(No Model.) 3 Sheets—Sheet 1.

T. A. BRIGGS & W. A. PHILPOTT, Jr.

PAPER FEEDING MACHINE.

No. 562,797. Patented June 30, 1896.

Fig. 2.

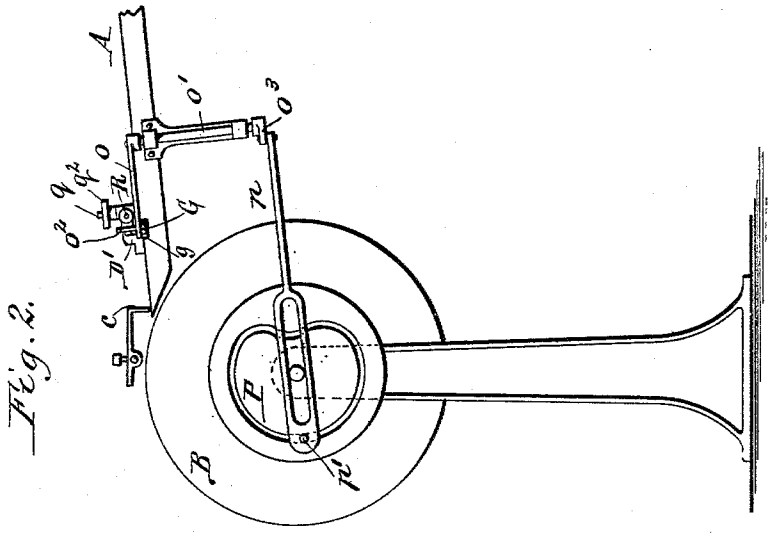
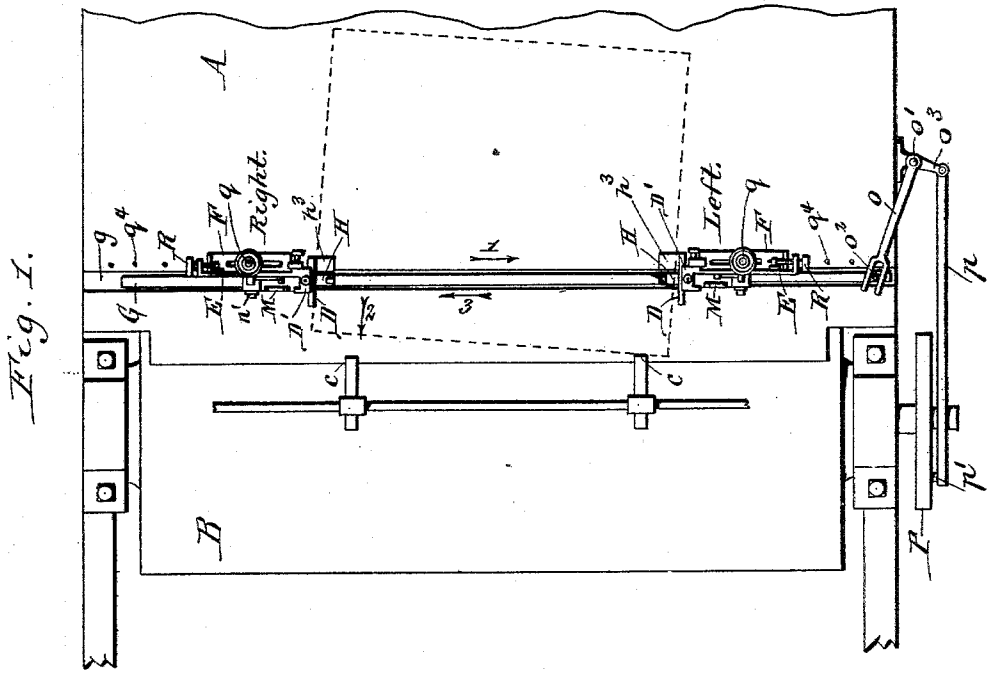


Fig. 1.



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

T. A. Briggs
W. A. Philpott Jr. } Inventors.
By Wilhelm & Bonnet
Attorneys.

ANDREW B. GRAHAM, PHOTO-LITHO. WASHINGTON, D.C.

(No Model.) 3 Sheets—Sheet 2.

T. A. BRIGGS & W. A. PHILPOTT, Jr.

PAPER FEEDING MACHINE.

No. 562,797. Patented June 30, 1896.

Fig. 3.

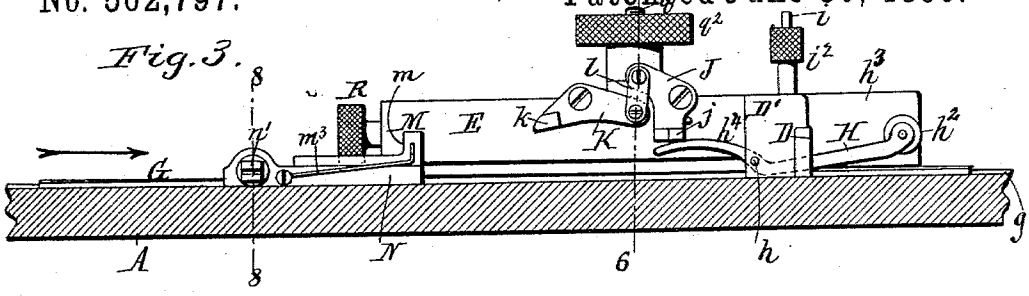


Fig. 4.

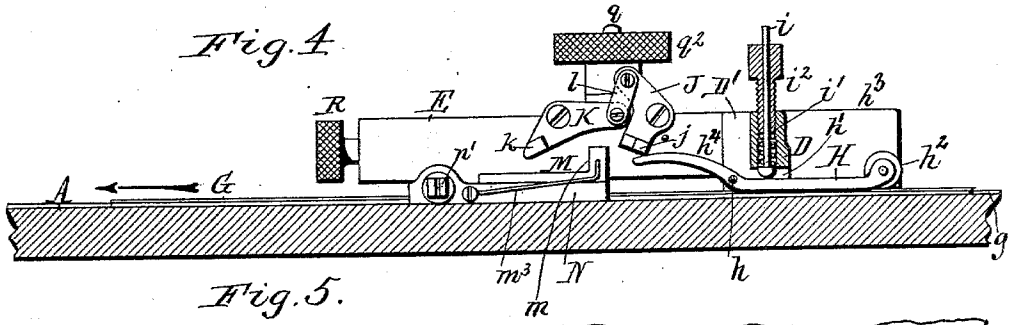


Fig. 5.

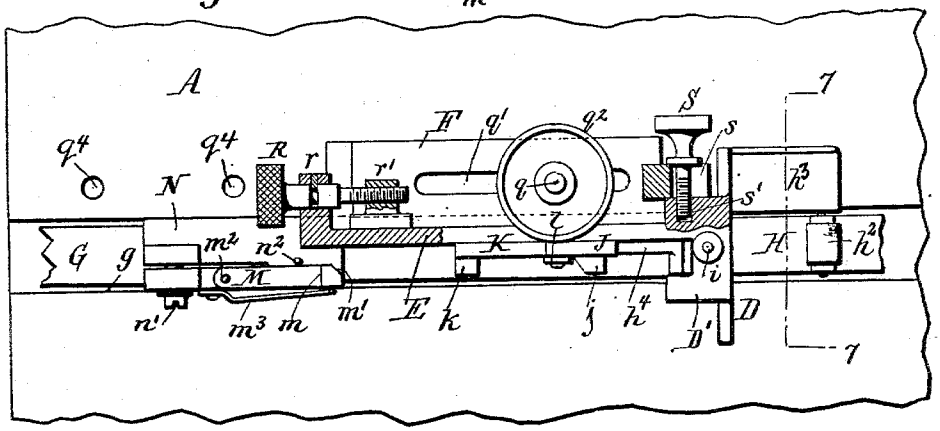


Fig. 6.

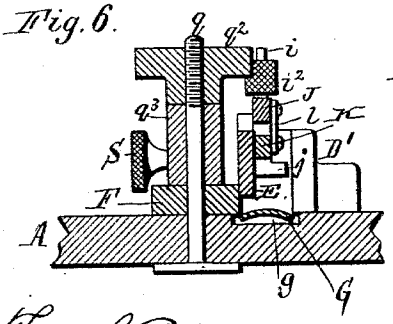


Fig. 7.

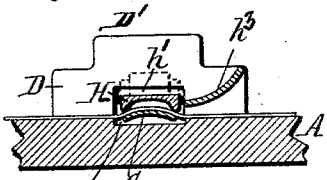
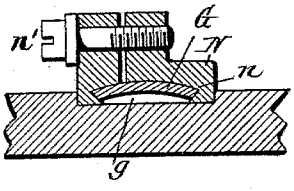


Fig. 8.



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

Inventors.
Thos. A. Briggs
W. A. Philpott Jr.
By Wilhelm & Bonner
Attorneys.

ANDREW B. GRAHAM, PHOTO-LITHO. WASHINGTON, D.C.

(No Model.) 3 Sheets—Sheet 3.

T. A. BRIGGS & W. A. PHILPOTT, Jr.

PAPER FEEDING MACHINE.

No. 562,797. Patented June 30, 1896.

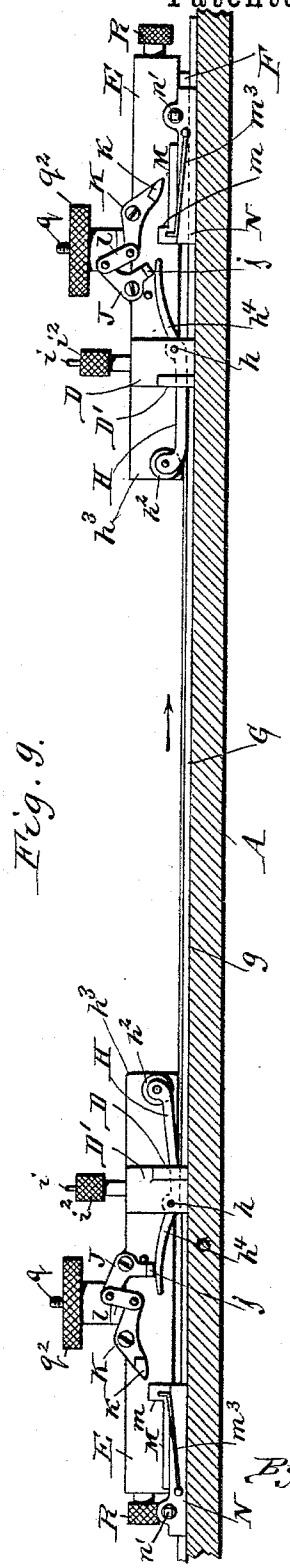


Fig. 9.

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

T. A. Briggs
W. A. Philpott Jr.
Inventors.
By Wilhelm Bonnet
Attorneys.

ANDREW B. GRAHAM, PHOTO-LITHO. WASHINGTON, D.C.

UNITED STATES PATENT OFFICE.

THOMAS A. BRIGGS, OF NIAGARA, CANADA, AND WILLIAM A. PHILPOTT, JR., OF NIAGARA FALLS, NEW YORK.

PAPER-FEEDING MACHINE.

SPECIFICATION forming part of Letters Patent No. 562,797, dated June 30, 1896.

Application filed July 9, 1895. Serial No. 555,370. (No model.)

To all whom it may concern:

Be it known that we, THOMAS A. BRIGGS, residing at Niagara Falls South, Ontario, Canada, and WILLIAM A. PHILPOTT, Jr., residing at Niagara Falls, Niagara county, 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 the automatic side-registering devices which are employed in connection with printing-presses and similar machines for correctly registering sheets of paper before they are fed into the machine.

One of the objects of our invention is to simplify the construction of the side-registering devices and to render the same more reliable in operation.

A further object is to so contrive these registering devices that they serve also to supplement the action of the front guides by restoring the sheets to the proper front register in case they should become displaced by rebounding from the front guides.

In the accompanying drawings, consisting of three sheets, Figure 1 is a top plan view of our side-registering devices applied to the feed-board of a printing-press. Fig. 2 is a fragmentary side elevation of the press, showing a means of actuating the registering device. Fig. 3 is a front elevation of one of the registering devices on an enlarged scale, showing the position of the parts when the gripping-finger is raised. Fig. 4 is a sectional front elevation thereof, showing the position of the parts when the gripping-finger is lowered. Fig. 5 is a sectional top plan view of the device. Fig. 6 is a transverse vertical section in line 6 6, Fig. 3. Fig. 7 is a similar section in line 7 7, Fig. 5. Fig. 8 is a similar section, on an enlarged scale, in line 8 8, Fig. 3. Fig. 9 is a front elevation showing both connected registering devices in the positions which they occupy during the forward stroke of the reciprocating bar by which both grippers are operated.

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

A represents the feed board or table upon which the sheets of paper are successively fed from a pile by any suitable or well-known means.

B is the cylinder of a printing-press, and *c* are the usual front or drop guides of the press, against which the front edge of the sheet is registered.

D is a fixed upright side guide or registering-face, which is arranged longitudinally upon the feed-table at one side thereof, and against which one of the lateral edges of the sheet is registered. This guide forms the inner and lower portion of a head D′, which is formed at the front or inner end of an upright supporting-plate E, arranged transversely upon the feed-table and secured to a base-plate F, which is in turn secured to the top of the feed-table.

G is a reciprocating actuating-bar arranged transversely on the feed-table underneath the head D′ and extending in front and in rear of the same, the feed-table being provided with a transverse groove *g*, in which the bar is guided with its surface substantially flush with the feed-table.

H is a gripping-finger, which is pivoted in the lower portion of the head D′ by a pivot *h*, the head being recessed or bifurcated in its lower portion, as shown at *h*′, Figs. 4 and 7, for the reception of this finger. The latter projects with its inner arm beyond the side guide and is arranged over the actuating-bar, so that the inner arm of the finger, in moving downwardly toward the bar, presses the sheet of paper down upon the bar and compels the sheet to move with the bar. The inner or front arm of the gripping-finger terminates in a horizontal roller h^2, which is adapted to bear upon the sheet of paper lying between the finger and the bar.

h^3, Figs. 3, 4, 5, and 7, is a downwardly sloping or curved guide arranged on the side guide on the receiving side of the gripping-finger for directing the front edge of each sheet downwardly and under the finger.

i, Fig. 4, is a spring-bolt which bears upon the gripping-finger in front of its pivot and which tends to force the finger against the bar. This spring-bolt is arranged with its lower portion in an internally-screw-threaded socket *i*′, formed in the head D′ of the supporting-

plate E, while its upper portion passes loosely through an adjustable screw plug or stem i^2, engaging in said socket. The spring of the bolt is arranged between the head of the latter and the inner end of the screw-plug. By screwing the plug up or down in its socket the downward pressure of the spring-bolt upon the finger is increased or diminished and the hold of the gripping-finger and bar upon the paper regulated accordingly.

J is a lifting-lever whereby the gripping-finger is raised and retained in that position. This lever is pivoted by a horizontal pin to the front side of the supporting-plate E, and its lower arm is so arranged that when it is swung into a vertical position it bears upon the outer or rear arm h^4 of the gripping-finger and depresses the same, thereby raising the inner end of the gripping-finger, as shown in Fig. 3, while when the lower arm of the lifting-lever is swung upwardly and outwardly out of its perpendicular position, as shown in Fig. 4, it releases the arm of the gripping-finger and allows the spring-bolt to depress the finger.

K is a vertically-swinging locking-lever pivoted to the supporting-plate E in rear of the lifting-lever J and having its front arm connected with the rearwardly-extending upper arm of the lifting-lever by a link l, so that when the rear arm of the locking-lever is swung upward, as shown in Fig. 3, its front arm depresses the upper arm of the lifting-lever through the medium of the link l, thereby swinging the lower arm of the lifting-lever forwardly into the locked position in which it depresses the rear arm of the gripping-finger. The lower arm of the lifting-lever is provided with an outwardly-projecting shifting-lug j, and the lower arm of the locking-lever is provided with a shifting-lug k, the two lugs being in substantially the same vertical plane.

M is a trip-pawl carried by the bar and adapted to engage against the shifting-lugs of the lifting and locking levers successively during the backward or outward stroke of the bar, so as to swing said levers on their pivots. The pawl, during its outward movement with the bar, first swings the lower arm of the lifting-lever outwardly, so as to release the gripping-finger and allow it to descend under the pressure of its spring-bolt, as shown in Fig. 4, and it then engages against the lower arm of the locking-lever and trips the latter to the position shown in Fig. 3, so as to cause said lever to return the lifting-lever to its locked position and raise the gripping-finger.

The trip-pawl is provided at its inner or free end with a head or nose having an abrupt outer or rear face m and a beveled inner or front face m', and the lug of the lifting-lever has a corresponding inner abrupt face and an outer beveled face, as most clearly shown in Fig. 5. The pawl is made laterally yielding, so that upon the inward or forward stroke of the bar the beveled face of the pawl rides inwardly over the beveled face of the lifting-lever without affecting the latter. For this purpose the pawl is pivoted at its outer end upon a vertical pin m^2 and is provided with a return-spring m^3, which tends to press the pawl into the path of the shifting-lugs of the lifting and locking levers.

The trip-pawl and its spring are preferably mounted on a plate N, which is adjustably secured to the bar. This plate is provided on its under side with an undercut or dovetail groove n, which receives the correspondingly-shaped bar, and the plate is split and clamped to the slide by a transverse bolt n', which passes through perforated lugs formed on the plate on opposite sides of its slit, as shown in Figs. 3, 4, and 8.

n^2 is a stop-pin arranged on the plate N in front of the trip-pawl and serving to limit the movement of the pawl toward the shifting-lugs.

A reciprocating movement is imparted to the bar by any suitable means. In the construction shown in the drawings the bar is actuated by a forked rock-arm o, secured to an upright rock-shaft o' and engaging with a pin o^2, secured to the bar, said rock-shaft being in turn operated from a cam P, mounted on the shaft of the press-cylinder by a connecting-rod p, attached at its outer end to an arm o^3 of the rock-shaft and provided at its opposite end with a pin p', which engages in the groove of the cam.

In order to stiffen the paper and prevent breaking or wrinkling thereof by contact with the side guides, the paper may be bent, arched, or corrugated transversely at its lateral edges. For this purpose the upper surface of the reciprocating bar is made convex or crowning and the under side of the inner arm of the gripping-finger is made correspondingly concave, as shown in Fig. 7.

The operation of our improved side-registering device is as follows: While the sheet is being fed forward over the feed-board against the front guides, the bar is at rest at the extremity of its outward stroke, the trip-pawl stands outside of the locking-lever, the lower arm of the lifting-lever is in engagement with the rear arm of the gripping-finger, and the latter is elevated, as shown in Fig. 3, allowing the sheet of paper to be fed forward under the gripping-finger and against the front or drop guides of the press. When the sheet has come in contact with said guides, the bar moves inwardly, and during this forward stroke of the bar the trip-pawl slips by the lugs of the locking and lifting levers without disturbing the same. After the head of the tripping-pawl has passed inwardly by the lug of the lifting-lever the movement of the bar is reversed. During the initial portion of this outward or reverse stroke the trip-pawl engages first against the abrupt face of the lug of the lifting-lever and swings the latter on its pivot, so as to release the gripping-finger and allow the spring-bolt to depress the finger, whereby the adjacent marginal portion

of the sheet is pressed by the roller of the finger against the upper surface of the bar. The frictional resistance between the bar and the paper is greater than that between the roller and the paper, and the sheet is therefore drawn against the side guide by the continued outward movement of the bar. As soon as the edge of the sheet comes in contact with the side guide it is arrested, while the bar, continuing its movement, slips along the under side of the sheet until the bar reaches the end of its outward stroke and position of rest. The trip-pawl immediately after releasing the lifting-lever encounters in its outward movement the lug of the locking-lever and by engaging against the inner face of said lug swings the locking-lever into the position shown in Fig. 3, thereby causing the locking-lever to return the lifting-lever to its locked position (shown in the same figure) and again raising the gripping-finger and releasing the registered sheet, which latter is now seized by the nippers of the printing-press.

By means of the adjusting-stem i^2 the pressure of the gripping-finger can be regulated with nicety in accordance with the thickness, stiffness, and smoothness of the paper.

In order to enable the side guide to be adjusted laterally to accommodate sheets of different widths, the base-plate F, which carries the supporting-plate E and the lifting and locking levers, is made adjustable transversely on the feed-board by means of a vertical clamping-bolt q, which passes through an opening in the feed-table, and a longitudinal slot q', formed in the base-plate, as shown in Figs. 5 and 6. This bolt is provided with a thumb-nut q^2, which bears upon a washer or thimble q^3, resting upon the base-plate. Upon loosening this thumb-nut, the base-plate with the side guide and the other parts carried thereby can be adjusted laterally on the feed-table, the nut being again tightened after effecting the adjustment. If desired, the range of adjustment of the parts may be increased by providing the table with a transverse row of openings q^4, as shown in Fig. 5, in any one of which the clamping-bolt q may be placed after removing its nut.

In addition to the two comparatively coarse adjustments just described, the side guide is preferably provided with means for making a slight or fine adjustment which does not require the base-plate to be shifted. For this purpose the supporting-plate E is made lengthwise adjustable on the base-plate by means of a longitudinal adjusting-screw R, which is held against endwise movement in a lug or flange r, formed at the rear end of the supporting-plate and which engages with an internally-screw-threaded lug r', formed on the upper side of the base-plate, as shown in Fig. 5.

S is a horizontal set-screw whereby the supporting-plate is clamped in place after adjustment and whereby its front portion is held against the base-plate. This set-screw passes through a horizontally-slotted lug s, formed on the upper front portion of the base-plate and engages in an internally-screw-threaded socket s', formed in the adjacent rear side of the supporting-plate. Upon loosening this set-screw and turning the adjusting-screw in one or the other direction, the supporting-plate with the side guide and the other parts connected therewith are adjusted forward or backward accordingly.

A sheet of paper on striking the front guides is liable to rebound therefrom into a more or less oblique position, destroying its front register, as indicated in Fig. 1. In order to straighten such displaced sheets before they are side-registered, we combine two of our improved side-registering devices in such a manner that the gripping device at the off side of the feed-board seizes the sheet first and draws it toward the off side of the feed-board during the forward stroke of the carrier-bar, while the gripping device on the near side of the feed-board seizes the sheet after the first-mentioned device has released the same and draws the sheet back against the side guide against which the sheet is side-registered. By the term "near side" of the feed-board we refer to the side on which that gripping device is arranged against which the sheet is ultimately side-registered, and by the term "off side" the opposite side, on which no side register is effected. In other words, the sheet is first moved away from that side guide against which it is ultimately side-registered and is then drawn back against the registering side guide. This movement of the sheet away from the registering side guide causes the retarded front corner of the sheet to be swung forwardly against the adjacent front guide, when the retarded corner of the sheet is adjacent to the side-registering guide, while, when the foremost corner of the sheet is adjacent to the side-registering guide, the movement of the sheet away from said guide has a tendency to swing the foremost corner of the sheet backwardly, and the subsequent movement of the sheet toward the side-registering guide swings the retarded corner of the sheet forwardly into proper front register. For instance, as illustrated in Fig. 1, the left-hand forward corner of the sheet, looking in the direction in which the sheet moves over the feed-board, has stopped against the adjacent front guide and the right-hand corner has been retarded. The right-hand side guide is the one against which the sheet is to be side-registered and is on the near side of the feed-board. During the forward stroke of the actuating or carrier bar in the direction of the arrow 1 the gripping device on the left-hand or off side of the feed-board draws the sheet away from the side guide on the right-hand or near side and swings the retarded front corner of the sheet forwardly, in the direction of the arrow 2, against the adjacent front guide, and so re-

stores the front register. The gripper engages with the edge of the sheet in such manner that the sheet swings on the point of engagement between the gripper and the sheet as a pivot while being moved with its retarded front corner against the front guide. During the return stroke of the carrier-bar the gripping device on the right-hand side of the feed-board moves the sheet against the registering side guide in the direction of the arrow 3, and side registers the sheet.

In Fig. 9 the carrier-bar moves forwardly in the direction of the arrow, the sheet is seized by the gripping device on the off side of the feed-board, which device is shown on the right-hand side of the figure, and the sheet is thereby being moved away from the side-registering guide on the near side of the feed-board (shown on the left-hand side of the figure) preparatory to its return movement toward said side-registering guide.

In order to swing displaced sheets into front register, the gripping devices should be so arranged as to seize the sheets not very far in rear of the retarded front corners. The side-registering guides are preferably duplicated, so that sheets can be registered on either side of the feed-board, as may be most convenient; but it is not necessary that the sheets should be moved against the side guide on the off side of the feed-board during the forward stroke of the carrier-bar and that side guide may be dormant and may be omitted when the sheets are only registered on one side of the feed-board.

The side-registering devices are duplicated at opposite sides of the feed-table and the actuating or carrier bar extends across the feed-board and carries two trip-pawls, one for each side-registering device. The two devices are arranged reversely, or with the side guides, gripping-fingers, and trip-pawls facing each other, as shown in Fig. 1. By this reverse arrangement of the two registering devices, the two gripping-fingers are depressed alternately, one finger being depressed during the inward or forward stroke of the bar and the other during the return stroke.

If a sheet does not rebound from the front guides, but remains in correct front register, it is simply moved first away from the side-registering guide and then against the same without disturbing its front register.

We claim as our invention—

1. The combination with a feed-board, of a gripping device consisting of a reciprocating bar or carrier, and a pressing-finger which does not partake of the movement of said bar or carrier, but has a movement toward and from the same for pressing the paper against said bar or carrier and compelling the paper to move therewith, substantially as set forth.

2. The combination with a feed-board, of a side-registering guide secured thereto, and a gripping device consisting of a transversely-movable bar or carrier and a pressing-finger which is supported independently of said bar or carrier, and does not partake of its movement, but has a movement toward and from said bar or carrier for pressing the paper against said bar or carrier, substantially as set forth.

3. The combination with a feed-board and a side guide, arranged thereon, of a gripping device consisting of a transversely-movable bar or carrier and a pressing-finger which does not partake of the movement of said bar or carrier but is capable of moving toward and from the same and which is provided with a pressure-roller, substantially as set forth.

4. The combination with a feed-board and a side guide arranged thereon, of a gripping device consisting of a transversely-movable bar or carrier, a pressing-finger supported independently of said bar or carrier and having a movement toward and from the same, a spring for depressing the gripping-finger, a lifting device whereby said finger is raised, and a trip device connected with the bar or carrier whereby said lifting device is released, substantially as set forth.

5. The combination with a feed-board and a side guide arranged thereon, of a transversely-movable bar or carrier, a vertically-movable gripping-finger arranged above the same, a lifting-lever whereby said finger is raised, a locking-lever whereby said lifting-lever is moved into engagement with the gripping-finger, and a trip device carried by the bar or carrier and adapted to operate said levers, substantially as set forth.

6. The combination with a feed-board and a side guide arranged thereon, of a transversely-movable bar or carrier, a vertically-movable gripping-finger arranged above the same, a spring for depressing said finger, a lifting-lever whereby said finger is raised, a locking-lever arranged in rear of said lifting-lever and connected therewith, and a trip-pawl arranged on said bar or carrier and adapted to engage with said levers, substantially as set forth.

7. The combination with a feed-board and a side guide arranged thereon, of a transversely-movable bar or carrier, a vertically-movable gripping-finger adapted to clamp the sheets of paper against said bar or carrier but held against movement therewith, a spring for depressing the finger, and an adjusting device for regulating the tension of said spring, substantially as set forth.

8. The combination with a feed-board, of a support or plate secured thereto and provided with a side-registering guide, a gripping-finger pivoted to said support or plate, a movable bar or carrier arranged underneath said finger, and mechanism, substantially as described, whereby the movements of said bar or carrier cause the gripping-finger to be raised and lowered.

9. The combination with a feed-board and a side guide, of a transversely-movable bar or carrier arranged on the feed-board and

having a convex upper surface, and a gripping-finger incapable of movement with said bar or carrier, but movable toward and from the same and provided on its under side with a recess or concavity coöperating with the convex upper surface of the bar or carrier, substantially as set forth.

10. The combination with a feed-board and a base-plate secured thereto, of a supporting-plate carrying a side guide and made transversely adjustable on said base-plate, a movable bar or carrier, and a gripping-finger arranged above said bar or carrier and adapted to clamp the sheets of paper against the slide or carrier, but held against movement therewith, substantially as set forth.

11. The combination with a feed-board and the front guides, of a side guide secured thereto, gripping devices arranged on both sides of the feed-board, and actuating mechanism whereby one gripping device is closed during the forward stroke of the actuating mechanism and moves the sheet away from the side guide and the other gripping device is closed on the return stroke and moves the sheet against the side guide, substantially as set forth.

12. The combination with a feed-board and the front guides, of side guides and supports arranged on both sides of the feed-board, gripping-fingers mounted on said supports, a movable bar or carrier arranged across the feed-board, and mechanism connecting said bar or carrier with both fingers and closing one during its forward stroke and the other during its return stroke, substantially as set forth.

Witness our hands this 3d day of July, 1895.

THOMAS A. BRIGGS.
WILLIAM A. PHILPOTT, JR.

Witnesses:
FREDK. LEUPPIN,
F. L. CROSS.