Nov. 11, 1941. A. MILLER 2,262,109

AUTOMATIC FEEDER FOR PRINTING PRESSES

Filed July 29, 1940 4 Sheets-Sheet 1

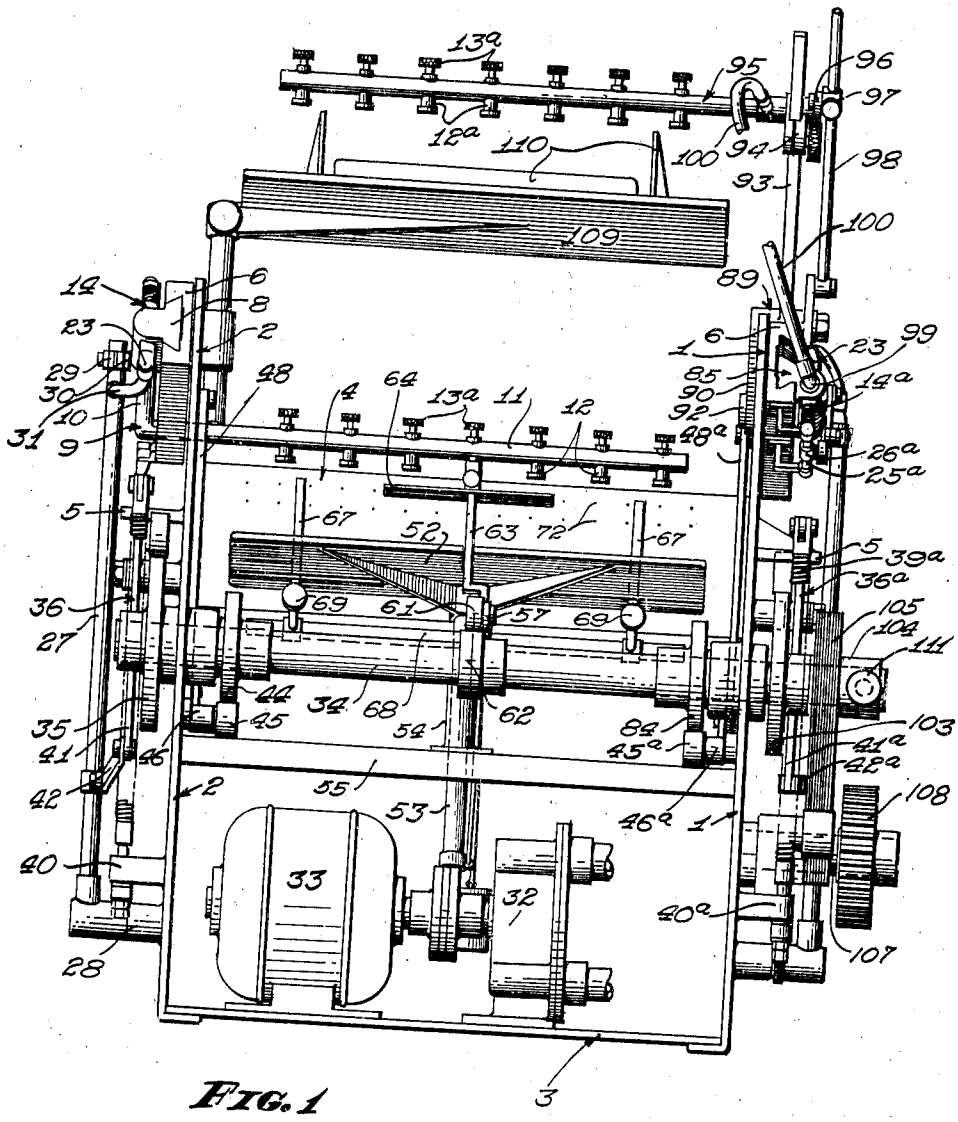


FIG. 1

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AUTOMATIC FEEDER FOR PRINTING PRESSES

Filed July 29, 1940 4 Sheets-Sheet 2

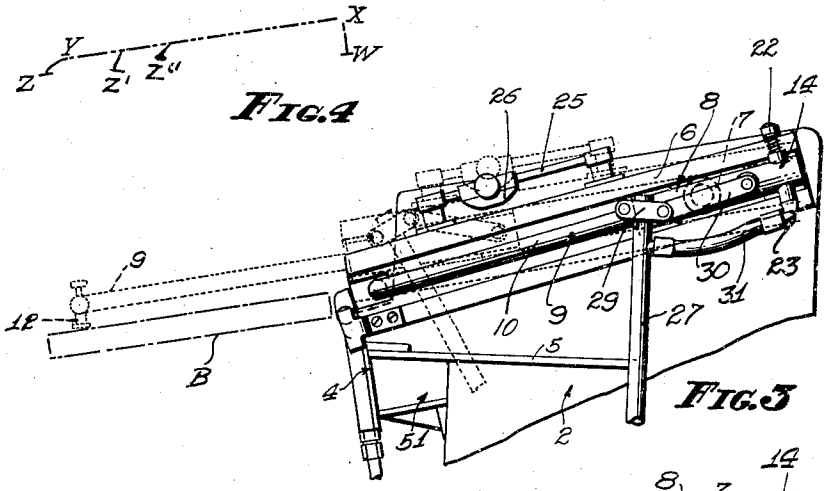


FIG. 4

FIG. 3

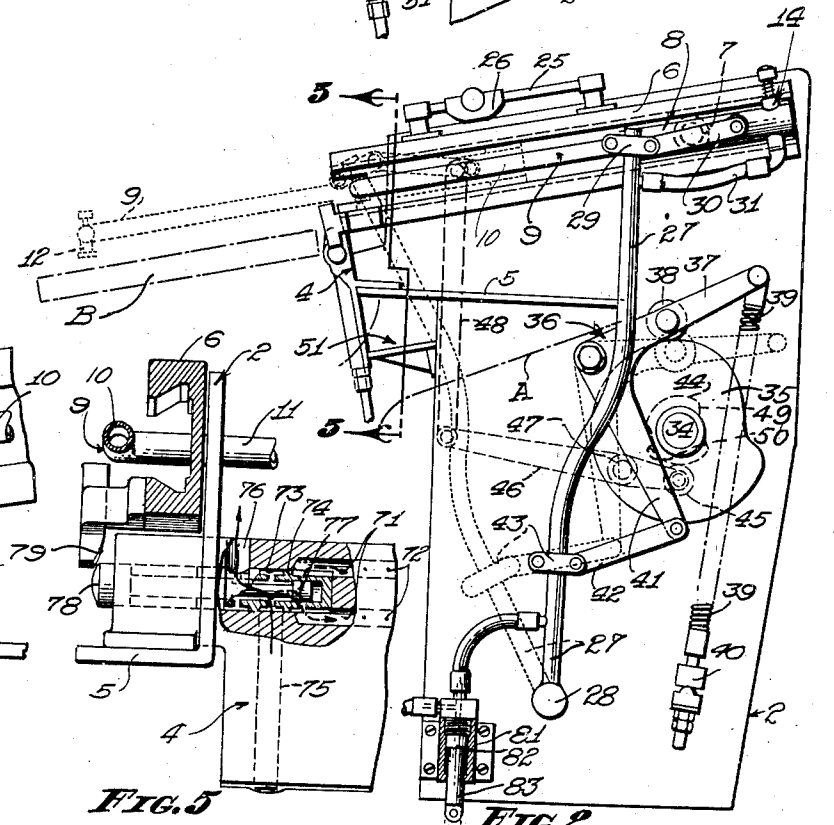


FIG. 2

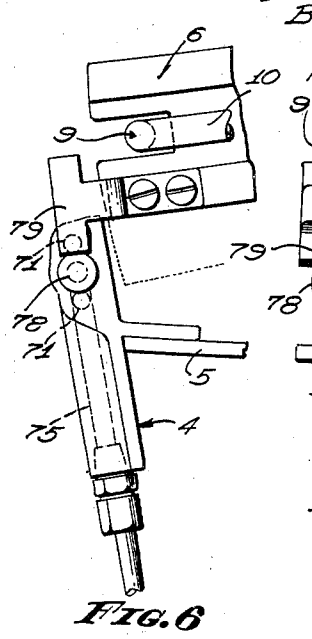


FIG. 6

FIG. 5

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AUTOMATIC FEEDER FOR PRINTING PRESSES

Filed July 29, 1940 4 Sheets-Sheet 3

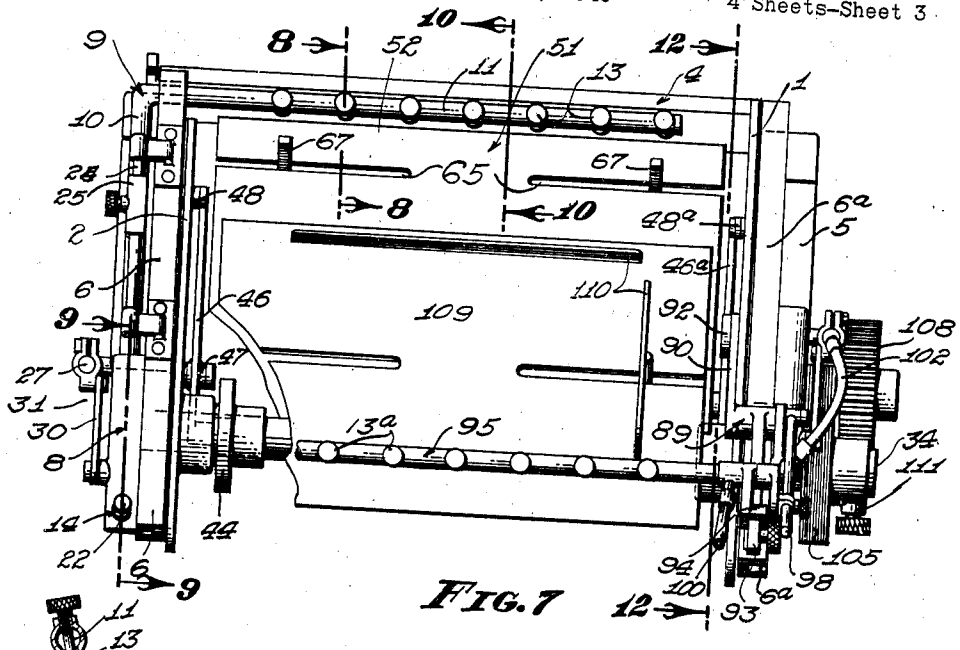


FIG. 7

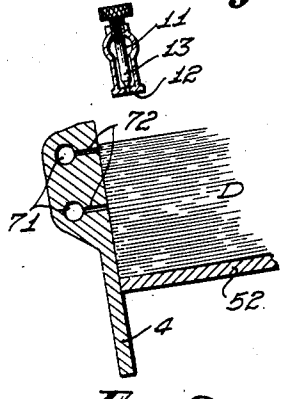


FIG. 8

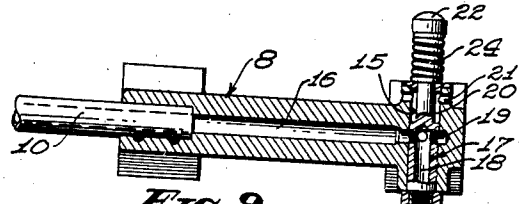


FIG. 9

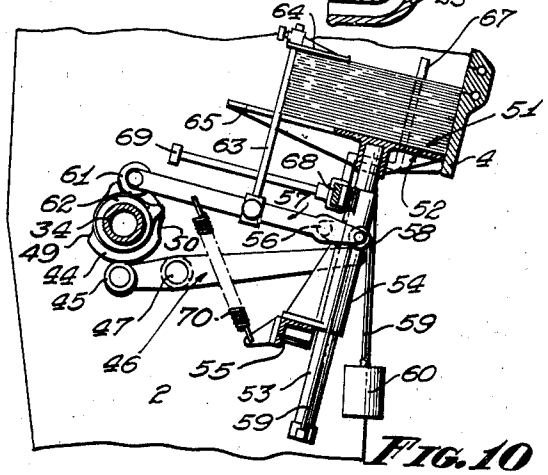


FIG. 10

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Nov. 11, 1941. A. MILLER 2,262,109

AUTOMATIC FEEDER FOR PRINTING PRESSES

Filed July 29, 1940 4 Sheets-Sheet 4

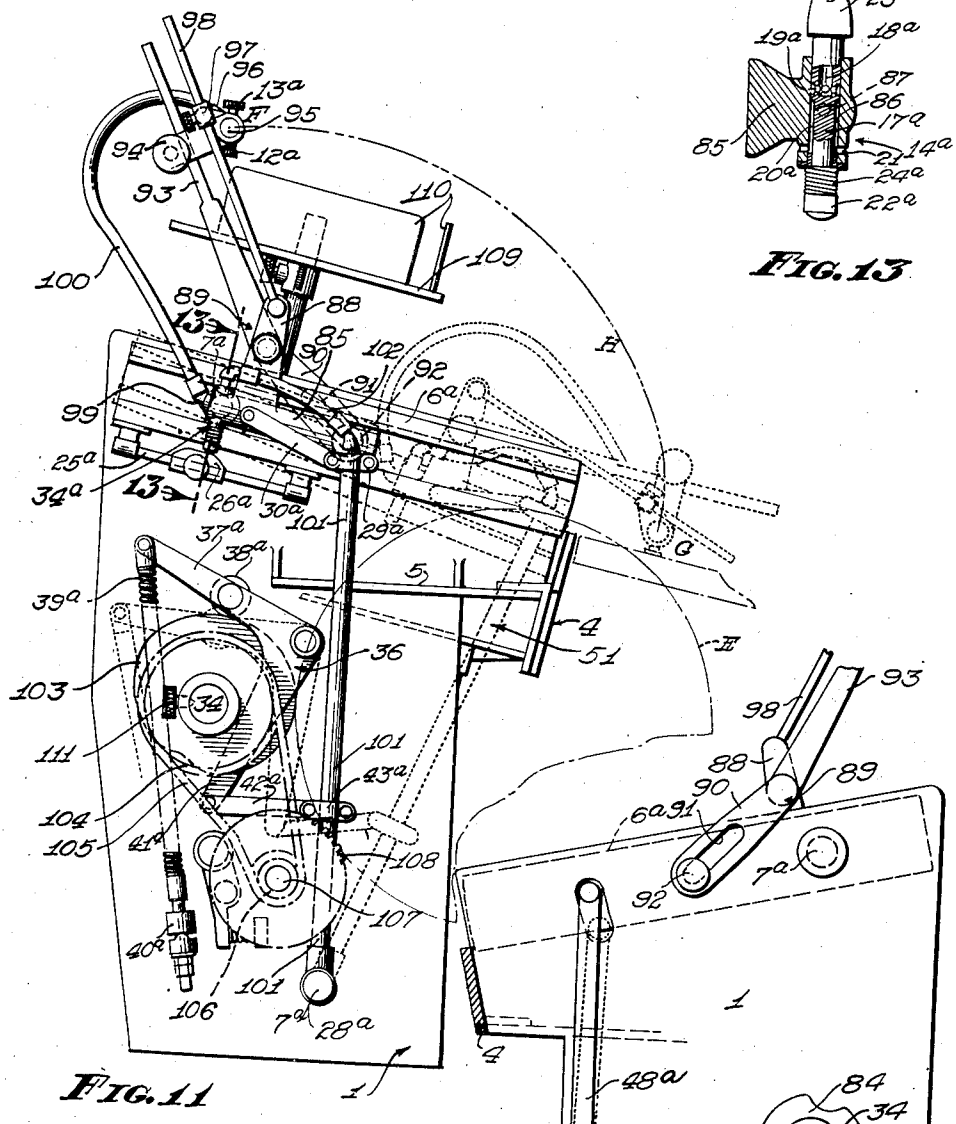


FIG. 11

FIG. 13

FIG. 12

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Patented Nov. 11, 1941 2,262,109

UNITED STATES PATENT OFFICE

2,262,109

AUTOMATIC FEEDER FOR PRINTING PRESSES

Allen Miller, Los Angeles, Calif., assignor to Robert F. Foard, Los Angeles, Calif.

Application July 29, 1940, Serial No. 348,196

19 Claims. (Cl. 101—287)

My invention relates to automatic feeders for printing presses, and among the objects of my invention are:

First, to provide an automatic feeder which is particularly adapted for operation in conjunction with flat bed presses of the "Gordon" type, which at the present time are usually manually operated.

Second, to provide an automatic feeder which may be readily and quickly mounted as a unit on a conventional printing press without altering the press, the feeder being a self-contained unit.

Third, to provide an automatic feeder for printing presses which incorporates a particularly novel means of effecting feeding of the paper to the press as well as removal of the paper from the press, said means comprising a delivery mechanism and a retrieving mechanism, many of the parts of which are similar and capable of interchangeable use; thus providing an automatic feeder which is inherently economical of manufacture, assembly and repair.

Fourth, to provide an automatic feeder which although built as a unit for unit mounting upon a printing press incorporates pneumatic control means, both sub-atmospheric control for engaging and holding the sheets of paper, and positive pressure control to facilitate separation of the sheets of paper.

Fifth, to provide an automatic feeder for printing presses which effects a particularly simple and direct movement of the paper from its point of storage to the platen of the printing press.

Sixth, to provide an automatic feeder for printing presses which may be readily and quickly rendered inoperative and arranged so that the printing press may be fed by hand, and may be as readily and quickly re-connected for operation, all without removing the feeder from the press.

With the above and other objects in view as may appear hereinafter, reference is made to the drawings, in which:

Figure 1 is a front view of my automatic feeder.

Figure 2 is a side elevational view of my automatic feeder showing particularly the paper feeder mechanism, the solid lines showing the positions of the parts when the paper delivery arm is about to descend and pick up a sheet of paper from the feeder box, the dotted lines indicating the positions of the parts when the feeder arm is extended and about to deposit a sheet of paper on the platen; adjacent parts of the press are indicated by broken lines.

Figure 3 is a similar, but fragmentary elevational view showing of the paper feeder mechanism, the solid lines showing the position assumed when the paper feeder arm has descended to the feeder box, and the dotted lines indicating the position occupied by the feeder arm as it deposits the paper on the platen.

Figure 4 is a diagrammatical view indicating the path taken by the paper feeder arm in the course of the movements depicted in Figs. 2 and 3.

Figure 5 is an enlarged fragmentary sectional view through 5—5 of Fig. 2, illustrating particularly the valve means for controlling air supply to the feeder box to effect separation of the paper and facilitate the action of the feeder arm.

Figure 6 is a fragmentary side elevational view of the parts shown in Fig. 5.

Fig. 7 is a plan view of my automatic feeder.

Figure 8 is an enlarged sectional view taken through 8—8 of Fig. 7 illustrating particularly the air control valve for the paper feeder mechanism.

Figure 9 is an enlarged fragmentary sectional view taken through 9—9 of Fig. 7 showing particularly the relationship between the feeder box, paper separator and paper feeder arm.

Figure 10 is a fragmentary sectional view through 10—10 of Fig. 7 illustrating the paper feeder box and the mechanism for raising the paper supply as sheets of paper are removed.

Figure 11 is a side elevational view of the feeder showing the paper retrieving mechanism, the solid lines indicating the positions assumed when the paper is deposited in the collector box, and the dotted lines showing the positions assumed when the paper is being picked up from the platen of the printing press; adjacent portions of the press being shown by broken lines.

Figure 12 is a sectional view through 12—12 of Fig. 7 showing inner side of the side plate which carries the paper retrieving mechanism and certain elements of said mechanism mounted thereon, Figure 13 is a sectional view through 13—13 of Fig. 11.

My automatic feeder is particularly adapted for attachment to a Gordon press, the press being shown partially and by broken lines. The feeder is supported on the side arms A of the press in place of the conventional feed table normally provided for hand operation of the press. The paper is deposited on the platen B of the press, the platen being indicated by broken lines and only by outline.

My feeder includes a pair of side plates 1 and 2 which fit between and adjacent the inner sides

of the side arms A and are connected by a bottom plate 3 and back member 4. Each side plate is provided with a side bracket 5 which rests upon and is secured to the corresponding side arm A to support the feeder in position.

The side plate 1 is adapted to support mechanism which removes paper from the printing press, which mechanism, is however, described more in detail hereinafter. The paper feeder mechanism will be described first, reference being directed particularly to Figs. 1 through 7.

The side plate 2 is provided along its upper portion on its outer side with a guide-track 6 which is supported by a journal 7 near the forward or outer end of the side plate so that the rear end of the guide track adjacent the platen may be raised or lowered. The guide-track 6 is channel shaped with the margins undercut or dovetailed to retain a traveler member 8 in the form of a bar having lateral feet coacting with the dovetailed margins.

The traveler member is adapted to move forwardly and backwardly along the track member. An L-shaped feeder arm 9 is secured to the rearward end of the traveler member. One branch 10 of the L extends along the side of the track member while the other branch 11 extends at right angles therewith horizontally across the rearward end of the track member and between the two side plates 1 and 2. The cross branch 11 of the feeder arm is adapted to move forwardly and backwardly as well as vertically over the platen and is equipped to carry sheets of paper.

The feeder arm is tubular and its cross branch 11 is provided with a plurality of depending nipples 12 having small openings and flat lower faces positioned substantially parallel to the surface of paper supported between the side plates 1 and 2 as will be described in more detail hereinafter. The nipples are individually controlled by needle valves 13. The entire feeder arm is made as light as possible preferably of light-weight material.

The forward end of the traveler member may incorporate integrally an air control valve 14, the traveler member forming the body of the valve in which is formed a vertical, transverse bore 15 and an intersecting longitudinal bore 16 which communicates with the feeder arm.

A valve element 17 fits within the transverse bore 15. The lower portion of the valve element is tubular and forms an intake passage 18 which communicates with the bore 16 through ports 19, while the upper portion of the valve element is reduced in diameter to form with the transverse bore 16, a relief passage 20 adapted, when the valve element 21 is lowered, to communicate with the bore 16. Ports 21 open the passage 20 to atmospheric pressure. The upper end of the valve element receives a head member 22 while the lower end is connected to a fitting 23. The valve element is normally held in an upper position by a spring 24.

Mounted on the upper side of the track member is a bar 25 upon which is adjustably supported a cam element 26 adapted to engage the valve head member 22 when the traveler member is in its rearward position. The cam element 26 depresses the valve element by engagement with the head 22 to bleed the feeder arm and thereby cause it to release the sheet of paper adhering to it by suction.

The traveler member is moved by a drive arm 27 which extends along the outer side of the side plate 2 and is provided with a journal 28 at its lower end. The upper end of the drive arm is opposite the track member rearward of the traveler member and is provided with a clamp 29 which is connected to the traveler by a link 30. The drive arm 27 is tubular and provides a means of connecting the feeder arm with a source of sub-atmospheric pressure. The upper portion of the drive arm 27 is connected by a lateral fitting and a flexible hose 31 with the fitting 24 of the air control valve. The lower end of the drive arm is suitably connected with the intake or suction side of a pump 32 mounted on the bottom plate 3 between the side plates 1 and 2 of the feeder. The pump 32 is driven by a suitable motor 33 likewise mounted on the bottom plate.

A drive shaft 34 extends between the side plates and is journaled therein. The end extending through the side plate 1 is connected with the main drive gear C of the printing press as will be described hereinafter. The end of the drive shaft extending through the side plate 2 is provided with a cam 35 which actuates the feeder arm. A bell crank 36 is journaled at its midportion and at a point above and rearward of the cam 35 and includes an upper arm 37 extending forwardly and upwardly past the cam. The upper arm 37 is provided with a cam follower wheel 38 intermediate its ends, while its extended end is attached to a spring 39 which extends downwardly and is secured to an anchor 40 near the lower forward corner of the side plate 2. The second or lower arm 41 of the bell crank 36 extends downwardly and is joined at its lower end through a link 42 to an adjustable clamp 43 secured to the drive arm 27.

The cam is so shaped that the feeder arm is caused to move slowly rearwardly and return rapidly; furthermore, the rearward movement is effected by the spring 39 so that the movement is not positive; the return movement, however is positively controlled by the cam.

The track member is raised and lowered at each end of travel of the feeder arm. This is accomplished by a cam 44 positioned on the shaft 34 adjacent the inner side of the side plate 2. The cam 44 is engaged by a cam roller 45 secured at one end of a rocker arm 46 which is provided with a journal 47 intermediate its ends. The rocker arm 46 extends rearwardly from the cam 44 and is connected by a connecting bar 48 with the track member near its rearward end. The cam 44 is provided with a major depression 49 and a minor depression 50 so positioned that the track member drops to its lowest position when the feeder arm is in its forward position for picking up a sheet of paper and to an intermediate position when the feeder arm is in its rearward position for depositing the sheet on the planten, these portions being shown in Fig. 2. Operation of the feeder mechanism will be described hereinafter.

The feeder box, designated generally 51, is shown best in Figures 1, 7 and 10. The feeder box utilizes the back member 4 of the feeder frame. The back member slopes forward and downward at approximately right angles to the plane of the printing press platen B. The feeder box includes a base plate 52 which is disposed at right angles to the back member and supported by a stem 53. The stem 53 is guided by a sleeve 54 which in turn is supported by a cross member 55 extending between the side plates 1 and 2.

Pivotally supported intermediate its ends by

a journal 56 is an elevator lever 57. One end is arranged alongside the stem 53 and is provided with a pulley wheel 58. A cable is attached to the lower end of the stem 53 and passes upwardly therefrom over the pulley wheel 58 and is provided with a counter weight 60.

The other end of the elevator lever 57 extends forwardly over the drive shaft 34 and is provided with a cam roller 61 which coacts with a cam 62 mounted on the shaft 34.

Adjustably secured to the lever 57 is a depresser arm 63 which extends upwardly through a slot 65 extending forwardly and rearwardly at the center of the base plate 52 and is provided with an adjustable depresser plate 64. Other slots 66 extend inwardly from the edges of the base plate parallel with the back member 4. These receive side guide bars 67 which extend downward through the base plate and are adjustably secured to a cross bar 68 by adjustment screws 69.

A spring 70 is attached to the lever 57 and pulls downward thereon.

Operation of the feeder box is as follows:

A stack of paper D is placed on the base plate 52 with one edge of the stack against the back member 4. The depresser arm 63 is positioned adjacent the forward edge of the paper stack and the depresser plate 64 is adjusted downwardly on the depresser arm. With each rotation of the drive shaft 34, the cam 62 raises the cam follower 61, lowering the pulley wheel 58, and lifting the depresser arm 63 from the stack of paper at which time the delivery arm withdraws a sheet of paper. When the cam follower lowers again to its normal position, the counter weight tends to raise the base plate, but the depresser arm and depresser plate 64 pushes downwardly on the stack of paper in opposition to the tendency of the counter weight, the net result is to raise the base plate substantially the thickness of the paper which was withdrawn by the feeder arm.

Operation of the paper feeder mechanism is as follows:

Initially the feeder arm rests in its forward position with the nipples 12 engaging the uppermost sheet of paper D stacked in the feeder box. At such time the suction side of the pump maintains a sub-atmospheric pressure in the feeder arm causing the paper to adhere to the nipples 12 and the track member is tilted to the lowermost position shown by solid lines in Fig. 3.

As the platen of the printing moves into the position shown in Figs. 2 and 3 and immediately following removal of the preceeding sheet of paper by the retrieving or removing mechanism as will be described hereinafter, the track member raises. That is, the operating end of the feeder arm moves from the point W to X of the path indicated in Fig. 4. As soon as the platen has reached its position indicated in Figs. 2 and 3, the cam 35 permits the spring 39 to move the feeder arm rearward from the solid to the dotted line positions shown in Fig. 2; that is, along the path X—Y of Fig. 4. As the feeder arm reaches its rearward position the track member tilts downward slightly causing the operating end of the feeder arm to describe a slight arc in moving from the dotted line position of Fig. 2 to the dotted line position of Fig. 3; that is the path Y—Z of Fig. 4.

The feeder arm in returning retraces path Z, Y, X, W.

The feeder arm may remain in the solid line position shown in Fig. 3 (W of Fig. 4) for an appreciable period of the operation cycle; consequently, the cam 44 may be made adjustable on the drive shaft 34 so that the point in the cycle at which the minor depression 50 causes the feeder arm to dip to the platen and may be changed; for example, to dip at points Z′ or Z″ as shown in Fig. 4.

At the point in the forward movement of the feeder arm at which the dip Z, Z′, or Z″ occurs, the valve control cam 26 is adjusted on the bar 25 to engage the control valve and thereby bleed the feeder arm so as to release the paper.

Reference is now directed particularly to Figs. 5 and 6.

In order to facilitate separation of the sheets of paper when the feeder arm engages the paper stack, air passages 71 are provided along the back member which are intersected by air ports 72 directed forwardly between the sheets of paper.

At the end of the back member connected with the side plate there is provided a valve bore 73 in which is fitted a valve liner 74 having ports connected with the passages 71. Another port of the liner connects with an air supply passage 75, while an exhaust passage 76 is likewise connected with a port of the valve liner. A spool valve 77 fits within the liner and protrudes from the end of the back member adjacent the rearward end of the track member 6.

The spool valve 77 is provided with a head 78 which is adapted to be engaged by a cam arm 79 secured to the lower rear corner of the track 6 when the track member is tilted to the position shown in Fig. 3. In such position, the spool valve connects the air passages 71 with the supply passage 75. The air supply passage 75 is suitably connected to the discharge or pressure side of the pump 32; so that air is introduced between the sheets of paper; however, only when the feeder arm is picking up a sheet of paper. At other times, the air supply is cut off from the passages 71.

The feeder mechanism hereinbefore described lends itself, inherently, to control of the conventional platen releasing mechanism usually provided on Gordon presses. Such mechanism, not shown, causes the platen to clear the press slightly so that it fails to make an impression and includes an arm which extends forward for foot engagement of the operator. If this arm is depressed the platen fails to make an impression, but when the arm is raised the press operates.

To effect automatic control of the platen releasing mechanism, a cylinder 81 is mounted vertically at the lower rearward corner of the side plate 2 as shown in Fig. 2. A piston 82 fits within the cylinder to which is connected a stem 83 adapted to be attached to the control arm of the platen releasing mechanism. The sub-atmospheric air line from the lower end of the drive arm 27 to the intake end of the pump 32 is connected to the cylinder 81 so that as long as a vacuum is held in the drive arm 27 the piston is held in an upper position; which holds the platen releasing mechanism clear but when the vacuum is relieved the piston and its stem drops.

Thus, should the feeder mechanism fail to pick up a piece of paper no vacuum is maintained and the stem is in the lower or dotted line position shown in Fig. 1. When held in this position, the platen releasing mechanism

operates to prevent an impression being made. At the time when the vacuum is intentionally released to drop the paper and during return movement of the delivery arm the conventional parts of the printing press are not in position to be affected by the position of the platen releasing mechanism.

The paper retrieving mechanism will now be described, reference being had to Figs. 1, 7, 11, 12, and 13. Many of the parts of the retrieving mechanism are duplicates of previously described parts of the feeder mechanism, these being given corresponding reference characters followed by the letter *a*.

Thus a track member 6*a* is supported by a journal 7*a* along the upper, outer margin of the side member 1 and is tilted by a cam 84 corresponding to cam 44 and operatively connected with the track member by a roller 45*a*, rocker arm 46*a*, journal 47*a* and connecting bar 48*a*, as shown in Fig. 12.

A traveler member 85 is adapted to ride in the guide track 6*a*. The forward end of the traveler member is provided with a vertical bore 86 and intersecting horizontal bore 87 to form a valve body for an air control valve 14*a*. The control valve itself may be identical to control valve 14, but is mounted with the head 22*a* of the valve element 17*a* directed downwardly and fitting 23*a* on the upper end of the valve element.

A bracket 88 extends upwardly from the traveler member 85. A retrieving arm lever 89 is journaled in the bracket 88. The lever 89 includes a downwardly directed arm 90 which extends along the inner side of the side plate 1 and is provided with a slot 91 which coacts with a pin 92 secured in the side plate so that, as the traveler member is reciprocated in the track, the lever 89 is caused to rotate about its fulcrum.

An arm 93 extends upwardly from the fulcrum of the lever 89 and its extended end is provided with an adjustable bracket 94 which extends rearwardly and journals one end of a retrieving arm 95. The retrieving arm extends horizontally between, but above the side plates 1 and 2. Arranged along the retrieving arm are nipples 12*a* having needle valves 13*a*. Attached to the end of the retrieving arm is a short lever 96, the extended end of which is pivotally connected to an adjustable collar 97 secured to a rod 98 which is positioned along the side of the arm 93 of the lever 89. The rod 98 is journaled on the bracket 88 above the fulcrum of the lever 89. The rod 98 and lever 96 serve to maintain the nipples 12*a* in a subtsantially vertical position during movement of the delivery arm as will be described hereinafter.

A fitting 99 is secured in the end of the traveler member 85 and communicates with the horizontal bore 87. A flexible hose 100 is looped upwardly from the fitting 99 to the retrieving arm 95.

The traveler member is moved by a drive arm 101 similar to the drive arm 27. The drive arm extends along the side of the plate 1 and is pivoted on a journal 28*a* near the lower margin of the plate. The drive arm is provided near its upper end with an adjustable clamp 29*a* which is connected by a link 30*a* to the traveler member. Like the drive arm 27, the drive arm 101 is tubular and suitably connected with the vacuum side of the pump 32. The upper end of the drive arm is provided with a fitting which receives one end of a hose 102, the other end of which is connected to the fitting 23*a* of the control valve 14*a*.

Secured to the under side of the guide track 6*a* near the forward end is a bar 25*a* which carries a control cam 26*a*. The control cam 26*a* engages the head 22*a* of the air control valve 14*a* when the retriever arm is in its forward or upper position shown by solid lines in Fig. 11.

The drive shaft is provided on the outer side of the plate 1 with a retriever cam 103 corresponding to the delivery cam 35. The retriever cam actuates the drive arm 101 through a bell crank 36*a*, cam follower wheel 38*a*, link 42*a* and adjustable clamp 43*a*, the latter secured to the drive arm 101. A spring 39*a* anchored at 40*a* and attached to the bell crank moves the drive arm 101 in one direction (from the solid to the dotted line positions shown in Fig. 11) while the cam effects the movement in the opposite direction by positive action.

The drive shaft 34 is provided at its outer end beyond the cam 103 with a sprocket wheel 104, preferably adapted to receive a silent chain 105. The silent chain 105 passes around a pinion sprocket 106 mounted on a stub shaft 107 extending outwardly of the drive shaft 34. On the stub shaft 107 is a pinion gear 108 which meshes with the main drive gear E of the printing press. The gear ratios between the drive gear E and the pinion gear 108 and between pinion sprocket 106 and sprocket wheel 104 are equal, but reversed, so that the drive shaft 34 rotates at the same speed as the drive gear E.

Suitably supported above and between the side plates 1 and 2 is a platform 109 having adjustable guard members 110 so that paper may be stacked thereon. The platform 109 slopes rearwardly.

A suitable clutch 111 may be provided between the sprocket sheet 104 and the drive shaft 34 so that the feeder may be rendered inoperative should it be desirable to operate the press by hand.

Operation of the retrieving mechanism is as follows:

Initially the parts are in the positions shown by solid lines in Fig. 11. As the platen B of the press moves to the position indicated by broken lines, the retrieving arm moves along the path F—G shown in Fig. 11. The retrieving arm may move slowly to point H, just clearing the edge of the platen as it swings into position. The movement between F—H may be accomplished entirely through movement of the drive arm 101 with the track member remaining in its solid line position. Movement between H and G is accomplished with the combined tilting of the guide track and travel of the traveler member, most of the movement being furnished by the guide track so that the retrieving arm descends almost vertically. Reverse movement is along the same path; that is, from G to F.

The movement of the feeder arm 9 is so timed that it begins its travel along path X—Y of Fig. 4 just as soon as the retrieving arm has raised from the platen. With the arrangement shown, movement of the retrieving arm need not be rapid except for the few inches of movement as it engages the paper on the platen and begins to move away.

The air control valve 14*a* normally occupies a position in which suction is maintained in the nipples 12*a*, bleeding the line only when in the solid line position shown in Fig. 11.

Inasmuch as the retrieving arm lever 89 rotates through a considerable arc, the rod 98 and lever 96 compensate for the rotation of the lever 89

and hold the nipples 12a substantially vertically. By adjusting the position of the bracket 94 and the control cam 26a the position at which the paper is deposited on the platform 109 can be altered to suit different sizes of paper.

The hereinbefore described structure has inherently several advantages which will be touched upon briefly:

1. Many of the parts of the feeder mechanism and retrieving mechanism are interchangeable.

2. The distance from the control valves 14 and 14a and the feeder arm and retrieving arm respectively is quite short so that equalizing of air pressure at the nipples 12 and 12a may occur practically instantaneously.

3. Bleeding of the feeder arm or retrieving arm does not bleed the entire suction lines but only to the air control valves 14 or 14a so that there is no material loss of suction, and a pump of low capacity may be employed which is capable of mounting in the limited space provided between the plates 1 and 2.

4. The entire feeding mechanism is arranged in a complete single unit capable of installation on a printing press without altering or dismantling the press other than to remove the manual feeding box.

5. Movement onto the platen by either the feeder arm or retrieving arm is accomplished by spring action, so that should there be an obstruction the arms will yield without damage.

6. Should it be desired to use the printing press manually, it is merely necessary to disengage the clutch 111 and remove the platform 109.

Though I have shown and described a particular embodiment of my invention, I do not wish to be limited thereto but desire to include in the scope of my invention the constructions, combinations, and arrangements, substantially as set forth in the appended claims.

I claim:

1. An automatic feeder apparatus for paper handling machines, comprising: a frame structure including a pair of side members and connecting cross members; a paper feeder mechanism carried by one of said side members, and a paper retrieving mechanism carried by the other of said side members; each of said mechanisms including a track member directed toward said machine, and adapted to tilt in a vertical plane, a traveler for said track member, paper carrying means connected with said traveler and adapted to be moved thereby to and from said paper handling machine and adapted to be raised and lowered by tilting of said track member; and a drive means for each of said mechanisms adapted to move said travelers and tilt said track members to effect movement of said paper carrying means.

2. An automatic feeder apparatus for paper handling machines, comprising: a frame structure including a pair of side members and connecting cross members; a paper feeder mechanism carried by one of said side members, and a paper retrieving mechanism carried by the other of said side members; each of said mechanisms including a track member directed toward said machine, and adapted to tilt in a vertical plane, a traveler for said track member, paper carrying means connected with said traveler and adapted to be moved thereby to and from said paper handling machine and adapted to be raised and lowered by tilting of said track member; a drive means for each of said mechanisms adapted to move said travelers and tilt said track members to effect movement of said paper carrying means; and a paper feeder box and paper receiver box mounted one above the other between said side members and adapted respectively to coact with said paper feeder mechanism and said paper retrieving mechanism.

3. A paper feeding mechanism for platen printing presses, comprising: a paper storage box positioned forwardly of the platen of said printing press; air supply ports connected with a source of positive air pressure for introducing air currents between sheets of paper in said feeder box; a tiltable track member mounted forwardly of said platen and directed toward said platen at one side thereof; a traveler adapted to ride said track and including a paper feeder arm extending laterally from said track across said platen; means for actuating said traveler and tilting said track member to effect movement of said feeder arm from the storage box over the platen substantially parallel thereto, and to dip said feeder over said storage box and at a predetermined position over said platen; suction elements carried by said feeder arm; and connected with a source of sub-atmospheric pressure; a control valve for said suction elements operable to relieve the negative pressure at said suction elements when said feeder arm dips over said platen; and a control valve for said supply ports adapted to permit discharge of air therefrom when said feeder arm dips over said storage box.

4. A paper feeding mechanism for platen printing presses, comprising: a paper feeder box mounted forwardly of the platen of a printing press; a feeder arm having a plurality of paper holding suction elements connected with a source of sub-atmospheric pressure; an actuating mechanism for said feeder arm including means for moving said feeder arm from said feeder box over said platen; and means for dipping said feeder arm over said feeder box and at a predetermined point over said platen; valve means operative when said feeder arm dips over said platen to equalize the pressure at said suction elements and release paper held thereby; said paper storage box including means for introducing air currents between a stack of paper carried in said box to facilitate separation thereof; and a control valve therefor operative when said feeder arm dips into said feeder box.

5. The combination with a platen printing press of the "Gordon" type in which the platen moves into a substantially horizontal receiving position, a pair of feeder box supporting brackets extend forwardly of the platen, and a drive gear is provided at one side of the supporting brackets, of an automatic feeder apparatus comprising: frame structure including side members fitting between and supported by said supporting brackets, cross members spacing said side members; a drive shaft mounted horizontally between said side members; a counter shaft carrying a pinion gear engaging said drive gear of the press; a driving means between said counter shaft and drive shaft, the ratios of rotation between said pinion gear and said drive gear being equal and opposite whereby said drive shaft rotate at the same speed as said drive gear; paper feeder mechanism and paper retrieving mechanism carried by said side members and actuated from said drive shaft; said frame structure, feeder mechanism and retrieving mechanism, drive shaft, driving means, counter shaft and pinion gear all comprising a single unit adapted to be placed

bodily on or bodily removed from said supporting brackets.

6. The combination with a platen printing press of the "Gordon" type in which the platen moves into a substantially horizontal receiving position, a pair of feeder box supporting brackets extend forwardly of the platen, and a drive gear is provided at one side of the supporting brackets, of an automatic feeder apparatus comprising: frame structure including side members fitting between and supported by said supporting brackets, cross members spacing said side members; paper storage boxes mounted between said side members, one positioned forwardly of and below said platen, the other mounted forwardly of and above said platen; paper feeder mechanism operatively associated with one of said boxes; and carried by one of said side members; paper retrieving mechanism operatively associated with the other of said boxes; and carried by the other of said side members; each of said mechanisms including a tiltable guide member directed toward said platen; a traveler adapted to reciprocate on said guide member; and a paper carrying means operatively associated with said traveler to be moved to and from said platen by movement of said traveler and vertically by tilting of said guide member; a drive shaft mounted horizontally between said side members; driving means for said drive shaft including a pinion gear engageable with said drive gear of the printing press; said frame structure, feeder mechanism, retrieving mechanism, drive shaft and driving means including said pinion gear comprising a single unit adapted to be placed bodily or bodily removed from said supporting means.

7. The combination with a platen printing press of the "Gordon" type in which the platen moves into a substantially horizontal receiving position, and is provided with a pair of feeder box supporting brackets extending forwardly of the platen, of an automatic feeder apparatus comprising: frame structure including side members fitting between and supported by said supporting brackets, cross members spacing said side members; paper storage boxes mounted between said side members one positioned forwardly of and below said platen, the other mounted forwardly of and above said platen; paper feeder mechanism operatively associated with one of said boxes; and carried by one of said side members; paper retrieving mechanism operatively associated with the other of said boxes; and carried by the other of said side members; and each of said mechanisms including a tiltable guide member directed toward said platen; a traveler adapted to reciprocate on said guide member; and a paper carrying means operatively associated with said traveler to be moved to and from said platen by movement of said traveler and vertically by tilting of said guide member.

8. A paper moving mechanism for a platen printing press comprising: a tiltable track member mounted forwardly of the platen of the printing press and directed toward but at one side of the platen and having a position in a plane substantially parallel to the surface of said platen; a traveler for said track member; a paper carrying arm connected to said traveler and extending across the platen; means for moving said traveler along said track to effect a movement of said paper carrying arm over adjacent and substantially parallel to said platen; means for tilting said track member when said paper carrying arm occupies predetermined positions over said platen and forwardly of said platen; a paper feeder box positioned forwardly of said platen and adapted to coact with said paper carrying arm; means for introducing air currents between sheets of paper in said feeder box including a control valve; and means for actuating said control valve when said paper carrying arm is tilted forwardly of said platen by said track member.

9. A paper moving mechanism for platen printing presses, comprising: a track member directed toward the platen of said printing press and positioned forwardly and to one side of said platen; a traveler adapted to reciprocate on said track member; a tubular paper carrying arm extending from said traveler member toward and across said platen; a tubular drive arm for actuating said paper carrying arm; a flexible tubular connection between said drive arm and said carrying arm; a source of sub-atmospheric pressure connected with said drive arm; a control valve incorporated in said traveler adapted to connect said paper carrying arm with said drive arm, or isolate said arms and vent said paper carrying arm to atmosphere; and means positioned for engagement with said control valve when said traveler moves to a predetermined position along said track member.

10. A paper moving mechanism for paper handling machines, comprising: a track member directed toward the paper receiving element of said machine, a device for tilting said track member in a vertical plane; a traveler member; means for reciprocating said traveler member on said track member; a paper carrying means incorporating suction elements, said paper carrying means operatively connected with said traveler member and extending across the paper receiving element of said machine, said paper carrying means adapted to be moved between a point in front of and a point over said paper receiving element by said traveler member, and vertically moved upon tilting of said track member; a source of sub-atmospheric pressure; and a conduit therefrom to said suction elements, said paper carrying means and said traveler reciprocating means constituting links in said conduit.

11. A paper moving mechanism for paper handling machines, comprising: a track member directed toward the paper receiving element of said machine, a device for tilting said track member in a vertical plane; a traveler member; means for reciprocating said traveler member on said track member; a paper carrying means incorporating suction elements, said paper carrying means operatively connected with said traveler member and extending across the paper receiving element of said machine, said paper carrying means adapted to be moved between a point in front of and a point over said paper receiving element by said traveler member, and vertically moved upon tilting of said track member; a source of sub-atmospheric pressure; a conduit therefrom to said suction elements, said paper carrying means and said traveler reciprocating means constituting links in said conduit; a control valve carried by said traveler and interposed in said conduit; and means engaged by said control valve during movement of said traveler member for relieving sub-atmospheric pressure at said suction elements and releasing paper held thereby.

12. An automatic feeder apparatus for paper handling machines, comprising: a unitary frame structure adapted to be positioned in operative relation with the paper receiving element of said machine; a paper feeder mechanism and a paper

retrieving mechanism carried by said frame structure; each of said mechanisms including a track structure directed toward said machine and adapted to tilt in a vertical plane, a traveler for each track member, a paper carrying means operatively associated with each traveler and adapted to be moved thereby to and from the paper receiving element of said machine by movement of its traveler and adapted to be moved vertically by tilting of its traveler.

13. A paper feeding mechanism for platen printing presses comprising: unitary frame structure; a paper feeder means; an associated paper feeder box means, paper retrieving means and an associated paper receiving box means, means providing a source of both positive and negative air pressure, and a drive means for said paper feeder and paper retrieving means operatively associated with press, all of said means being carried by said unitary frame structure; said paper feeder and paper retrieving means each including suction elements and conduits extending therefrom to said source of negative pressure; an element associated with said paper feeder box means and connected with said source of positive pressure for directing a current of air between paper carried by said paper feeder box means to facilitate separation thereof; and a device for controlling said element operatively associated with said paper feeder means.

14. A paper feeding mechanism for platen printing presses comprising: a unitary frame structure; a paper feeder mechanism; a paper retrieving mechanism, and a drive means for both of said mechanisms operatively associated with the driving elements of said press, said mechanisms and means being carried by said frame structure; each of said mechanisms including a track member directed toward said printing press, a traveler for said track member, paper carrying means connected with said traveler, means for tilting said track member and means for reciprocating said traveler member to impart both tilting and reciprocal movement to said paper carrying means.

15. A paper feeding mechanism for platen printing presses comprising: a unitary frame structure; a paper feeder mechanism; a paper retrieving mechanism, and a drive means for both of said mechanisms operatively associated with the driving elements of said press, said mechanisms and means being carried by said frame structure; each of said mechanisms including a track member directed toward said printing press, a traveler for said track member, paper carrying means connected with said traveler, means for tilting said track member and means for reciprocating said traveler member to impart both tilting and reciprocal movement to said paper carrying means; suction elements for said paper carrying means, a conduit incorporating said paper carrying means and traveler reciprocating means; and a source of subatmospheric pressure common to said conduits.

16. A paper feeding mechanism for platen printing presses comprising: a unitary frame structure; a paper feeding mechanism; a paper retrieving mechanism, and a drive means for both of said mechanisms operatively associated with the driving elements of said press, said mechanisms and means being carried by said frame structure; each of said mechanisms including a track member directed toward said printing press, a traveler for said track member, paper carrying means connected with said traveler, means for tilting said track member and means for reciprocating said traveler member to impart both tilting and reciprocal movement to said paper carrying means; suction elements for said paper carrying means, a conduit incorporating said paper carrying means and said traveler reciprocating means; a valve carried by said traveler and interposed in said conduit; means adapted to be engaged upon movement of said valve and traveler to control said valve; and a source of sub-atmospheric pressure common to the conduits of said mechanisms.

17. The combination with a platen printing press having a main driving gear and brackets for supporting a manual feeder box; of an automatic feeder apparatus comprising: a frame structure fitted between and supported by said brackets; a drive shaft carried by said frame structure; means mechanically and separably connecting said drive shaft in timed relation with said main driving gear; a paper feeder mechanism and a paper retrieving mechanism carried by said frame structure and actuated from said drive shaft; said frame structure, feeder mechanism, retrieving mechanism drive shaft and connecting means all comprising a single unit adapted to be placed bodily on or bodily removed from said supporting brackets.

18. An automatic feeder apparatus for paper handling machines, comprising: a unitary frame structure; paper storage boxes carried thereby one above the other; and paper feeder and paper retrieving mechanisms mounted on said frame structure, each of said mechanisms including a tiltable track; a reciprocating traveler member thereon; a paper carrying arm connected with said traveler member and caused to tilt with said track and reciprocate with said traveler member, the paper carrying arm of one of said mechanisms being directly connected with its traveler member, and linkage means interposed between the other of said paper carrying arms and its traveler member.

19. An automatic feeder apparatus for paper handling machines, comprising: a unitary frame structure; paper storage boxes carried thereby one above the other; and paper feeder and paper retrieving mechanisms mounted on said frame structure, each of said mechanisms including a tiltable track; a reciprocating traveler member thereon; a paper carrying arm connected with said traveler member and caused to tilt with said track and reciprocate with said traveler member, the paper carrying arm of one of said mechanisms being directly connected with its traveler member, and linkage means interposed between the other of said paper carrying arm and its traveler member; similar drive means for actuating the track member and traveler of each mechanism; a common drive shaft for said drive means; and separable mechanical connecting means between said drive shaft and the driving element of said paper handling machine.

ALLEN MILLER.