E. W. LESHER.

BLANK FEEDING MECHANISM.

APPLICATION FILED DEC. 13, 1913.

1,295,773.

Patented Feb. 25, 1919.

3 SHEETS—SHEET 1.

Fig. 1

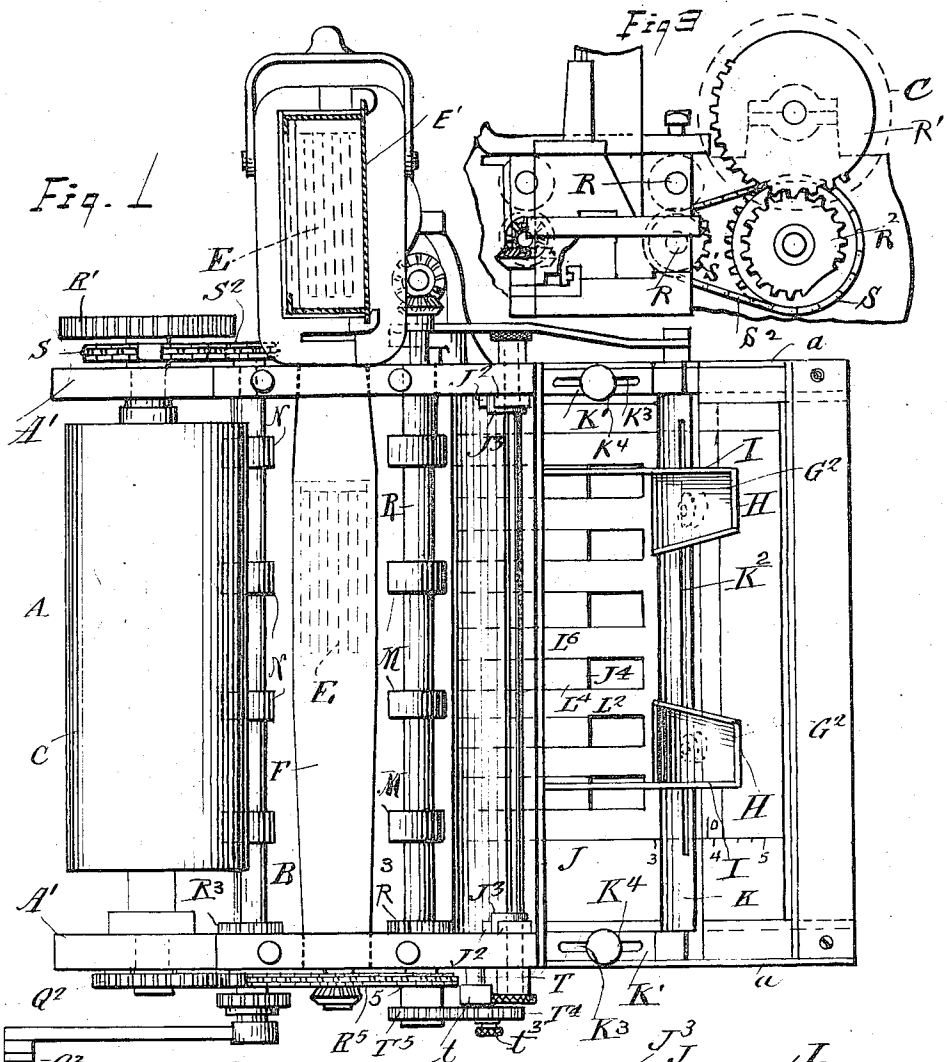
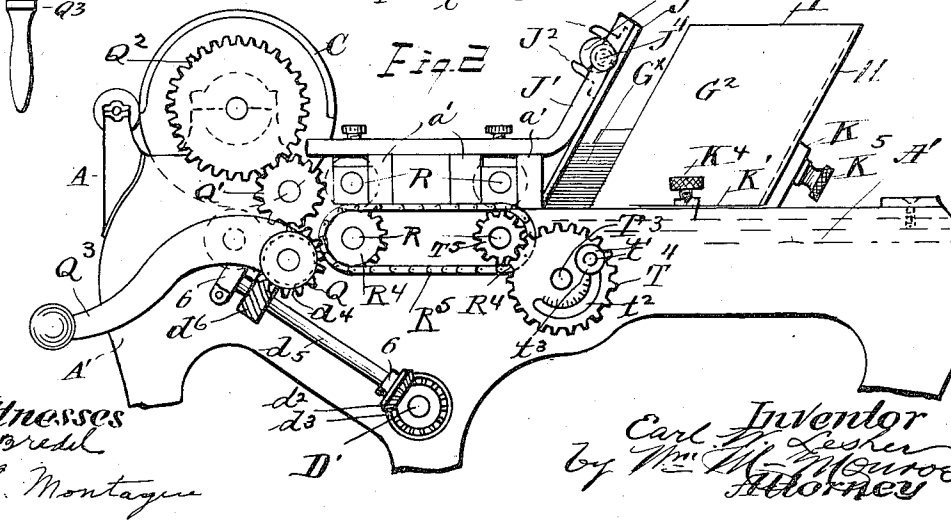


Fig. 3

Fig. 2



Witnesses
P. Breul
E. C. Montague

Inventor
Carl W. Lesher
by Wm. M. McGuire
Attorney

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3 SHEETS—SHEET 2.

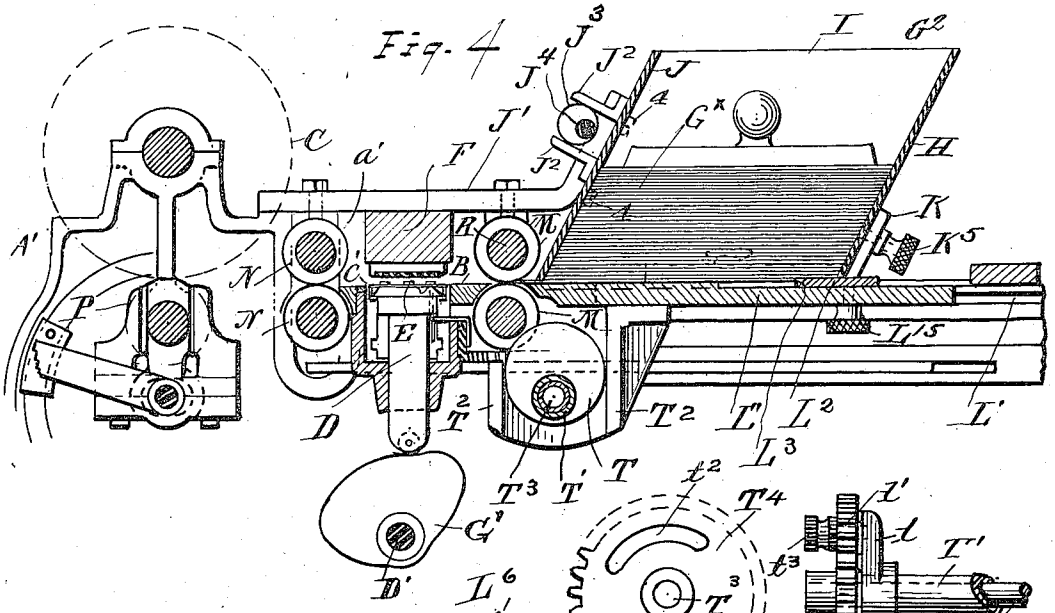


Fig. 4

Fig. 2

Fig. 3

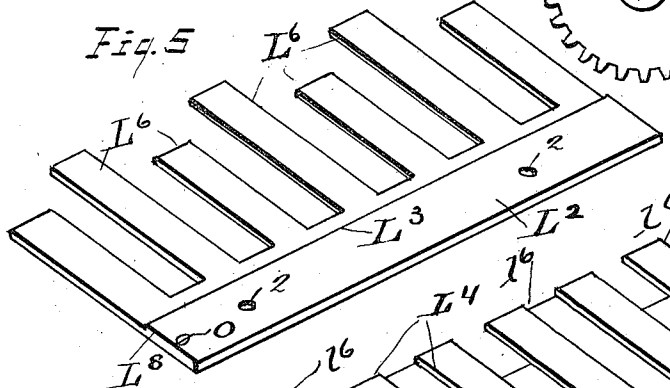


Fig. 5

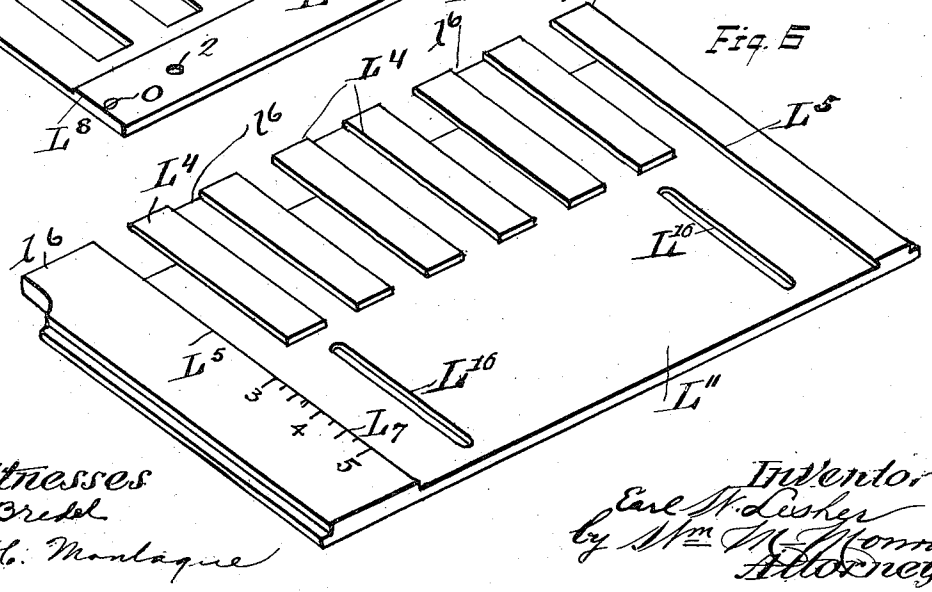


Fig. 6

Witnesses
O. Bresel
E. C. Montague

Inventor
Earl W. Lesher
by Wm. M. Monroe
Attorney

E. W. LESHER.

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3 SHEETS—SHEET 3.

Fig. 7

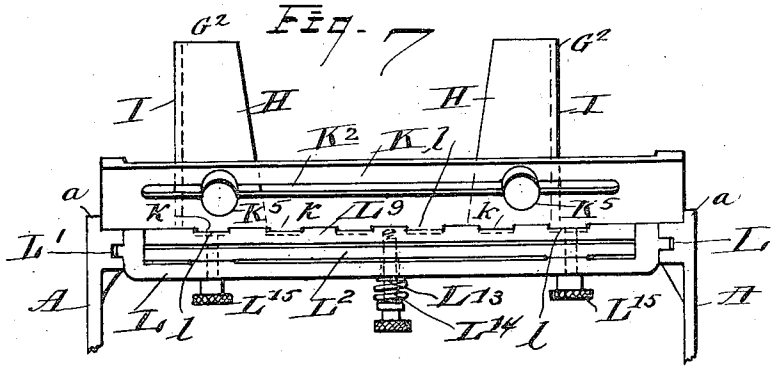


Fig. 8

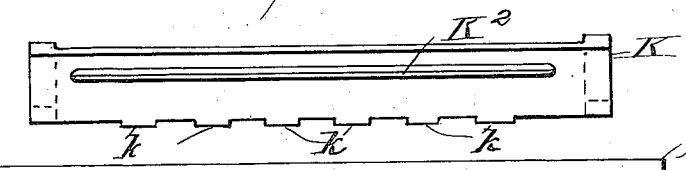


Fig. 9

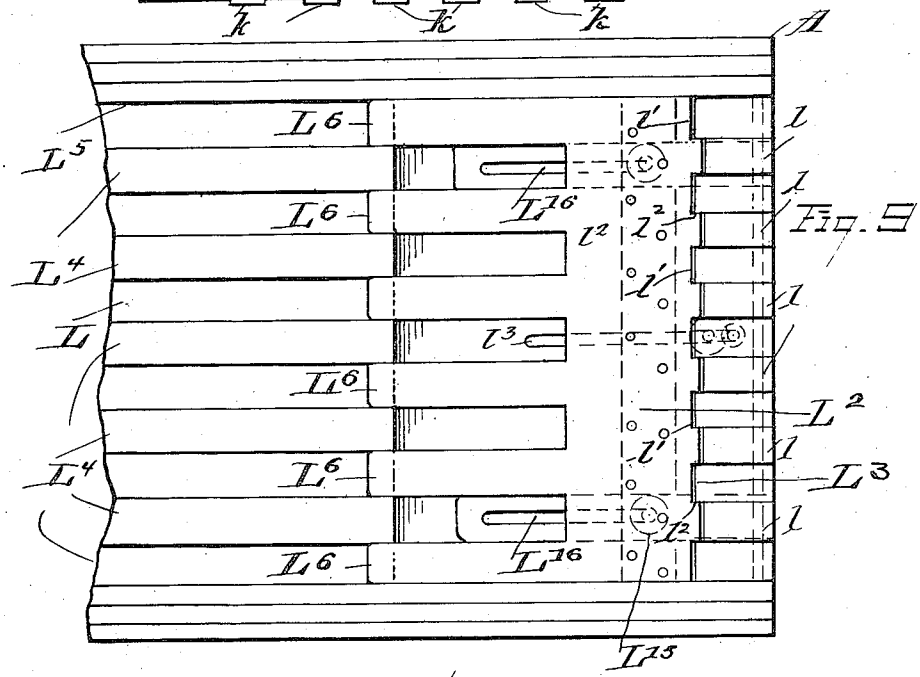


Fig. 10

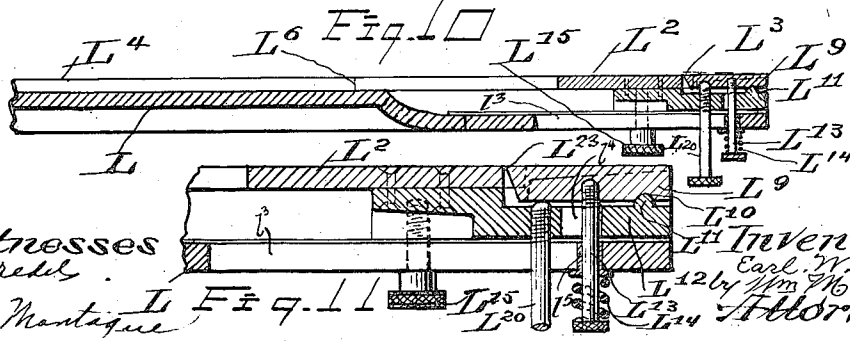


Fig. 11

Witnesses
P. Breul.
E. E. Montague.

Inventor
Earl W. Lesher
by Wm. H. Monroe
Attorney

UNITED STATES PATENT OFFICE.

EARL W. LESHER, OF LAKEWOOD, OHIO, ASSIGNOR, BY MESNE ASSIGNMENTS, TO THE ADVANCE MANUFACTURING COMPANY, OF DETROIT, MICHIGAN, A CORPORATION OF MAINE.

BLANK-FEEDING MECHANISM.

1,295,773. Specification of Letters Patent. Patented Feb. 25, 1919.

Application filed December 13, 1913. Serial No. 806,477.

To all whom it may concern:

Be it known that I, EARL W. LESHER, a citizen of the United States, and resident of Lakewood, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Blank-Feeding Mechanism, of which I hereby declare the following to be a full, clear, and exact description, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to blank feeding mechanism for printing machines. I have chosen a combined printing and addressing machine as an example of one type of printing machine to which my invention may be applied.

One object of the invention is to provide improved means for feeding blanks from a pile or stack.

Another object of the invention is to provide improved blank feeding means adapted to be readily adjusted to different sizes of blanks.

Another object of the invention is to provide improved blank feeding means adapted to be readily adjusted to feed blanks of any desired thickness.

Another object of the invention is to provide in a mechanism for feeding blanks, improved means for regulating and controlling the forward movement of the feeder.

Another object of the invention is to provide, in a mechanism for feeding blanks, a feeder which supports the blank being moved during the entire forward stroke of the feeder.

Another object of the invention is to provide an improved blank feeding mechanism capable of ready adjustment for coöperation with the machine and the printing devices thereon with which it is correlated.

With these and other objects in view, the invention consists of the parts and combination or combinations of parts hereinafter described and set forth in the claims.

For the purpose of illustration, I have, in the accompanying drawings, shown and herein described one form of mechanism embodying my invention.

Referring to the drawings,

Figure 1 is a plan view of a printing machine having applied thereto a blank feeding mechanism embodying my invention.

Fig. 2 is a fragmentary side view thereof.

Fig. 3 is a fragmentary side view of the opposite side of the machine.

Fig. 4 is a central longitudinal section of the machine, parts being broken away.

Figs. 5 and 6 are perspective views of the bottom plate and blank feeding device, respectively.

Fig. 7 is a rear view of a blank feeding mechanism of a slightly modified form.

Fig. 8 is a detail view.

Fig. 9 is a plan view of and Figs. 10 and 11 are longitudinal sectional views through the bottom plate and feeder for the form of the invention shown in Fig. 7, the former view being somewhat enlarged.

Figs. 12 and 13 are detail views.

In the drawings, A indicates as an entirety a printing machine that is preferably adapted to print on both sides of each blank. Of this machine, A′, A′, indicate side frames and B a table connected to and supported by the frames. C indicates a printing drum, the shaft of which is mounted in suitable bearings provided on the side frames. C′ indicates an opening formed in the table B. D indicates a plunger mounted to move vertically in the opening and against a slug E and in coöperation with a platen F to cause an impression upon a blank fed to a position over the opening. By successively moving a series of address slugs from a holder E′ to a position above the plunger D, a different address may be printed upon one side of each blank.

The slugs are preferably fed to the printing position in a plane below the table B so that each blank may be positioned between a slug E and the platen F and receive an impression on its under side; and the drum C is preferably arranged above the table B to cause impressions upon the upper side of each blank; but it is obvious that these printing devices could readily be arranged for printing upon the same side of the blank.

G indicates as an entirety the mechanism

for supporting and feeding forwardly the blanks, such as papers or cards G^x. Of this mechanism, K indicates a bar which extends across the machine. At its opposite ends, the bar K is provided with extensions or supporting members K′ (Fig. 1) which may slidably engage the upper edges of the side frames A′. The outer edges of the side frames A′ are preferably flanged, as shown at *a*, to form walls which prevent movement of the bar K and supporting members K′ transversely of the machine. K^3 indicates a slot formed in each supporting member K′. K^4 indicates a screw which fits a screw threaded opening in each side frame A′ and serves to adjustably secure the adjacent supporting member K′ thereto. From this description it will be understood that the flanges *a* serve as guides for the members K′ and that the bar K can be adjusted forwardly and rearwardly for purposes which will be later set forth. K^2 indicates an elongated slot formed in the bar K. The purpose of this slot will be later described. G^2 indicates a pair of relatively movable angle plates each having walls H, I, which form the rear and side walls, respectively, of a box to hold a pile of blanks G^x. The bar K is preferably arranged at an obtuse angle to the supports K′ in order that the rear walls H may be inclined upwardly and rearwardly and thus, in coöperation with an inclined front wall J hold the blanks with their front and rear edges in stepped relationship to each other. The plates G^2 may be adjustably secured to the bar K by screws K^5 which extend through the slot K^2 and fit screw threaded openings in the rear walls H. As will be readily understood, the screws K^5 permit the plates G^2 to be moved along the bar K independently of each other, thus permitting the plates to be adjusted to blanks of different widths; while the adjusting screws K^4 permit, through the bar K, adjustment of the plates forwardly and rearwardly to fit blanks G^x of different lengths. It will also be understood that by adjusting both plates G^2 along the bar, the blanks can be positioned to receive impressions on any desired portion of their surfaces.

J′, J′, indicate a pair of bars supported upon and secured to a plurality of blocks *a*′ mounted on the side frames A′. The rear ends of the bars J′ are bent upwardly at an angle, as best shown in Figs. 2 and 4. 4 indicates screws which extend through elongated slots formed in the front wall J and have screw threaded engagement with the bars J′. The screws 4 serve to hold the wall J in sliding engagement with the bars J′. The inclined ends of the bars J′ are provided with bearings to rotatably support a shaft or rod J^4 to which are preferably secured two eccentrics or cams J^3. J^2, J^2, indicate pairs of projecting members or lugs, one pair for each eccentric, secured to and extending from the outer face of the front wall J. These lugs are spaced apart to engage with the opposite sides of the eccentrics J^3, whereby the latter support the front wall J. As the eccentrics are fixed to the rod J^4, they may be operated to move the front wall up and down to adjust its lower end relative to a feed device L to provide an opening for any thickness of blank and permit only one blank to be fed forward at a time.

The feed device may comprise a bottom plate L″ and a blank engaging member or feeder L^2 which is adjustably secured to the bottom plate L″ in any desired manner. The opposite side edges of the bottom plate extend into and have sliding engagement with grooves L′ formed in the inner faces of the side frames A′.

There is a transverse wall or edge provided on the feeder L^2 that operates to engage the rear edge of the lowermost blank G^x and feed it forward. In that form of my invention illustrated in Figs. 4 and 5, where the feeding edge or wall L^3 is rigid or non-adjustable, it is preferably formed by cutting away a portion of the upper surface of the feeder L^2. I prefer to provide means to adjust the feeder L^2 on and relative to the bottom plate L″. These means may comprise one or more elongated slots L^{16} formed in the bottom plate L″ and set screws L^{15} which extend through the slots L^{16} from the under side of the plate and fit screw threaded openings 2 in the feeder L^2. By loosening the screws L^{15}, the feeder may be adjusted to any desired position and then fixed to the bottom plate L″, so that the blank engaging wall L^3 can be made to engage a blank at the proper time in a forward movement of the feeding device L. The bottom plate L″ may be provided with a plurality of intermediate guides L^4 and end guides L^5 between which members L^6, projecting forwardly from the feeder L^2, slide to effect rectilinear movements of the feeder during adjustment thereof on the bottom plate L″. One purpose of this construction is to permit adjustment of the feeder L^2 without in anywise changing its angular position with reference to its direction of movement.

A graduated edge L^7 upon the bottom plate registers with a defining line O upon the corresponding edge L^8 of the feed plate and the exact position of the feed plate can be adjusted relative to the position of the blanks upon the movable bottom which will be determined by their size. The graduations upon the edge of the bottom are therefore preferably shown in inches and divisions thereof.

When the bottom is moved forwardly, the blank which is moved thereby, is disposed

between and seized by one or more pairs of rollers M. The rollers M preferably comprise hardened steel disks mounted upon shafts R but spaced from each other thereon. The rollers M serve to positively feed each blank without slipping to a position above the plunger D to receive an impression from an address slug. When the blank reaches this position, the rollers M stop rotating until after the printing impression has been made. The blank is then fed to one or more pairs of rollers N disposed on the opposite side of the printing couple D, F from rolls M. The rollers N are preferably similar in construction and arrangement to the rollers M and operate at the same rate of speed. The rollers N successively feed the blanks to the printing cylinder C, which coöperates with a pressure roller P to print upon the upper side of the blanks.

The bottom L'' is preferably provided with projecting members l^6 which pass between adjoining pairs of rollers M, as the feeding member moves forwardly and thus supports the blank until it is positioned over the plunger D. The spaces between the projecting members l^6 receive the rollers M as the feeding member moves forwardly (see Fig. 4).

In Figs. 7, 8, 9, and 10 I have shown a slightly modified form of feeding device wherein is provided an adjustable blank engaging wall L^{23} to adapt the feeder L^2 to blanks of different thicknesses. In these views, L^9 indicates a transverse bar mounted in a recess formed in the feeder L^2 and a block L^{12} fixed thereto in any suitable manner. L^{10} indicates a groove formed in the underside of the bar L^9 and arranged to receive a rib L^{11} which is provided on the block L^{12} and forms a pivot for the bar L^9 to swing on. L^{20} indicates the device for raising and lowering or adjusting the front edge of the bar L^9. As shown, this device consists, by preference, of a screw which extends through a slot l^3 formed centrally of the bottom plate and a screw threaded opening in the block L^{12}, so that its inner end may engage the bar L^9. By turning the screw L^{20}, the bar L^9 can be raised or lowered to cause its front edge or wall L^3 to project any desired distance above the upper surface of the feeder L^2. I prefer to provide means for yieldingly maintaining the bar L^9 in engagement with the inner or free end of the adjusting device L^{20}, so that the bar cannot be jolted upwardly during movement of the feed device and thus engage more than one blank at a time. These means may comprise a bolt L^{13} extending through the slots l^3 and l^4 (the latter being formed in the block L^{12}) and having screw threaded connection with the bar L^9, and a compression spring L^{14} engaging at its opposite ends with the head of the bolt L^{13} and the bottom plate L'' or the flange of a collar l^5 surrounding the bolt L^{13}. By turning the bolt L^{13}, the tension of the spring L^{14} can be adjusted as conditions may require.

In order to prevent the blanks from slipping underneath the bar K which supports the movable walls H, H, the lower edge of this bar is provided with spaced projections k, k and the feed bar L^9 of the feeder plate is provided with corresponding grooves l, l into which the projections k, k enter.

The raised portions of the knife plate also project at l' l' and enter recesses l^2, l^2 in the feed plate L^2, thus overlapping the projecting parts and engaging the blank at a number of spaced points, forming the feed edge L^{23}, which thus becomes interrupted or broken.

The mechanism for operating the reciprocating bottom and the feed rollers may be described as follows: An intermittent movement is necessary for the feed rollers and blank feeding mechanism to allow for the time occupied in giving a reciprocating movement to the plunger. The printing cylinder is preferably rotated continuously and the plunger D may be operated by a cam G' which gives it two rest periods, one at each end of its stroke.

The cylinder C is preferably rotated by a gear train Q, Q', Q^2, the latter gear being fixed in any well known manner to one end of the cylinder C. Q^3 indicates a crank connected to the gear Q, whereby the gear train may be operated. At its opposite end the cylinder C is preferably provided with a mutilated gear R' which coöperates with a mutilated gear R^2 to intermittently rotate a sprocket S. S' indicates a sprocket fixed to one of the adjacent shafts R and driven from the sprocket S by a chain S^2. R^4 indicates a sprocket preferably fixed to the opposite end of the shaft R carrying the sprocket S'. 5 indicates a sprocket fixed to one of the shafts R for the rollers M and driven from the sprocket R^4 by a chain R^5. From this construction it will be seen that the rollers M and N are intermittently operated and preferably at the same rate of speed, the sprockets R^4 and 5 being of the same size.

I preferably provide connections between the shaft for the crank Q^3 and the plunger D for reciprocating the latter. These connections preferably comprise a cam G' fixed in any suitable manner to a shaft D' rotatably supported at its opposite ends in the side members A'. At one end the shaft D' may be provided with a bevel gear d^3 which meshes with a gear d^2 on one end of a shaft d^5. The shaft d^5 is supported in suitable bearings 6. At or near its opposite end, the shaft d^5 carries a worm d^6 which meshes with a worm d^4. The cam G' is shaped to operate the plunger D in coöperation with the other parts of the apparatus and to per-

mit the feeding of address plates or slugs to and from the plunger.

The blank feeder is reciprocated by suitable connections which are preferably operated by the shaft R carrying the sprocket 5. Of these connections, T indicates a device, preferably an eccentric, mounted upon a sleeve T′ and between a pair of parallel lugs T^2 fixed to and depending from the bottom plate L″. The sleeve T′ is mounted on and connected to a shaft T^3. T^4 indicates a gear fixed to the shaft T^3 and meshing with a gear T^5 fixed to the adjacent shaft R.

From the foregoing description it will be seen that the feeder is operated through the devices which rotate the feed rollers; accordingly, the feeder will be operated in cooperation therewith, so that any increase or decrease in the speed of the rollers will cause a corresponding increase or decrease in the movement of the feeder. The cam T and its sleeve T′ are preferably adjustable angularly upon the shaft T^3. This makes it possible to control the moment of advance of the bottom plate so that the first pair of feed rollers will seize the blank at the proper time during their period of revolution and so as to provide a predetermined width of margin for the printed matter and to locate the address in exactly the desired position on the blank.

This adjustment is accomplished by means of an arm t upon the sleeve and a screw t' therein, which passes through a circular slot t^2 in the gear T^4. By means of a clamping nut t^3 upon the screw the cam sleeve and cam can be placed at any angle desired relative to the shaft T^3.

The edges of the circular slot can be graduated if desired for fine adjustment, and so that the same adjustment can be made again without experimenting.

It is important that the speed of rotation at the periphery of the cylinder should be the same as the speed of rotation at the peripheries of the feed rollers, since the hardened rollers grip the blanks firmly and do not permit the printing cylinder to pull the blanks at a greater rate of speed than their own.

To those skilled in the art, many modifications and widely differing embodiments and applications of my invention will suggest themselves, without departing from the spirit and scope thereof. My disclosures and descriptions herein are purely illustrative and are not intended to be in any sense limiting.

Having described the invention what I claim as new and desire to secure by Letters Patent is:

1. In apparatus of the class described, the combination of a pair of feed rollers, means for rotating said rollers intermittently, a blank holder including a movable bottom on which the blanks are supported, said bottom being provided with a transverse wall to engage the lowermost blank, means for reciprocating said bottom, and means for timing the throw of said bottom relative to the periods of movement of said feed rollers.

2. In apparatus of the class described, the combination of a pair of feed rollers, means for rotating said feed rollers intermittently, a blank holder including a movable bottom on which the blanks are supported, said bottom comprising a plate and a member adjustably mounted on said plate and arranged to engage the lowermost blank and feed it forwardly, means for reciprocating said bottom, and means for timing the throw of said bottom relative to the periods of movement of said feed rollers.

3. In apparatus of the class described, the combination of a plurality of pairs of feed members spaced relative to each other, a support for a series of blanks including a horizontally disposed movable device for supporting the lowermost blank in a horizontal plane, said device being provided with a wall extending transversely from side edge to side edge thereof and arranged to engage the lowermost blank and feed it forwardly and supporting members each adapted to move between adjoining pairs of feed members and support the blank therebetween as said blank moving device moves forwardly, and means for reciprocating said movable device.

4. In mechanism of the class described, the combination of a frame comprising a pair of spaced supports, a cross bar mounted on and adjustable longitudinally of said supports, side and rear walls laterally adjustable upon said cross bar, a plate longitudinally movable in said supports below said walls, a feeder longitudinally adjustable upon said plate, an eccentric for reciprocating said plate, means for rotating said eccentric, and means for adjusting the connection between said eccentric and the rotating means therefor.

5. In a blank feeding device, the combination of a holder adapted to receive a pile of superposed blanks, a pair of members which coöperate to support the pile of blanks and to feed the lowermost one thereof forwardly, one of said members being provided with a transverse wall arranged to engage the lowermost blank, and means for reciprocating said members.

6. In a blank feeding device, the combination of a holder adapted to receive a pile of superposed blanks, a pair of members, one of which is adjustable relative to the other, for supporting the pile of blanks, said members being provided with coöperat-

ing devices which support the lowermost blank in a horizontal plane during and after adjustment of said members, said adjustable member being provided with a transverse wall arranged to engage the lowermost blank, and means for reciprocating said members.

7. The combination of a box for receiving a pile of blanks, said box including rearwardly inclined front and rear walls, a reciprocatable device arranged below said front and rear walls for supporting the pile of blanks in said box with the lowermost blank in a horizontal plane and for successively feeding the blanks forwardly, said device being provided with a wall which engages with the lowermost blank to feed it forwardly, and means for operating said feeding device.

8. In mechanism of the class described, the combination of a holder, including front and rear walls, for a pile of blanks, a reciprocating device arranged below and adapted to support the pile of blanks in said holder, said device being provided with a transverse wall which engages the lowermost pile of the blanks to feed it forwardly, and an elevated horizontal surface extending rearward of said wall for supporting the pile of blanks during forward and return movement of said device, and means for reciprocating said device.

9. In mechanism of the class described, the combination of a holder adapted to receive a pile of blanks, a reciprocating member on which the pile of blanks rests, said member comprising a plate and a feeder adjustable thereon and provided with a transverse wall arranged to engage the lowermost blank and feed it forwardly, devices interposed between said plate and said feeder for maintaining said feeder at right angles to the direction of movement of said reciprocating member during adjustment of the feeder on said plate, and means for reciprocating said member.

10. In mechanism of the class described, the combination of a holder adapted to receive a pile of blanks, a reciprocating member on which the pile of blanks rests, said member comprising a plate and a feeder adjustable thereon and provided with a transverse wall arranged to engage the lowermost blank and feed it forwardly, longitudinally extending devices interposed between said plate and said feeder for maintaining said feeder at right angles to the direction of movement of said reciprocating member during adjustment of the feeder on said plate, and means for reciprocating said member.

11. In a blank feeding and holding device, the combination with a pair of side frames, of side and rear walls adjustably mounted upon said frames, a bottom plate slidably mounted in said side frames, a feeding plate adjustable on said movable bottom plate in spaced longitudinal guides, a bar movably mounted on said plate and provided with a blank engaging wall, and means for moving said bar to adjust its blank engaging wall relative to the upper surface of said plate.

12. In a blank holding and feeding device, the combination with a frame or support, of adjustable side and rear walls for holding a pile of blanks, a device movably mounted in said support, a feeding plate longitudinally adjustable in said device, means for adjustably securing said plate to said device, a transverse bar pivoted on said feeding plate and having a blank feeding edge, and means for raising and lowering said bar to adjust its feeding edge relative to the surface of said plate.

13. In a blank feeding mechanism, the combination of side and rear walls, a reciprocating bottom plate, a feed plate thereon, a tilting transverse bar mounted in a recessed portion of said feed plate, said transverse bar having a feed edge, means for elevating and depressing said feeding edge, the meeting edges of said transverse bar and feeding plate being alternately projecting and recessed substantially as set forth.

14. In a blank feeding device, the combination of a framework, a reciprocating bottom plate slidably mounted in said framework, a feeder longitudinally adjustable in said reciprocating bottom plate, a transverse bar having a blank feeding edge, adjustably fastened to said feeder, and means for raising and lowering said bar to adjust its feeding edge to the proper thickness of the blanks.

15. The combination of a holder for a pile of blanks, a reciprocating member on which the blanks rest, a bar mounted on said member and provided with a wall arranged to engage the lowermost blank of the pile and feed it forwardly relative thereto, and means for raising and lowering said bar to adjust its blank engaging wall relative to the surface of said member for engagement with blanks of different thicknesses.

16. The combination of a holder for a pile of blanks, a reciprocating member on which the blanks rest, a bar mounted on said member and provided with a wall arranged to engage the lowermost blank of the pile and feed it forwardly relative thereto, means for raising and lowering said bar to adjust its blank engaging wall relative to the surface of said member for engagement with blanks of different thicknesses, and means for yieldably holding said bar against said raising and lowering means.

17. The combination of a holder for re-

ceiving a pile of blanks, the front and rear walls of said holder being inclined but arranged parallel to each other, whereby the front and rear edges of the blanks are held in stepped relationship, a reciprocatable device on which the pile of blanks rest, said device being movable in a plane parallel to the blanks and provided with a wall arranged to engage the lowermost blank and feed it forwardly relative to the pile of blanks, and means for operating said feeder device.

In testimony whereof, I hereunto set my hand this 13th day of October, 1913.

EARL W. LESHER.

In presence of—

A. D. SALORSKY,

WM. M. MONROE.