

C. F. ANNAN.
Machines for Making Paper-Bags.
No. 134,580. Patented Jan. 7, 1873.

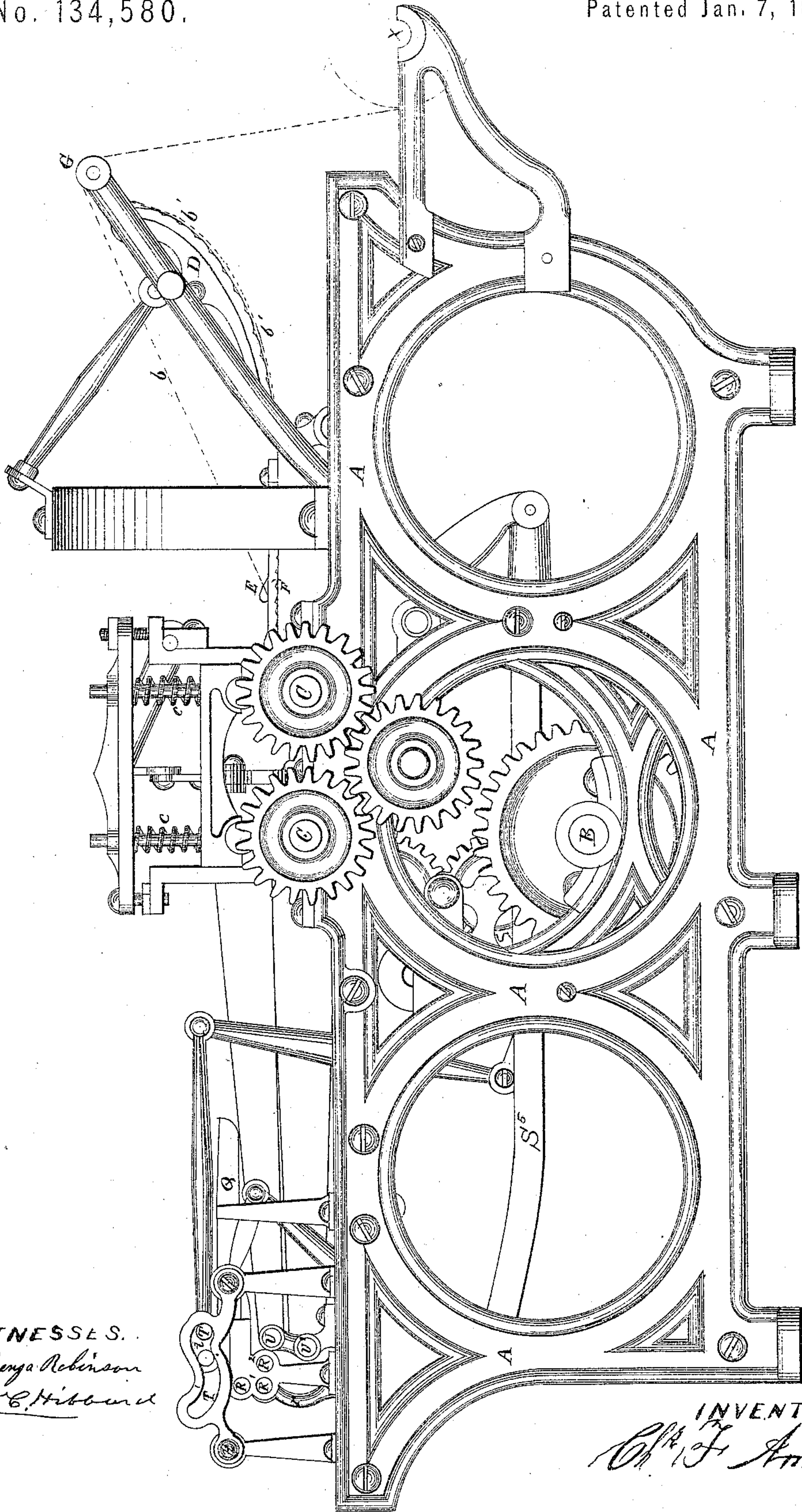
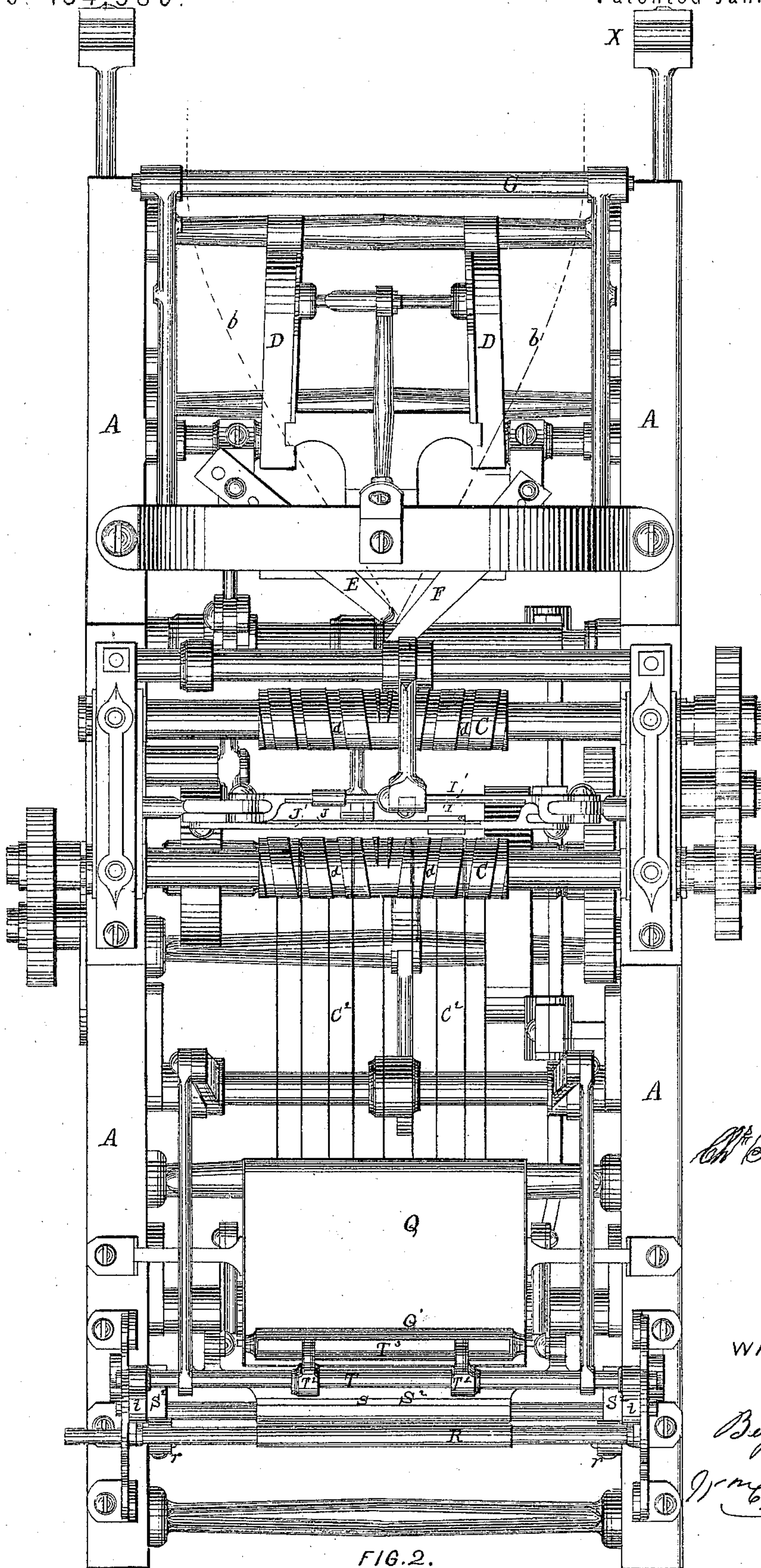


FIG. 1.

WITNESSES.
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INVENTOR

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WITNESSES.

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FIG. 2.

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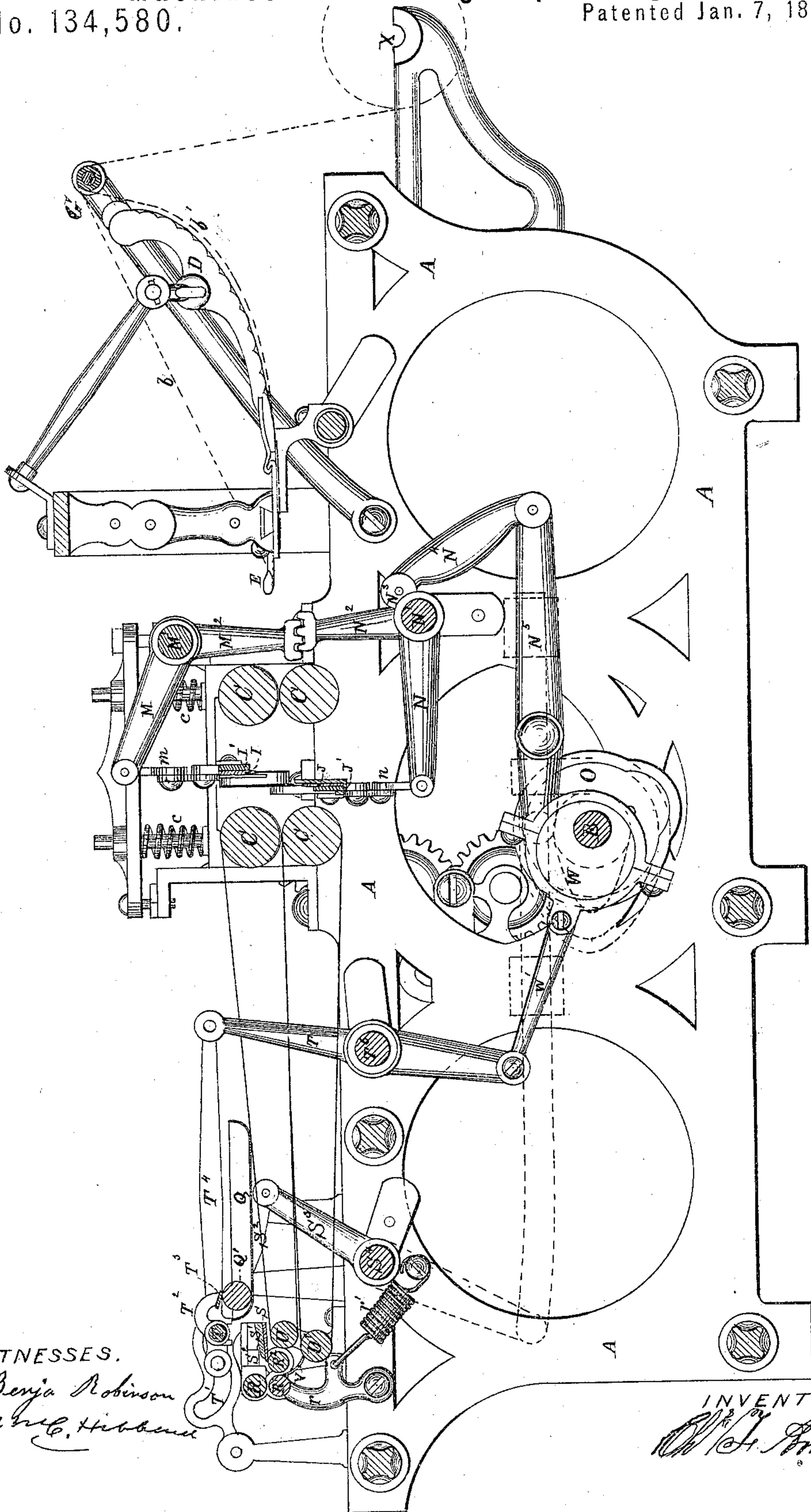


FIG. 3

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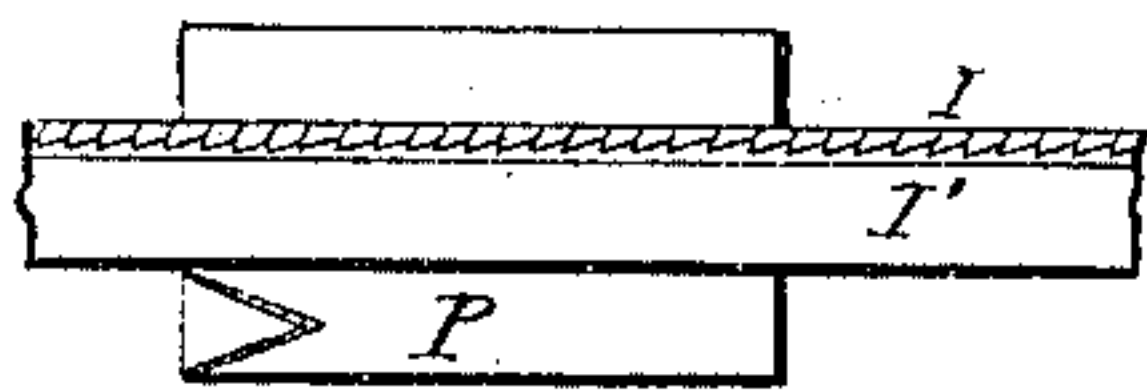


FIG. 8.

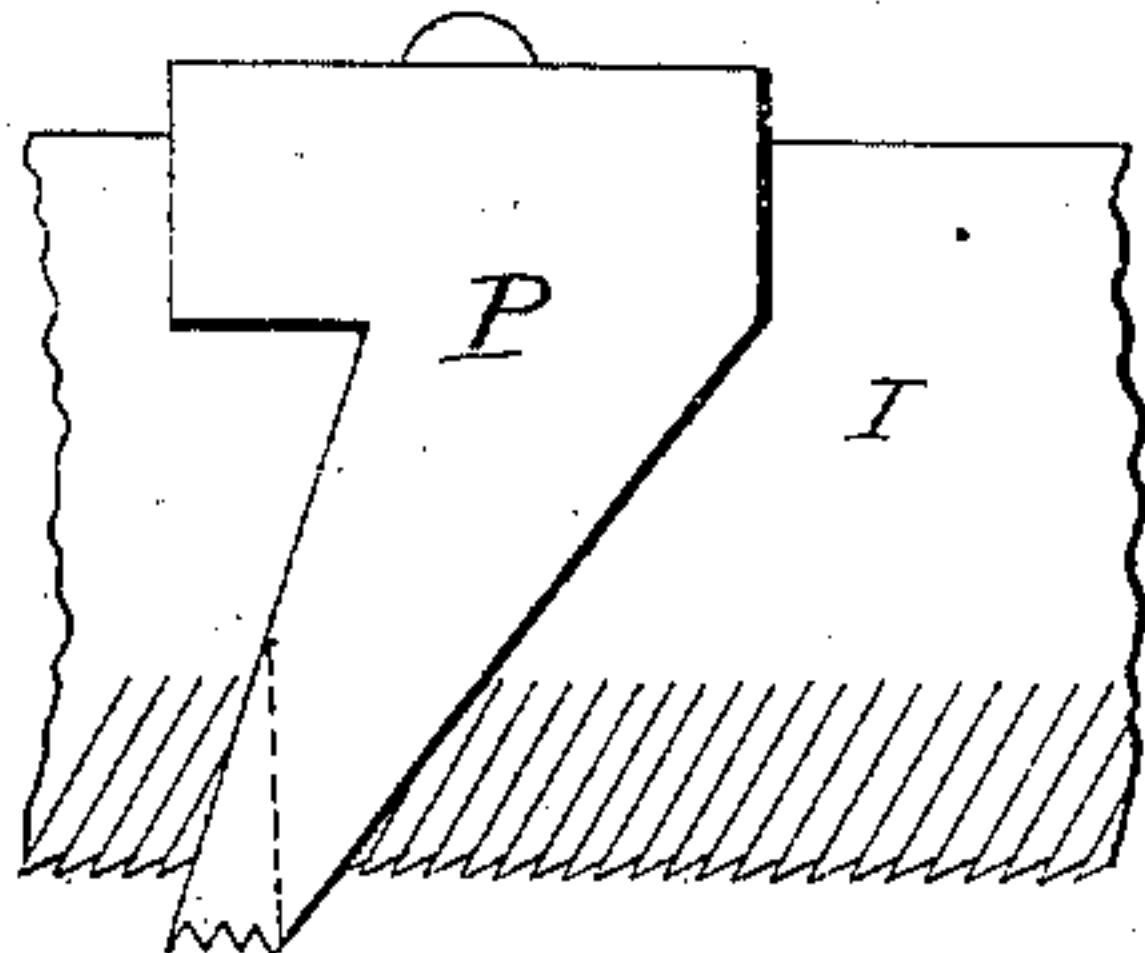


FIG. 7.

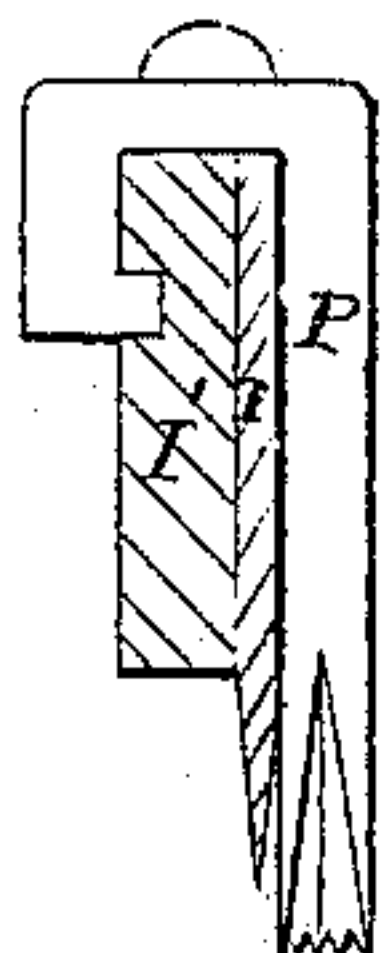


FIG. 6.

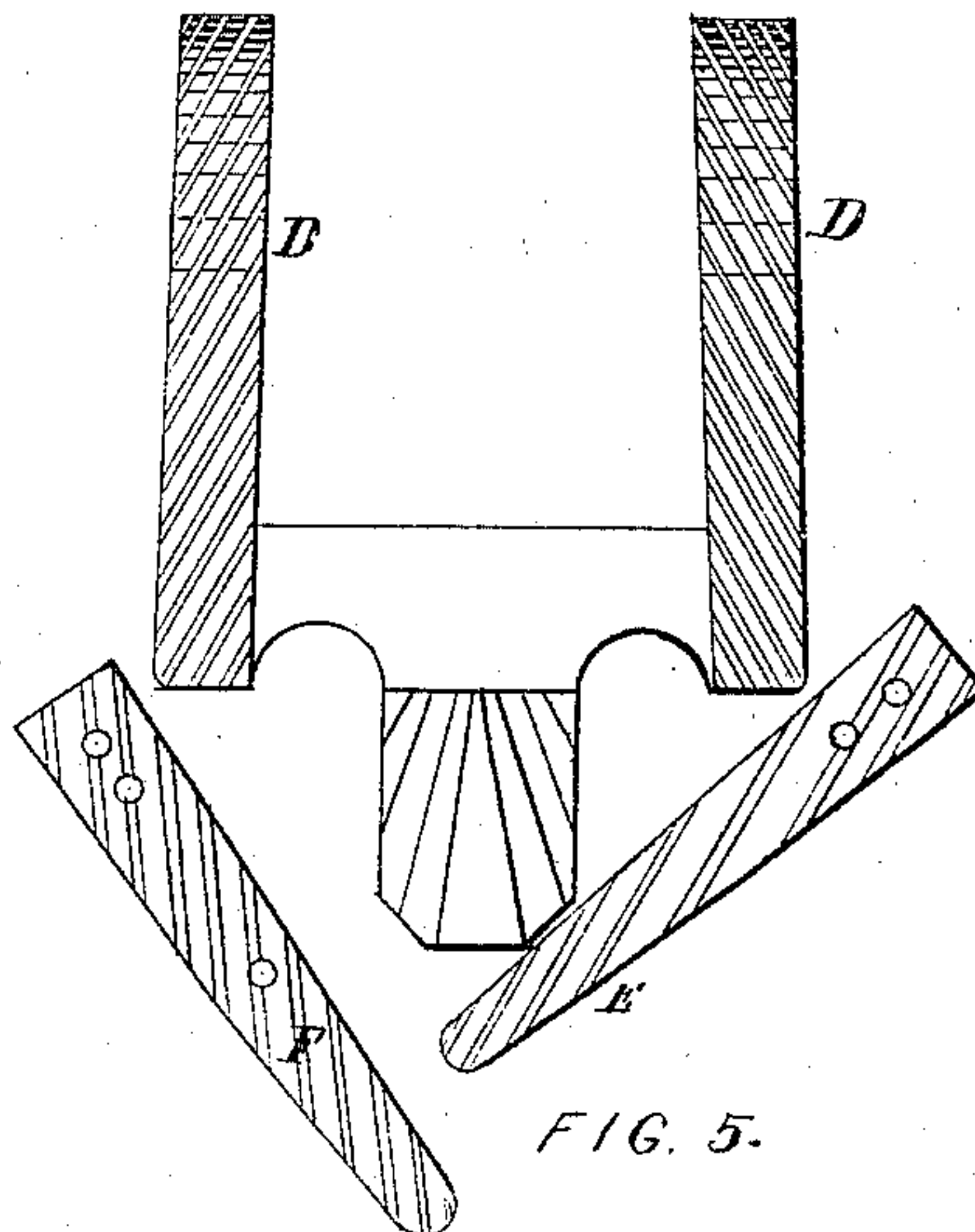


FIG. 5.

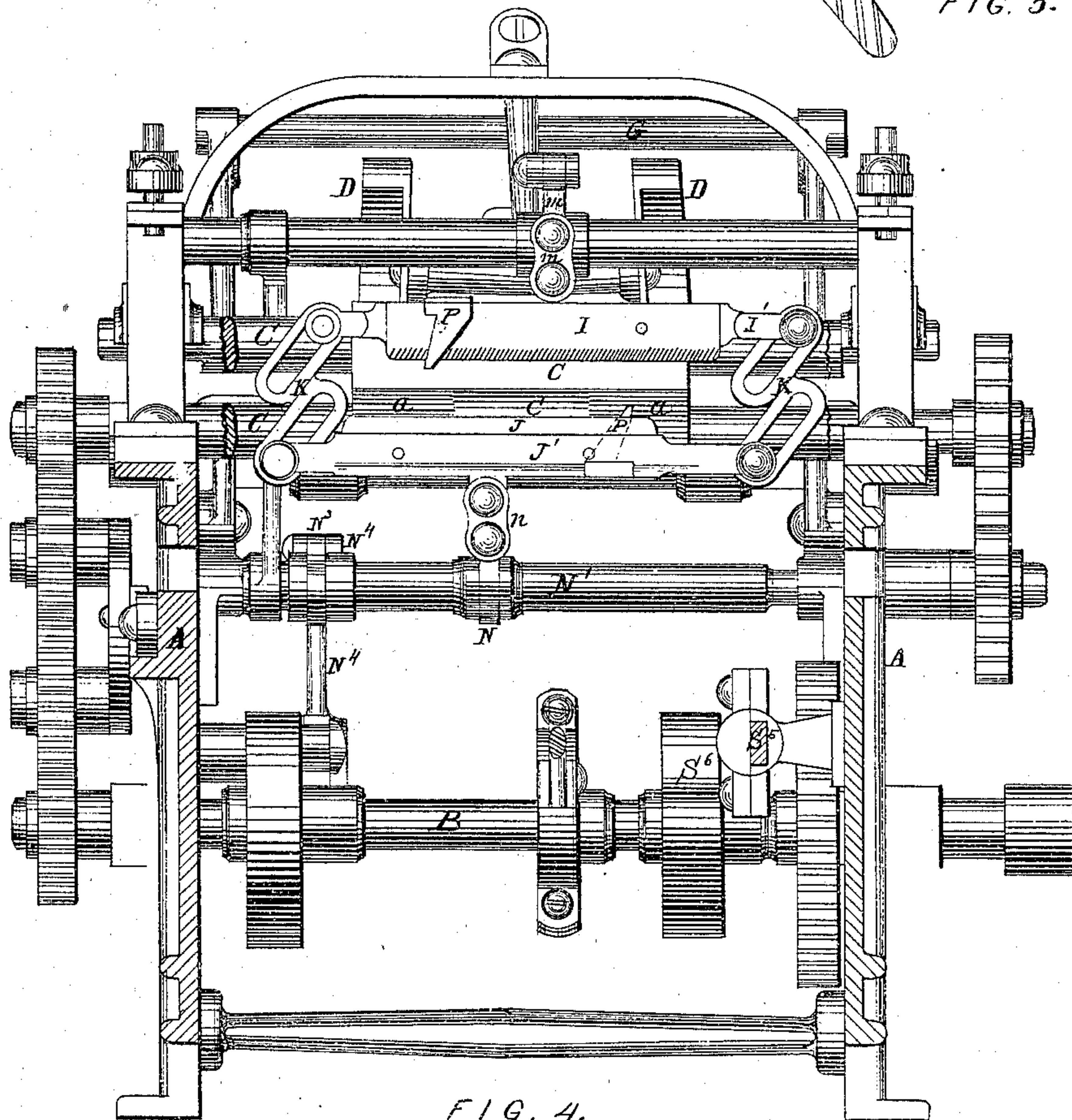


FIG. 4.

WITNESSES.

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UNITED STATES PATENT OFFICE.

CHARLES F. ANNAN, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO HIMSELF
AND HERBERT S. MERRILL, OF SAME PLACE.

IMPROVEMENT IN MACHINES FOR MAKING PAPER BAGS.

Specification forming part of Letters Patent No. 134,580, dated January 7, 1873.

To all whom it may concern:

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

My improvements relate to the construction of an improved machine for making paper bags, in which the bags are made by forming an endless tube of paper, and then cutting it up into sections of the proper length to form a bag, and folding over and pasting one end of the same to complete it. My first improvement relates to the construction of the "curved guide," so called, which was patented to me December 27, 1870; and consists in forming diagonal ribs or grooves in the faces of the same, which come in contact with the web of paper, which, as the paper is drawn forward, serve to keep the paper distended and prevent it from entering the feeding-rolls in a wrinkled condition. My second improvement relates to the mechanism and mode of operation by which a web of paper is folded together and formed into a flat tube; and consists of a combination of a curved guide, two lapping-guides, and a pair of feeding-rolls, or their equivalents, so arranged that the web of paper can be folded from a flat condition to that of a flattened tube in a very short space in length, without the use of the "former," so called, within the tube, which has been heretofore used for that purpose. My third improvement relates to the construction of the feeding-rollers by which the paper is drawn through the machine; and consists in forming in their surfaces helical grooves leading from the end of the roller inward as the rollers revolve, by which any tendency of the paper to wrinkle and form plaits is avoided, as will be explained; also, in fluting the surface of the two ends of the lower feeding-rollers, leaving the middle portion plain. My fourth improvement relates to the construction of the mechanism and method by which the tube of paper is cut off in sections to form bags, so that the cut upon one side of the same will be at a little distance from that of the other side; and consists in the use of two knives having finely-serrated edges, which are made to approach the tube simul-

taneously upon opposite sides with considerable velocity, but not in the same plane, each of which cuts the thickness of paper upon its own side, and leaves the other side uncut, by a mode of operation that will be described; and it also consists in giving to each serrated cutter an oblique motion transversely to the plane of the paper by which the cutting is facilitated; and it also consists in an arrangement of mechanism for operating said knives, which will be described; and it also consists in the use, in combination with each of said knives, of an edge-cutter, by which the space between the cuts of said knives, at the edges of the tube, will be cut or torn away to assist the separation. My fifth improvement relates to the construction of the pasting and folding apparatus for closing the end of the bag, the peculiarities of which will be best seen from the description.

In the drawing, Figure 1 is a side elevation of my improved machine. Fig. 2 is a plan of the same. Fig. 3 is a vertical longitudinal section. Fig. 4 is a transverse sectional elevation near the cutting-knives. Fig. 5 is a view of the working faces of the curved guide and the two closing guides, showing the grooves or ribs in their faces; and Figs. 6, 7, and 8 are details drawn to a larger scale, showing the construction of the knives and edge-cutters for separating the bag-pieces from the tube.

A is the frame of the machine, upon which the operative parts are arranged, as is shown. B is the main shaft, which drives the machine, and upon which are arranged the cams for working some of the devices. C C are the feeding-rollers, by which the paper is carried through the machine. They may be driven from the main shaft B by any appropriate system of gearing, and they are forced together by springs c, or their equivalents, pressing upon their boxes, and they may be geared together to make their surfaces run with equal velocity in the usual way. The surfaces of the upper rollers are made with shallow helical grooves d, starting from the end of the roller and running to the middle, as shown. The purpose of this is to cause any looseness or bulging of the paper to be transferred inward, and disappear at the edges of the paper, and thus prevent the formation of plaits in the

paper, which, in practice, produce what are termed "calender cuts," when the plait passes between the rollers. The surfaces of the lower rollers are made smooth for about one-third of the middle, more or less, and from this to each end the surface is fluted with fine grooves, as is seen at *a*, Fig. 4, the purpose of which is to compensate for or favor the inequalities of the paper in relation to its varying thickness and want of perfect uniformity of texture, which is found in practice in all such paper as is used in making bags. The rear pairs of feeding-rollers are also each provided with several small circumferential grooves in which the cords or lines *C*² run, which transfer the bag-pieces to the apparatus which closes the bottom of the bag, and which dispenses with separate rollers near the feeding-rollers to carry the lines, as is usually done. *D* is a curved guide for directing the paper as it comes from the roll and assisting in folding it into the tubular form, as will be described. In its general form it is similar to that described in the patent granted to me December 27, 1870, No. 110,536, excepting that in this case I have formed the faces of the same that come in contact with the paper with diagonal ribs or grooves, as is seen in Fig. 5, to smooth out the paper as it passes over them and prevent the formation of plaits; and excepting, also, that it is not used in connection with a "former" within the tube, but is combined with two diagonal closing guides, *E* and *F*, exterior to the tube, which, in connection with the curved guide *D*, bring the edges of the paper together and lap them into the proper position to be pressed together by the first feeding-rollers. The dotted lines *b* and *b'* show the direction that the edges and middle of the paper take in folding the edges together. By this arrangement of the guides the paper can be doubled together smoothly in a very short space, which cannot be done when a former is used within the tube, as has heretofore been practiced. *G* is a roller over which the paper is led in passing from the roll to the curved guide *D*, which is mounted in the arms *H*, which are made adjustable to vary the height of the roller *G*. The relative positions of the roller *G* and the curved guide *D* and the closing guides *E* and *F* are very important in folding the paper from a flat web into a flat tube in so short a space, and when their relative adjustments are right the distance from the roller *G* to the feeding-rollers, measured along the line *b'*, will be the same as the distance along the lines *b*, which represent the edges of the paper. These conditions are indispensable to making the tube in this way without a former. *I* *J* are the cutters, which cut the tube in pieces of the length to make the bags. They are both made with serrated sickle edges, which are made by cutting one side of the blade with teeth like a float-file, so called, and grinding a bevel upon the other side to make a serrated edge of fine sharp points, as is seen in Figs. 6, 7, and 8,

which are enlarged views of the same. The blades are attached to the stocks *I'* and *J'*, respectively, as shown, which extend outward beyond the blades, and are guided at their ends by the diagonal guides *K* *K*, so that as they move toward and from each other they move in a diagonal direction coincident with the inclination of the sickle cuts on the blades. The two cutters are placed between the two pairs of feeding-rollers *C* *C*, and are set so as to work in different vertical planes, say three-eighths of an inch, more or less, apart, and are made to approach the tube of paper as it is held between the rollers simultaneously upon the opposite sides with considerable velocity, their edges going some way past each other, and then instantly returning. The effect of each cutter upon the tube is to sever the thickness of the paper next to it only, leaving the other thickness uncut, because, as soon as the first thickness is cut upon each side of the tube it yields, and offers no further resistance to the cutter to make it cut the other thickness of paper opposite to its edge, which thus leaves one side of the bag-piece longer than the other to facilitate the closing of the end of the bag-piece by pasting and folding, as has long been done. The cutters are worked up and down by arms *M* and *N* upon the rocking-shafts *M'* and *N'*, which are geared together so as to move simultaneously in opposite directions by the sector arms *M*² and *N*². The shaft *N'* is oscillated, by its short arm *N*³ and link *N*⁴, from the lever *N*⁵, the short arm of which carries a roller which works in the path of cam *O* upon the cam-shaft *B* in an obvious manner. The cutters are connected with the arms *M* and *N* by the links *m* and *n*, which are made with reel-joints, as shown, to permit the diagonal movement of the cutters, and the diagonal position of the guides *K* *K* also compels the cutters to move with their edges parallel to each other. *P* *P* are the edge-cutters, one of which is attached to each cutter-stock *I'* *J'*, and is shown in three views in Figs. 6, 7, and 8. The edge of the cutter shown has its cutting-edge *V*-form, and serrated so as to cut a notch from each edge of the flattened tube, between the cuts of the cutters *I* and *J* and a little in advance of their action, which assists the tube in separating freely. The cutters *P* are made to be adjusted upon the stocks *I* and *J* to adapt them to varying widths of bags, and their edges may be made of any form desirable. *Q* is the paste-trough, and *Q'* the paste-roller for supplying paste to the mechanism for closing the bottom of the bag. *R* *R*¹ are a pair of presser-rollers, one over the other, which deliver the finished bag, and between which the bottom end of the bag-piece is folded by the folding-blade *S* at the proper time in a manner well known in folding and bag machines. The blade *S* is attached to a stock, *S*¹, which slides horizontally in guides *S*² at the ends. It is set at the proper height to come opposite to the bight of the rollers *R* *R*¹ and to force the fold be-

tween the rollers as the end of the bag-piece passes upward before it. T is a vibrating shaft, which is carried at each end in the fixed cam-grooves T¹ upon the frame of the machine. There is also upon each end of the shaft T a kind of short crank, *t*, the crank-pin of which also runs in the groove T¹ as the shaft T vibrates. This shaft also carries two arms, T², to which is attached the paste-bar T³, which takes the paste from the paste-roller Q' and applies it to the bag-piece when it is folded. R² is another pressure-roller, which works in connection with R¹, and has its axis in the same horizontal plane. The roller R¹ is mounted in the arms *r*, and is held up to the roller R² by the springs *r'*. U and U' are rollers, about which the carrying cords or bands C² work which bring the bag-pieces from the rollers C C. V is a curved guide, formed of a plate of metal, which directs the end of the bag-piece, as it leaves the cords C², upward between the rollers R¹ and R².

The shaft T is vibrated back and forth in the grooves T¹ by the links T⁴ and arms T⁵ of the rocking-shaft T⁶, which is operated by the eccentric W on the cam-shaft B through the rod W'. As the shaft T is vibrated the form of the grooves T¹ causes the shaft to carry the paste-bar T³ down upon the paste-roll Q', and as it moves in the opposite direction to raise the bar and carry it over the folder and turn it down close to the folding blade and upon the inner face of the end of the bag-piece, which, as the folding-blade crimps the paper between the rollers R R¹, wipes the paste from the bar at the proper place to secure the fold.

The folding-blade S and its stock S' are worked by the links S² from the arms S³ of the rocking-shaft S⁴, which is driven by the rod S⁵ and cam S⁶ on the main shaft B, the position of which is shown by the dotted lines in Fig. 3.

The several cams on the shaft B are so set upon the shaft that they will act at the proper times on their respective devices and cause them to perform their respective operations on the bag-piece, as has been described.

To make bags of a different length the sizes of the gears B¹ and B², which drive the feeding-rollers, would have to be changed so as to measure off a different length of the paper tube at each revolution of the main shaft B; but the relations between the cutting and the pasting and folding mechanisms would remain the same.

The roll of paper is placed on a shaft at X, and is led up and over the roller G, and from that past the guides and folded, as has been described, and while it rests upon the roller G paste is applied to one edge of the web, to complete the tube, by a paste-roller of any usual construction, not shown, as it forms no part of this invention.

The rollers R R¹ R² are to be driven, by any suitable gearing, with a circumferential velocity about one-third, more or less, greater than that of the feeding-rollers C C, so as to take the bag out of the way of the succeeding one.

It is obvious that different devices may be employed to impart the requisite motions to the several parts; but those shown have been used with success and are a complete embodiment of my invention.

What I claim as my invention is—

1. The combination of the curved guide D, the closing guides E F, the feeding-rollers C, and roller G, or their equivalents, arranged as described to fold the web of paper into a flat tube as it is drawn by them, without the use of a former, substantially as described.

2. The inclined ribs or grooves in the faces of the curved guide, and the closing guides E and F, substantially as described.

3. The upper feeding-rollers provided with the helical grooves terminating at the middle thereof, substantially as and for the purpose described.

4. The lower feeding rollers having smooth middle portions and longitudinally-fluted ends, substantially as described.

5. The serrated cutter working in an inclined direction, substantially as described, as a device for separating paper and other tissues.

6. The combination of two of said cutters working in opposite directions in different planes, as described, for the purpose of separating the two thicknesses of the paper on different lines, substantially as described.

7. The combination of the two serrated cutters with the two rocking shafts geared together, and their accessories for operating said cutters from a single reciprocating movement, substantially as described.

8. The edge-cutters P, in combination with the cutters I and J, substantially as described.

9. The pasting-bar T³ having the movements described, in combination with the delivering-rollers R R¹ and the folding blade S and the paste-roller Q', so arranged that the paste is applied to the lap of the bag, substantially as described.

10. The combination of the shaft T and its cranks and guide-pieces with the stationary cam-guides T¹, by which the paste-bar is carried and applied to the paste-roller and the flap of the bag by the reciprocating motion of the shaft T, substantially as described.

Executed May 4, 1872.

CHS. F. ANNAN.

Witnesses:

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WM. C. HIBBARD.