

F. L. CROSS.
PAPER FEEDING MACHINE.
APPLICATION FILED DEC. 4, 1903.

971,975.

Patented Oct. 4, 1910.

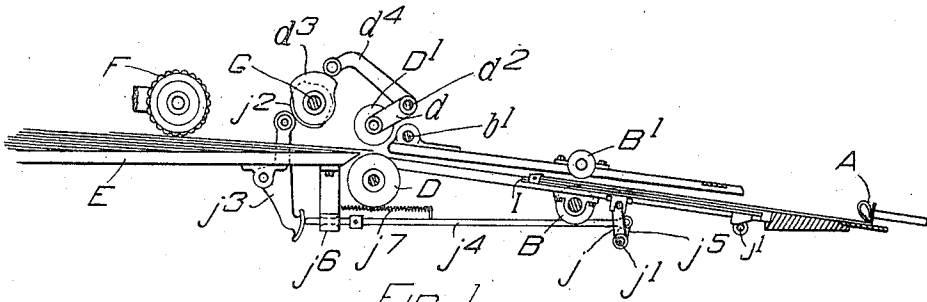


FIG. 1.

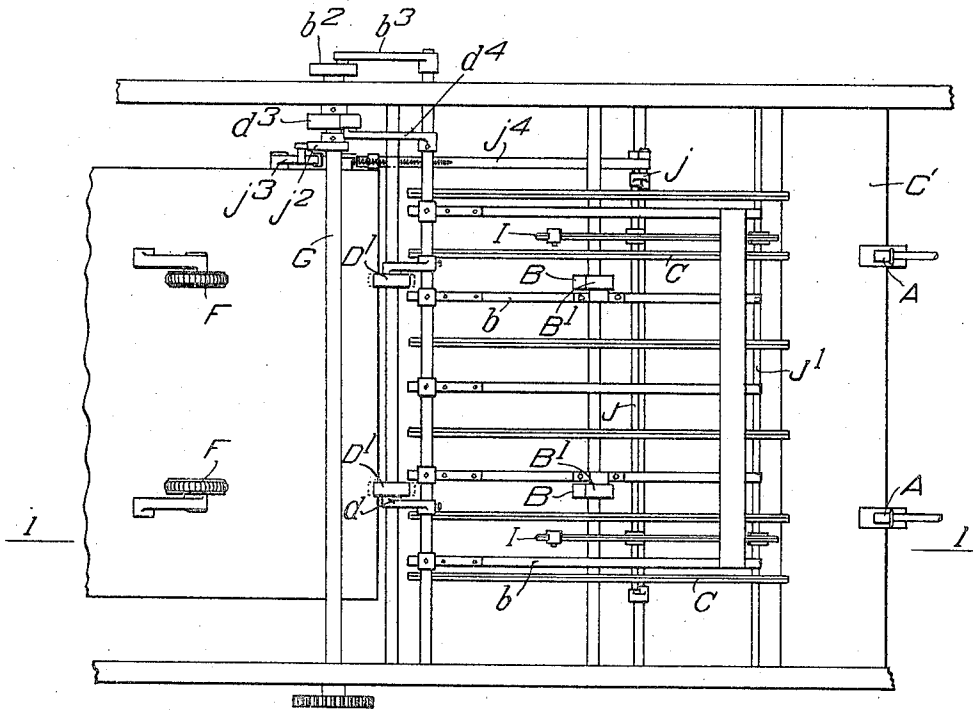


FIG. 2.

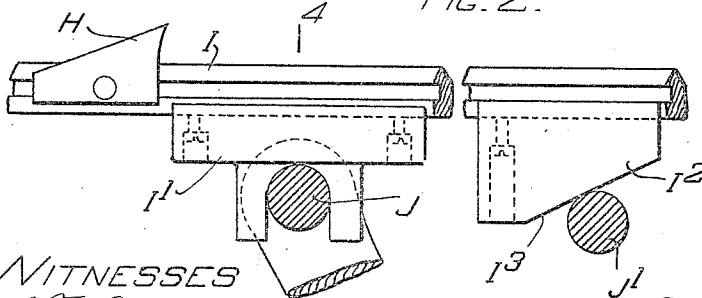


FIG. 3.

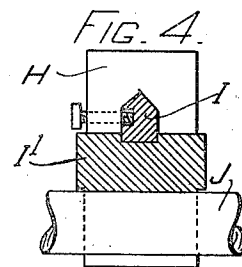


FIG. 4.

WITNESSES

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PAPER-FEEDING MACHINE.

971,975.

Specification of Letters Patent.

Patented Oct. 4, 1910.

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To all whom it may concern:

Be it known that I, FRANK L. CROSS, of Mystic, in the county of New London and State of Connecticut, have invented certain new and useful Improvements in Paper-Feeding Machines, of which the following is a specification.

The invention relates to sheet feeding mechanisms for presenting individual sheets at the front gages of a printing press or other machine for acting upon sheets and more especially to devices for insuring the accurate register of the sheets against the front gages.

In mechanisms embodying the features of the invention the accurate register of the sheets against the front gages is insured by devices arranged below the path of the sheet as it is fed to the gages and which are raised to engage the sheet and moved forward to press the sheet snugly against the front gages. These devices consist of fingers which move up behind the sheet after it has passed and by engagement with the rear edge of the sheet push it forward so that its front edge is accurately registered against the front gages. The forward movement of the sheet by the pushers may be facilitated by supporting the sheet in front of the pushers upon a support which advances with the pushers. This construction is of especial advantage in feeding large or thin sheets where the friction between the sheet and a stationary support might interfere with the efficient action of the pushing fingers. In case the sheet when released by the devices which deliver it at the front gages, rests upon a stationary support the friction may be relieved in part or wholly by lifting devices which raise the sheet and move forward with the pushing fingers. In such construction the lifting devices constitute one form of support in advance of the pushers moving forward with the pushers. In embodying these features of invention in a simple and efficient mechanism I have employed certain further features of invention. All these features of invention will be understood from a detailed description of the construction which I have shown in the accompanying drawings.

In these drawings Figure 1 is a sectional elevation on the line 1—1 Fig. 2. Fig. 2 is a plan view of so much of the feeding mechanism as is necessary to show the application of the present improvements thereto.

Fig. 3 is a detail showing the manner of mounting and operating the pushing fingers on an enlarged scale. Fig. 4 is a sectional view on line 4—4 Fig. 3.

In the construction shown in the drawings, A indicates the front gages of a printing press or other machine to which the sheets are presented. The devices for delivering the sheets at the front gages consist of delivery rolls B B' arranged to engage opposite sides of the sheets and feed them forward over the guiding and supporting bars C and feed board C' which form a stationary support for the sheets as they pass to the front gages. The sheets are advanced to the rolls B B' by a second set of delivery rolls D D' which are arranged at the front end of a feed board E. The individual sheets are separated from a pile of sheets on the feed board E and advanced into position to be acted upon by the delivery rollers D D' by combing rolls F which act intermittently upon the pile and may be controlled by suitable tripping devices such for instance as are shown in Patent 690,702 granted to me January 7, 1902. The delivery rollers D, B are rotated either continuously or intermittently by any suitable operating mechanism (not shown) and the rollers D', B' are raised and lowered at proper intervals to press the sheets against the rolls D, B and to release the sheets after they have been advanced into proper position. The rollers D' are carried in arms d' secured to a rock shaft d² which is rocked at proper intervals by a cam d³ secured to a cam shaft G and engaging an arm d⁴ secured to the shaft d². The rollers B' are mounted upon two of a series of bars b' which extend forward from a rock shaft b'. The shaft b' is rocked at the proper intervals by a cam b² secured to the shaft G and engaging an arm b³ secured to the shaft b'. The parts are so timed that the rollers D' B' are dropped into engagement with the rollers D, B after the sheet has been advanced into position between the rollers D, D'. The roller D' is raised after the front edge of the sheet has reached the rollers B, B' and the roller B' is raised to release the sheet as its front edge comes into position at the front gages A. After the sheet has been presented at the front gages by the delivery devices the front edge of the sheet is pressed snugly against the front gages by the action of two pusher fingers H which

lie below the path of the sheet as it is advanced over the bars C and are raised and advanced after the sheet has passed to bring them up back of the sheet and against its rear edge so that they push the sheet forward against the front gages. By these pushing fingers the sheet will be accurately registered against the front gages in case it has rebounded from the gages when presented to them by the delivery devices or in case it has not been brought into engagement with the front gages by the delivery devices. In case the delivery devices employed to present the sheets at the front gages are so constructed or operated that they will deliver the sheet in a fixed position the pushing fingers will insure the accurate register of the sheet against the front gages even if the adjustment of the front gages is changed without a corresponding adjustment in the delivery devices. To insure this action of the pushing fingers they should be so adjusted that they will advance somewhat after the front edge of the sheet has engaged the front gages, the rear edge of the sheet buckling to allow such movement. With the fingers thus adjusted they will advance the sheet against the front gages even if the gages are adjusted to increase their distance from the delivery devices.

The pushing fingers H are in the form of blocks secured upon bars I arranged below the path of the sheets and the rear sides of the fingers are inclined so that the sheet may pass freely over the fingers in case they should project somewhat above the support over which the sheets are fed to the front gages. The fingers are adjustably secured upon the bars I so that they may be adjusted to act upon the rear edge of the sheets of varying size. The bars I are secured in blocks I¹, I², which rest respectively upon transverse rods J, J'. The rod J is carried in the upper ends of rock arms j secured upon a rock shaft j', while the rod J' is fixed in position and is engaged by a cam surface I³ on the block I². When the shaft j' is rocked the bar I is advanced toward the front guides and is also raised, the rear end of the bar being raised by the movement of the arms j and the front end of the bar being raised by the sliding of the cam surface I³ on the rod J'. As the bar I moves upward it lifts the sheet in front of the fingers H away from the bars C so that the bars I act as a support for the sheet in front of the fingers H which moves forward with the fingers. This lifting of the sheet relieves the friction between the sheet and the bars C so that the forward movement of the sheet by the pushing fingers H is insured even when acting upon large or thin sheets. The rock shaft j' is operated from a cam j² on the cam shaft G which engages the upper end of a lever j³ the lower end of which is en-

gaged by a bar j⁴ connected with the rock shaft j' by an arm j⁵ secured thereto. The rear end of the bar j⁴ is guided in a bracket j⁶ and the bar is held in engagement with the lever j³ by a spring j⁷. The parts are so timed that the bars I are raised and advanced as the delivery devices release the sheet and are returned to their rearward and lower position before the next sheet is advanced by the delivery devices.

While I have shown and described a construction in which the delivery devices consist of a series of rolls, and the sheet support over which the sheets are fed comprises a series of supporting bars, it will be understood that the features of invention are not confined to these forms of delivery devices and supports and that any other suitable or well known form or construction of delivery devices or supports may be combined with the devices for insuring the accurate register of the sheet against the front gages set forth in the claims.

What I claim and desire to secure by Letters Patent is:

1. The combination with front gages of delivery devices for delivering sheets at the gages, bars arranged below the path of the sheets, pushers secured to the bars in position to engage the rear edge of the sheet, and means for raising and advancing the bars to lift the sheet and advance it against the front gages.

2. The combination with front gages of delivery devices for delivering sheets at the gages, a sheet support over which the sheets pass to the gages, bars arranged below the path of the sheets, pushers adjustably secured to the bars, and means for raising the bars above the support and advancing them to carry the sheet forward against the front gages.

3. The combination with front gages of a sheet support over which the sheets pass to the gages, bars arranged below the path of the sheets, pushers secured to the bars, devices whereby the pushers may be adjusted to engage the rear edge of sheets of different length, and means for raising the bars above the surface of the sheet support and advancing the bars.

4. The combination with front gages of a sheet support over which the sheets pass to the gages, sheet lifting devices arranged below the path of the sheets, means for raising and advancing the lifters to lift the sheet from the support and carry it forward, and adjustable pushers arranged to engage the rear edge of the sheet and push the sheet forward against the front gages.

5. The combination with front gages of delivery devices for delivering sheets to the front gages, a stationary sheet support over which the sheets pass to the gages, sheet lifting devices arranged below the surface of

the sheet support, means for raising and advancing the lifters to lift the sheet from the support and carry it forward, and pushers arranged to engage the rear edge of the sheet and push the sheet forward against the front gages.

6. The combination with front gages of delivery devices for delivering sheets to the gages, a fixed sheet support over which the sheets pass to the gages, sheet lifting devices arranged below the surface of the sheet support, means for raising and advancing the

lifters to lift the sheet from the support and carry it forward directly toward the front gages, and adjustable pushers arranged to engage the rear edge of the sheet and push the sheet forward against the front gages.

In testimony whereof I have affixed my signature, in presence of two witnesses.

FRANK L. CROSS.

Witnesses:

IRA L. FISH,

KATHARINE A. DUGAN.