

1,027,657.

4 SHEETS—SHEET 1.

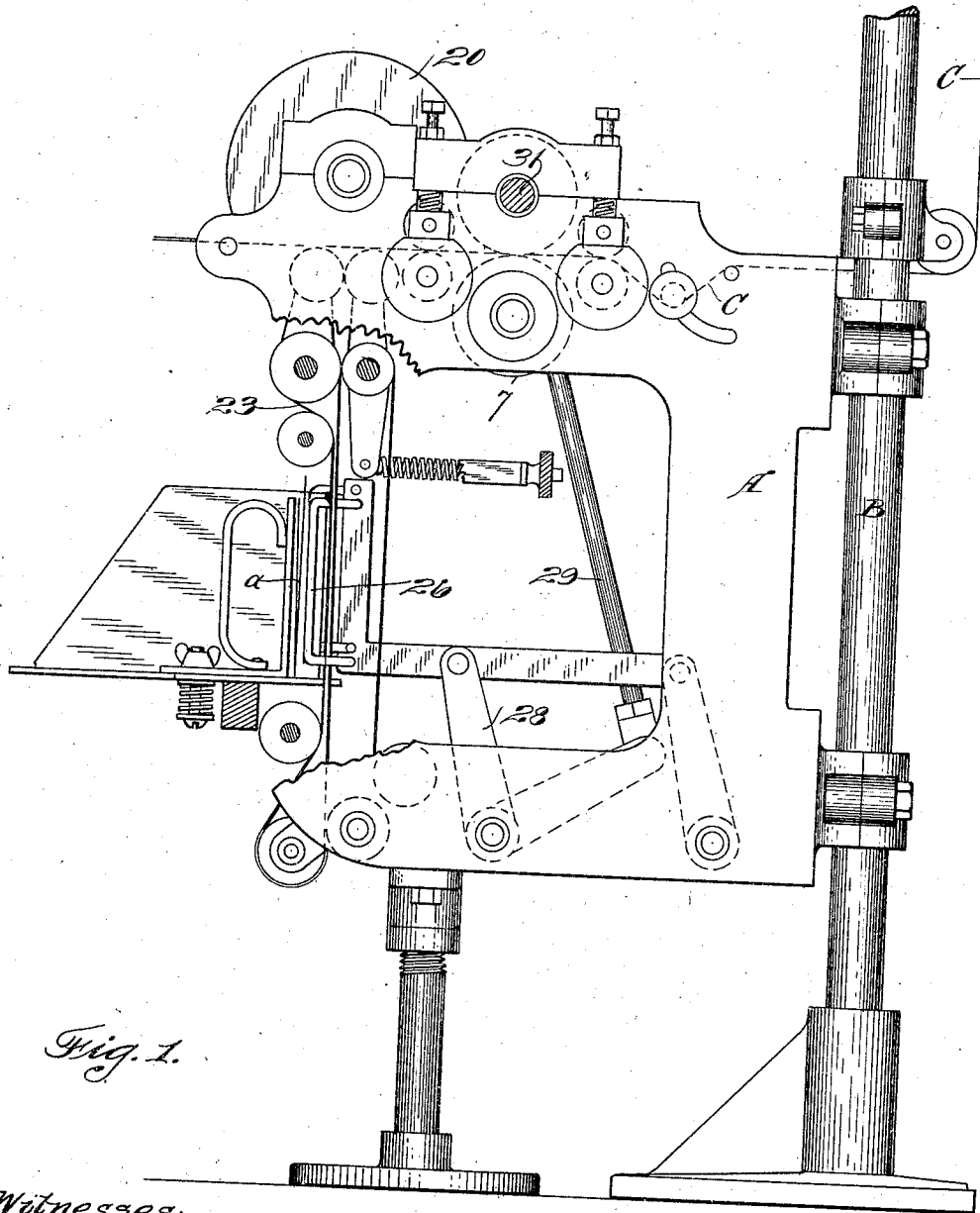


Fig. 1.

F. E. Maynard.
Chris. Westberg.

his City.

C. L. JOHNSTON.
FOLDING MECHANISM.
APPLICATION FILED AUG. 24, 1910.

1,027,657.

Patented May 28, 1912.

4 SHEETS-SHEET 2.

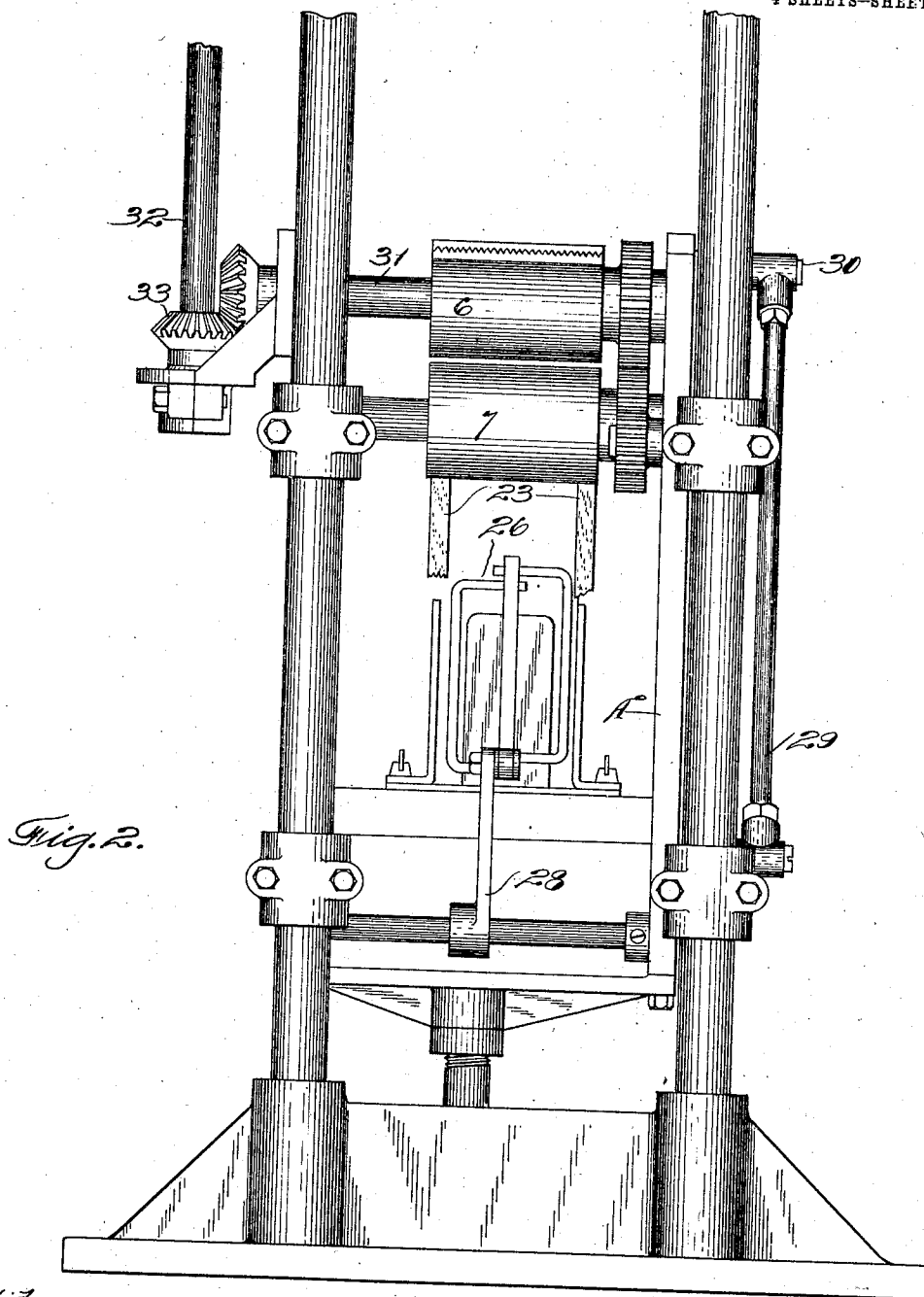


Fig. 2.

Witnesses,

A. E. Maynard.
Wm. C. Kestner.

Inventor,
Clarence L. Johnston,
By G. H. Strong.
his atty.

C. L. JOHNSTON.
FOLDING MECHANISM.
APPLICATION FILED AUG. 24, 1910.

1,027,657.

Patented May 28, 1912.

4 SHEETS-SHEET 3.

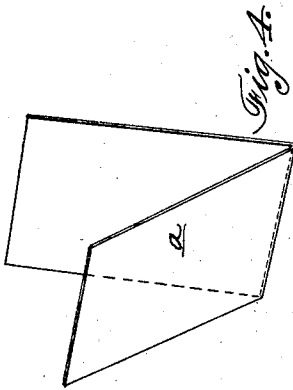


Fig. 4.

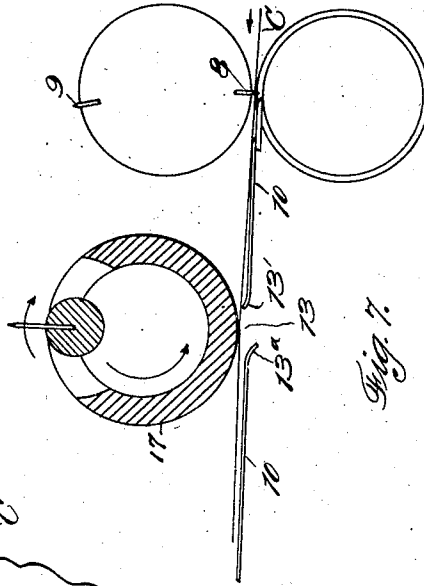


Fig. 7.

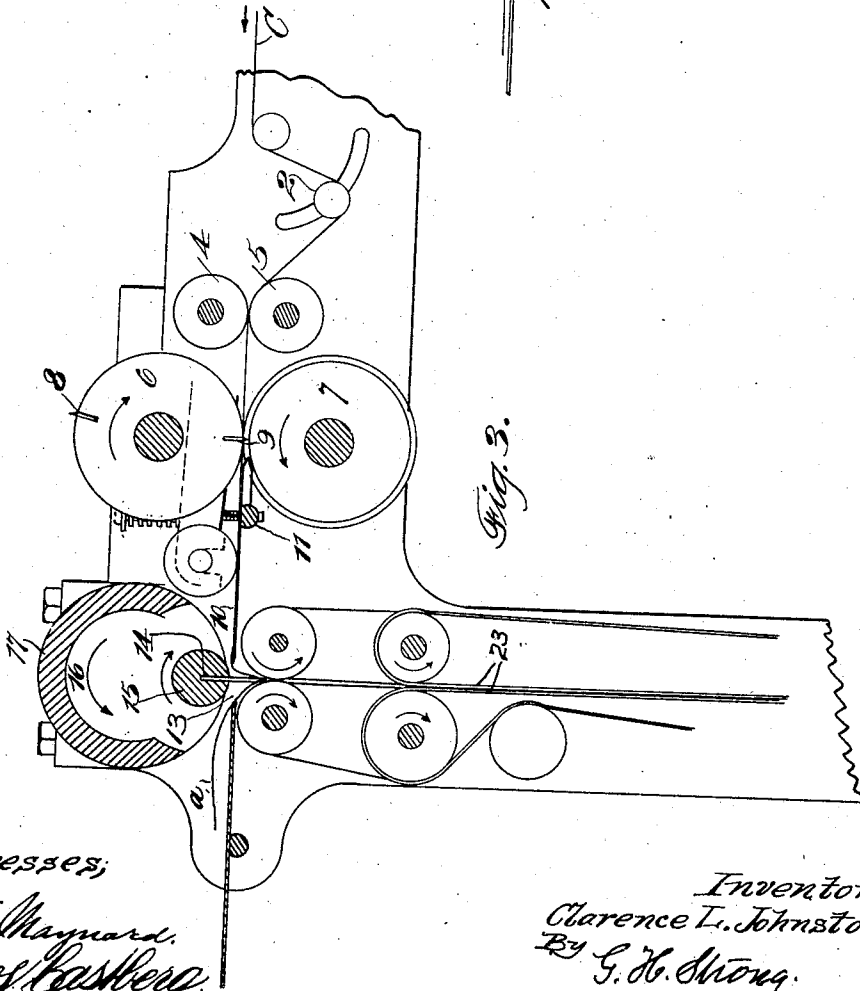


Fig. 3.

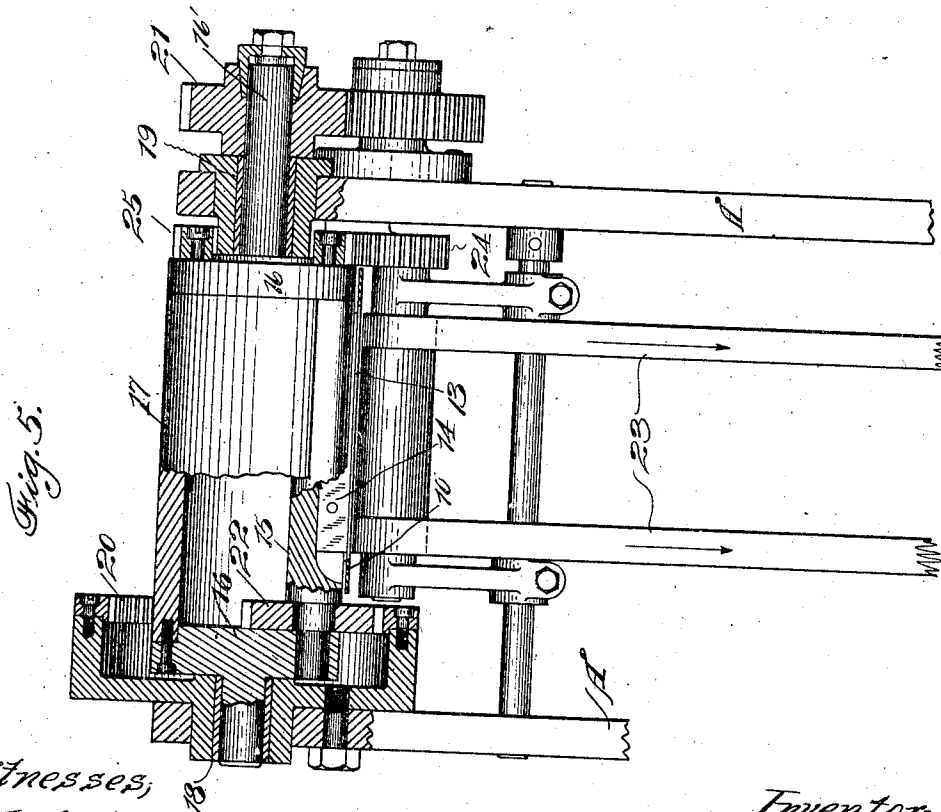
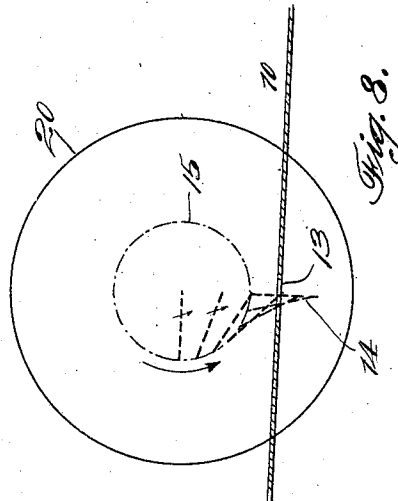
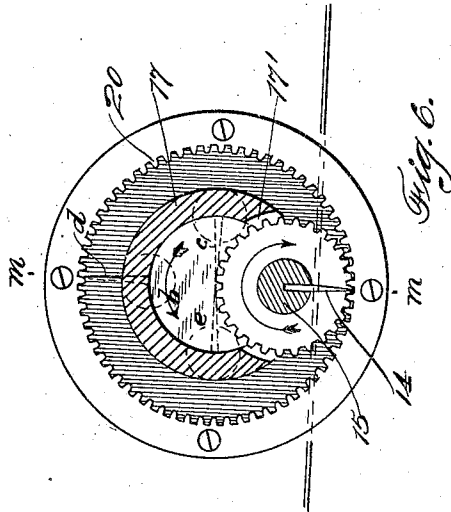
Witnesses,
A. E. Maynard.
Chas. Eastberg.

Inventor,
Clarence L. Johnston;
By G. H. Strong.
his atty

1,027,657.

C. L. JOHNSTON.
FOLDING MECHANISM.
APPLICATION FILED AUG. 24, 1910.

Patented May 28, 1912.
4 SHEETS-SHEET 4.



Witnesses;
H. E. Chaynard,
Chas. Kestberg

Inventor;
Clarence L. Johnston;
By G. H. Strong.
Att. Coun.

UNITED STATES PATENT OFFICE.

CLARENCE L. JOHNSTON, OF EMERYVILLE, CALIFORNIA.

FOLDING MECHANISM.

1,027,657.

Specification of Letters Patent.

Patented May 28, 1912.

Application filed August 24, 1910. Serial No. 578,750.

To all whom it may concern:

Be it known that I, CLARENCE L. JOHNSTON, citizen of the United States, residing at Emeryville, in the county of Alameda and State of California, have invented new and useful Improvements in Folding Mechanism, of which the following is a specification.

This invention relates primarily to mechanical movements, and pertains especially to a movement suitable for folding or creasing pliable material.

The object of my invention is to devise and provide a novel and valuable mechanism adaptable to various machines and purposes, and which is particularly useful where I have practically applied it, in connection with the rapid folding of a continuous web of paper in the manufacture of manifold books, sales check-books and the like.

It consists in the combination of parts and details of construction which will be more fully explained by reference to the accompanying drawings, in which—

Figure 1 is a side elevation in partial sections of a folding and cutting mechanism used in conjunction with a printing press and to which the invention is applied. Fig. 2 is an end view of the same. Fig. 3 is a cross-section through the stock feeding and folding mechanism. Fig. 4 shows a folded leaf. Fig. 5 is a partial longitudinal sectional view line *m-m* Fig. 6, showing the new movement. Fig. 6 is a cross-section Fig. 5. Fig. 7 illustrates the slotted table, with the folder in another position. Fig. 8 is a diagrammatic view representing the successive positions of the folder immediately preceding and at the time of folding.

In the manufacture of sales check-books, and manifold books the rapidity of the travel of the paper and the complicated and involved press on which the webs for the books are printed renders it desirable to devise a reliable, effective mechanism whereby the paper may be regularly and evenly folded while the press is operating at great speed. I have provided a mechanism which accomplishes this result and have shown it incorporated with a paper perforating and cutting attachment having a suitable frame A, secured to standards B of a press, not shown, from which a printed stock or web C is delivered and run into the folder mechanism.

The web C, Fig. 3, is guided over an adjustable spacing roller 2 and feed rollers

4—5, from which it passes between perforating and cutting cylinders 6 and 7 carrying perforating and cutting devices 8 and 9. After passing between the perforating cylinders 6 and 7, the web C rests upon a platen or flat table 10 held by transverse ties 11 of the frame A. At an appropriate point the table is transversely slit as at 13 and above this slit is mounted the mechanical movement which forms the principal feature of the invention and constitutes the folding device. The device comprises a lengthwise slotted cylinder 17, a folding blade 14, Figs. 3, 5 and 6, detachably fastened in a rod 15 in and extending lengthwise of cylinder 17 and revolving eccentrically in the heads 16 of the cylinder 17. The rod or shaft 15 not only is carried by the cylinder 17 but it has a revolving movement independent of the cylinder 17 as will be described. These heads 16 have stub shafts journaled in bushings 18 and 19; one of which 18, is held in a stationary internal gear 20 held fixedly in the frame A. The other bushing 19, is held in the other side of the frame A. A pinion 22 on shaft 15 meshes the internal gear 20. The cylinder 17 is revolved by means of power applied to a gear 21 on the stub shaft 16'. Since the internal gear 20 cannot revolve and the cylinder 17 is driven around by the gear 21 secured to the stub shaft 16' of the head 16, the blade 14 revolves inside cylinder 17; but at each complete revolution of the latter it is thrust radially outward through the peripheral longitudinal slot 17' to do the folding, as will be described. The pinion 22 is one half the diameter of the fixed internal gear 20; thus as the cylinder 17 revolves once on its own axis, the shaft 15 and folder 14 is turned twice in a direction opposite to the direction of rotation of the cylinder. The result is that the blade 14 is at every revolution of the cylinder projected through the slot 17' in the cylinder, and through the slot 13 in the table 10 to press a section of the moving web C down between a pair of tapes 23 driven by suitable drums having gear connections as 24 and 25 with the cylinder 17. The tapes 23 catch the folded sheet *a*, Fig. 3, and carry it down to a suitable packer 26, Fig. 1 operated by a connection as lever 28 and rod 29 with a crank 30 on the shaft 31 of the cylinder 6.

The front lip or edge of slot 13 is turned upwardly as shown at 13' Fig. 7, and the rear edge or lip is turned downwardly as

shown at 13^a, so that the paper or web as it is fed toward the folding cylinder 17 is first thrown upward against the cylinder and made to bridge over the slot 13 without catching in the slot; the downwardly curved lip 13^a on the opposite side assisting to prevent the paper catching and buckling.

The cylinder 17 is driven by power derived from the press by a shaft 32 geared at 33 to the shaft 31, which is geared to drive wheel 21.

Referring especially to Figs. 6-8 it is to be observed that the peculiar relations of the folder 14 to the fixed internal gear 20 has the effect of compelling the edge of the folder to constantly move in a plane of a diameter of the cylinder 17; in this instance being the vertical diameter in line with slot 13 in the table. In other words, the plane of the slot 13 is the locus of the edge of the folder. When the folder is in the vertical positions shown in Fig. 6 it projects vertically beyond the cylinder. As the cylinder 17 turns in the direction of the arrow *b* the blade is carried gradually to dotted position *c*, thence to *d*, thence to *e* and finally to the full line folding position again, as shown diagrammatically in Fig. 8. The edge of the folder during the first half of the revolution of cylinder 17 moving up on the diametral line *m m* and then during the second half moving down again; the edge always being in this line so that it acts like a vertically reciprocating folding blade to press squarely down on the paper to fold it through slot 13 without any brushing or sweeping effect as might naturally be expected of a rotary member acting on a sheet having a rectilinear movement.

In operation a web *C* is fed from the cylinders 6 and 7 over table 10 to a pre-determined distance and then the folding blade 14 will descend and depress the paper through the slot 13 pushing it well down so that it will be engaged by the tapes 23, the free end *a* of the web being drawn backward. At the proper instant the cutter 9 will sever the web between the rollers 6 and 7, and the folded sheet *a*, (Fig. 4) will be drawn down by tapes 23 and packed by the member 26, Fig. 1.

If desired the web may be perforated along the line where it is to be folded, by the perforator 8.

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

1. The combination in a paper folding machine, of a rotary cylinder longitudinally slotted in its periphery, shafts attached to the ends of said cylinder, removable bushings supporting said shafts, a change speed driving gear attached to one of said shafts,

a fixed internal gear to which is secured one of said bushings, a shaft eccentrically journaled in the cylinder, a pinion secured on said last-named shaft and meshing with the fixed gear, a folding blade secured to the last named shaft and adapted to be projected through the cylinder, a throat plate disposed beneath the rotary cylinder, a paper feeding mechanism, and a device interposed between said rotary cylinder and the feeding mechanism for perforating and cutting the paper in suitable lengths.

2. The combination in a paper folding machine, of a rotary cylinder longitudinally slotted in its periphery, shafts attached to the ends of said cylinder, removable bushings supporting said shafts, a change speed driving gear attached to one of said shafts, a fixed internal gear to which is secured one of said bushings, a shaft eccentrically journaled in the cylinder, a pinion secured on said last-named shaft and meshing with the fixed gear, a folding blade secured to the last-named shaft and adapted to be projected through the cylinder, a throat plate disposed beneath the rotary cylinder, a paper feeding mechanism, and a device interposed between said rotary cylinder and the feeding mechanism for perforating and cutting the paper in suitable lengths, said device including a cylinder carrying a cutter and a perforator.

3. The combination in a paper folding machine, of a rotary cylinder longitudinally slotted in its periphery, shafts attached to the ends of said cylinder, removable bushings supporting said shafts, a change speed driving gear attached to one of said shafts, a fixed internal gear to which is secured one of said bushings, a shaft eccentrically journaled in the cylinder, a pinion secured on said last named shaft and meshing with the fixed gear, a folding blade secured to the last-named shaft and adapted to be projected through the cylinder, a throat plate disposed beneath the rotary cylinder, a paper feeding mechanism, and a device interposed between said rotary cylinder and the feeding mechanism for perforating and cutting the paper in suitable lengths, said device including a cylinder carrying a cutter and a perforator, the aforementioned throat plate extending close to the line of operative position of said cutter and designed to receive and guide the severed paper.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

CLARENCE L. JOHNSTON.

Witnesses:

A. MACKENZIE,
BARBARA THOMAS.