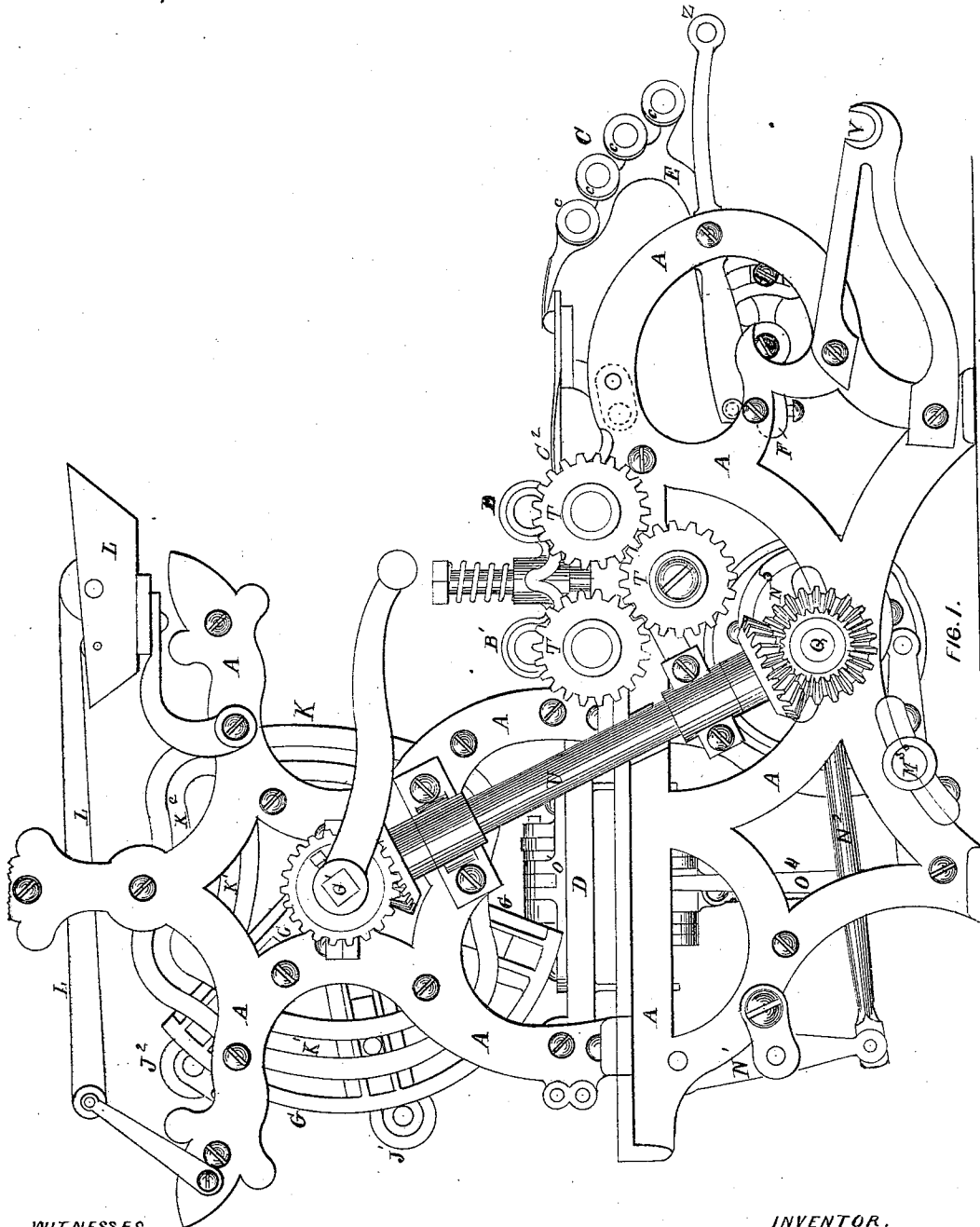


C. F. ANNAN.

Improvement in Machines for Making Paper-Bags.

No. 132,890.

Patented Nov. 12, 1872.



WITNESSES.

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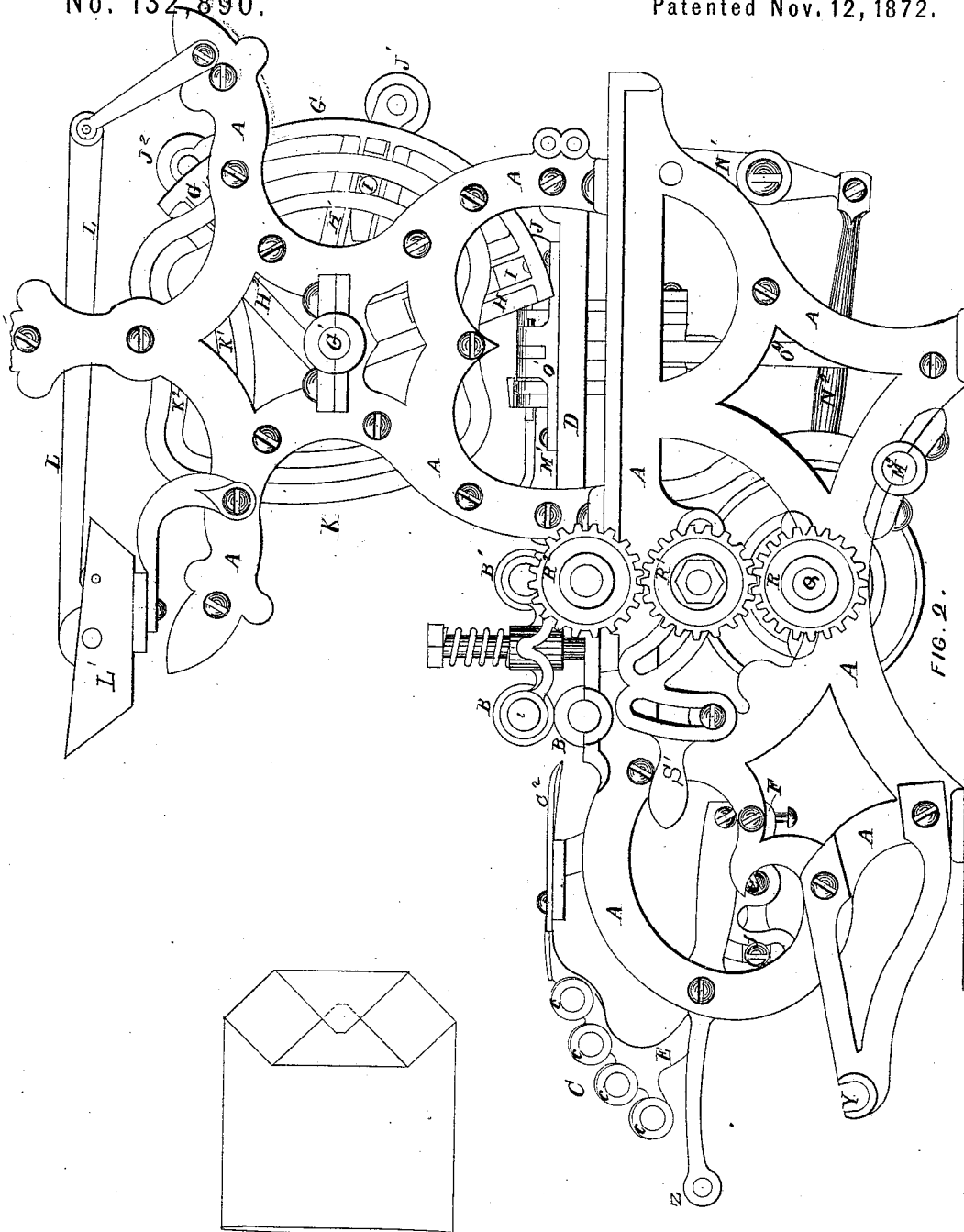


FIG. 7.

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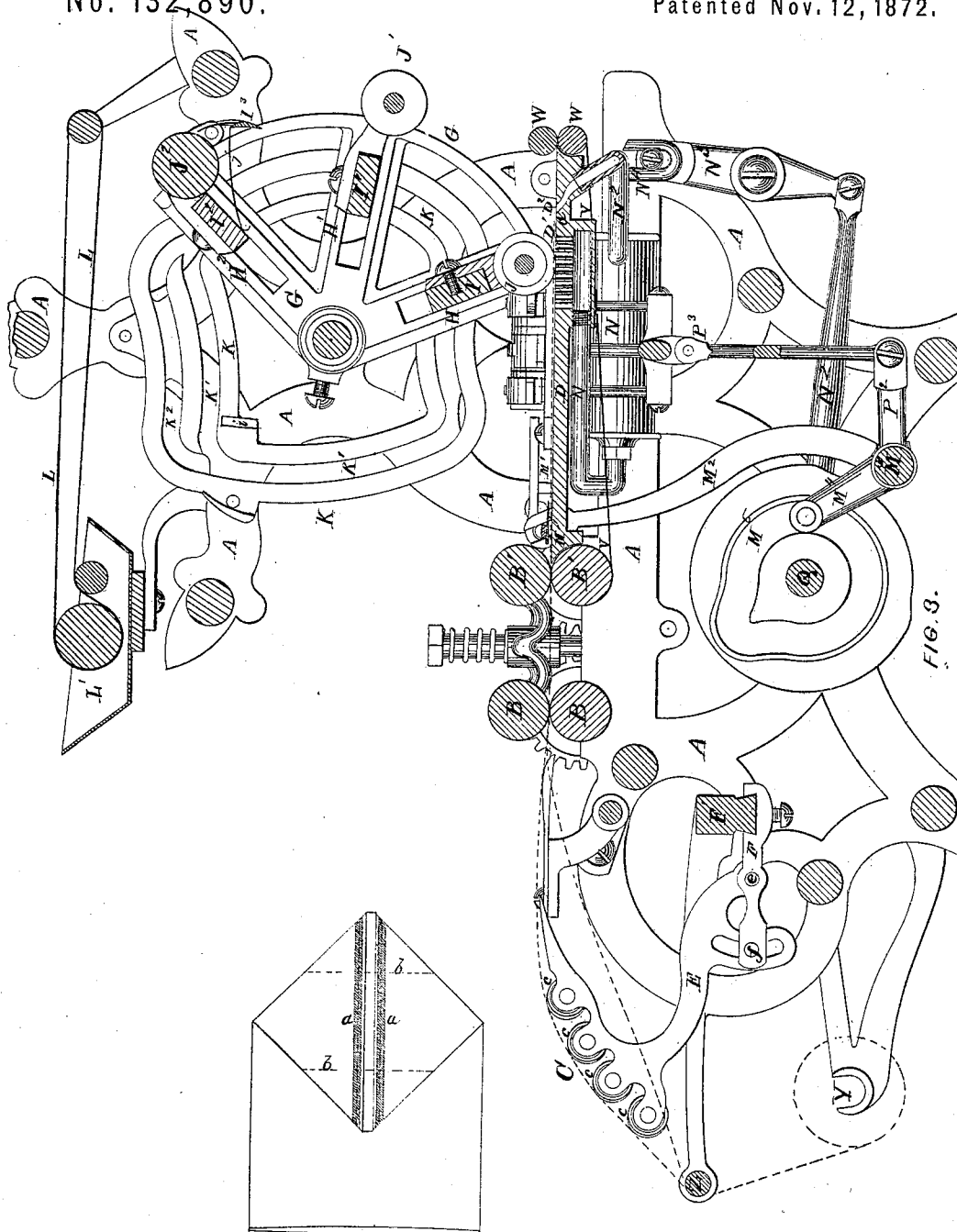


FIG. 6.

Witnesses.

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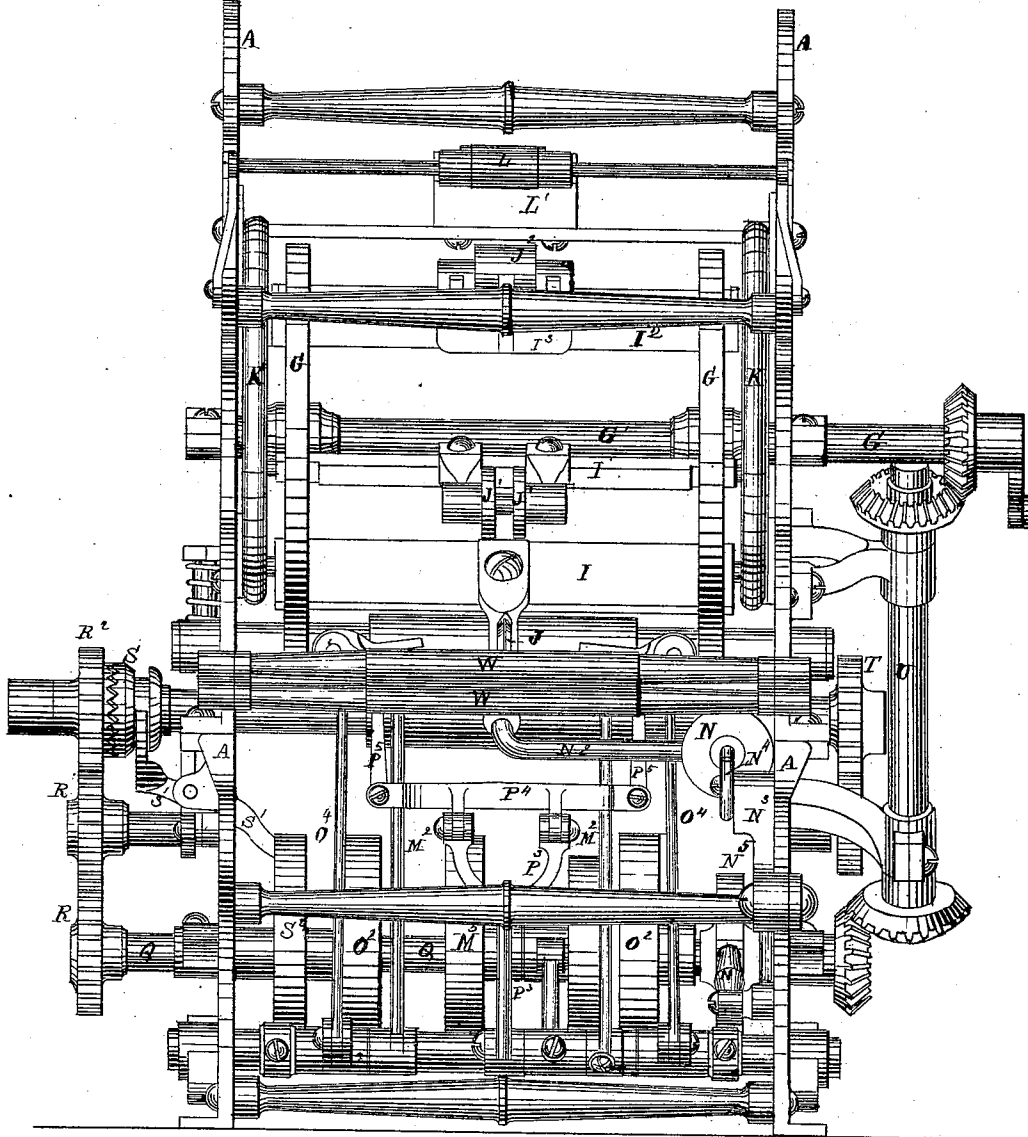


FIG. 4.

WITNESSES.

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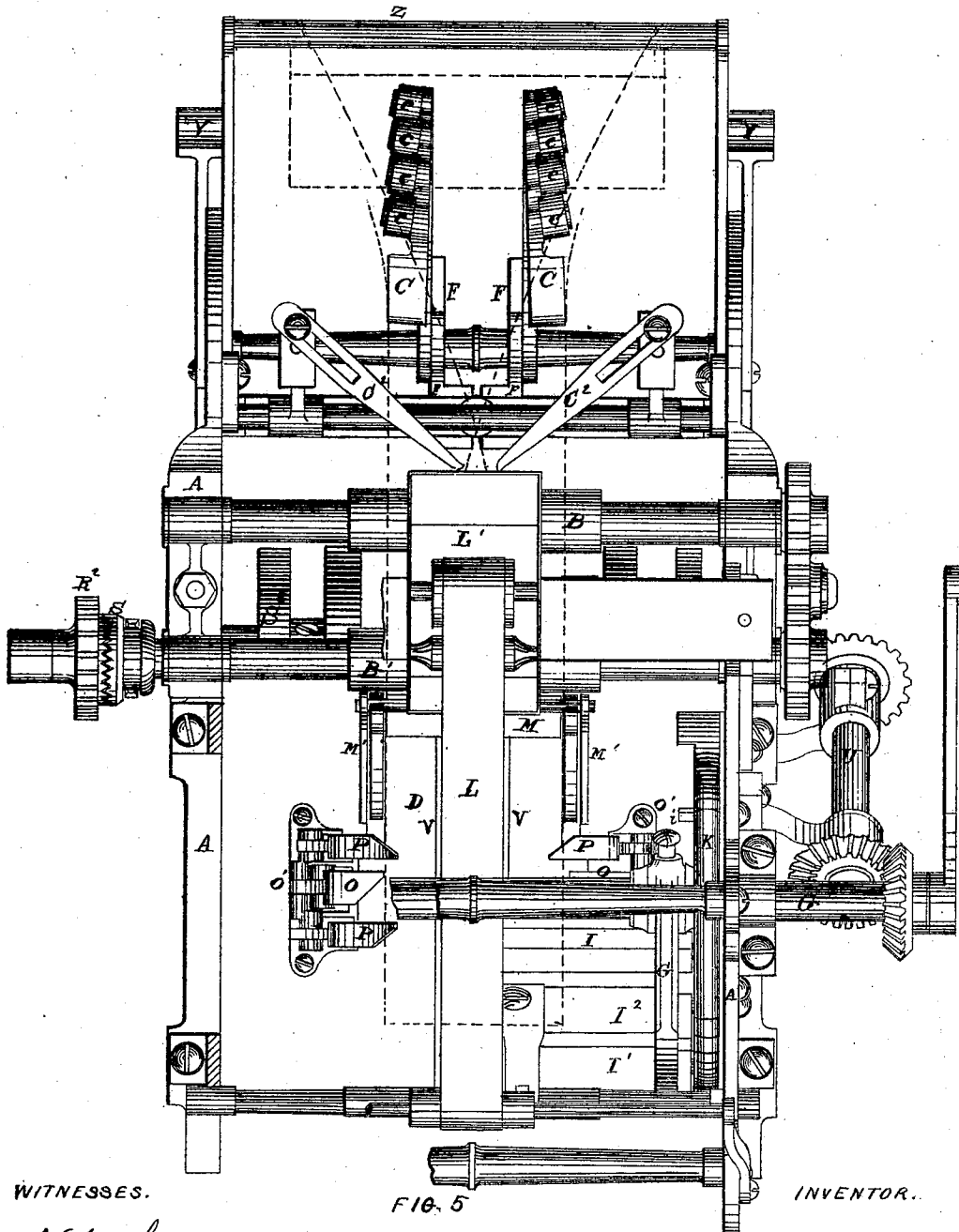
Chas. F. Amman

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WITNESSES.

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FIG. 5

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UNITED STATES PATENT OFFICE.

CHARLES F. ANNAN, OF BOSTON, MASSACHUSETTS.

IMPROVEMENT IN MACHINES FOR MAKING PAPER BAGS.

Specification forming part of Letters Patent No. 132,890, dated November 12, 1872.

To all whom it may concern:

Be it known that I, CHARLES F. ANNAN, of Boston, county of Suffolk and State of Massachusetts, have invented certain Improvements in Machines for Making Paper Bags, of which the following is a specification:

My invention consists of several improvements in the construction of a machine for making paper bags with what is called square or satchel bottoms by a peculiar manner of folding and pasting the end of the tube of paper of which the bag is made. My first improvement relates to an improvement of the curved guide for which Letters Patent No. 110,536 were granted to me December 27, 1870; and consists, in part, in making the two guides separate from each other, each being independently attached to and traversing upon a bar so that they may be separately adjusted to the paper transversely to the web, as the nature of the paper may require; also, in giving to each guide a separate oscillating adjustment so as to bring the delivering end of the same nearer to or further from the pressure-rollers which close the tube and carry it forward; also, in the use of a series of inclined rollers upon the face of the guide to form the guiding-surface. My second improvement relates to the manner of combining and arranging the guides that form a tube from a roll of paper, the carrying or feeding rolls that carry the tube forward, and the folding-table and folding mechanism, so that the folding of the bottom of the bag will not disturb the side seam of the same; and consists in so combining and arranging the parts named that the seam which forms the tube of paper will be upon the under side or next to the folding-table, while the opposite side is carried backward to form the first folds of the bottom of the bag, while the side seam is held at rest upon the table. This is a very important consideration, as, if the side seams were made on the upper side of the tube, the folding apparatus, by its action upon this seam, would be liable to tear it open if the paste was not fully dry, or, if dry, might make the seam stiff and interfere with its proper folding. My third improvement relates to the method of holding and opening the end of the tube of paper to receive the operation of the first folder; and consists in holding the middle of the

lower side of the tube at the end onto the table by the exhaustion of the air beneath it through suitable orifices; and also in raising the upper side of the tube by a jet of air directed against it, as will be more fully described. My fourth improvement relates to the method of carrying the folders, pasting-rollers, and pressing-roller over the bag-piece as it lays upon the folding-table; and consists in arranging them in a revolving frame, in which they are suitably guided in their movements over the table and otherwise by stationary cams working in combination therewith, as will be described. My fifth improvement relates to the means for holding the bag-piece to the table, and to determine the position of the several folds to be made therein to form the bottom; and it consists in combining with the table two sets of clamps or fingers worked by suitable cams or other devices to hold the bag-piece at opposite edges at the proper points to determine the positions of the folds, as will be described. My sixth improvement relates to the means for removing the bag-piece from the table after it is folded; and consists in the combination, with the table and feeding-rollers, of two or more tapes or bands and a pair of delivering-rollers, as will be described; and it also consists of several other details of construction, which will be more particularly specified.

In the drawing, Figure 1 is a side elevation of the front of the machine; Fig. 2 is an elevation of the opposite side; Fig. 3 is a vertical longitudinal section through the center of the machine; Fig. 4 is an end elevation of the machine; Fig. 5 is a plan of the machine with a part of the folding-frame broken away to show the folding-table beneath more clearly; Fig. 6 is a view of the bag after the first fold is made in the bottom; and Fig. 7 is the bag finished.

A A is the frame of the machine, constructed as shown. B B and B' B' are two pairs of pressure-rollers for carrying the paper tube forward through the machine as it is formed. C C are curved guides, over which the web of paper is drawn to form it into a tube, operating in a manner similar to those described in my patent No. 110,536, but in a reversed position, so that the folding together and overlapping of the edges of the web to form the tube

takes place beneath the web instead of above it, and the longitudinal seam is formed upon the under side of the tube instead of the upper side, as is usual. This feature, in connection with the method of folding the bottom of the bag herein described, is very important. The curved guides C are distinguished from those before patented by me by several improvements in construction which better adapt them to their purpose. They are each placed upon the extremity of a vibrating arm, E, the inner end of which is jointed to and oscillates at *e* upon a bracket, F, that slides upon the cross-bar F', attached to the frame of the machine, so that each block with its guide may be separately adjusted transversely to the machine without moving the other; and the guide C may also be adjusted toward or from the rollers B by oscillating the arm to the desired position and securing it by the clamping-screw *f*. The guides are also provided with short diagonal rollers *c c*, over which the paper is drawn, which, by their diagonal position as they revolve, tend to keep the paper distended and prevent the formation of wrinkles in it in an obvious manner. By these several adjustments of the curved guides they are readily adapted to the varying conditions of the web of paper from which the bags are made. D is the folding-table upon which the bag-piece lies while the bottom is folded, its upper surface being of the same height as the bight of the rolls B'. G is a revolving frame, which is mounted upon the shaft G' above the table, and is provided with three sets of radial guides, H H¹ H², in which the several cross-heads I I¹ I² work, which carry several rollers, J J¹ J². The several cross-heads have guides upon their ends, which work in the grooves K¹ K² of the stationary cams K, which are fixed upon the inside of the frame of the machine. The grooves in the cams K are of such form as to carry the rollers J over the surface of the folding-table, and also to carry the pasting-roller J¹ up against the endless paste-belt L, by which it is charged with paste to close the bottom of the bag, while the other rollers J J² pass clear of the belt. This is done by means of the two grooves K¹ K², into the upper one of which, K², Fig. 3, the cross-head I¹ is guided by the fixed projection *i*, which is attached to the fixed cam K, and comes in contact with a projection upon the cross-head I¹, which, as the frame G revolves, forces the guides upon this cross-head I¹ into the outer grooves and carries the paste-roll up against the paste-belt. The other guides of the two cross-heads pass through the lower groove K², and their rollers pass clear of the belt. The roller J is made narrow in this case, with its periphery brought to nearly a sharp edge. Its purpose is to take the upper ply of the tube and carry it backward upon itself to make the first or "diamond fold" of closing the end, as is seen in Fig. 6. J¹ is the paste-roller; it is made double so as

to deposit two lines of paste upon the folds, as shown by the shaded surface *a* in Fig. 6. J² is a pressure-roller for closing the two cross-folds which complete the bottom of the bag. There is also attached to the cross-head I² a folding-blade, I³, which is jointed to the jaws which receive the axis of the pressure-roller J², as is shown, and is also held in position by a light spring, *j*, which allows it to glide over the table with a light pressure. Its purpose is to pass beneath the bag-piece and double it over to form the last cross-fold, and turn it backward so as to be pressed down by the roller J² as it passes over the fold. M is a reciprocating folding-blade, which works back and forth in the guides M¹ upon the top of the table to make the first cross-fold in the bag-piece, as will be described. At the ends of the guides M¹, next to the rollers B', the grooves are turned upward to raise the folding-blade at that extremity of its motion to permit the tube of paper to pass freely beneath it as it moves forward the length of a bag. This blade is moved by the rocker-arms M², fixed upon the rocking-shaft M³, which, by the arm M⁴, is worked by the cam M⁵ in an obvious manner, as is seen in Fig. 3. The folding-table D, upon which the bag-piece is received, has at D¹ a series of orifices, and a passage connecting by the pipe N¹ with the blowing-cylinder N, and at D² an inclined orifice or blast-pipe, which, by the pipe N², connects with the other end of the blowing-cylinder N, by which means, when the piston of the blowing-cylinder is moved to the right (Fig. 3) it produces an exhaustion in the orifices D¹ and a blast at the pipe D². By this arrangement, when the bag-piece is in its proper position upon the table the lower ply of the bag-piece, near its end, is held down upon these orifices D¹ by the suction, and the upper fold is slightly raised by the blast from the pipe D² so as to admit the roller J beneath it to turn it back to make the "diamond fold" of the bottom, as has been stated. The piston-rod of the blowing-cylinder is worked by the lever N³ and connecting-rod N⁴ from the eccentric N⁵ upon the cam-shaft Q, as is shown. The suction through the orifices D¹ not only serves to hold the lower ply of the bag-piece fixed upon the table while the "diamond fold" is made, but, as its longitudinal seam is upon the under side, and the paste of it is still moist, it prevents the turning back of the upper side from tearing the longitudinal seam open. O O are two fingers or clamps for holding the edges of the bag-piece to the table to determine the limit of the "diamond fold" when it is formed by turning back the upper ply of the bag-piece, and P P P P are four fingers or clamps for holding the edges of the bag-piece after the "diamond fold" is made, to determine the limits of the two cross-folds which complete the bottom, as will be described. These fingers are all jointed to the brackets O¹ fixed to the table, and swing up and down.

The fingers O are worked by the two path-cams O² through the levers O³ and the connecting-rods O⁴. The fingers P are worked by the path-cam P¹ through the lever P², and the forked connecting-rod P³, and the forked cross-bar P⁴, and the four connecting-rods P⁵ leading to each of the four fingers, as is shown. The several cams are so set upon this shaft Q as to operate the fingers in their proper order. The pressure-rollers B B' B', for carrying the tube of paper forward are driven intermittently, and stop when a sufficient length of the tube has been delivered upon the table to make a bag. The bag-piece is severed from the tube by a serrated cutting-blade of any usual construction, placed between the two pairs of pressure-rollers, B, and working in the usual manner, which, as it forms no part of the present invention, is not shown. The pressure-rollers receive their motion from the shaft Q through the train of gearing R R¹ R². The gear R² revolves loosely upon its shaft, and is connected with the same by the clutch S. This clutch is thrown into and out of connection with the gear R² by the lever S¹, which is worked by the cam S² upon the cam-shaft Q, as is shown. The length of the bag-piece that is delivered at each operation is determined by the relative sizes of the gears R and R², which are to be changed to make bags of different lengths. The first pair of pressure-rollers B are driven from the other pair by the train of gears T upon the opposite side of the machine. The shaft Q is driven from the shaft G' by means of the inclined shaft U and its bevel-gears, as is shown, which give the two shafts the same velocity; but other forms of gearing may obviously be used instead. The endless paste-belt L passes around pulleys, as is shown, one of which wallows in the paste-trough L¹ to charge the belt with paste, and it is to be continuously rotated by a belt from the shaft G' or by any other convenient means. V V are two endless cords or bands, which pass around and are carried by the lower pressure-roller B' of the last pair, and around the lower delivering-roller W, and rest upon the table, as is shown. They serve to assist in carrying the bag forward over the table and between the delivering-rollers, which discharge the completed bag from the machine.

The mode of operation is as follows: A roll of paper of the proper width is placed on an arbor at Y, and is led upward over the roller Z and over the guides C, and by the closing-guides C² the edges are brought together, one lapping over the other, and are held by the paste that is applied to one edge of the sheet by a roller in a well-known manner, but which is not shown in the drawing, as it forms no part of my invention. The tube of paper thus formed passes between the first and second pairs of feeding-rollers B B' B', and is pressed flat and delivered upon the folding-table when the rollers revolve. When the

rollers are at rest the bag-piece is cut off from the tube by the cutting-blade working vertically between the two pairs of feeding-rollers, which is not shown. At this time the forward end of the bag-piece will be at the point *d* of the folding-table, and the blowing-cylinder commencing to act. This, by the suction through the orifices D¹, will draw the seam of the lower ply of the bag-piece down upon the table and hold it fixed, and at the same time the blast from the orifice D will raise the upper ply of the bag-piece and allow the roller J to pass under it as the frame G revolves, and strip the middle of the upper ply of the bag-piece back, while the edges of the bag are held by the fingers O O, which produce the "diamond fold," as is shown in Fig. 6. The fingers P are then closed down upon the fold and the paste-roller J¹ passes over its upper surface and applies to it two lines of paste, shown by the shaded lines *a* in Fig. 6. The folding-blade M then moves forward beneath the "diamond fold," and turns over all that part of it outside of the fingers P, shown by the dotted lines *b* in Fig. 6. The blade I³ upon the revolving frame also takes under the opposite end of this fold and turns it back over the fold last made. The pressing roller J² then passes over the whole and presses the folds together. The feeding-rollers B again commence to revolve, and by the aid of the bands V V the bag is carried forward to the delivering-rollers W W, by which it is discharged from the machine.

What I claim is—

1. The combination of each of the curved guides C with the brackets F, upon which they are adjustable, and which brackets are adjustable transversely of the machine, substantially as described.
2. The diagonal rollers *c c*, in combination with the curved guides C C, substantially as described.
3. The combination, with the folding-table, of the orifices D¹ and means for exhausting the air therein to hold the bag-piece to the table, substantially as described.
4. The blast or jet of air D² for opening the end of the bag-piece, substantially as described.
5. The combination and arrangement upon a revolving frame, G, of the folding-roller J, and the pressure-roller J¹ and the pressure-roller J² and the folder I³, with their subordinate devices, so that they will be carried over the folding-table D to fold the bag-piece by a continuous rotary motion, substantially as described.
6. The combination of the stationary cams K with the revolving frame G and the folding-table so as to direct the several rollers and folder in a straight line over the surface of the table, substantially as described.
7. The secondary groove K² and fixed projection *i* of the stationary cam K, in combi-

nation with the cross-head or piece that carries the paste-roller J¹ to carry said paste-roller out of the track of the other rollers, to meet the paste-belt or other device for supplying paste to it, substantially as described.

8. The combination and arrangement of the table D and the several devices for holding the bag-piece upon the same, and the several devices for forming the folds and securing them, by which the bottom of the bag is en-

tirely completed while the bag-piece is at rest, substantially as described.

9. The combination, with the mechanism last claimed, of the tapes V and the delivering-rollers W, substantially as described.

July 12, 1872.

CHS. F. ANNAN.

Witnesses:

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WM. C. HIBBARD.