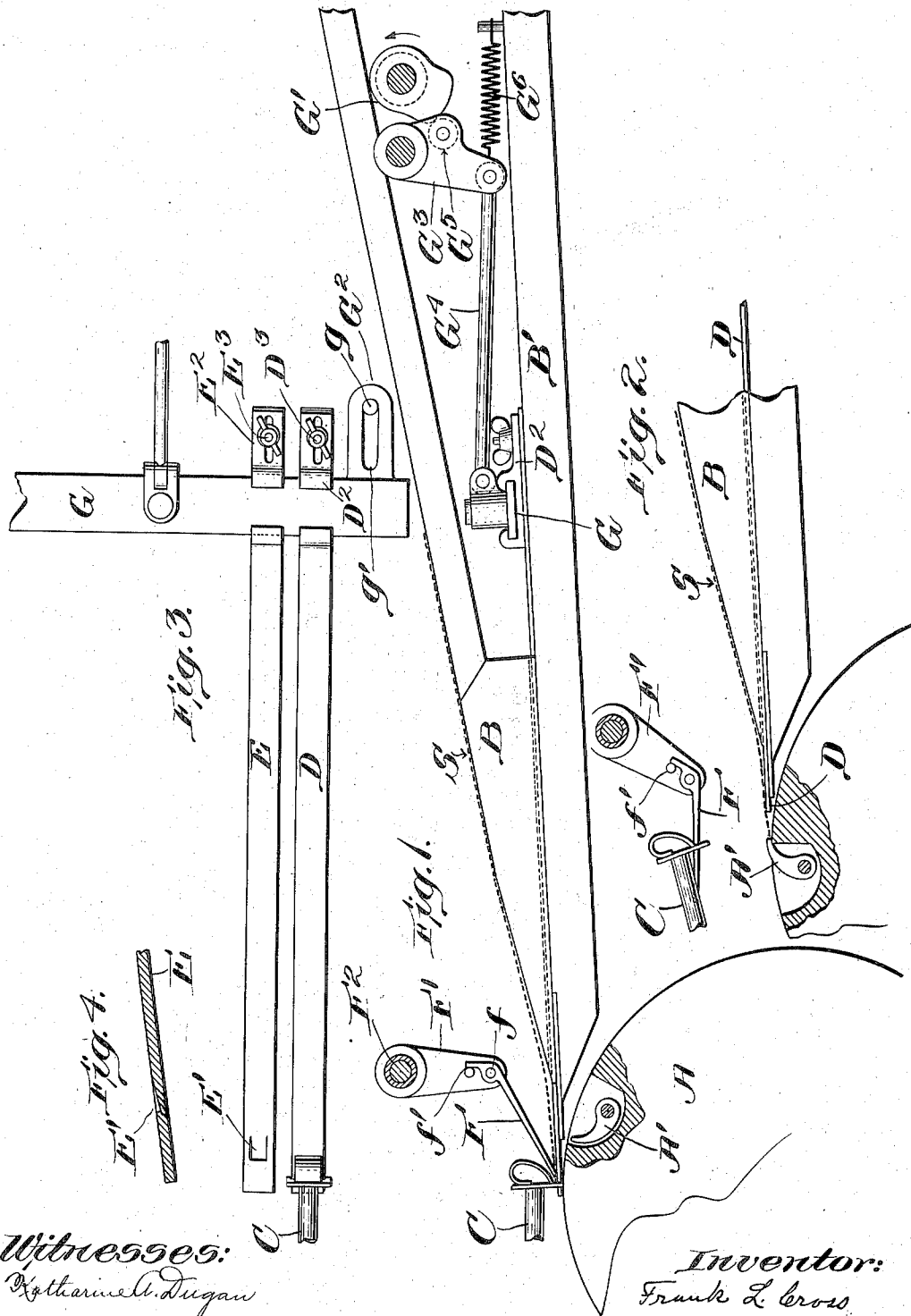


F. L. CROSS.
SHEET FEEDING MACHINE.
APPLICATION FILED MAY 22, 1905.

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UNITED STATES PATENT OFFICE.

FRANK L. CROSS, OF MYSTIC, CONNECTICUT, ASSIGNOR TO CROSS PAPER FEEDER COMPANY, OF BOSTON, MASSACHUSETTS, A CORPORATION OF MAINE.

SHEET-FEEDING MACHINE.

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Specification of Letters Patent.

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To all whom it may concern:

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

My improvements relate to machines in which sheets are fed into position to be seized by the grippers of a rotary cylinder and are designed more especially for use in connection with cylinder printing presses.

In feeding sheets to the cylinder of a printing press the sheet is positioned against front gages arranged above the cylinder of the press and close to the upper surface of the cylinder. The front edge of the sheet when in position against the front gages is supported by thin fingers projecting from the front edge of the feed-board and lying close to the surface of the cylinder. The front gages rest upon these fingers as the sheet is fed into position and the edge of the sheet is thus directed against the front gages which act to accurately position the front edge of the sheet. The front gages are raised just previous to the engagement of the grippers with the sheet so that the sheet is free to be carried forward by the grippers. The presence of the fingers under the front edge of the sheet at the time the sheet is pressed against the surface of the cylinder by the grippers causes buckles or bends to be formed in the edge of the sheet at the points where the fingers are located. In doing certain classes of work, in which very accurate register of the sheets is essential, the formation of these bends in the edge of the sheet is liable to disturb the register of the sheet and thus produce imperfect work.

In cases where feeding mechanism is employed for automatically feeding the sheets into position to be seized by the grippers, additional fingers are frequently employed which extend under the edge of the sheet when it is in position to be seized by the grippers and which cooperate with other devices in stopping the operation of the feeding mechanism and of the press in case the sheet is not properly positioned against the front gages. These fingers also cause a buckling or bending of the sheet at the points where they are located when the grippers press the front edge of the sheet against the surface of the cylinder.

It is customary to make the fingers which extend beneath the front edge of the sheet, as thin as practicable in order that the sheet shall lie as close to the surface of the cylinder as is practicable when it is in position to be seized by the grippers and so that the fingers will form the least possible bend in the sheet when the sheet is seized by the grippers. In doing the great majority of work which is usually done upon printing presses of this character, the presence of these fingers does not materially interfere with the proper register of the sheet. In doing some classes of work however, in which extremely accurate register is essential, the presence of these fingers beneath the front edge of the sheet and especially the presence of the fingers forming a part of the stop mechanism, prevents the requisite accurate register of the sheet and renders the use of automatic feeding mechanism impracticable when doing this class of work.

It is the object of my present invention to overcome the objections and difficulties above explained and I accomplish this by providing mechanism for withdrawing the fingers before the sheet is seized by the grippers and then returning the fingers to their operative position previous to the feeding of the succeeding sheet into position against the front gages. When the fingers are thus operated the front edge of the sheet may rest smoothly against the surface of the cylinder at the time the sheet is seized by the grippers, thus avoiding any lateral displacement of the sheet or any change in the relation of either edge of the sheet to the form against which it is to be carried by the cylinder.

It is usually necessary that the fingers which form a part of the stop mechanism, should be thicker than it is customary to make the fingers which support the sheets against the front gages, and it is therefore frequently desirable to withdraw these thicker fingers in doing work which does not require the withdrawal of the thinner fingers. In practicing my invention therefore, I may withdraw a part only of the fingers which extend beneath the front edge of the sheet or I may withdraw all of such fingers according to the conditions under which the machine to which the invention is applied is to operate.

The invention will be readily understood from the following detailed description of

the device shown in the accompanying drawings, in which one form of the invention is shown applied to a cylinder printing press.

In these drawings Figure 1 is a side elevation showing so much of the feed-board of a printing press as is necessary to an understanding of the present improvements; Fig. 2 is a partial view of the same showing the parts in a different position; Fig. 3 is a detail plan view of the fingers which project beneath the front edge of the sheet when in position at the front gages and of the bar to which they are secured; and Fig. 4 is a sectional detail showing the notch in the end of the finger which forms a part of the mechanism for throwing the machine out of operation.

In the construction shown in the drawings, A indicates a printing press cylinder which is provided with grippers A' which are operated in the usual manner to seize and release the front edge of the sheet. The sheets S are supposed to be fed into position to be seized by the grippers by feeding mechanism which advances the sheets in succession over the sheet support B which is mounted above the feed board B' of the press. The sheet is fed into position with its front edge engaging the front gages C and is then acted upon by side register devices as is usual in automatically feeding sheets to printing presses. The front edge of the sheet is supported and directed against the front gages by fingers D which project from the front edge of the feed board and lie close to the surface of the cylinder and beneath the front gages.

In addition to the fingers D which cooperate with the front gages, one or more fingers E are provided which extend beneath the front edge of the sheet when it is in position against the front gages. Each of these fingers is provided with a notch E' which lies just back of the front edge of the sheet when the sheet is in engagement with the front gages. Cooperating with this notched finger E is a controlling finger F pivoted at f to a rock arm F'. The rock arm F' is secured to a rock shaft F² which is rocked at proper intervals to cause the controlling finger F to move forward and back along the notched finger E. If a sheet is in position against the front gages at the time the controlling finger is moved forward, this sheet covers the notch E' so that the controlling finger is guided over the notch by the sheet. The rear end of the controlling finger is arranged to engage a stop pin f' on the rock arm F' after the lower end of the finger has passed the notch E' so that the finger is lifted during the continued movement of the rock arm F' as indicated in Fig. 2. In case the sheet is not properly fed to the front gages into position to cover the notch E, then as the controller

finger advances it engages the notch E' thus arresting the movement of the rock arm F'. The arrest of the controlling finger and rock arm acts through suitable mechanism, not shown, to cause the driving mechanism for the feeding device and for the press to be thrown out of operation. The fingers E are shown merely for the purpose of illustrating one form of finger which may be employed as a part of a mechanism for controlling the operation of the feeding device and of the press, and it will be understood that my invention may be employed in connection with any other form of finger arranged to lie between the front edge of the sheet and the surface of the impression cylinder when the sheet is in position against the front gages and to cooperate with other devices in effecting the stopping of the machine in case the sheet is not properly fed.

If the fingers D and E remain in their active position at the time when the grippers A' seize the front edge of the sheet, they will prevent the front edge of the sheet from engaging the surface of the cylinder at the points where they are located and will thus produce bends in the sheet and may affect the lateral position of the sheet upon the impression cylinder to a sufficient extent to prevent accurate register. In practicing my invention I eliminate all danger of thus affecting the register of the sheet by providing means for withdrawing the fingers before the sheet is seized by the grippers A'. The means which I prefer to employ for this purpose consists of a transverse bar G to which the fingers are secured and which is reciprocated at proper intervals by means of a cam G'. The bar G is arranged transversely of the sheet support and is guided by means of pins g arranged to engage slots g' formed in arms G² projecting from the ends of the bar G. The connections between the bar and the cam G' consists of a lever G³ connected by means of a link G⁴ with the bar and provided with a roll G⁵ which is held in engagement with the cam by means of a spring G⁶.

In order that the fingers D and E may be adjusted laterally according to the size of the sheet being operated upon, I connect these fingers with the bar G by means of plates E² D² provided with jaws which frictionally engage the bar. I also prefer to provide for longitudinal adjustment of the fingers by connecting them to the plates E² D² by means of screws E³ D³ passing through slots formed in the plates E² D² respectively.

The operation of the parts is so timed that the fingers D and E are in the position indicated in Fig. 1 at the time that the front edge of the sheet is engaged with the front gages C when the sheets are being properly

fed. Immediately after the sheet comes into this position, the rock arm F' is swung forward causing the controller finger to ride along the upper edge of the sheet until the end of the controller finger passes beyond the notch E', after which the finger is swung up into the position indicated in Fig. 2. While the cylinder A is rotating from the position shown in Fig. 1, into the position shown in Fig. 2, the front gages C are raised and the fingers D E are retracted into the position indicated in Fig. 2. This movement of the fingers withdraws them from between the front edge of the sheet and the surface of the cylinder so that the front edge of the sheet rests smoothly against the surface of the cylinder as the grippers act to press the sheet against the surface of the cylinder. Thus the sheet is taken by the grippers of the cylinder without any danger of lateral displacement owing to buckles or bends formed in the sheet by the fingers which project beneath the front edge of the sheet when it is in position against the front gages. After the grippers have seized the sheet and before the succeeding sheet is brought into position against the front gages, the fingers D and E are returned to the position indicated in Fig. 1, where they will underlie the front edge of the sheet when it is in position against the front gages. This return of the fingers may take place just before the front edge of the succeeding sheet is brought against the front gages or at any time after the front edge of the preceding sheet has been seized by the grippers.

In the construction shown I have provided means for withdrawing the fingers which cooperate with the front gages, as well as the fingers which form a part of the stop mechanism, and in doing work which requires extremely accurate register, it will be found desirable to thus withdraw all the fingers which may extend beneath the front edge of the sheet when in position against the front gages. In doing many classes of work however, the presence beneath the front edge of the sheet of the fingers which cooperate with the front gages, is not objectionable for the reason that these fingers may be formed of very thin sheet metal which will not separate the sheet from the surface of the cylinder sufficiently to materially affect the register. In many cases however, where the presence of the fingers cooperating with the front gages is not objectionable, the presence of the fingers forming a part of the stop mechanism may be found objectionable and in such cases the fingers of the stop mechanism may be withdrawn, while the fingers cooperating with the front gages may be mounted in the usual manner and remain in their active position.

Without attempting to set forth in detail all the forms and mechanisms in which the invention may be embodied, what I claim and desire to secure by Letters Patent is:—

1. The combination of a cylinder provided with grippers, a feed board, a transverse bar arranged below the path of the sheets, fingers adjustably secured upon the bar and extending forward beneath the front edge of the sheet when in position to be seized by the grippers, and mechanism for operating the bar to withdraw the fingers from beneath the front edge of the sheet before the sheet is seized by the grippers.

2. The combination of a cylinder provided with grippers, a feed board, sheet supporting fingers projecting from the front edge of the feed board over the cylinder, front gages cooperating with said fingers, additional fingers arranged at the front of the feed board and below the path of the sheets, sheet controlled devices cooperating therewith, and mechanism for withdrawing the additional fingers previous to the operation of the grippers, substantially as described.

3. The combination with a cylinder provided with grippers and a feed board of fingers extending from the front end of the feed board beneath the front edge of the sheet when in position to be seized by the grippers, sheet controlled devices cooperating therewith, and mechanism for withdrawing the fingers from beneath the front edge of the sheet before the sheet is seized by the grippers, substantially as described.

4. The combination with a cylinder provided with grippers and a feed board of a finger extending beneath the front edge of the sheet when in position to be seized by the grippers, a notch in said finger, a controlling finger arranged to ride along the upper edge of the sheet until the end of the finger passes beyond the notch, and mechanism for withdrawing said notched finger before the sheet is seized by the grippers, substantially as described.

5. The combination with a cylinder provided with grippers, of fingers having their front ends extending in the direction of feed beneath the front edge of the sheet when in position to be seized by the grippers, and mechanism acting to withdraw the fingers from beneath the sheet previous to the operation of the grippers, substantially as described.

In witness whereof, I have hereunto set my hand, this 19th day of May.

FRANK L. CROSS.

In the presence of—

IRA L. FISH,

KATHARINE A. DUGAN.