE.

WILLIAM A. LORENZ AND EDWARD E. CLAUSSEN, OF HARTFORD, CONNECTICUT, ASSIGNORS TO ALBERT H. WALKER, TRUSTEE, OF SAME PLACE.

## PAPER-BAG MACHINE.

SPECIFICATION forming part of Letters Patent No. 444,729, dated January 13, 1891.

Application filed July 31, 1890. Serial No. 360,454. (No model.)

*To all whom it may concern:*

Be it known that we, WILLIAM A. LORENZ and EDWARD E. CLAUSSEN, of Hartford, Connecticut, have jointly invented a new and useful Improvement in Paper-Bag Machines, of which the following description and claims constitute the specification, and which is illustrated by the accompanying five sheets of drawings.

This improvement is applicable to such a paper-bag machine as that shown in Letters Patent of the United States No. 361,951, of April 26, 1887, and part of it is also applicable to such a paper-bag machine as that shown in Letters Patent of the United States No. 417,346, of December 17, 1889; and it consists in improved mechanism for opening out one end of a tucked-paper tube like that shown in Figs. 1, 2, and 3 of the first-mentioned Letters Patent into a box-like form similar to that shown in Figs. 5 and 6 of those Letters Patent and in Figs. 3 and 4 of the drawings of this specification.

Figure 1 of the drawings of this specification is a perspective view of the top of such a rocking carriage as that designated by the numeral 80 in said Letters Patent No. 361,951, but provided with some of the new devices which constitute parts of the present improvement, and that figure shows also a section of tucked-paper tubing in position to be operated upon by those devices. Fig. 2 is a perspective view of what is shown in Fig. 1 and of one of the side-folders operating with the devices of Fig. 1 in opening out one end of the tucked-paper tube. Fig. 3 is a plan view of the top of the rocking carriage 80 and its appurtenances and of the tucked-paper tube opened thereby into the box-like form. Fig. 4 is a side elevation of the rocking carriage 80 and its appurtenances and the mechanism which actuates the latter, and of the box-like form of the tucked-paper tube. Fig. 5 is a view of the right-hand end of the mechanism shown in Fig. 4. Fig. 6 is a sectional side view on the broken line *c d* of Fig. 8 of such paper-bag machinery as is shown in said Letters Patent No. 417,346, of December 17, 1889, having a part of our present improvement incorporated therewith. Fig. 7 is a view of the left-hand end of the machinery of Fig.

6. Fig. 8 is a sectional plan view of the machine of Figs. 6 and 7 on the broken line *a b* of Fig. 6. Fig. 9 is a diagram showing the relative positions of certain parts of Fig. 6 at a particular stage of their operation.

The connecting-rod 78 is worked by a crank, (not shown in the drawings,) and is pivoted by the stud 79 to the rocking carriage 80, and that carriage rocks upon the shaft 81 in the brackets 82 and 83.

In the form of machine which is shown in Figs. 1, 2, 3, 4, and 5 there is a fixed presser-plate 98<sup>a</sup>, fastened at its respective ends to the bracket 80<sup>a</sup> and to a corresponding bracket extending upward from that side of the rocking carriage 80 which is opposite the side from which the bracket 80<sup>a</sup> extends upward. The forward edge of the presser-plate 98<sup>a</sup> is a narrow surface sloping upward and backward, as shown in Fig. 1. The upper surface of the forward part of the carriage 80 is level with the upper surface of the plate 98<sup>a</sup>. It is separated from the rearward part of the upper surface of the carriage by an opening which extends crosswise of the top of the carriage just forward of the forward edge of the plate 98<sup>a</sup>. In that opening is situated the rocking gripper 1, provided with the backwardly-inclined flange 2. That flange operates to clamp the paper-bag blank across the forward edge of the plate 98<sup>a</sup>, and that gripper is rocked on the shaft 3 by the arms 4, the connecting-rod 5, the arms 6, and the cam 7. The side holders 517 and 518 are rocked horizontally upon the upper ends of the shafts 519 and 520, respectively, while the shaft 519 is rocked by the arm 521 and the cam 522, and the shaft 519 rocks the shaft 520 by means of the arms 523 and 524, which are attached to those shafts, respectively, and by means of the rod 525, which connects those arms. The lower sides of the working ends of the side holders 517 and 518 are inclined downward and inward, so as to fit the downward and backward inclination of the rearward edge of the forward part of the carriage, as particularly shown in Figs. 1 and 2. The side-folders 8 and 9 are carried by the sleeves 10 and 11, respectively, and those sleeves vibrate upon the tops of the shafts 12 and 13, while those shafts are rocked by the



sectors 14 and 15 and the sector-arms 16 and 17, and those arms are fixed to the shaft 18, which is rocked by the arm 19 and the cam 20. The side-folders 8 and 9 not only vibrate with the sleeves which carry them, but are caused to turn in opposite directions alternately upon their axes in those sleeves by means of the sector-pinions 21 and 22 meshing with the fixed sectors 23 and 24.

The new parts of the mechanism shown in Figs. 6, 7, 8, and 9 consist of such modified forms of the new parts of the diamond-folding mechanism shown in Figs. 1, 2, 3, 4, and 5 as adapt that mechanism to the diamond-folding mechanism shown in said Letters Patent No. 417,346. In this case the side folders 8 and 9 are carried by the sleeves 10 and 11, and those sleeves vibrate upon the ends of the shafts 12<sup>a</sup> and 13<sup>a</sup>, while those shafts are rocked by the pinions 14<sup>a</sup> and 15<sup>a</sup> and the sector-arms 16<sup>a</sup> and 17<sup>a</sup>, and those arms are fixed to the shafts 18<sup>a</sup> and 18<sup>b</sup>, which are rocked by the arms 26 and 27 and the fixed vertical cams 28 and 29. The shafts 12<sup>a</sup> and 13<sup>a</sup> rock in bearings in the inner ends of the brackets 30 and 31, and those brackets extend inward from the concave sides of the sectors 23 and 24, respectively. The brackets 32 and 33 extend outwardly from the convex sides of those sectors, and carry bearings for the shafts 18<sup>a</sup> and 18<sup>b</sup>, respectively. The sectors 23 and 24 are fixed to the lower outer corners of the tucker-plate P. The side-folders 8 and 9 not only vibrate in the sleeves which carry them, but are caused to turn in opposite directions alternately upon their axes in those sleeves by means of the sector-pinions 21 and 22 meshing with the sectors 23 and 24. The other parts of the mechanism shown in Figs. 6, 7, 8, and 9 are substantially the same as the corresponding mechanism shown in said Letters Patent No. 417,346, except that the inside fingers LL and the outside fingers MM and their appurtenances and actuating parts which are shown in the said Letters Patent are omitted in our present drawings.

In the machine illustrated in Figs. 6, 7, 8, and 9 the function of the reciprocating carriage 80 of the other machine is performed by the revolving carriage or cylinder G, while the function of the presser-plate 98<sup>a</sup> of the other machine is performed by the tucker-plate P, and the function of the side holders 517 and 518 of the other machine is performed by the side holders g' g'.

The mode of operation of the machine shown in Figs. 1, 2, 3, 4, and 5 is as follows: The forward end of a length of tucked-paper tube is thrust forward over the rearward part of the rocking carriage 80 under the presser-plate 98<sup>a</sup> and over the forward part of the carriage 80. Then the side holders 517 and 518 vibrate inward from their positions shown in Fig. 1 to those shown in Fig. 2, and thus clamp the lower folds of the tucks of the tube upon the rearward and downward inclined

surface of the forward part of the carriage 80. After the beginning of this motion and before its end the gripper 1 rocks from its position shown in Fig. 1 to that shown in Fig. 2, so that its backwardly-inclined flange 2 bends and grips all the plies of the tucked-paper tube back over the edge of the presser-plate. Then the inner ends of the side-folders 8 and 9 vibrate backward from the positions indicated by the forward ends of the curved broken lines, which in Fig. 3 indicate the paths of those vibrations, and thus pass into the adjacent tucks of the tube over the side holders 517 and 518. Then the continuation of the backward swing of the side-folders 8 and 9 operates to fold backward over the forward edge of the presser-plate the upper ply of the tucked-paper tube, and also operates to fold backward a triangular portion of each of the lower plies of the upper folds of the tucks. This folding backward is accomplished against the resistance of the side holders 517 and 518 and results in the inwardly-inclined triangular folds of the well-known diamond form of a tucked-paper-bag blank. Thus by the use of the mechanism shown in Figs. 1, 2, 3, 4, and 5 one end of a tucked-paper-bag blank is opened out into the box-like form shown in Figs. 3 and 4. That box-like form may be folded down into the well-known diamond form of a paper-bag blank, and that diamond form may be folded and pasted into the form of a square-bottom paper bag by other machinery already well known in the art.

The construction and mode of operation of the old parts of the machine shown in Figs. 6, 7, 8, and 9 are substantially the same as the construction and mode of operation of the corresponding parts in the machine shown in said Letters Patent No. 417,346.

The mode of operation of the above-described new parts of the machine of Figs. 6, 7, 8, and 9 is substantially the same as the mode of operation of the corresponding parts of the machine shown in Figs. 1, 2, 3, 4, and 5, and is as follows: When the old parts of the machine shown in Figs. 6, 7, 8, and 9 have carried the process of opening out one end of a tucked-paper tube into the box-like form as far as the stage indicated in Fig. 7, the inner ends of the side-folders 8 and 9 have entered the adjacent tucks of the paper-bag blank from below and have reached the lower edge of the tucker-plate P. Then the continuation of the upward swing of the side-folders 8 and 9 operates to fold backward over the lower edge of the tucker-plate P the upper ply of the tucked-paper bag, and also operates to fold back a triangular portion of each of the lower plies of the upper folds of the tucks. This folding backward is accomplished against the resistance of the side holders g' g' and results in the production of a box-like form substantially like that of Figs. 3 and 4, including the inwardly-inclined triangular folds of the well-known diamond form of a tucked-paper bag. That box-like form may be folded down into



the completed diamond form, and that diamond form may be folded and pasted into the form of a square-bottom paper bag by other machinery already well known in the art, portions of which are also shown in Figs. 6, 7, and 8. It is not essential that the side folders as they vibrate backward shall move so closely to the presser-plate 98<sup>a</sup> or the tucker-plate P, as the case may be, as to press the paper down upon the presser-plate or back against the tucker-plate, respectively, and if they do move so closely as that it is not necessary to cause them to positively revolve upon their own axes by extraneous means, for in that case they will thus revolve by reason of the friction between them and the paper along which they roll. Nor is it necessary to the present invention that the side folders shall revolve upon their own axes at all, for they will work effectively if they simply swing upon the ends of the shafts 12 and 13, or 12<sup>a</sup> and 13<sup>a</sup>, as the case may be, without turning upon their own axes; but it is expedient to make the side-folders revolve positively, whether they move so close to the presser-plate or tucker-plate as to press the paper against it or not, and such positive revolution may be imparted to them by other extraneous means than those shown in the drawings. When the side-folders move so close to the presser-plate or tucker-plate as to press the paper against it, the working ends of the side-folders should gradually decrease in diameter from localities near their inward extremities outward as far as the outer bends of the tucks of the paper tube, and that gradual diminution should be in such degree as would cause the periphery of the working end of each side-folder to meet in a point at the center of vibration of that side-folder if that diminution were to continue so far. In this case also the axes of the side-folders must not be exactly at right angles to the axes of the shafts with which the side-folders vibrate, for that part of the periphery of the working end of each side-folder which presses the paper upon the presser-plate or the tucker-plate, as the case may be, is at right angles with the axis of vibration, as shown in Figs. 5 and 8.

The special utility of the fixed presser-plate 98<sup>a</sup>, in connection with the rocking gripper 1, as compared with the moving presser-plate 98 of the said Letters Patent No. 361,951, in connection with the top of the carriage 80, resides in the fact that in the use of the last-mentioned and older invention the upper ply of the paper-bag blank when clamped by the presser-plate 98 to the carriage 80 still extends forward from the forward edge of the presser-plate, whereas in the new invention the backward inclined flange 2 of the rocking gripper 1 bends the upper ply of the paper-bag blank backward over the lower corner of the forward edge of the presser-plate 98<sup>a</sup>, and in the fact that that bending backward of that part of the upper ply of the

paper-bag blank which is between the inner bends of the tucks materially assists the side folders in opening out the forward end of the paper-bag blank shown in Fig. 1 into the box-like form shown in Figs. 3 and 4. It is essential that the ends of the side-folders shall be rounded, so as not to abrade the paper while doing their work thereon, and it is also essential that those side-folders shall be mounted upon substantially parallel pivots located nearly or quite on a line with the forward edge of the presser-plate, and shall vibrate on those pivots toward each other into the tucks of a tucked-paper tube, and then vibrate away from each other out of those tucks while they do their work upon the paper.

We claim as our joint invention—

1. The combination of a pair of oppositely-disposed end-rounded outside folders constructed and mounted to vibrate upon substantially parallel pivots located as described, and thus to enter the tucks of a tucked paper tube and likewise to vibrate apart out of those tucks and to turn the upper folds of those tucks backward as they thus withdraw therefrom, with a pair of oppositely-disposed diagonal holders, and with a transverse plate constructed substantially as described and operating to define a transverse line across the tucked paper tube directly between the said pivots, all substantially as described.

2. The combination of the rolling side-folders 8 and 9, the sleeves 10 and 11, provided with bearings for the side-folders, the shafts 12 and 13, carrying and vibrating the sleeves, the sector-pinions 21 and 22, turning the side-folders within the sleeves, and the sectors 23 and 24, turning the pinions, all substantially as described.

3. The combination of the fixed presser-plate 98<sup>a</sup>, having its forward edge sloping upward and backward, and the rocking gripper 1, provided with the backwardly-inclined flange 2 and adapted to clamp a paper-bag blank to that forward edge, all substantially as described.

4. The combination of the fixed presser-plate 98<sup>a</sup>, having its forward edge sloping upward and backward, the rocking gripper 1, provided with the backwardly-inclined flange 2 and adapted to clamp a paper-bag blank to that forward edge, and two vibrating side-folders constructed and operating together to enter the tucks of a tucked paper-bag blank and to turn the upper folds thereof downward upon the presser-plate, so as to form inwardly-inclined triangular folds of portions of the material of the two tucks, all substantially as described.

WILLIAM A. LORENZ.  
EDWARD E. CLAUSSEN.

Witnesses:

ALBERT H. WALKER,  
JOHN H. WHITE.