(No Model.) 3 Sheets—Sheet 1.

B. W. CHILD, M. B. FOY & F. M. LEAVITT.

PAPER FEEDING MACHINE.

No. 567,264. Patented Sept. 8, 1896.

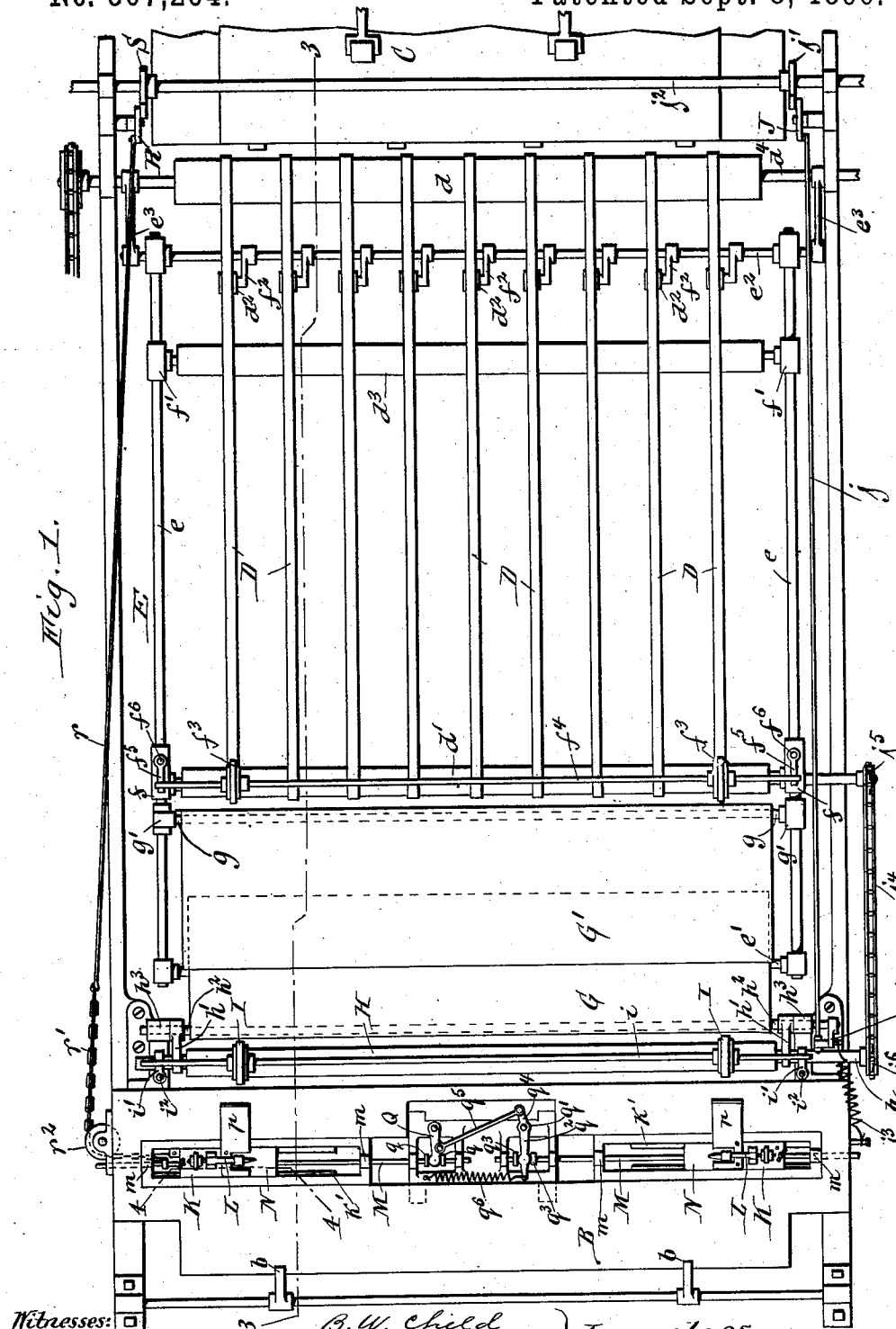

Fig. 1.

Witnesses:
Theo. L. Popp.
Henry L. Deck.

Inventors
B. W. Child
F. M. Leavitt
M. B. Foy
By Wilhelm Bonner
Attorneys.

(No Model.) 3 Sheets—Sheet 2.

B. W. CHILD, M. B. FOY & F. M. LEAVITT.

PAPER FEEDING MACHINE.

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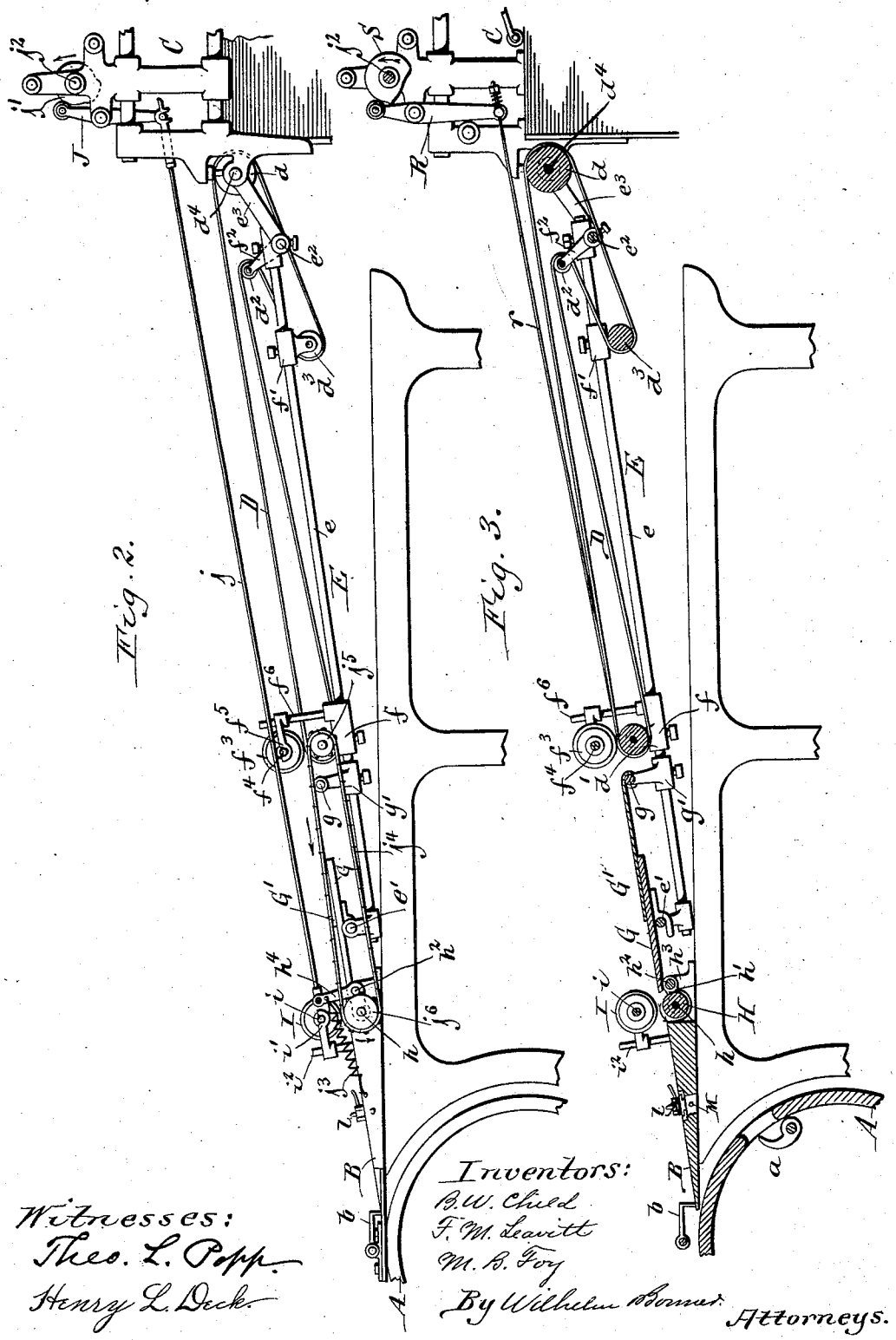

Fig. 2.

Fig. 3.

Witnesses:
Theo. L. Popp.
Henry L. Deck.

Inventors:
B. W. Child
F. M. Leavitt
M. B. Foy
By Wilhelm Bonner
Attorneys.

(No Model.) 3 Sheets—Sheet 3.

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Fig. 4.

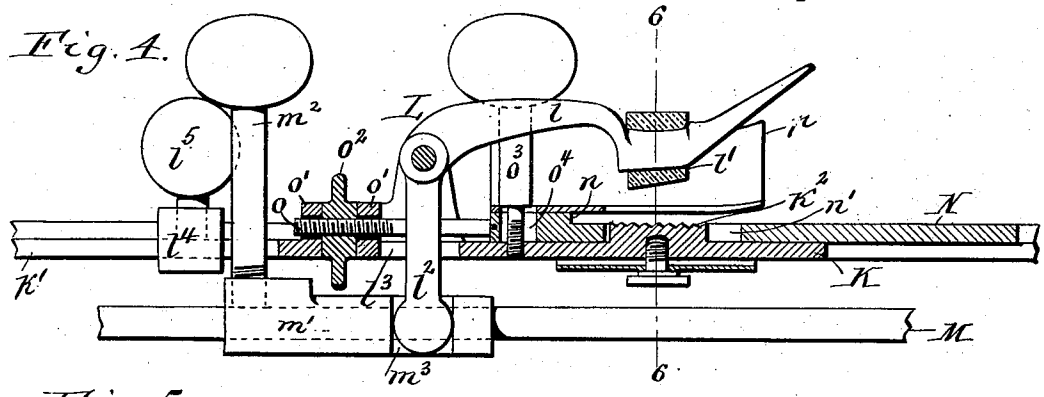


Fig. 5.

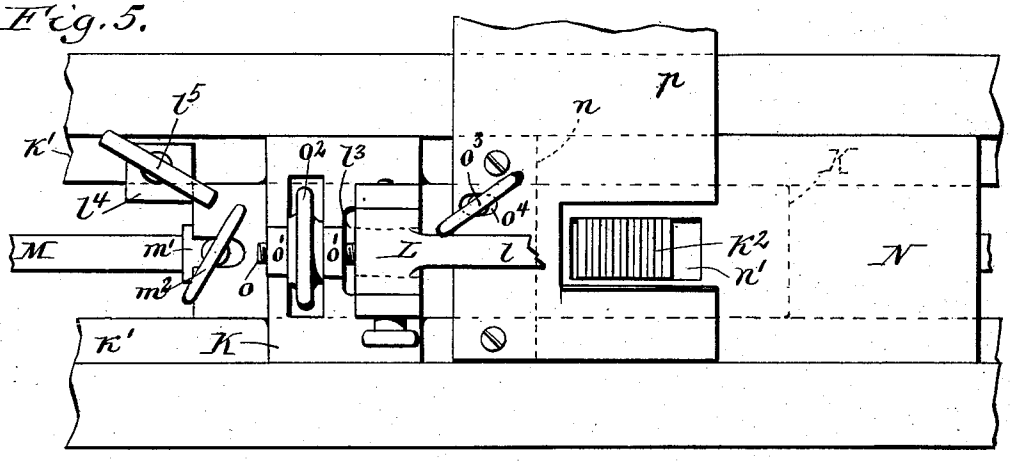
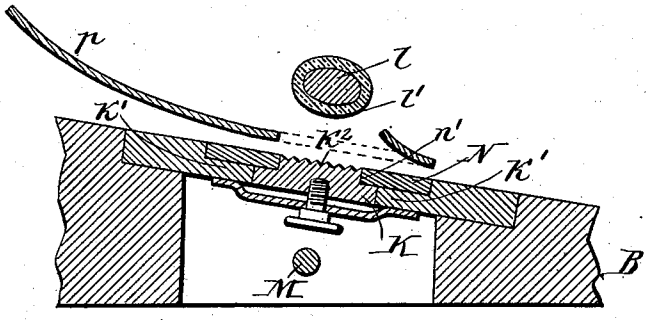


Fig. 6.



Witnesses:
Theo. L. Popp.
Henry L. Dick.

B. W. Child
F. M. Leavitt
M. B. Foy
} Inventors.

By Wilhelm Bonnet
Attorneys.

UNITED STATES PATENT OFFICE.

BRAINERD W. CHILD AND MICHAEL B. FOY, OF NEW YORK, AND FRANK M. LEAVITT, OF BROOKLYN, NEW YORK, ASSIGNORS TO THE ECONOMIC MACHINE COMPANY, OF NEW YORK, N. Y.

PAPER-FEEDING MACHINE.

SPECIFICATION forming part of Letters Patent No. 567,264, dated September 8, 1896.

Application filed September 25, 1895. Serial No. 563,606. (No model.)

To all whom it may concern:

Be it known that we, BRAINERD W. CHILD and MICHAEL B. FOY, of the city and county of New York, and FRANK M. LEAVITT, of the city of Brooklyn, Kings county, State of New York, citizens of the United States, have invented new and useful Improvements in Paper-Feeding Machines, of which the following is a specification.

This invention relates to a sheet-paper-feeding machine and more particularly to the carrying and registering devices arranged between the feeding mechanism and the printing-press or other machine to which the sheets are fed.

One of the objects of our invention is to improve the sheet-supporting devices, which are interposed between the tape mechanism and the feed-board.

Another object of our invention is to provide means for retarding the forward speed of the sheets so that the latter will not strike the front guides of the press with sufficient force to injure the front edge of the sheet or to cause the sheets to rebound and destroy its front register.

Another object of our invention is to improve the construction of the side registering mechanism so that the same can be more readily and accurately adjusted.

In the accompanying drawings, consisting of three sheets, Figure 1 is a fragmentary top plan view of a paper-feeding machine and printing-press provided with our improvements. Fig. 2 is a side elevation of the same. Fig. 3 is a vertical longitudinal section in line 3 3, Fig. 1. Fig. 4 is a vertical transverse section, on an enlarged scale, of the side registering device, taken in line 4 4, Fig. 1. Fig. 5 is a fragmentary top plan view of the same. Fig. 6 is a vertical longitudinal section in line 6 6, Fig. 4.

Like letters of reference refer to like parts in the several figures.

A represents the cylinder of a printing-press provided with the usual grippers *a*, B the feed-board, and *b* the vertically-movable front guides.

C represents the automatic sheet-feeding mechanism, which may be of any suitable and well-known construction.

D represents the carrying-tapes whereby the sheets are carried from the pile in the feeding-machine to the front guides of the press and which pass with their receiving portions around a receiving-roller *d*, arranged in front of the feeding-machine, thence forwardly with their uppor portions and downwardly around a delivery-roller *d'*, thence backwardly and downwardly around tightening-rollers d^2, thence forwardly and downwardly around an intermediate roller d^3, thence backwardly and upwardly to the place of beginning. The receiving-roller is mounted on a transverse shaft d^4, which is journaled in bearings in the frame of the feeding mechanism.

E represents the tape-frame, which consists of two longitudinal side bars *e e*, a cross-bar *e'*, connecting the front ends of the side bars, a cross-bar e^2, connecting the rear ends of the side bars, and arms e^3, supporting the rear cross-bar from the shaft of the receiving-roller. The delivery-roller is journaled in bearings *f*, which are capable of lengthwise adjustment on the side bars, so that the delivery portion of the tapes can be moved toward and from the front guides of the press. The intermediate roller is journaled in bearings *f'*, which are also capable of lengthwise adjustment on the side bars for taking up a portion of the slack in the tapes upon adjusting the delivery-roller. Each of the tightening-rollers is mounted on an arm f^2, which is adjustably secured to the rear cross-bar, so that upon turning this arm the tape passing around the respective roller can be individually tightened.

f^3 are pressure-rollers which press the side portions of the sheets down upon the delivery-roller, so as to increase the carrying effect of the latter. These rollers are mounted on a transverse shaft f^4, journaled in bearings f^5, which are secured to posts f^6, arranged on the bearings of the delivery-roller.

G G' represent the two sections of an adjustable dead-board or supplemental feed-board, which bridges the greater portion of the space between the delivery-roller and the

feed-board. The front section G, which is conveniently made of wood, is secured to the upper side of the front cross-bar of the tape-frame, while the rear section G', which is conveniently made of metal, overlaps the front section and is secured with its rear portion to a cross-bar g, which is capable of lengthwise adjustment on the side bars by means of clamps g'. Upon adjusting the delivery-roller toward or from the front guides the rear section of the dead-board is adjusted backward or forward accordingly, so as to properly bridge the space between said roller and the feed-board.

In feeding sheets to a lithographic or other color-printing press it is usually desirable to so adjust the delivery-roller that it just clears the rear edge of the sheet when the front edge of the latter is in engagement with the front guides, thereby avoiding displacement of the sheet, which would destroy the register of the same. In feeding sheets to a typographic printing-press where the same nicety of register is not usually required the delivery-roller may be so adjusted that the delivery portions of the tapes remain in engagement with the rear portion of the sheet after the latter bears with its front edge against the front guides, whereby the tapes tend to constantly feed the sheet forward and hold the same against the front guides. By adjusting the delivery-roller on the side bars only so much of the tapes may be retained in engagement with the sheets as may be necessary to hold the sheets properly against the front guides without turning over the front edge of the sheet.

In order to prevent the sheets from being fed by the tapes against the front guides with a force which would turn over the front edge of the sheets, the speed of the latter is retarded during the last portion of its forward movement by the following means: H represents a retarding-roller whereby the sheets are retarded during the last portion of their movement toward the front guides, and which is arranged between the front dead-board section and the feed-board. This roller is arranged below the path of the sheet and has a movement toward and from the same.

I I represent abutting rollers, which are arranged above the path of the sheet, over the end portions of the retarding-roller, so as to bear only upon the edge portions of the sheets. These abutting rollers are arranged above the space between the dead-board and the feed-board, and the retarding-roller is arranged in that space.

The retarding-roller is mounted on a transverse shaft h, which is journaled in the front ends of horizontal rock-arms h'. The rear ends of the latter are secured to a transverse rock-shaft h^2, which is journaled in bearings h^3 on the feed-board and provided at one end with an upright rock-arm h^4.

The abutting rollers are secured to a transverse shaft i, which is pivoted at its ends in bearings i', secured to posts i^2 on the feed-board.

The radiating roller rotates at a slower peripheral speed than the lineal speed of the tapes and the sheet carried thereby. This roller is raised at the proper time and pressed against the sheet, finding its abutment in the abutting rollers, thereby reducing the speed of the sheet. The roller is then lowered to its normal position.

The mechanism for raising and lowering the retarding-roller and for rotating it is constructed as follows: J represents a rock-lever pivoted on the frame of the feeding mechanism and having its lower arm connected with the free end of the upright rock-arm of the rock-shaft by a rod j. The retarding-roller is raised by a cam j', secured to the driving-shaft j^2 of the feeding mechanism and bearing against the upper arm of the rock-lever. The retarding-roller is lowered when released by the cam by a spring j^3, secured to the feed-board and the upright rock-arm. A continuous rotary movement is imparted to the retarding-roller in the direction of the arrow, Figs. 2 and 3, with a peripheral speed less than the lineal speed of the tapes by a chain belt j^4, passing around sprocket-wheels j^5 j^6, secured, respectively, to the shaft of the tape delivery-roller and the shaft of the retarding-roller, sufficient slack being allowed in the chain belt to permit of the necessary swinging movement of the retarding-roller.

While the sheet is being carried by the tapes toward the front guides the retarding-roller is at first held below the surface of the dead-board and feed-board, so that the sheet can move freely forward between the retarding and abutting rollers. After a portion of the sheet has passed the retarding-roller the latter rises and presses the sheet against the abutting rollers, whereby the speed of the sheet is reduced from the high speed of the tapes to the low speed of the retarding-roller, thereby preventing the sheet from striking the front guides with sufficient force to turn the front edge or rebound. After the sheet has been fed against the front guides the retarding-roller is lowered to clear the sheet. After the sheet has been fed against the front guides the same is registered on one of its side edges. For this purpose both sides of the feed-board are provided with a registering device, so that the sheet can be registered from either side, each of said registering devices being constructed as follows:

K represents a transversely-reciprocating slide which is guided on ways k', formed on an open frame secured to the feed-board and provided on the upper side of its inner end with a lower gripper-jaw k^2, which projects upwardly. L represents an elbow-lever pivoted on lugs arranged on the outer portion of the slide and provided on its inwardly-projecting horizontal arm l with an upper gripper-jaw l', which is adapted to coöperate with the lower jaw. The other arm, l^2, of the elbow-lever is

bifurcated and extends downwardly through an opening l^3 in the outer portion of the slide. M represents a reciprocating actuating-rod guided in eyes m on the guide-frame and provided with a sleeve m', which is adjustably secured thereto by a set-screw m^2. This sleeve is provided on opposite sides with notches m^3, which receive the bifurcated arm of the elbow-lever. During the inward movement of the actuating-rod the elbow-lever is turned on its pivot without disturbing the slide until its lower arm strikes the inner end of the opening l^3, thereby opening the gripper, after which the slide and lever move inwardly together until the actuating-rod reaches the end of its inward movement. During the subsequent outward movement of the rod the elbow-lever turns on its pivot without affecting the slide until the upper gripper-jaw engages with the lower jaw, after which the slide and lever move outwardly together to the end of the outward movement of the actuating-rod. The outward movement of the gripper is limited by a stop l^4, which consists, preferably, of a block adjustably secured to one of the ways k' by a set-screw l^5.

N represents a registering-plate resting on the slide and provided with an upright registering face or guide n, against which the side edge of the sheet is registered. This plate is provided with a slot n', through which the lower gripper-jaw projects and is capable of transverse adjustment with reference to the feed-board, so that the registering-face can be adjusted for correctly registering the sheets. This adjustment is preferably effected by a screw adjusting-rod o, connected at one end with the registering-plate and extending with its opposite screw-threaded end through eyes o' o' on the outer portion of the slide and a thumb-nut o^2, which is arranged between said eyes and which receives the screw-threaded portion of the adjusting-rod. Upon turning this thumb-nut the side guide is shifted transversely and after adjustment the side guide is held in position by means of a clamping-screw o^3, passing through a slot o^4 in the registering-plate and engaging in a screw-threaded opening in the slide.

While the gripper is in its outer position the upper jaw is open and the sheet passes with its marginal portion between the upper and lower jaws in the usual manner. During the inward or forward movement of the gripper the side guide strikes the side edge of the sheet, and during the subsequent outward or backward movement of the gripper the latter closes upon the sheet, while the sheet rests against the side guide and carries it outwardly in this position until the gripper reaches the end of its outward movement. The actuating-rod is next moved inwardly sufficiently to open the upper jaw and release the sheet without affecting the slide and registering-guide. The gripper now remains in its outer open position until the registered sheet has been withdrawn by the grippers of the press-cylinder and another sheet has been fed between the registering-grippers and against the front guides. A curved guide-plate p is preferably secured to the registering-plate in front of the gripper-jaw, so as to facilitate the passage of the sheet between the gripper-jaws. When it is desired to shift the side registering-grippers for registering sheets of different widths, the course or principal part of the adjustment is effected by shifting the stop-block l^4 and the sleeve m', together with the gripper, approximately into position for registering the sheets, after which the side guide of the registering-plate is finely and accurately adjusted to the proper position by turning the thumb-nut o^2.

The actuating-rods of both side registering devices are coupled so as to operate in unison and are reciprocated by the following means: Q represents a rock-arm having its free end arranged between two collars q q on the inner end of one actuating-rod, and q' is a rock-lever having one of its arms, q^2, arranged between two collars q^3 on the other actuating-rod, while its other arm, q^4, is connected with the rock-arm Q by a link q^5, whereby the actuating-rods are caused to move simultaneously outward and inward. The actuating-rods are moved inwardly by means of a spring q^6, which is secured at one end to the arm q^2 of the rock-lever and with its other end to a stationary part of the feed-board.

R is a rock-lever which is pivoted on the frame of the feeding mechanism and which has its lower arm connected with one of the actuating-rods by a rod r, connected with the lower arm of the rock-lever and a chain r', extending from the rod to the actuating-rod and passing around a roller r^2, arranged on the feed-board. The outward movement of the actuating-rods and the grippers connected therewith is produced by a cam S, mounted on the driving-shaft of the feeding mechanism and engaging with the upper arm of the rock-lever R.

We claim as our invention—

1. The combination with the feed-board, the front guides and the tape mechanism capable of adjustment toward and from the front guides, of a stationary dead-board or sheet-support arranged between the tapes and the feed-board and composed of a front and a rear section and a support for the rear section capable of adjustment toward and from the front guides, substantially as set forth.

2. The combination with the feed-board, the front guides, the stationary tape-frame and a tape-roller capable of adjustment toward and from the front guides, of a dead-board or sheet-support arranged between the tape-roller and the feed-board and composed of a stationary front section mounted on the stationary tape-frame and an adjustable rear section overlapping the front section, and a

support for the rear section attached to the stationary tape-frame and adjustable toward and from the front guides, substantially as set forth.

3. The combination with the feed-board, of a transversely-movable slide provided with gripper-jaws, a side registering-plate provided with a side guide and capable of transverse movement on said slide, a transverse adjusting screw and nut mounted on said slide and connected with said registering-plate, and a clamping-screw passing through a slot in said plate and engaging in the slide, substantially as set forth.

4. The combination with the feed-board and the reciprocating actuating-rod, of a transversely-movable slide provided with a lower gripper-jaw on its inner portion and with two eyes on its outer portion, an elbow-lever pivoted on said slide and having one of its arms connected with said rod while its other arm is provided with an upper gripper-jaw, a registering-plate provided with a side guide and arranged on said slide and an adjusting-rod connected at one end with said plate and arranged with its other screw-threaded end in said eyes, a screw-nut arranged on the adjusting-rod between said eyes and a clamping-screw passing through a slot in said plate and engaging with a threaded opening in the slide, substantially as set forth.

Signed by BRAINERD W. CHILD and MICHAEL B. FOY this 31st day of August, 1895.

BRAINERD W. CHILD.
MICHAEL B. FOY.

In presence of—
EDWARD WILHELM,
THEO. L. POPP.

Signed by FRANK M. LEAVITT this 5th day of September, 1895.

FRANK M. LEAVITT.

In presence of—
BRAINERD W. CHILD,
FRED V. BENSON, Jr.,
EDWARD WILHELM.