

(No Model.)

2 Sheets—Sheet 1.

G. L. WINSHIP.
FOLDING MACHINE.

No. 458,008.

Patented Aug. 18, 1891.

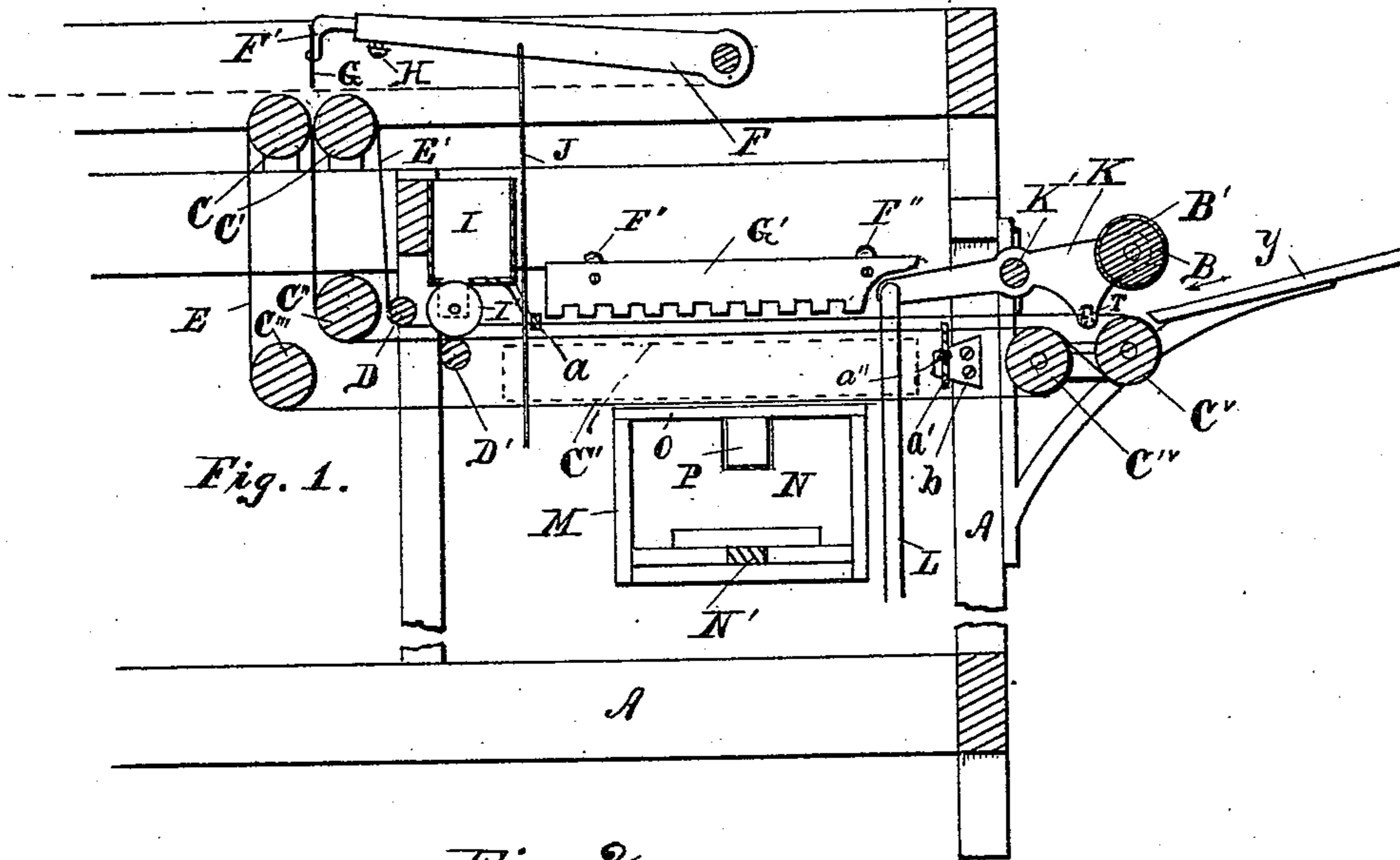
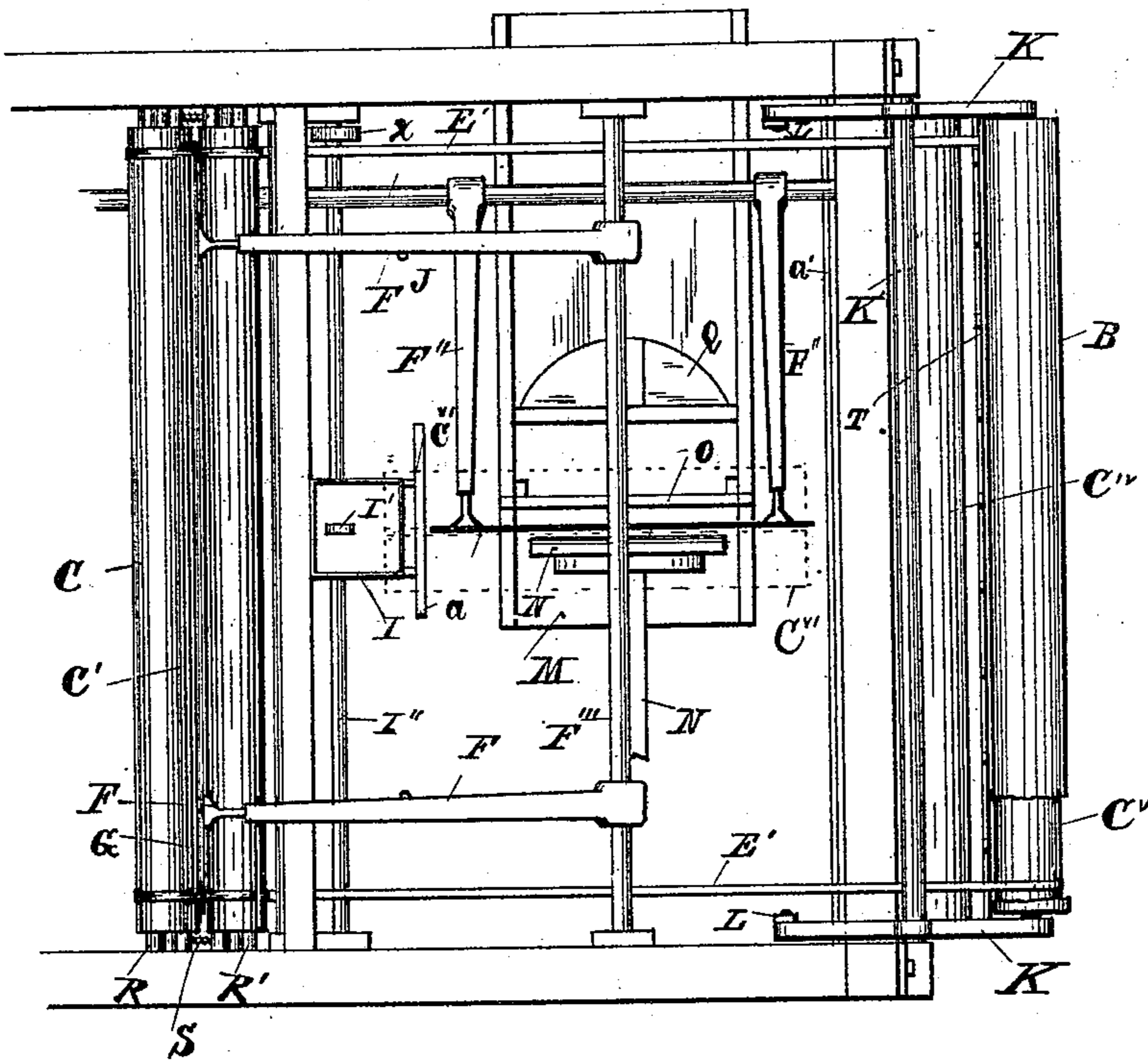


Fig. 1.

Fig. 2.



WITNESSES:

E. N. Perry
C. C. Allen

INVENTOR

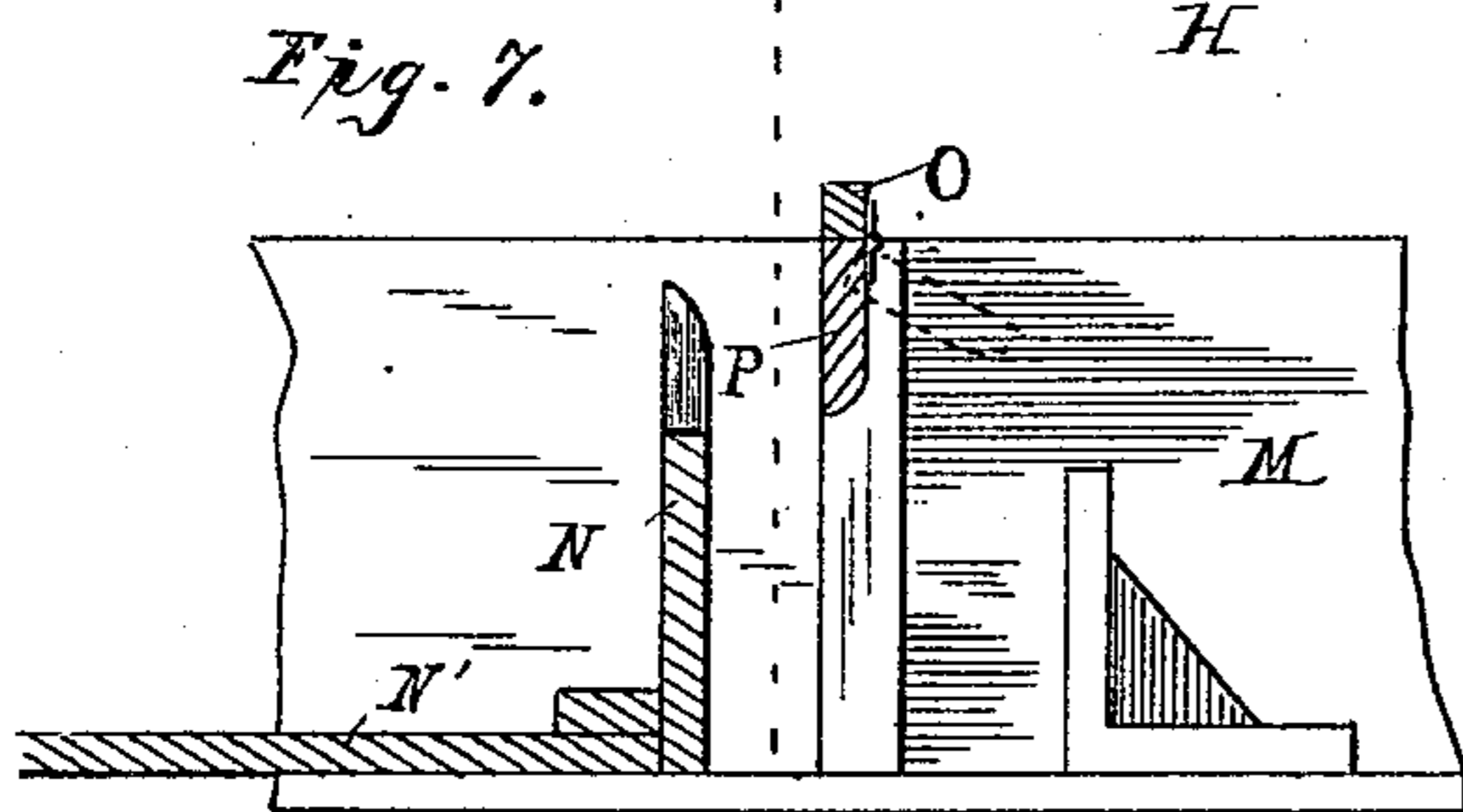
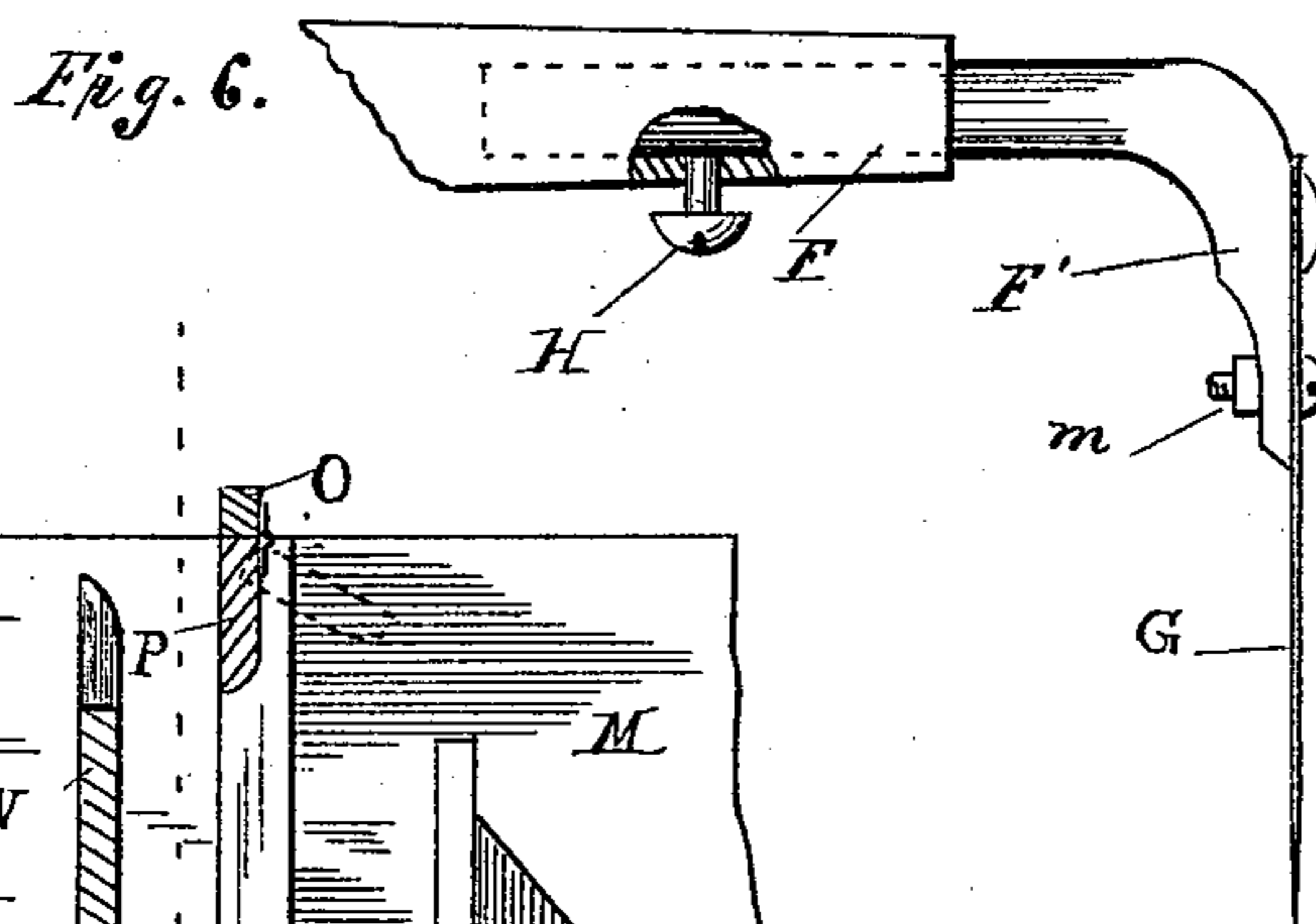
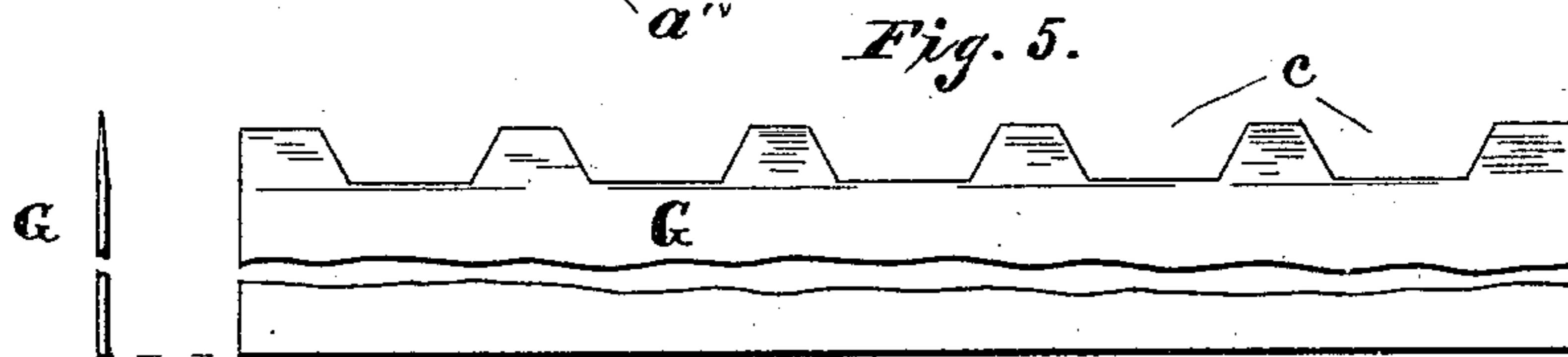
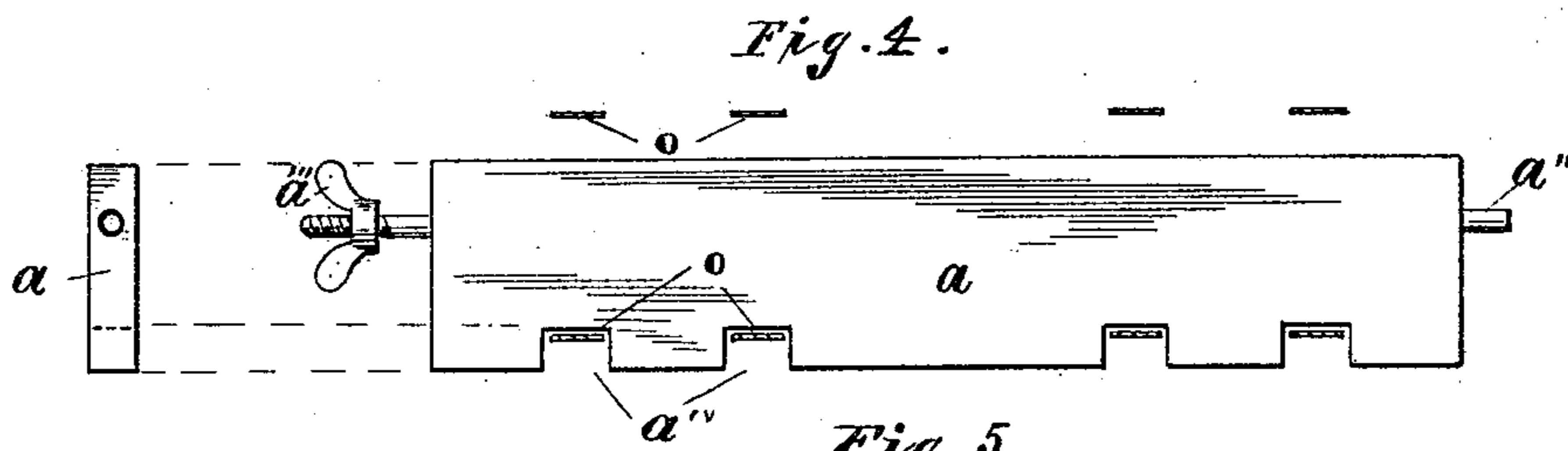
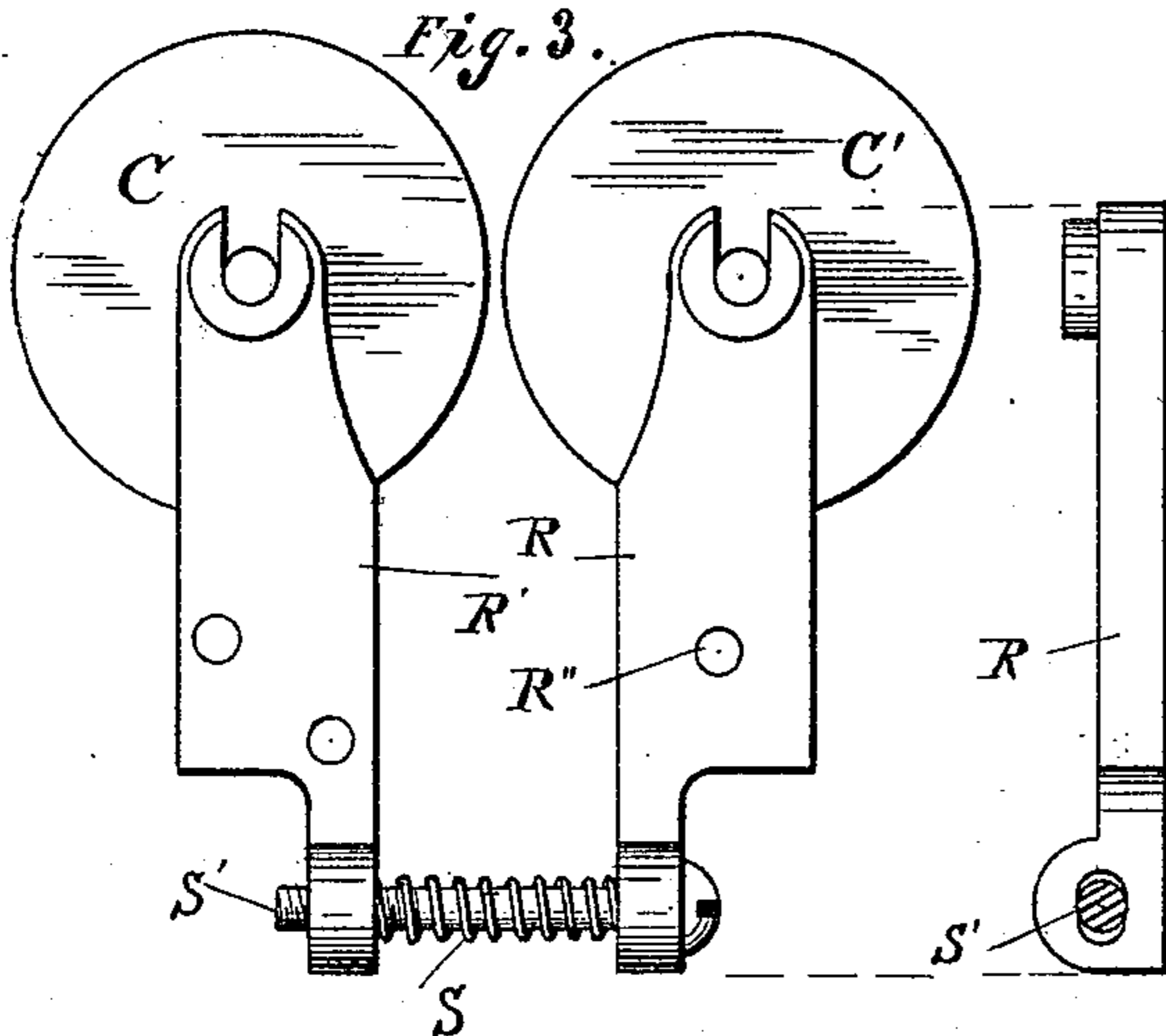
G. L. Winship

by Miles & Co. Attys.

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G. L. Winship

By Miles & Brewster
Attys.

UNITED STATES PATENT OFFICE.

GUSTAVUS L. WINSHIP, OF FAIRLEE, ASSIGNOR TO THE OPINION MANUFACTURING COMPANY, OF BRADFORD, VERMONT.

FOLDING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 458,008, dated August 18, 1891.

Application filed April 4, 1891. Serial No. 387,686. (No model.)

To all whom it may concern:

Be it known that I, GUSTAVUS L. WINSHIP, a citizen of the United States, residing at Fairlee, in the county of Orange and State of Vermont, have invented certain new and useful Improvements in Folding-Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention is in folding-machines adapted for use with printing-presses; and it relates particularly to devices for inserting a supplementary sheet during the process of folding and to certain constructions and combinations hereinafter described.

In the drawings, Figure 1 is a sectional elevation of a folding-machine, certain well-known parts not of my invention being omitted. Fig. 2 is a plan of the devices shown in Fig. 1. Fig. 3 shows, upon a larger scale, means for adjusting the folding-rolls. Fig. 4 is a side and end view of a certain stop of novel construction. Fig. 5 shows in like manner a folding-blade. Fig. 6 shows the folding-blade-adjusting devices. Fig. 7 is a longitudinal section of the packing-box.

In the drawings, A is a frame supporting all the working parts of the machine.

C C' C⁴ C⁵ are two pairs of rolls bearing the usual endless tapes. These, instead of running in a straight course between the rolls by which they are borne, are deflected by intermediate rolls so placed that the tapes upon opposite sides of them lie in planes nearly perpendicular to each other. For convenience in description the contiguous advancing portions of the tapes may be designated as "middle folds" and the widely-separated returning portions as "outer," or more specifically, as "upper folds" and "lower folds," respectively. Over the pair of rolls C C' the sheet to be folded is brought by any suitable means into the position indicated by the dotted line. The sheet when in this position is struck by a folding-blade G and forced between the rolls, whence it is carried by the tapes against a stop *a'*, receiving during its passage a line of paste from the paste-wheel I' directly over its middle. Meantime a supplementary sheet,

which had been placed against stops upon a bar T, is caught by a wheel or roller B and fed upon the constantly-moving upper folds of the tapes passing around the rollers C' C⁵, and by them is carried against a stop *a*, where it rests for an instant slightly above the folded and pasted sheet which has been arrested by the stop *a'*. The next instant it is struck immediately over the line of paste by a second folding-blade G' and forced between a second set C⁶ of folding-rollers, which, being of like construction to the rolls above, are shown in dotted lines only. From these rolls it passes to a packing-box M, either directly or after passing in the usual manner through other set of folding-rolls, according to the number of foldings desired. To avoid complication in showing parts that present no additional novelty, the box is shown below the dotted rollers, where, in fact, it may well be if the stops are properly placed.

The rolls C C' are mounted in bearings R R', Fig. 3, one of which is fixed, while the other is centrally pivoted. The lower ends of these bearings are connected by a screw S', that works in a threaded opening in one of them and slides freely in the other, and upon the screw is coiled a spring S, which tends to separate the lower ends of the bearings, and consequently to cause the approach of the rolls. Evidently, then, the distance of the rolls from each other may be adjusted by simply turning the screw in one or the other direction. The blade G, Figs. 1, 2, 5, and 6, is carried upon swinging arms F, which are actuated by the usual mechanism below connected to the arms by rods J. The blade is fixed to bent rods F', that slide in the ends of the arms and are secured by set-screws H, by which means it may be brought exactly into the plane tangent to both rolls. The lower edge of the blade is cut away, as shown at *c*, Fig. 5, doing away with most of the frictional resistance to its withdrawal from the rolls after it has forced the paper between them. The paste-wheel has its upper edge in a slot in the bottom of the paste-trough I, and bears upon its shaft a friction-roller *x*, which rests upon a small roll D', mounted just beneath the paste-wheel. As the paper passes over this roll D'

the rotating wheel takes paste from the trough and deposits it in a narrow even line along the middle of the sheet.

For feeding in the supplementary sheets bars K are centrally pivoted at opposite sides of the machine upon the same shaft K', and provided at their outer ends with a rubber-coated roll B to swing against the constantly-rotating roll C, and also with a bar T, lying below the upper folds of the tapes and having stops that project above the plane of the tapes when the roll B is raised, but fall below that plane when the roll is allowed to fall upon the roll C'. The inner ends of the bars K are connected by rods L with any of the well-known devices used in machines of this class for the purpose of swinging analogous devices back and forth. The supplementary sheets are fed against the stops of the bar T by the hand or otherwise, a table γ being used to support them when the manner of feeding makes it desirable.

It is sometimes desirable to let the sheets pass out of the machine before receiving all the folds the machine is capable of imparting, and to provide for this the stops, against which the sheet strikes as it arrives before the several sets of folding-rollers, are constructed as shown in Fig. 4. A plate a' is pivotally mounted between the folds of the tapes σ , passing around one of the rollers and in such position that one fold may lie in notches a^{IV} in one of its edges. The parts between the notches thus project beyond the plane of the tapes and form a stop for the paper borne by them. If the paper is to pass out of the machine, it is only necessary to give the plate a partial rotation. This plate serves as a tape-guide as well as a stop when in the position illustrated, and also when rotated, if it be rotated one hundred and eighty degrees. These stops are used wherever the main sheet is arrested preparatory to forming a new fold, and hence a machine adapted to fold many times may be instantly converted (by simply turning the proper stop) into a machine giving any number of folds less than its maximum.

The packing-box is the common open trough having a plunger to push the papers forward, side ribs to prevent their falling forward or backward, and a weight which is pressed forward along the bottom of the trough as the papers accumulate behind it. With ordinary packing-boxes of this construction the sheets must be of a given size or they do not reach, when folded, from cleat to cleat in the box, and so are not supported but fall forward upon entering the box, or rearward after having been pushed past the cleats or ribs. To obviate this difficulty a bar O is fixed to the top of the box in the plane of the ribs and from its middle depends a block P, hinged to swing forward, but not rearward, from a vertical position. The plunger is cut away so that it passes this block without striking it. Now when papers enter the box in the

position indicated by the dotted line, they are supported in front by the block and in the rear by the plunger N. As the plunger moves forward the paper itself swings the block and passes beneath it, the block immediately falling by its own weight to a vertical position. The plunger then retreats to its original position, leaving the paper supported in the rear by the block and in front by the weight of the papers that have preceded it.

What I claim is—

1. The combination, with the two pairs of coacting rolls, tapes running thereon, and intermediate tape-deflecting rolls, of a stop for arresting sheets carried upon the middle-folds of said tapes, mechanism for feeding sheets upon the upper of the returning folds of said tapes, and a stop for arresting the sheets last named, whereby the same tapes bring sheets from opposite directions into registering position one slightly above the other.

2. The combination, with the roll mounted at the upper end of the fixed bearing R, of the second roll mounted at the end of the centrally-pivoted bearing R', the screw connecting the lower ends of said bearings, and the spring coiled about the screw between the bearings and pressing the screw-connected ends apart.

3. The combination, with two rolls and tapes passing around both of them, of a transverse plate mounted between the upper and lower folds of the tapes to rotate upon a longitudinal axis and having in one edge notches registering with the tapes, whereby it may by partial rotation be thrown into or out of position to act as a stop and may serve as a guide for the tapes, substantially as set forth.

4. The combination, with the folding-rolls, of the folding-blade secured near each end to the bent rods, sliding independently in rocking arms approximately perpendicular to the blade, and means for adjustably fixing each rod in its arm, substantially as set forth, whereby the blade may be adjusted at either end alone or at both ends.

5. The combination, with the folding-rolls C', a coacting folding-blade, and the deflecting-rolls below and unequally distant therefrom, of the rolls C^{IV} C^V in the horizontal planes, respectively, of said deflecting-rolls, sets of tapes passing, respectively, around the pairs of rolls C C^{IV} C' C^V and deflected by said deflecting-rolls, stops in position to arrest, respectively, sheets passing upon the upper folds of either set, and the swinging stops and feed-roll arranged to drop, respectively, upon and below the tapes passing around the roll C^V, substantially as and for the purpose set forth.

In testimony whereof I affix my signature in presence of two witnesses.

GUSTAVUS L. WINSHIP.

Witnesses:

H. W. GWYN,

H. C. CHAMBERLIN.