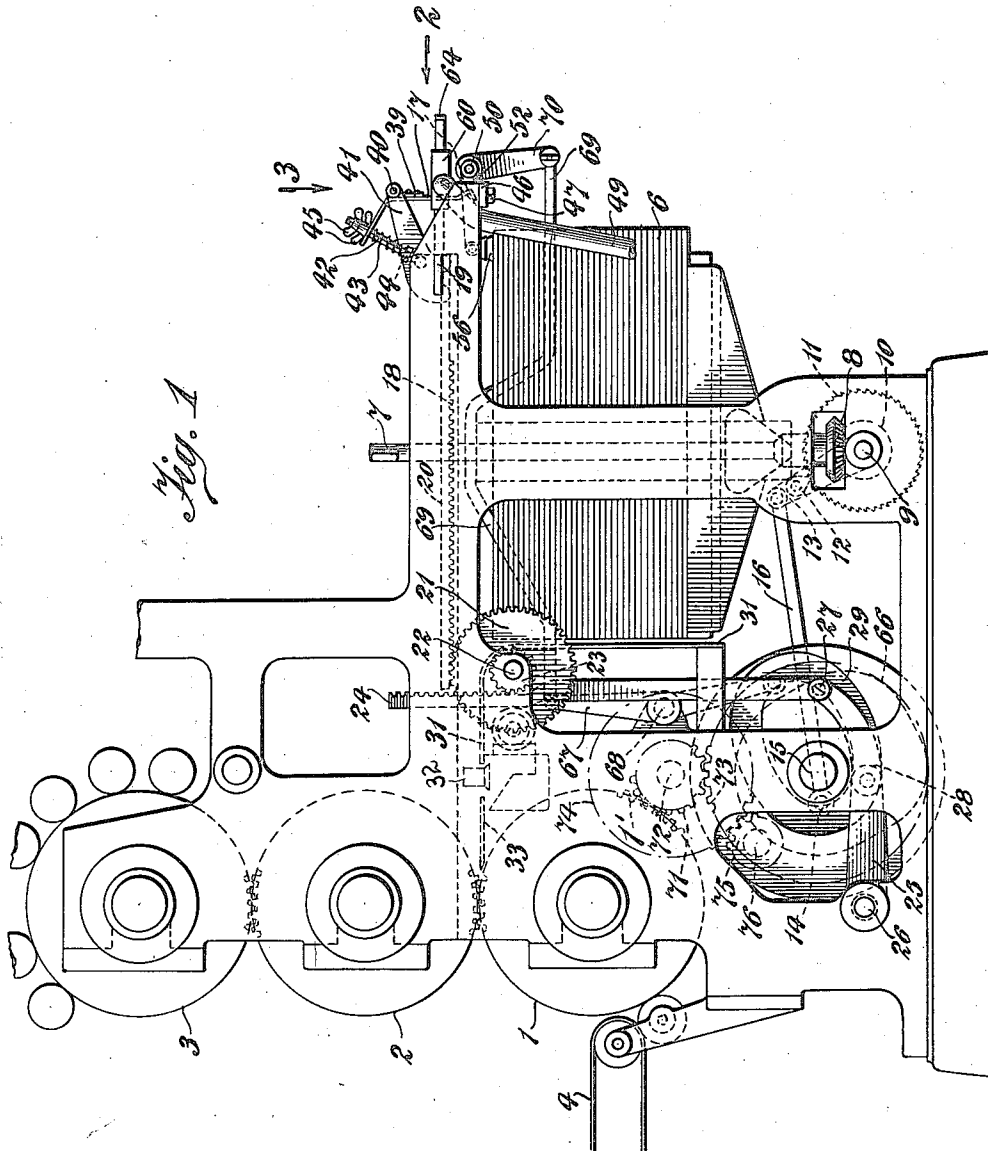


I. A. HUNTING.
SHEET FEEDING MECHANISM FOR PRINTING PRESSES.
APPLICATION FILED DEC. 9, 1914.

1,224,645.

Patented May 1, 1917.
3 SHEETS—SHEET 1.



Witnesses:

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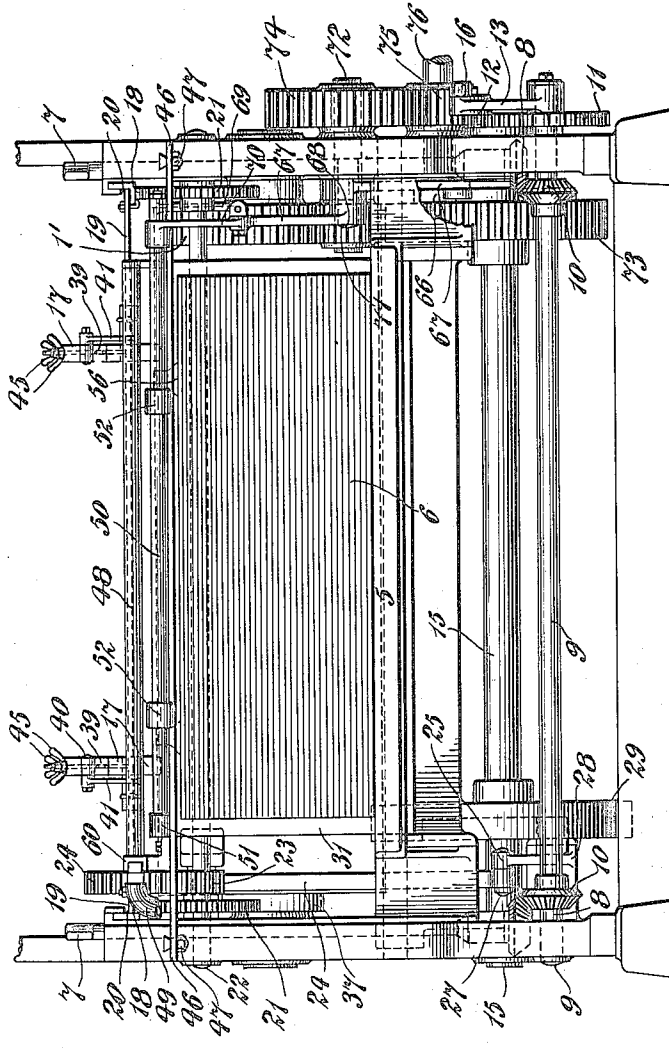
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Fig. 2



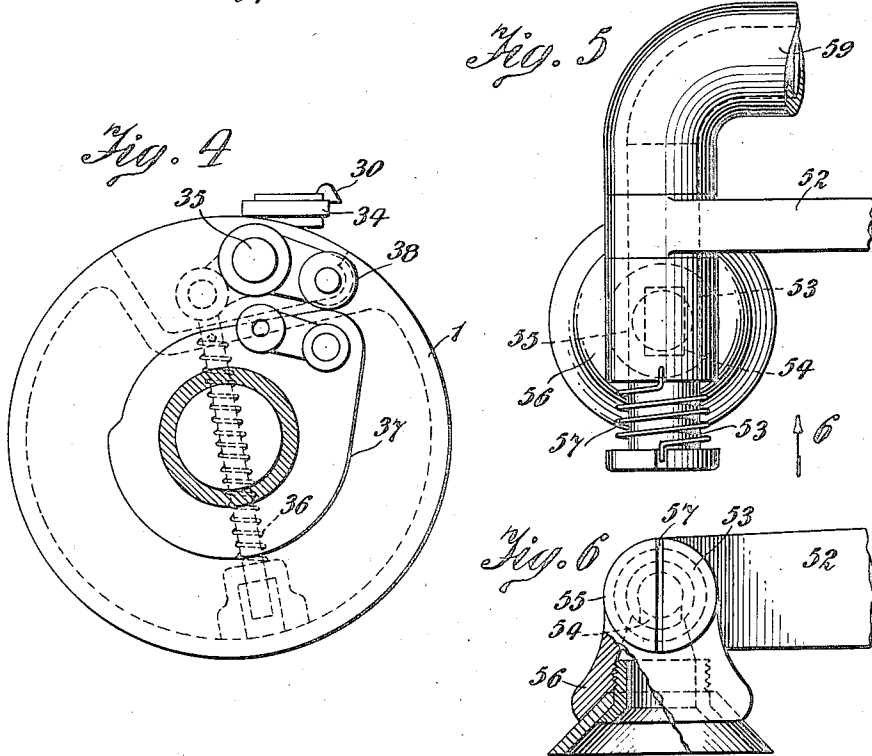
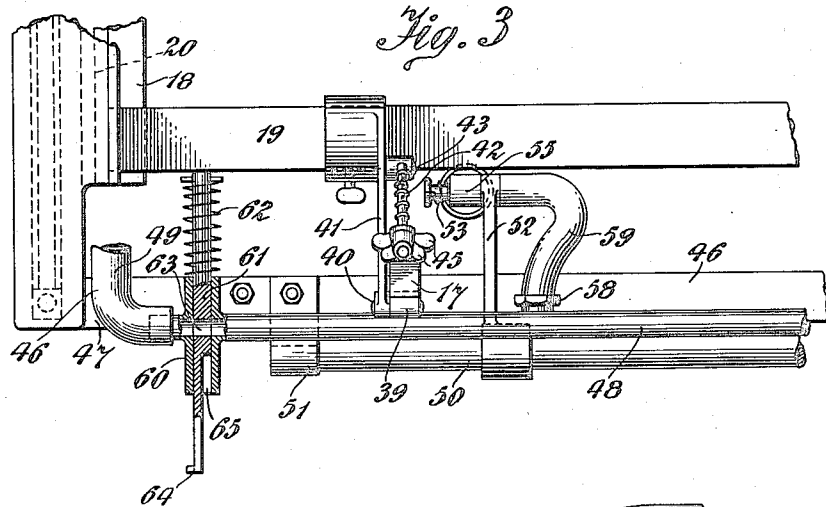
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3 SHEETS—SHEET 3.



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UNITED STATES PATENT OFFICE.

IRVING A. HUNTING, OF PLAINFIELD, NEW JERSEY.

SHEET-FEEDING MECHANISM FOR PRINTING-PRESSES.

1,224,645.

Specification of Letters Patent.

Patented May 1, 1917.

Application filed December 9, 1914. Serial No. 876,207.

To all whom it may concern:

Be it known that I, IRVING A. HUNTING, a citizen of the United States of America, residing at Plainfield, in the county of Union and State of New Jersey, have invented certain new and useful Improvements in Sheet-Feeding Mechanisms for Printing-Presses, of which the following is a specification, reference being had to the accompanying drawings.

The object of the present invention is to facilitate the separation of sheets of relatively stiff material, such as tin or cardboard, from a pile, and to employ the sheet-separating means also as a sheet-feeding means for conveying the sheets from the pile to the sheet-taking devices on a printing press or other machine.

To this end the invention consists in means for uninterruptedly moving the top sheet from its position on the pile into the bite of the sheet-taking devices on the cylinder or other member of a printing press or other machine.

The invention further consists in means for seizing the rear edge of the sheet while on the pile and carrying it forward, free to be registered and with its rear edge elevated. To this end members are provided for supporting the underside of the rear edge of the sheet. In connection with these members, means are utilized for moving said members forward, thereby advancing the sheet with its forward edge sliding on the sheet support and with its rear edge elevated.

In order to place the rear edge of the sheet on the supporting members aforesaid, a preliminary or partial separation of the top sheet from the pile has to be effected. This may be effected by hand by the operator taking hold of the rear edge of the sheet and placing it on the supporting members, or, as shown in the drawings, this preliminary or partial separation may be effected by automatic sucking means, such as a magnet, in case sheets of tin are to be separated, or, preferably by means of a pneumatic suction device.

Other features of construction will appear as the specification proceeds.

In the accompanying drawings the invention is embodied in a concrete and preferred form, but changes of construction may of course be made within the scope of the claims without departing from the legitimate and intended scope of the invention.

In the said drawings:

Figure 1 is a side elevation of an "offset" printing press for decorating tin, embodying the invention, which press has been chosen as a preferred form disclosing the invention.

Fig. 2 is an end elevation of Fig. 1, looking in the direction of the arrow 2 in Fig. 1.

Fig. 3 is a top plan detail view, looking down upon the parts in the direction indicated by the arrow 3 in Fig. 1.

Fig. 4 is a detail view of an impression cylinder which may be utilized in connection with the invention.

Fig. 5 is an enlarged top plan detail view of the sucker for effecting the preliminary separation of the top sheet from a pile.

Fig. 6 is a view, looking in the direction of the arrow 6 in Fig. 5, of the sucker head, with parts broken away.

Similar characters of reference denote corresponding parts in the different views.

The printing couple in the present instance consists of the impression cylinder 1, the blanket cylinder 2, and the form cylinder 3, of a well known construction. Adjacent to the rear of the impression cylinder is the delivery 4. 5 indicates a platform or pile-supporting means, adapted to hold a stack or pile of tin sheets 6 or other material. In the present embodiment of the invention the customary automatic means are employed for gradually raising this pile support. As here shown, these means consist in the present instance of the elevating screws 7 driven by the bevel gears 8 which are caused to move in unison by means of the transversely extending shaft 9, having bevel gears 10. Intermittent motion is imparted to the shaft 9 by means of the ratchet 11 mounted thereon and adapted to be actuated by means of the pawl 12, mounted on the lever 13 which is loosely supported on the shaft 9. The lever 13 is actuated by a crank 14 on the cam shaft 15 and connection 16. All these parts are well understood in the prior art and need not be further elaborated upon.

17 indicates supporting members or fingers for supporting the underside of the rear edge of the sheet. These members are mounted in a manner hereinafter to be described, upon a reciprocating carriage which in the present instance consists of two longitudinally extending racks 18 connected by a suitable cross-bar 19 and adapted to slide in the ways 20 of the frame-work. Motion is imparted to this reciprocating carriage

by any suitable means, a convenient construction being that shown in the drawings, which consists of gears 21 mounted on the shaft 22 and adapted to engage the racks 18. On the shaft 22 is a pinion 23 adapted to mesh with a reciprocating rack 24 extending upwardly and receiving its motion from the cam lever 25 mounted at 26 on the frame and connected to said rack by means of a pivot 27. The cam lever 25 is provided with a cam roll 28 engaging in the cam 29 on the cam shaft 15.

The amplitude of movement of the racks 18 is such that the supporting members 17 travel from the rear of the pile over the same and forward toward the cylinders of the press, and the parts will preferably be so arranged that the movement of the said supporting member 17 is an uninterrupted one, the effect of which is to carry a sheet whose rear edge has been placed upon said supporting member 17 forward into the bite of the grippers 30 of the impression cylinder 1. In so doing, the forward edge of the sheet will slide upon the sheet support, while the rear edge will be held elevated by the members 17, which by their action thus effect a separation of the top sheet from the pile and also serve to convey the sheet forward to the impression cylinder. A suitable sheet path is interposed between the pile and the impression cylinder. In the present instance this consists of an apron of sheet material 31, which extends in an upward direction adjacent to the pile so as to form an abutment therefor and which extends in a curved direction at its upper end and thence horizontally to the transverse brace rod 32. It will be noted that the horizontal portion of this apron 31 is in a plane slightly higher than the top sheet of the pile so that in moving the top sheet over the said pile and on to the said apron 31, the latter will prevent the underlying sheets from following with the top sheet. From the transverse brace rod 32 and toward the impression cylinder extend fingers 33 of the usual well-known construction, forming thereby a continuation of the sheet path between the pile and the cylinder. It will be understood that in moving a sheet forward, the front part thereof, and in fact the greater portion of the body of the sheet travels over the pile and over the sheet path, consisting of the apron 31 and the fingers 33, all these elements forming the sheet support. The words "sheet support" as used in the claims are intended to mean any means for supporting the sheet, whether it be the pile, the apron 31 or the fingers 33.

The sheet may be registered either against the sheet-support members 17 which in that event would be rigid back gages; in a manner well known in the printing press art,

or, as shown in the drawings, the sheet may be registered against the surfaces 34 and the grippers 30 of the impression cylinder. These grippers are operated in the usual manner, timed with the operation of the press, and are mounted in the present instance upon the shaft 35 in the cylinder 1 and normally held in their closed position by means of a spring 36. A stationary cam 37 is utilized to open the grippers by acting upon the cam roll 38 connected to the grippers in the usual manner.

The sheets may be side registered by the means shown in United States Patent No. 1,066,528 granted to Frank D. Randolph, July 8, 1913.

Inasmuch as the sheets here are front registered against the surfaces 34 of the grippers 30 on the cylinder 1, it is necessary on account of variations in the size of sheets to make the supporting members 17 yielding. In order to permit yielding of the members 17, they will preferably consist of strips of sheet material and will each be mounted at a point intermediate its ends to a member 39 pivoted at 40 to a bracket 41 carried by the cross bar 19. Mounted on this bracket 41 is a rod 42 which passes through one end of the member 17 and around which is coiled an expansion spring 43 interposed between the collar 44 and the member 17. 45 indicates nuts by means of which the members 17 may be positioned. As previously explained, the rear edge of the sheet may be placed upon the supporting member 17 by the operator. If it is, however, preferred to have automatic means for effecting the partial or preliminary separation of the rear edge of the sheet from the pile and placing it upon the supporting member 17, the following means may be employed, it being understood that said means are but an exemplification of many other devices which may be utilized for this purpose.

Mounted on the frame of the machine in the rear of the pile 5 is a transversely extending bar 46 adjustable in a longitudinal direction by means of the bolts 47. Suitably mounted on this bar is a transversely extending suction pipe 48 connected by the pipe 49 to a suitable exhaust device, as a pump or fan, in a well-known manner and not shown. 50 indicates a rockshaft mounted in the bearings 51 carried by the bar 46. Mounted upon this rockshaft is an arm 52 which carries a hollow stud member 53 having an opening 54 on its underside. Mounted upon this hollow stud by means of a sleeve 55 is a sucker head 56 communicating with the opening 54. 57 is a spring which has one end seated on the tubular shaft 53 and the other end seated in the sleeve 55, for the purpose of maintaining the sucker head in an upright position and yet to per-

mit it to rock slightly when engaging the sheets. Connecting the hollow stud 53 and the nipple 58 of the pipe 48 is a flexible tube 59 or other suitable flexible connection, for conducting air from the sucker head into the pipe 48. Located in the suction pipe 48 is a valve 60 comprising a casing in which is mounted a sliding piston or plunger 61 provided with an expansion spring 62 which normally serves to close the port 63 in the said plunger by moving the latter forward until the stop 64 engages the valve casing. When the plunger 61 is in this position, the pipe 48 is in communication with the atmosphere through the escape port 65, thereby destroying the vacuum previously existing in the suction pipe and sucker heads. The plunger 61 is adapted to be moved into position to establish communication between the exhaust fan and the pipe 48 by the return movement of the reciprocating carriage carrying the supporting members 17. This is effected by causing the cross-bar 19 to engage with the said piston thereby overcoming the resistance of the spring. Suitable mechanism is provided for rocking the rockshaft 50, consisting in the present instance of a cam 66 adapted to actuate the rocking lever 67 mounted at 68 and thereby transmitting the motion of the cam 66 through the connections 69 to the arm 70 mounted on the rockshaft 50.

The parts are so timed that as the reciprocating carriage mounting the members 17 returns, the valve controlling the exhaust device will be opened by contact of the bar 19 with the plunger 61. The supporting members 17 are now in the rear of the pile. At this time the sucker 56 descends and lifts the rear edge of the top sheet. The supporting members 17 now advance toward the cylinders and pass underneath the top sheet, the suction in the suckers is destroyed by the forward movement of the reciprocating carriage allowing the spring 62 to close the valve between the suction pipe 47 and the exhaust mechanism and the members 17 then carry the sheet forward over the pile into the sheet path and into the bite of the grippers. This operation takes place once in each cycle of the machine which, in the present instance, is once in each revolution of the printing cylinders.

It is of course understood that there may be one or more supporting members 17 and one or more suckers 56.

It will be observed by inspecting Fig. 1 that by my invention I am enabled to construct a very compact machine, taking up very little room, and I am further enabled to feed sheets of tin or other material automatically from a pile into the cylinders without any intervention of the operator, if so desired.

The cylinders 1, 2, 3, are gear-connected;

and meshing with the gear 1' of the cylinder 1 is the gear 71 fast upon the transverse-shaft 72. The gear 71 also meshes with the gear 73 fast upon the cam-shaft 15; hence, the cylinder-gear 1' is connected with the cam-shaft gear 73 through the gear 71 upon the transverse-shaft 72. Upon one end of the latter shaft there is mounted a gear 74 which is driven by a gear 75 fast upon the driving-shaft 76.

I am aware of United States Patent No. 779,975 granted Joseph E. Smyth, January 10th, 1905. On page 2 of the specification of that patent there is proposed at lines 37-40 a problem for solution, to-wit, the provision of suitable mechanism for raising one edge of the topmost sheet of the pile. This problem I have solved as hereinbefore set forth and illustrated.

I claim:

1. The combination of a sheet support; a reciprocating carriage for advancing the sheet over said support by engaging with the rear edge thereof; a sucker for raising the rear edge of the sheet; a valve controlling the suction in said sucker and adapted to be opened and closed by the movement of the carriage; and means for raising and lowering the sucker.

2. A sheet-feeding mechanism including a sheet-support; a carriage; sheet-supporting fingers carried thereby; a pneumatic device for raising one end of the sheet the other end of which still remains supported by said sheet-support; and mechanism for reciprocating said carriage to bring said fingers into and out of engagement with the raised end of the sheet and to feed the latter along said sheet-support.

3. A sheet-feeding mechanism including a sheet-support; a carriage; yieldingly-mounted sheet-supporting fingers carried thereby; a pneumatic device for raising one end of the sheet the other end of which still remains supported by said sheet-support; and mechanism for reciprocating said carriage to bring said fingers into and out of engagement with the raised end of the sheet and to feed the latter along said sheet-support.

4. A sheet-feeding mechanism, including a sheet-support; a carriage; sheet-supporting devices carried thereby; a cam-controlled pneumatic device for raising one end of the sheet the other end of which still remains supported by said sheet-support; and cam-controlled mechanism for reciprocating said carriage to bring said devices into and out of engagement with the raised end of the sheet and to feed the latter along said sheet support.

5. A sheet-feeding mechanism including a sheet-support; a carriage; sheet-supporting devices carried thereby; a pneumatic device for raising one end of the sheet the

other end of which still remains supported by said sheet-support, said carriage controlling the supply of air to said device; and mechanism for advancing the carriage to
 5 bring said fingers into engagement with the raised end of the sheet and to feed the latter along said sheet support.

6. A sheet-feeding mechanism comprising devices for engaging and supporting the
 10 topmost sheet at its rear edge, free to be registered; a carriage for moving said devices forwardly and feeding the topmost sheet directly from the pile, the front portion of said sheet sliding over and being
 15 supported by the pile during its forward movement; and a device forming a sheet-path in front of the pile and separating therefrom the front edge portion of the topmost sheet.

7. A sheet-feeding mechanism comprising sucking means for raising the rear edge portion of the topmost sheet and separating the same from the pile; devices for engaging and supporting said rear edge portion,
 25 free to be registered, after said means have lost control of said sheet; and a carriage for advancing said devices into engagement with the raised rear edge portion of the topmost sheet and feeding the latter directly
 30 from the pile, with its front portion sliding over and supported by the pile.

8. A sheet-feeding mechanism comprising sucking means for raising the rear edge portion of the topmost sheet and separating the same from the pile; devices for engaging and supporting said rear edge portion, free to be registered, after said means have lost control of said sheet; a carriage for advancing said devices into engagement with
 40 the raised rear edge portion of the topmost sheet and feeding the latter directly from the pile with its front portion sliding over and supported by the pile; and a device forming a sheet-path in front of the pile
 45 and separating therefrom the front edge portion of the topmost sheet.

9. A sheet-feeding mechanism comprising sucking means for raising the rear edge portion of the topmost sheet and separating
 50 the same from the pile; devices for engaging

and supporting said rear edge portion, free to be registered, after said means have lost control of said sheet; a carriage for advancing said devices into engagement with the raised rear edge portion of the topmost sheet
 55 and feeding the latter directly from the pile, with its front portion sliding over and supported by the pile; and means controlled by said carriage for throwing said sucking means into and out of operation.

10. A sheet-feeding mechanism including a sheet-support; a reciprocating sheet-feeding carriage; fingers mounted upon said carriage for supporting the rear edge of the sheet free to be side-registered; and a sheet-
 65 path in front of said sheet-support, said sheet-path having an upwardly-inclined portion for separating the topmost sheet from the sheet next below the same.

11. A sheet-feeding mechanism including a sheet-support; a reciprocating sheet-feeding carriage; fingers mounted upon said carriage for supporting the rear edge of the sheet free to be side-registered; a sheet-path
 75 in front of said sheet-support, said sheet-path having an upwardly-inclined portion for separating the topmost sheet from the sheet next below the same; and means for front-registering the sheet.

12. A sheet-feeding mechanism including a sheet-support upon which rests the pile of sheets; a sheet-feeding carriage; fingers mounted upon said carriage for supporting the rear edge of the sheet free to be side-registered; and an L-shaped sheet-path one side
 85 of which is substantially upright and in front of said sheet-support and serves as an abutment, the corner at the junction of the sides of said sheet-path being arranged to separate the topmost sheet from the sheet
 90 next below the same.

Signed at Plainfield in the county of Union and State of New Jersey, this third day of December, A. D. 1914, in the presence of the two undersigned witnesses.

IRVING A. HUNTING.

Witnesses:

IDA SPICER HUNTING,
 ASA F. RANDOLPH.