

**No. 608,843.**

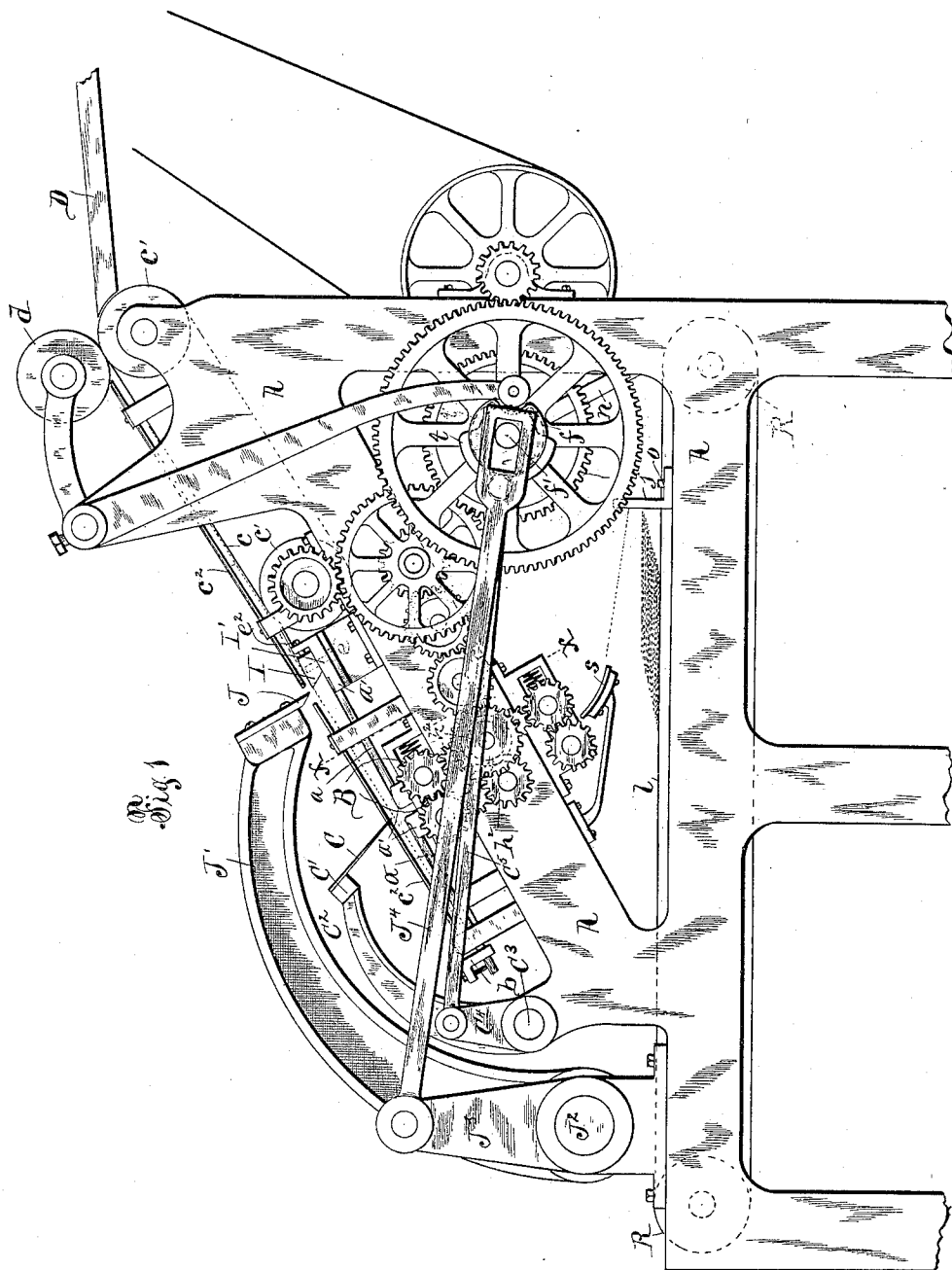
**Patented Aug. 9, 1898.**

**T. C. DEXTER.**  
**PAPER FOLDING MACHINE.**

(Application filed Mar. 17, 1897.)

(No Model.)

4 Sheets—Sheet 1.



WITNESSES :

J. J. Laatz  
H. B. Smith

INVENTOR

INVENTOR  
*Talbot C. Hexter*  
*By E. Laess*  
 his ATTORNEY

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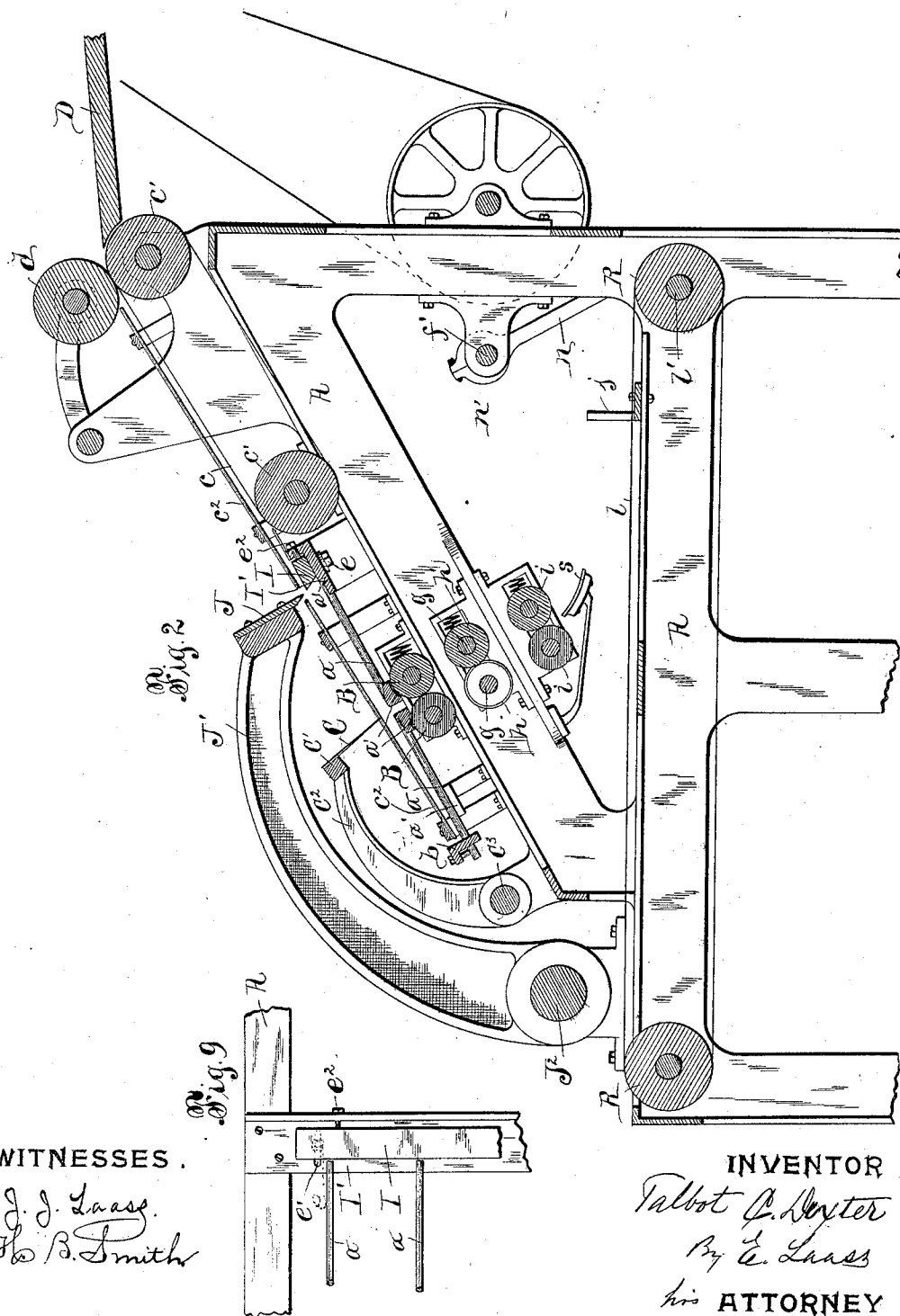
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4 Sheets—Sheet 2.



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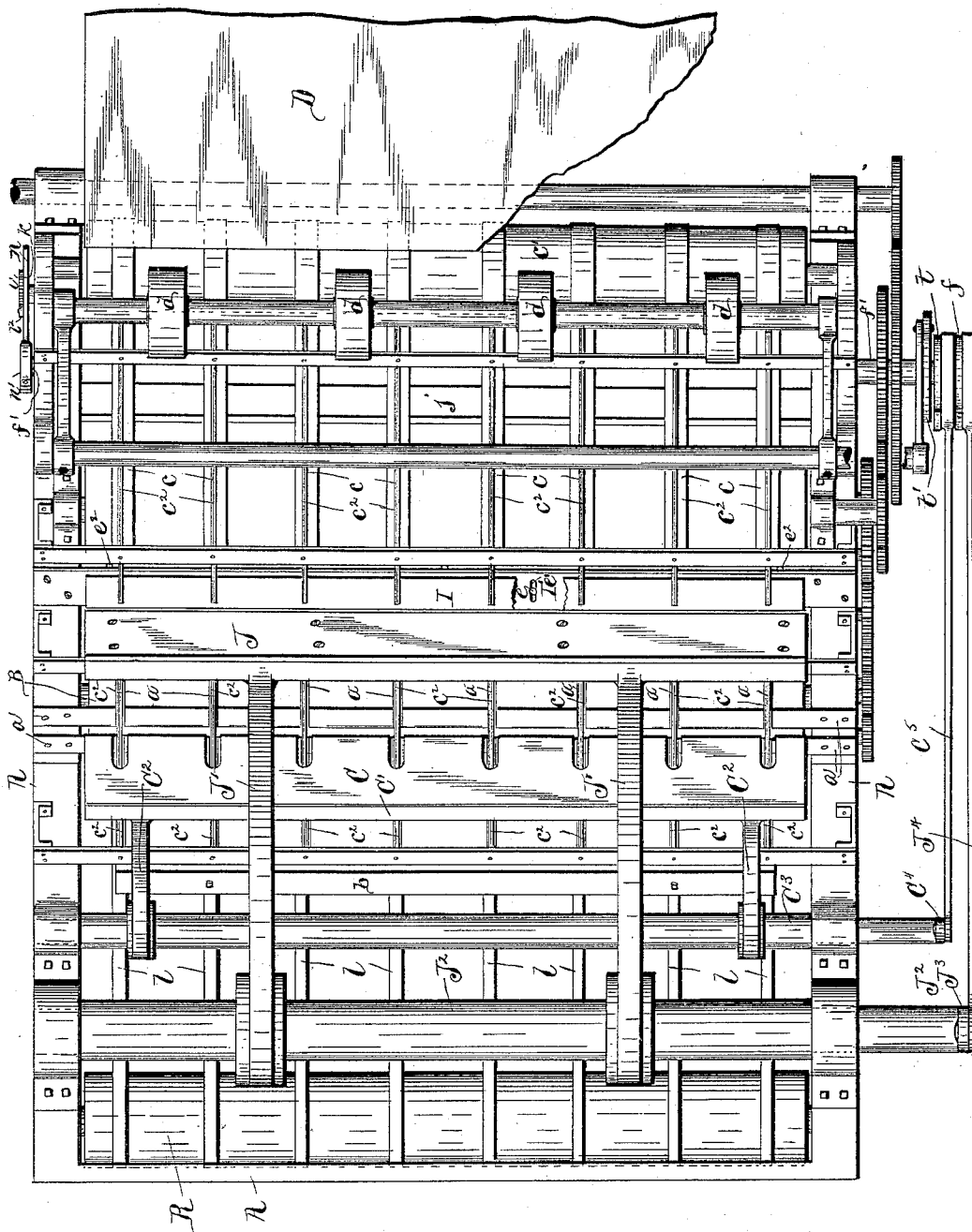
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(No Model.)

4 Sheets—Sheet 3.



WITNESSES:

J. J. Lasey.  
W. B. Smith.

Fig. 3

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No. 608,843.

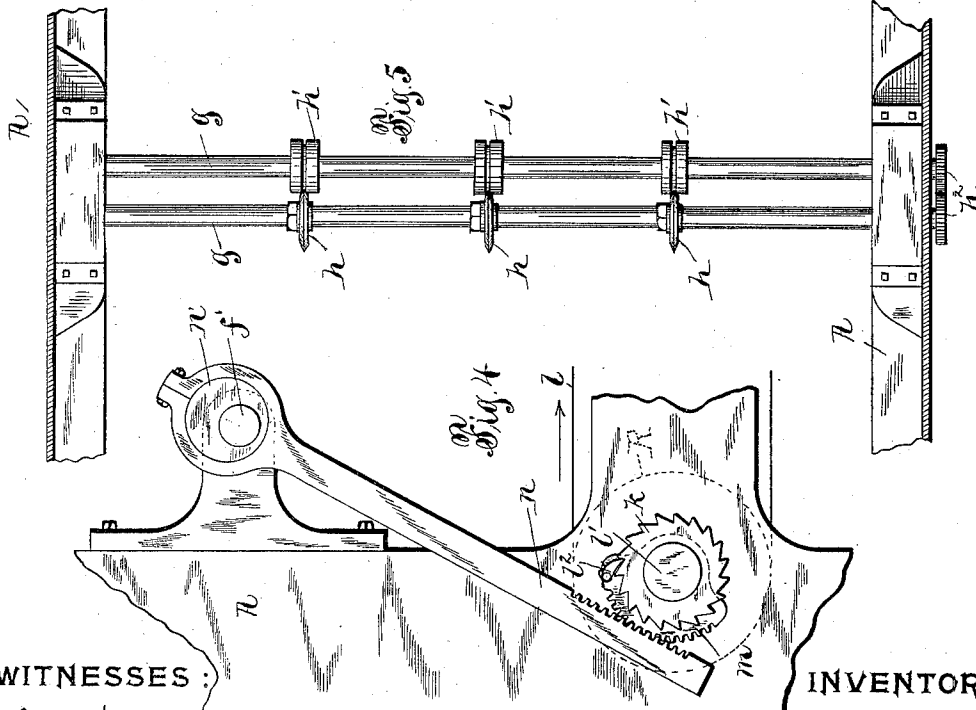
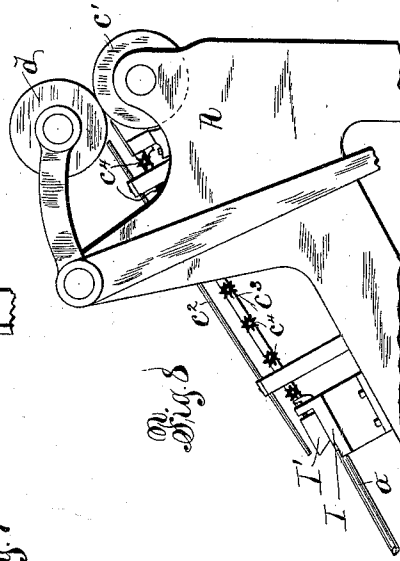
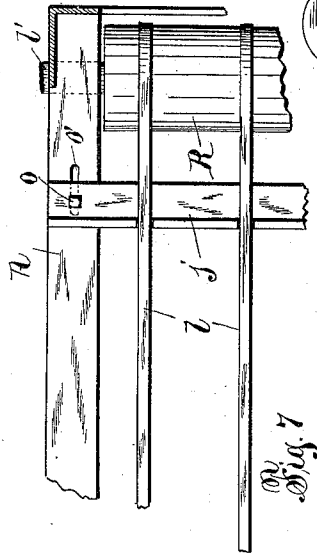
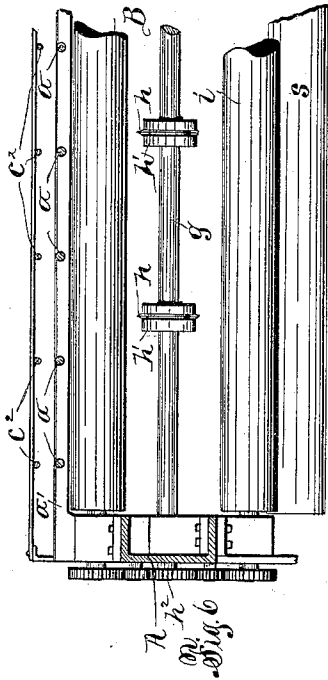
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PAPER FOLDING MACHINE.

(Application filed Mar. 17, 1897.)

(No Model.)

4 Sheets—Sheet 4.



WITNESSES:

J. J. Laess.  
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INVENTOR

Talbot C. Dexter  
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his ATTORNEY

# UNITED STATES PATENT OFFICE.

TALBOT C. DEXTER, OF PEARL RIVER, NEW YORK, ASSIGNOR TO THE  
DEXTER FOLDER COMPANY, OF NEW YORK, N. Y.

## PAPER-FOLDING MACHINE.

SPECIFICATION forming part of Letters Patent No. 608,843, dated August 9, 1898.

Application filed March 17, 1897. Serial No. 627,948. (No model.)

*To all whom it may concern:*

Be it known that I, TALBOT C. DEXTER, of Pearl River, in the county of Rockland, in the State of New York, have invented new and useful Improvements in Paper-Folding Machines, of which the following, taken in connection with the accompanying drawings, is a full, clear, and exact description.

The chief object of this invention is to provide a paper-folding machine which shall deliver the sheets properly folded into pamphlet form and with the edges of the leaves cut, so as to free each leaf thereat from the adjacent leaves and thus relieve the reader of the annoyance of slitting the edges of the pamphlet or printed periodical; and the object of the invention is also to provide simple, efficient, and convenient means for gathering the folded sheets delivered from the folding-machine or other machine delivering sheets of paper successively; and to that end the invention consists in the novel organization of mechanisms hereinafter described, and summed up in the claims.

In the annexed drawings, Figure 1 is a side elevation of a paper-folding machine embodying my invention. Fig. 2 is a vertical longitudinal section of said machine. Fig. 3 is a plan view of the same. Fig. 4 is a side view of the mechanism for imparting intermittent motion to the sheet-gathering carrier. Fig. 5 is a plan view of the cutters, which slit the folded sheets on lines at right angles to the folding-rollers. Fig. 6 is a vertical transverse section on line XX in Fig. 1 of the drawings. Fig. 7 is a sectional plan view of the sheet-gathering carrier. Fig. 8 is a side view of a modification of the sheet-delivering conveyers, and Fig. 9 is a detail plan view of a portion of the adjustable stationary cutter.

Similar letters of reference indicate corresponding parts.

A denotes the main frame of the machine, which frame may be of any suitable shape to support the various mechanisms of the machine.

BB represent the folding-rollers, which are journaled in boxes mounted on inclined beams of the frame A, and C represents the folding-blade, which tucks the sheet into the bite of said folding-rollers in the usual and well-

known manner. Said blade is secured to a suitable head C', attached to the free ends of two arms C<sup>2</sup> C<sup>3</sup>, secured to a horizontal rock-shaft C<sup>4</sup>, to one end of which shaft is secured an arm C<sup>5</sup>. To said latter arm is secured a pitman C<sup>5</sup>, receiving reciprocating motion from a cam *t* on the driving-shaft *f'*, by which intermittent oscillatory motion is imparted to the arms C<sup>2</sup> C<sup>3</sup>. In the front and rear of the bite of said rollers are sheet-supports, preferably formed of bars *a a*, disposed at right angles to the folding-rollers and inclined in one direction. Said bars are secured to cross-bars *a' a'*, which are properly supported at opposite sides of the machine.

*b* represents the usual front stop or sheet arresting and alining gage, which is adjustably attached to the lower ends of the bars *a*. From the upper ends of said sheet-supporting bars extend the sheet-delivering conveyers *c c*, which are disposed in a higher plane than said bars and are inclined correspondingly to deliver the paper into its requisite position on the folding-machine.

D represents the feed-board from whence the paper is fed to the conveyers *c*. Said conveyers may consist either of endless tapes or belts running on rollers *c' c'*, extending across the machine and journaled in suitable bearings on the sides of the main frame A, or in lieu of said tapes or belts stationary bars *c<sup>3</sup>*, with star-wheels *c<sup>4</sup>* pivoted to the sides thereof, as shown in Fig. 3 of the drawings, may be used for carrying the sheet down to its requisite position over the folding-rollers. In either case, however, the upper roller *c'* is to be used with drop-rollers *d* over it to propel the sheet from the feed-board D onto the inclined conveyers. Over said conveyers, as well as over the sheet-supporting bars *a a*, are longitudinal sheet-guiding bars *c<sup>2</sup> c<sup>2</sup>*.

Between the upper ends of the sheet-supporting bars and lower ends of the sheet-conveyers is interposed a stationary cutter I, which extends across said ends of the conveyers on a line parallel with the folding-rollers and is mounted on a bar I', which is firmly secured at its ends to the sides of the main frame. Said cutter is adjustably fastened to the bar I' by means of bolts *e*, inserted from the bottom of the lower bar I' and

passing through a transverse slot  $e'$  in said bar, as shown in Fig. 1 of the drawings, and entering a screw-threaded socket in the under side of the cutter. Said adjustable attachment allows the cutter to be set to take up the wear thereof and into a proper position to cooperate with the shearing-blade J. The cutter is further sustained in its adjusted position by means of set-screws  $e^2$ , passing through a vertical flange on the lower bar  $I'$  and abutting against the back of the cutter. This cutter is disposed with its top in the same plane with the tops of the sheet-delivering conveyers  $c c$ , so as to allow the sheet to pass from said conveyers over the cutter and down onto the supporting-bars  $a a$ . Over said stationary cutter is the shearing-cutter J, attached to oscillatory arms  $J'$ , fixed to the rock-shaft  $J^2$ , which is mounted in bearings on the sides of the main frame and has an arm  $J^3$  attached to its end. A pitman  $J^4$ , attached to the free end of said arm and receiving reciprocating motion from a cam  $f$  on the main driving-shaft  $f'$ , serves to impart the requisite shearing motion to the cutter J. The said cutter and the gage  $b$  are disposed parallel with and equidistant from the folding-rollers B B to cause the line of folding to be located exactly midway the length of the sheet lying between said cutter and gage.

Beneath the folding-rollers B B and parallel therewith are two shafts  $g$  and  $g$ , journaled similar to said rollers in bearings on the side of the frame A. To one of these shafts are fastened properly-spaced cutting-disks  $h h$ , which have their edges passing through circumferential grooves in collars  $h' h'$ , fixed to the other of said shafts, as shown in Fig. 5 of the drawings. These shafts have secured to corresponding ends intermeshing gears  $h^2 h^2$  to cause the cutting-disks  $h$  and collars  $h'$  to revolve in directions and at a velocity corresponding to those of the folding-rollers. Said cutting-disks slit the sheets on lines at right angles to the folding-rollers and divide the folded sheets into four equal parts or signatures, as hereinafter more fully described. Beneath the shafts  $g g$  and parallel therewith are two rollers  $i i$ , sustained contiguously side by side in the same manner as the folding-rollers B B and in position to receive between them the aforesaid signatures. These rollers are geared to rotate similar to the folding-rollers and serve to compress and smooth said signatures.

Below these compressing-rollers I employ my improved sheet or signature gatherer, which consists, essentially, of a longitudinally-movable carrier receiving upon it the folded signatures and a detent  $j$  for controlling the position of the delivered sheets or signatures on said carrier.

I prefer to form said gatherer of endless belts  $l l$ , running on horizontal parallel rollers R R, which are journaled in boxes secured to the sides of the frame A. Said belts are moved longitudinally at regular intervals by suitable

mechanism receiving motion from the driving-shaft of the machine. Said actuating mechanism of the signature-gatherer is illustrated in Fig. 4 of the annexed drawings and consists of a ratchet-wheel  $k$ , fastened to the shaft  $l'$  of one of the rollers R, and a pawl  $k^2$ , pivoted to a pinion  $m$ , mounted loosely on said shaft contiguous to the side of the ratchet-wheel. A rack  $n$  engages the pinion  $m$  and receives reciprocating motion from a rotary eccentric  $n'$ , to which said rack is connected.

The detent  $j$  I prefer to form of a bar extending across the machine parallel with the rollers R and adjustably secured to the sides of the frame A by bolts  $o$ , passing through a horizontal flange on the bar  $j$  and through longitudinal slots  $o'$  in the frame A, as represented in Fig. 7 of the drawings. Said attachment allows the detent  $j$  to be adjusted in its position to accommodate it to different sizes of paper or signatures to be gathered on the belts  $l l$ .

To properly guide the signatures onto said belts, I place under the compressing-rollers  $i i$  a chute  $s$ , which leads from the bite of said rollers toward the detent  $j$ .

A suitable train of gears (shown in Fig. 1 of the drawings) transmits motion to the folding-rollers B B, cutter-shafts  $g$ , and compressing-rollers  $i i$ , all of which rotate in unison, and by means of suitable cams  $t'$  and  $t$  and  $f$ , attached to the driving-shaft  $f'$ , as more clearly shown in Fig. 3 of the drawings, the drop-rollers  $d$ , shearing-cutter J, and folding-blade C receive their respective properly-timed motions to act in unison with the aforesaid rollers and cutter-shafts.

The purpose of the described machine is to sever from a printed sheet the component signatures of a magazine or pamphlet and to fold and properly gather said signatures in a convenient condition for binding the same in book form with the edges of the leaves cut, so as to allow each leaf to be turned from the adjacent leaf or leaves.

The operation of the machine is as follows: The printed sheet is placed upon the feed-board D in such a position as to present toward the upper ends of sheet-conveyers  $c c$  the same edge of the sheet which was used in gaging it in the process of printing the sheet. From the feed-board the said sheet is passed under the drop-rollers  $d$  in the usual manner. The drop-rollers then descend and cause the sheet to be carried down on the inclined conveyers  $c$  and supporting-bars  $a a$  to the gage  $b$ , which arrests the further forward movement of the sheet by contact with the front edge of the sheet, which is the edge by which the sheet was gaged in printing, as aforesaid, and consequently the margin of the sheet adjacent to the gage  $b$  is perfectly uniform. This gage is adjusted so that the exact center of the middle margin on the sheet is brought precisely over the cutting edge of the cutter I. Then the shearing-blade J descends and severs the sheet. The lower half of the sheet

lying over the bars *a a*, which are in a lower plane than the conveyers *c c*, causes the upper end of said portion of the sheet to drop from the edge of the cutter *I*. The blade *J* having then been lifted causes the upper half of the sheet to be carried down and shifted onto the top of the lower half. The front edge of said upper section or half of the sheet coming in contact with the gage *b* and becoming aligned thereby causes the two front edges of the two halves of the sheet to be perfectly even and the central margins of said portions of the sheet to lie central and parallel over the bite of the folding-rollers. The folding-blade *C* then tucks the paper into the bite of the folding-rollers in the usual manner, and in passing between said rollers the two halves of the sheet are folded jointly and then pass between the cutters and grooved collars *h'* and are thereby slit on lines at right angles to the folding-rollers and divided into four equal parts, each of which comprises a signature of eight pages. These signatures thence pass between the compressing-rollers *i i* and onto the belts *b b* of the gatherer. In the approach to the latter the advance edges of the folded signatures strike the detent *j* and become thereby properly deposited on said belts. The intermittent travel of the belts is so timed that after the deposit of each set of signatures upon the belts the latter travel about one-half or three-fourths of an inch, so as to carry the signatures that distance from the detent, and thus guard against the striking of the advance edges of the succeeding signatures against the rear edges of the deposited signatures. The signatures are thus gathered in a very neat and convenient condition for removing them from the belts *l l* and for binding the signatures into book form.

What I claim as my invention is—

1. The combination with the folding-rollers, of conveyers depositing the sheet over said rollers, a cutter severing the sheet on a line parallel with and remote from the rollers, means for shifting the remote severed section of the sheet upon the section lying over the rollers, and a blade tucking said sections jointly into the bite of the folding-rollers as set forth.

2. The combination with the folding-rollers, paper-supports in front and rear of said rollers, and conveyers delivering the paper upon said supports, of a gage and a cutter disposed parallel at opposite sides of and equidistant from the folding-rollers, and means for shifting the rear severed section of the sheet upon the top of the front section thereof, substantially as set forth.

3. In a paper-folding machine the combination with the folding-rollers, folding-blade, sheet arresting and alining gage, and paper-supports at opposite sides of the folding-rollers, conveyers delivering the sheet to the gage and disposed in a higher plane than the aforesaid sheet-supports, a cutter severing the

sheet at the junction of said delivering-conveyers and sheet-supports, and means for shifting the rear severed section of the sheet from the said conveyers onto the top of the section lying upon the aforesaid supports.

4. In a paper-folding machine the combination with the folding-rollers, folding-blade, sheet-supports in front and rear of said rollers and sheet arresting and alining gage, of sheet-conveyers delivering the sheet to the aforesaid gage and disposed in a higher plane than said sheet-supports, a stationary cutter extending across the machine at the junction of the sheet-conveyers and sheet-supports and in the same plane with said conveyers, and a shearing-blade over the stationary cutter to sever the delivered sheet, as set forth and shown.

5. In combination with the folding-rollers and folding-blade, sheet-supporting bars at the rear and front of said rollers and inclined, respectively, to and from the rollers, a stationary cutter extending across the upper ends of the rear supporting-bars and elevated therefrom, sheet-delivering conveyers extending rearward from and inclined to said cutter, and a shearing-blade over the stationary cutter and severing the sheet thereat and in its downward movement dropping the lower severed section of the sheet from the cutter, and in its elevated position allowing the upper section of the sheet to slide down upon the top of the lower section preparatory to folding one within the other, as set forth.

6. In combination with the folding-rollers, folding-blade and sheet-supports in front and rear of said rollers, a cutter severing the sheet on a line parallel with the folding-rollers while lying at rest across said rollers, means for shifting one of the severed sections of the sheet onto the top of the other section, and a cutter severing the jointly-folded sections of the sheet on a line at right angles to the folding-rollers, as set forth.

7. In combination with the folding-rollers, folding-blade, sheet-supports in front and rear of said rollers and inclined in one direction and in lines at right angles to the folding-rollers, a sheet-arresting gage on the lower ends of said supports, sheet-delivering conveyers at the upper ends of the sheet-supports, a cutter interposed between said conveyers and supports severing the sheet on a line parallel with the folding-rollers, means for shifting the severed upper section of the sheet onto the top of the lower section, and cutters severing the jointly-folded sections of the sheet on lines at right angles to the folding-rollers, as set forth.

8. In combination with the folding-rollers and folding-blade, sheet-supports in front and rear of said rollers, a cutter severing the sheet at the receiving end of said supports and on a line parallel with the folding-rollers, means for shifting one of the severed sections of the sheet onto the top of the other section, cutters beneath the folding-rollers slitting the

jointly-folded sections on lines at right angles to the folding-rollers, compressing-rollers receiving the slitted sheets between them, and a longitudinally-movable carrier gathering the sheets delivered from said compressing-rollers.

9. In combination with the folding-rollers and folding-blade, sheet-supporting bars in front and rear of said rollers and inclined in one direction at right angles to the folding-rollers, a sheet-arresting gage on the lower ends of said bars, sheet-delivering conveyers at the upper ends of said bars and in a higher plane, a stationary cutter extending across the delivery end of said conveyers and in the same plane therewith, a shearing-cutter over said stationary cutter and severing the sheet, rotary cutters beneath the folding-rollers slitting the jointly-folded sections of the sheet

on lines at right angles to the folding-rollers, sheet-compressing rollers receiving between them the slitted sheets, two parallel horizontal rollers disposed in a plane beneath the compressing-rollers, endless belts running on said rollers, a chute conducting the slitted sheets to said belts, a detent over the belts controlling the position of the sheets thereon, and mechanism imparting to said belts an intermittent longitudinal movement from the sheet-arresting side of the detent, substantially as described and shown.

In testimony whereof I have hereunto signed my name this 23d day of February, 1897.

TALBOT C. DEXTER. [L. S.]

Witnesses:

V. E. MARSH,  
J. F. COLE.