(No Model.)

4 Sheets—Sheet 1.

T. C. DEXTER.

PAPER REGISTERING MECHANISM.

No. 575,150. Patented Jan. 12, 1897.

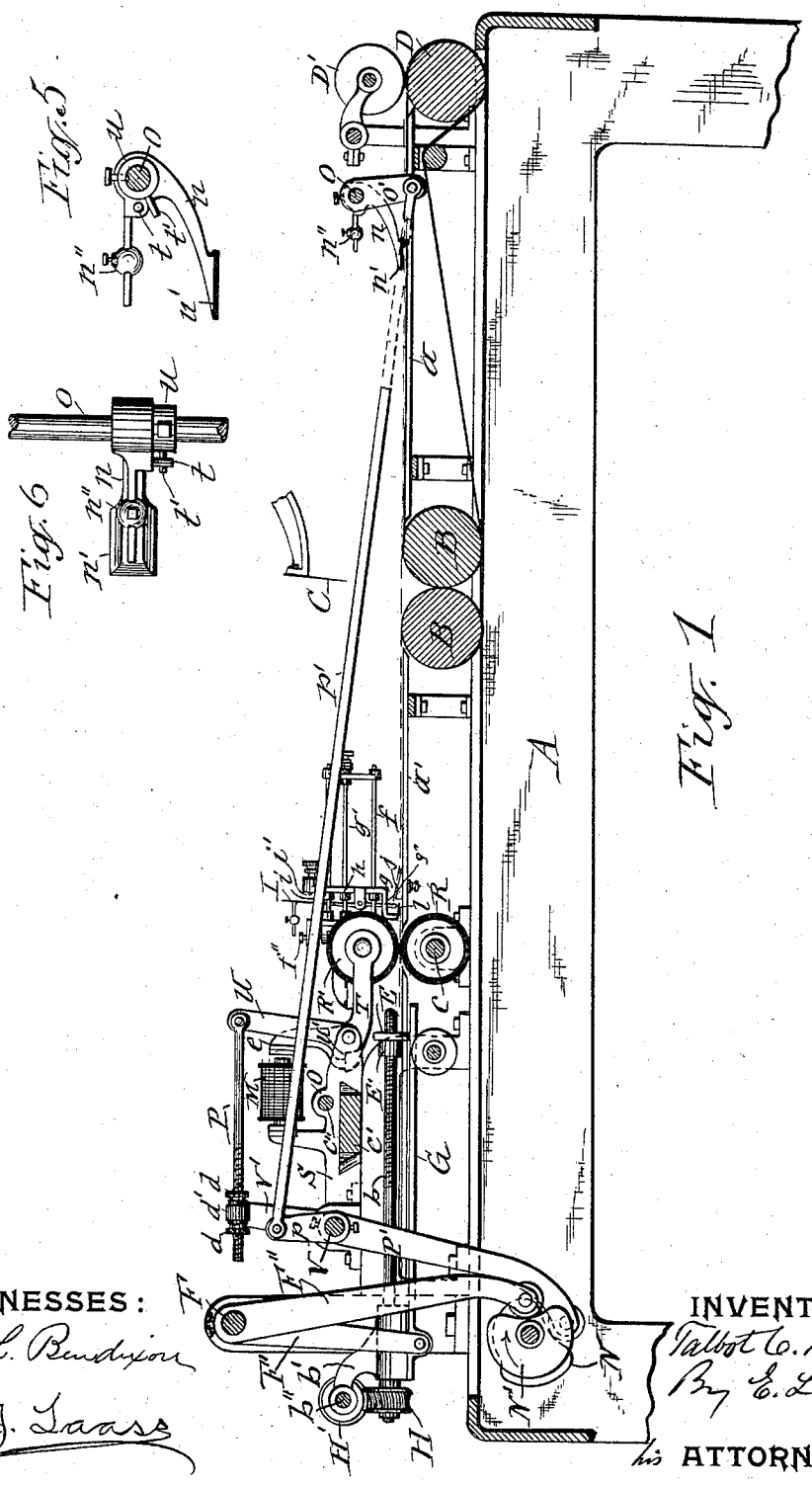

Fig. 1

Fig. 4

Fig. 6

WITNESSES:

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J. J. Lanss

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(No Model.) 4 Sheets—Sheet 2.

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PAPER REGISTERING MECHANISM.

No. 575,150. Patented Jan. 12, 1897.

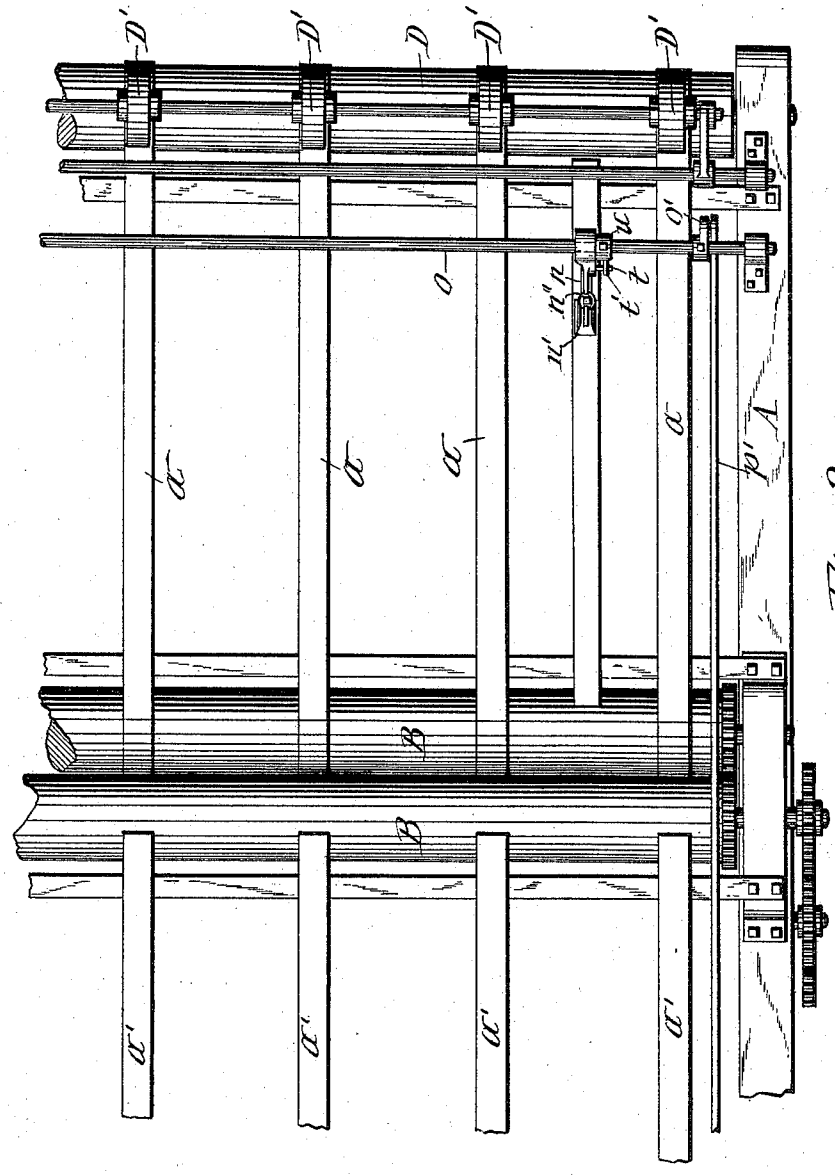

Fig. 2.

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(No Model.) 4 Sheets—Sheet 3.

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PAPER REGISTERING MECHANISM.

No. 575,150. Patented Jan. 12, 1897.

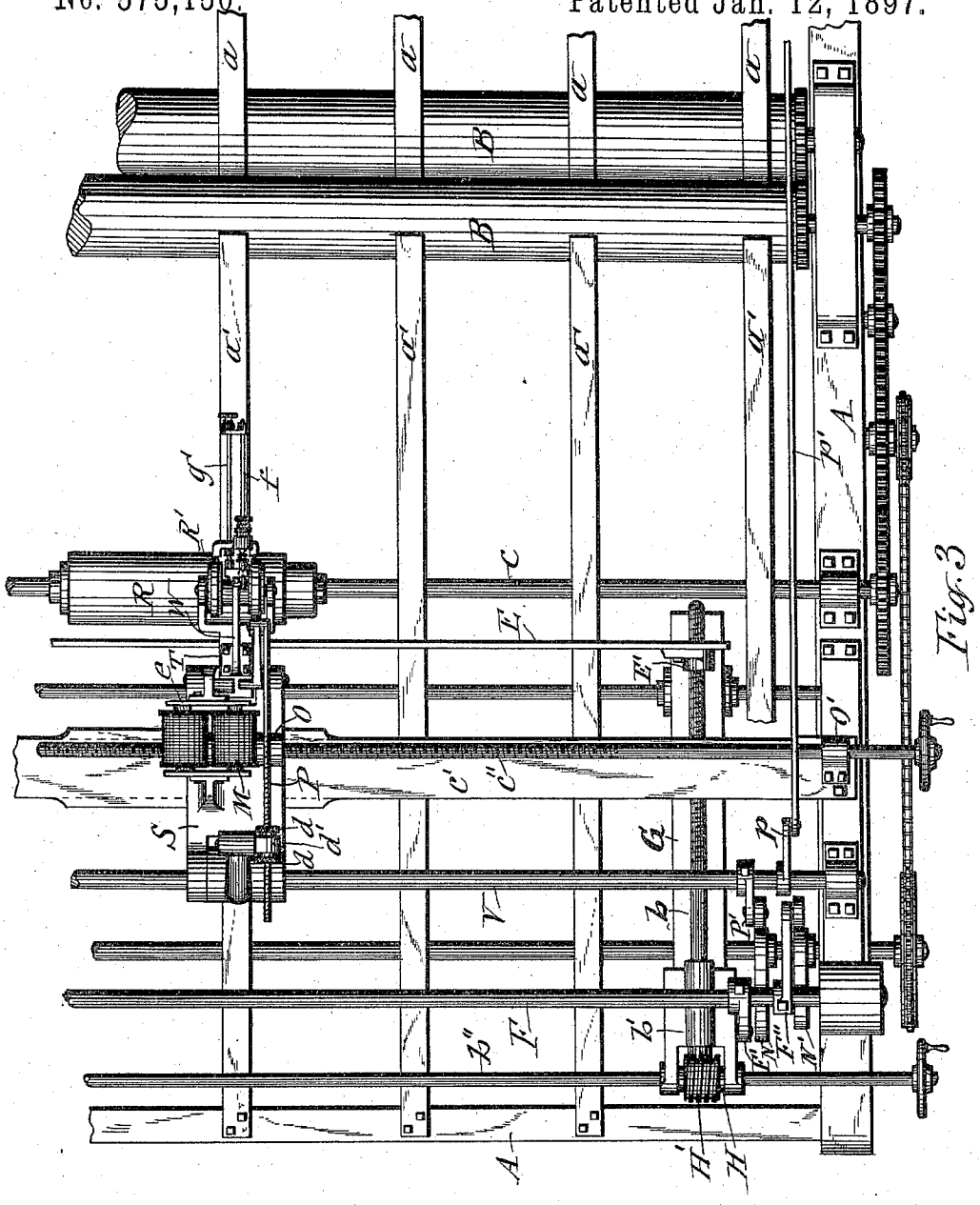

Fig. 3

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(No Model.) 4 Sheets—Sheet 4.

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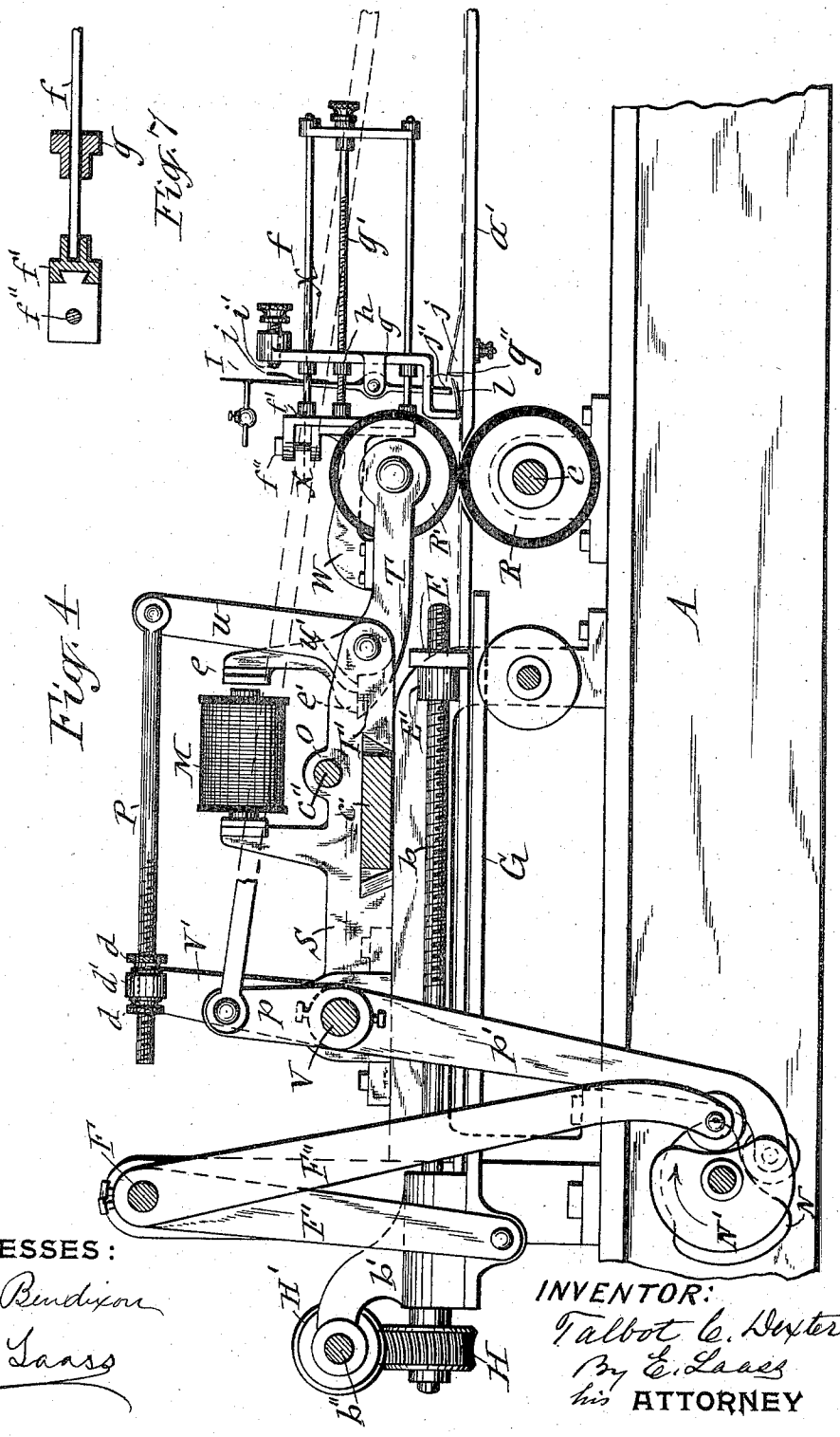
PAPER REGISTERING MECHANISM.

No. 575,150. Patented Jan. 12, 1897.



WITNESSES:

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UNITED STATES PATENT OFFICE.

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

PAPER-REGISTERING MECHANISM.

SPECIFICATION forming part of Letters Patent No. 575,150, dated January 12, 1897.

Application filed December 9, 1895. Serial No. 571,520. (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-Registering Mechanism, of which the following, taken in connection with the accompanying drawings, is a full, clear, and exact description.

This invention is designed more particularly for registering very thin and flimsy paper, especially on paper-folding machines on which the sheet is carried over the folding-rolls and to a front stop by means of traveling tapes. The flimsy sheet thus delivered is liable to buckle and sag in the space over the bite of the folding-rolls, owing to the want of proper support for the sheet thereat and the simultaneous forward impulse imparted to the sheet by the rapidly-traveling tapes. Said buckling and sagging destroy the accuracy of the subsequent folding of the sheet.

My invention is also essential to paper-folding machines or analogous machines designed to operate on thin flimsy paper which is perforated or slitted in predetermined portions of the sheet for the purpose of receiving in the perforations pins or points located on the machine, and thereby registering the sheet preparatory to folding or otherwise operating on the sheet. In machines equipped with the aforesaid registering devices the paper, impelled by the rapidly-moving tapes, is liable to be torn by the registering pins or points entering the perforations.

The object of this invention is to obviate the aforesaid defects; and to that end the invention consists, essentially, in a machine for folding, ruling, or otherwise treating sheets of paper and provided with traveling tapes carrying the sheet on the machine, the combination of registering instruments having points entering perforations made in the sheet for that purpose, and a sheet-restraining brake checking the advance movement of the sheet to protect the same from being torn by the registering-points.

The invention also consists in the combination, with the folding-rolls, folding-blade, and sheet-conveying tapes passing the sheet to said rolls, of a sheet-restraining brake engaging one end of the delivered sheet, and sheet-propelling mechanism engaging the opposite end of said sheet during the restraining action of the brake, and thereby smoothing the sheet during the impact of the folding-blade; and the invention also consists in certain details of the component parts of the sheet registering and stretching mechanism, as hereinafter described, and set forth in the claims.

In the annexed drawings, Figure 1 is a vertical longitudinal section taken immediately inside of the main supporting-frame of a paper-folding machine equipped with my invention. Figs. 2 and 3 are enlarged plan views of the front and rear end portions, respectively, of the said folding-machine with my invention connected thereto. Fig. 4 is a further enlarged side view of the electrically-controlled paper-registering mechanism. Figs. 5 and 6 are enlarged side and plan views of the sheet-restraining brake, showing the means for obtaining the lost motion between said brake and its supporting-shaft; and Fig. 7 is a horizontal section on line $x\ x$ in Fig. 4.

Similar letters of reference indicate corresponding parts.

A represents the main supporting-frame of the paper-folding machine. B B denote the rolls which receive the paper between them and fold said paper. C designates the blade which tucks the sheet between said folding-rolls. D is the feed-roller upon which run the tapes $a\ a$, which convey the sheet across the folding-machine, and D′ is the drop-roller which presses the sheet upon the traveling tapes. All of said parts are arranged to operate in the usual and well-known manner.

E represents the front stop or end gage against which the end of the paper is made to abut during the process of feeding said sheet to the folding-machine. This gage is made to intermittently move part way toward and from the folding-rolls by means of suitable mechanism, which in this case is represented to consist of a rock-shaft F, having depending from it, near each end thereof, an arm F′, the lower end of which is connected to one of the longitudinal bars G, to which the aforesaid gage is adjustably secured by means of a screw-rod b, passing through a nut E′ on the gage and journaled in a bracket b', attached to the bar G. A gear H on the

end of the screw-rod *b* meshes with a worm H′ on a shaft *b″*, which extends across the machine and is provided with a hand wheel or crank by which to turn it.

The rock-shaft F receives motion from a lever F″, which is attached thereto and oscillated by a rotary cam N′. In connection with said movable gage I employ suitable sheet-propelling mechanism for imparting a secondary impulse to the sheet after the gage E has receded from the paper arrested by said gage, which secondary movement of the sheet I utilize in conjunction with a sheet-restraining brake for stretching the sheet, as hereinafter described. Said stretching of the sheet preparatory to registering and folding the same is the salient feature of my present invention.

For imparting the aforesaid secondary impulse to the sheet and at the same time registering the same I prefer to employ electrically-controlled devices similar to those shown in my Letters Patent of the United States No. 528,657, dated November 6, 1894, but in an improved construction of its details whereby the same is simplified and dispenses with a number of actuating-gears, as hereinafter described. In the present case the roller R is fastened to a transverse shaft *c*, journaled in bearings on the sides of the frame A and rotated by suitable gearing, as indicated by dotted lines 1 2 3 4 in Fig. 3 of the drawings.

Upon a bar *c′*, which is parallel with the shaft *c* and secured to the frame A, rides a carriage S, which is adjustable lengthwise of said bar to accommodate to the width of the paper the sheet-registering devices carried on said carriage. The adjustment of the carriage is effected by means of a screw-rod *c″*, which is parallel with the bar *c′* and journaled in a suitable bearing O′ on the frame A and passes through a nut O, formed on the carriage.

To the end of the carriage facing toward the folding-rolls B B is hinged or pivoted the arm T, to the free end of which is pivoted the roller R′, arranged directly over the rotary roller R, which latter is faced with hard rubber. In proximity to the arm T is another arm U, pivoted to the carriage and provided with a lug U′, by which it bears on the top of a shoulder T′, formed on the heel of the arm T. In the opposite end of the carriage S is journaled a rock-shaft V, to which is fastened a lever V′, the free end of which is connected by a rod P to the end of the arm U, which latter thus receives oscillatory motion from said rock-shaft, and by the engagement of the lug U′ with the shoulder T′ it intermittently lifts the roller R′ from the lower roller R. In order to allow said motion of the roller R to be regulated to lift it to the desired height from the lower roller, the rod P is adjustably connected to the lever V′, which connection may be made by means of the screw-threaded end portion of the rod passing freely through an ear *d′* on the lever and provided with nuts *d* at opposite sides of said ear.

The rock-shaft V receives its motion by means of a lever P′, fastened to said shaft and having its free end held in operative contact with a rotary cam N, as shown in Fig. 4 of the drawings. The aforesaid mechanism lifts the roller R′ to its extreme elevation to allow the front portion of the sheet to freely pass under it, as hereinafter more fully explained. The roller R′ receives also another lift by means of the armature *e* of an electromagnet M, the energy of which is controlled by a circuit maker and breaker actuated by the paper when propelled by the aforesaid rollers R R′. Said armature is provided with a lug *e′*, by which it bears upon the top of the shoulder T′ of the arm T.

To the arm T of the roller R′ is firmly secured a block W, the free end of which is formed with a vertical face, on which is supported the bracket *f*, the attaching end of which consists of a vertical bar *f′*, which is connected to the aforesaid face of the block W by a vertical tongue on one of said parts sliding in a corresponding groove on the other of said parts, as illustrated in Fig. 7 of the drawings.

A set-screw *f″*, connected to a projection on the upper end of the bar *f′* and bearing on top of the block W, serves to support the bracket *f* adjustably in a vertical direction, so as to carry said bracket a greater or less distance from the plane of the paper-supporting bars *a′*.

On the bracket *f* rides a hanger *g*, which is movable in a horizontal direction and adjustably sustained in its position by means of the horizontal screw-rod *g′*, journaled on the bracket and passing through a nut *h* on the hanger, as more clearly shown in Fig. 4 of the drawings.

To the hanger *g* is pivoted the vertically-disposed circuit making and breaking finger I, designed to be operated by the paper moved by the rollers R R′. The electric terminal *i* is attached to the upper end of said finger and in position to be brought in contact with the terminal *i′*, which is attached to the hanger *g*. In connection with the said finger I, I prefer to employ the bridge *j*, which rises gradually from the plane of the paper-supporting bars *a′* and terminates abruptly adjacent to the lower end of the finger I, which is in front thereof and presents thereat an abutment *j′* for the edge of the slitted portion of the paper lying upon the bridge *j*, which, in conjunction with the sheet-depressing shoe *l*, serves to open or distend the slit made in the paper during its passage through the printing-press from which the paper is delivered to the folding-machine, said slit being made for registering the paper, so as to bring it in alinement with the folding-rolls. In order to sustain said shoe in its proper operative position, I attach it to an extension *g″* of the hanger *g*, so as to adjust the shoe simultaneously with the finger I.

The registering of the paper is effected in the following manner: In the operation of the folding-machine the tapes *a a* carry the sheet in the usual manner over the folding-rolls B B until the front edge of the sheet comes in contact with the gage E, by which it is arrested. During this movement of the sheet the roller R′ is lifted by the arm U and its connection with the rock-shaft V and the bearing of the lug U′ on the shoulder T′ of the roller-arm T. Said lifting of the roller R′ allows the sheet to pass freely under it. As soon as the sheet has been arrested by the gage E the latter recedes and the arm U is tilted to allow the roller R′ to drop onto the portion of the sheet riding on the revolving roller R, by the frictional contact of which the sheet receives a secondary forward impulse, and in drawing the same forward the slitted portion of the sheet is drawn over the bridge *j*, the upward pressure of which at the rear of the slit with the downward pressure of the shoe *l* in front of the bridge strains the paper so as to open the slit and allow the shoe to enter the slit and cause the raised edge of the slitted portion to abut against the lower end of the finger I, which is thereby tilted so as to close the electric circuit. The magnet M, which is thereby energized, attracts its armature *e* and causes the same to lift the roller R′ by the engagement of the lug *e′* with the shoulder T′. The roller R thus loses its hold upon the paper and leaves the same in its registered position.

In my present invention I further utilize the forward draft of the rollers R R′ on the paper in conjunction with a sheet-restraining brake bearing on the opposite end of the sheet to stretch the sheet and hold it properly registered and smoothly across the folding-rolls B B. Said brake I prefer to form of an arm *n*, which is hung loosely on a transverse shaft *o*, and has its free end provided with a brake-shoe *n′*, of either felt or rubber or other suitable material affording the required frictional hold on the paper, with which it is held normally in contact by gravity of the arm, which may be provided with an adjustable weight *n″*, by which to regulate the pressure of the brake upon the paper according to the quality of the latter.

The rock-shaft *o* receives its motion from the rock-shaft V, which lifts the roller R′. Said motion is transmitted from shaft to shaft by means of arms *o′* and *p*, attached, respectively, to the shafts *o* and V, and connected by a rod *p′*, as shown in Fig. 1 of the drawings.

The bearing of the brake *n* on one end of the sheet simultaneously with the draft exerted on the opposite end of said sheet by the rollers R R′ stretches the paper as aforesaid. The cam N, which actuates the rock-shaft V, is formed with two cam-faces of different radii stepped to impart to said shaft two successive increasing turns in one direction and thus cause the arm U to lift the roller-arm T and bracket *f* twice in succession to increased elevations. The first lift of said arm causes the shoe *l* to lift the slitted portion of the sheet above the bridge *j* to prevent the latter from tearing the sheet in its movement to the folding-rolls, and the second lift of said arm raises the roller R′ still farther to permit the next sheet to freely enter under said roller.

In order to allow the brake *n* to retain its hold on the sheet until the blade C has tucked the sheet between the folding-rolls, I provide a lost motion between the shaft *o* and brake-arm sufficiently to allow the rock-shaft V to lift the roller-arm T, with the bracket *f*, attached thereto for raising the slitted portion of the sheet from the bridge *j*, as aforesaid, without disturbing the brake *n* from its bearing on the sheet, but cause the hereinbefore-described second motion of the rock-shaft V to lift the brake *n* from the sheet and thus allow said sheet to be freely drawn in between the folding-rolls B B. The aforesaid lost motion may be obtained by means of a pin *t*, projecting from the side of the brake-arm in such a position as to cause it to come in contact with a pin *t′*, projecting from a collar *u*, fastened to the shaft *o*, as shown in Figs. 5 and 6 of the drawings.

What I claim as my invention is—

1. In combination with the folding-rollers, folding-blade and sheet-conveying tapes, sheet-shifting mechanism engaging the advance edge of the sheet and imparting a secondary forward impulse to said sheet, registering-points located between said shifting mechanism and folding-blade and operating independently of said blade to enter into the slits of the sheet and register the said sheet in advance of the operation of the folding-blade, and sheet-restraining brakes engaging the rear end portion of the sheet to check the motion of the sheet during the entrance of the registering-points into the aforesaid slits, as set forth.

2. In combination with the folding-rolls, folding-blade and sheet-conveying tapes, a sheet-restraining brake engaging the rear end of the sheet, sheet-propelling mechanism engaging and releasing the opposite end of the sheet and mechanism transmitting motion from the propelling mechanism to the aforesaid brake to apply the latter to the sheet simultaneously with the engagement of the propelling mechanism as set forth.

3. In combination with the folding-rolls, folding-blade and sheet-conveying tapes, a rock-shaft over the sheet-feeding end of the machine, a sheet-restraining brake carried on said rock-shaft, sheet-propelling mechanism engaging and releasing the opposite end of the sheet and a rock-shaft controlling the action of said propelling mechanism and connected with the rock-shaft of the brake to apply the latter simultaneously with the engagement of the propelling mechanism as set forth.

4. In combination with the folding-rolls, folding-blades and sheet-conveying tapes, a

rock-shaft over the sheet-feeding end of the machine, a sheet-restraining brake carried on said shaft, an arm attached to the latter shaft, sheet-propelling mechanism engaging and releasing the opposite end of the sheet, a rock-shaft throwing said propelling mechanism out of operative position, an arm attached to the latter rock-shaft and a rod connecting said two rock-arms as set forth.

5. In combination with the folding-rolls, folding-blade and sheet-conveying tapes, a rock-shaft over the feeding end of the machine, a sheet-restraining brake hung on said shaft with a lost motion between them, a rock-arm attached to said shaft, sheet-propelling mechanism over the opposite end of the machine and having one of its sheet-engaging members movable vertically to and from the sheet, a cam-wheel having cam-faces of different radii, a rock-shaft imparting the vertical movement to said member, a rock-arm attached to the latter rock-shaft, and a rod connecting said two rock-arms as set forth and shown.

6. In combination with the folding-rolls, folding-blade, sheet-conveying tapes and a gage arresting the longitudinal movement of the sheet and movable to recede from the arrested sheet, sheet-propelling mechanism imparting a secondary impulse to the arrested sheet, an electromagnet controlling the action of said propelling mechanism, a circuit maker and breaker actuated by the paper moving under the aforesaid secondary impulse, a rock-shaft having an arm throwing the sheet-propelling mechanism out of operative position, a rock-shaft over the feeding end of the machine, a sheet-restraining brake connected to said rock-shaft with a lost motion between them, a rock-arm attached to the latter shaft, and a rod connecting said two rock-arms as set forth.

7. In combination with the sheet-propelling roller R, carriage S, arm T, pivoted to one end of said carriage and provided with the shoulder T′ and the roller R′ pivoted to said arm, the rock-arm U pivoted to the carriage in proximity to the arm T and provided with a lug U′ for engaging the shoulder T′, the rock-shaft V journaled in the opposite end of the carriage, the lever V′ attached to said shaft, and the rod P connecting said lever with the arm U adjustably to regulate the lift of the roller R′ substantially as described.

8. In combination with the sheet-conveying tapes *a*, bridge *j*, rotary roller R, drop-roller R′, electromagnet M and armature of said magnet lifting said drop-roller by energy of the magnet, a bracket carried on the arm of the drop-roller, a circuit making and breaking finger pivoted to said bracket and having its lower end presenting in front of the aforesaid bridge an abutment for the edge of the slitted portion of the sheet, and a sheet-depressing shoe attached to the aforesaid bracket and extending under the aforesaid end of the circuit making and breaking finger substantially as set forth and shown.

9. In combination with the sheet-conveying tapes *a*, bridge *j*, rotary roller R, drop-roller R′, electromagnet and armature of said magnet lifting said drop-roller, a bracket connected to the arm of the drop-roller adjustably in a vertical direction and horizontally toward and from the drop-roller, a circuit making and breaking finger pivoted to said bracket and having its lower end presenting in front of the aforesaid bridge an abutment for the edge of the slitted portion of the sheet, and a sheet-depressing shoe attached to said bracket and extending under the aforesaid end of the circuit making and breaking finger, said adjustable bracket permitting the said finger and shoe to be adjusted in relation to the position of the bridge as set forth.

In testimony whereof I have hereunto signed my name this 19th day of October, 1895.

TALBOT C. DEXTER.

Witnesses:
JAS. A. WHITLOCK,
V. E. MARSH.