June 16, 1959 L. MESTRE 2,890,884

MULTIPLE SHEET EJECTING MECHANISM

Original Filed Oct. 12, 1953 3 Sheets-Sheet 1

FIG. 1.

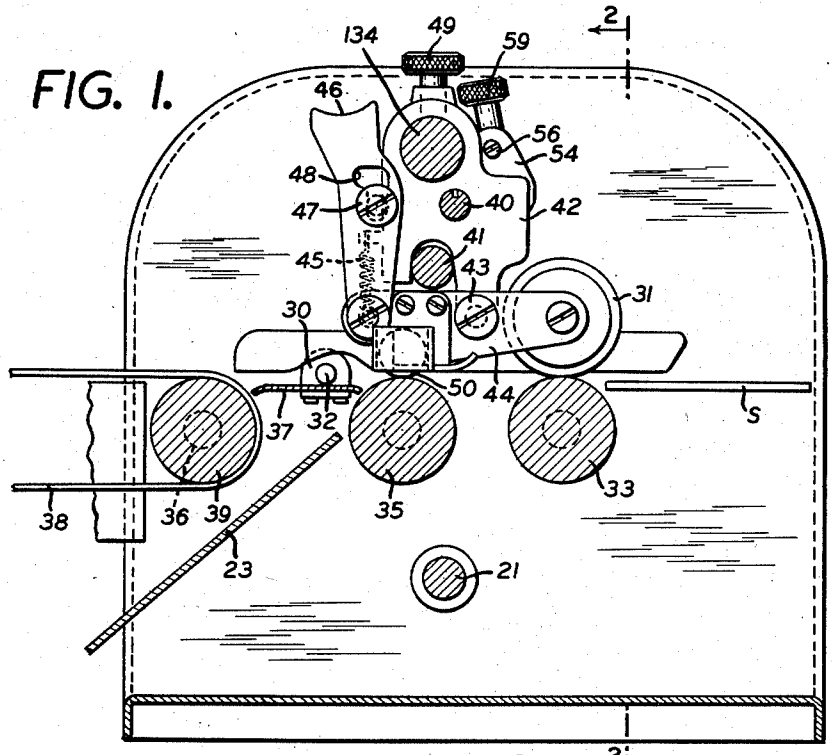
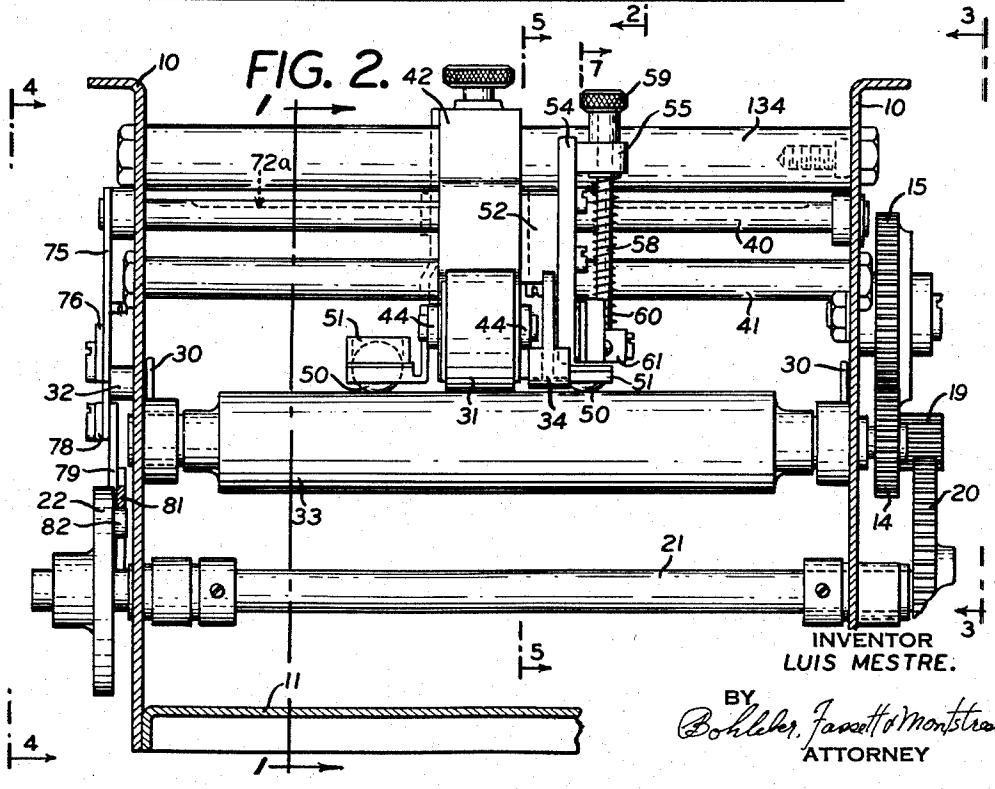


FIG. 2.



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Original Filed Oct. 12, 1953 3 Sheets-Sheet 2

FIG. 3.

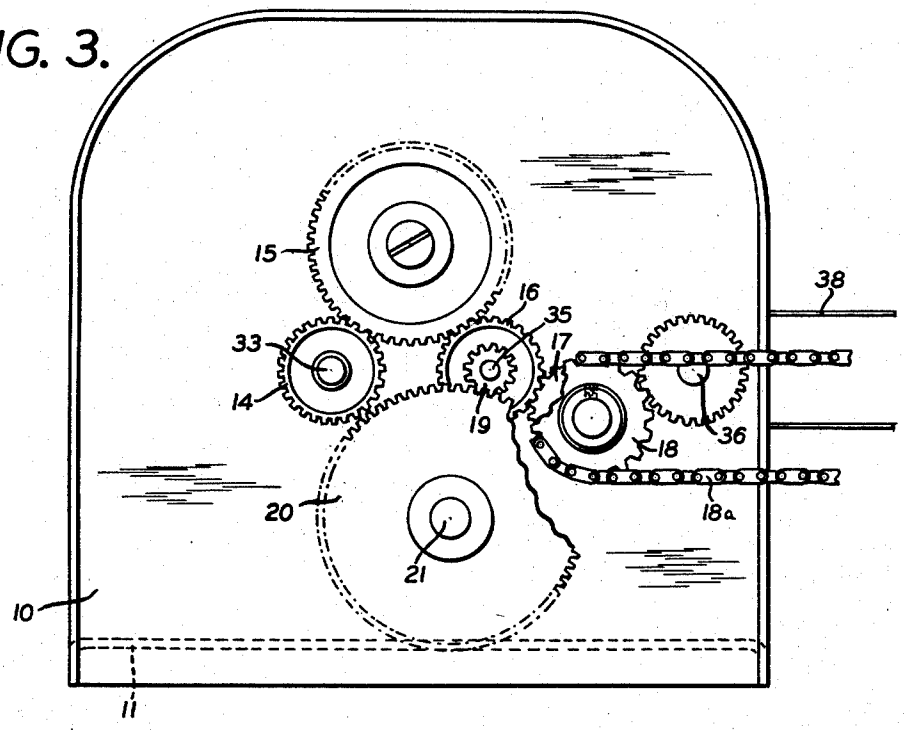


FIG. 4.

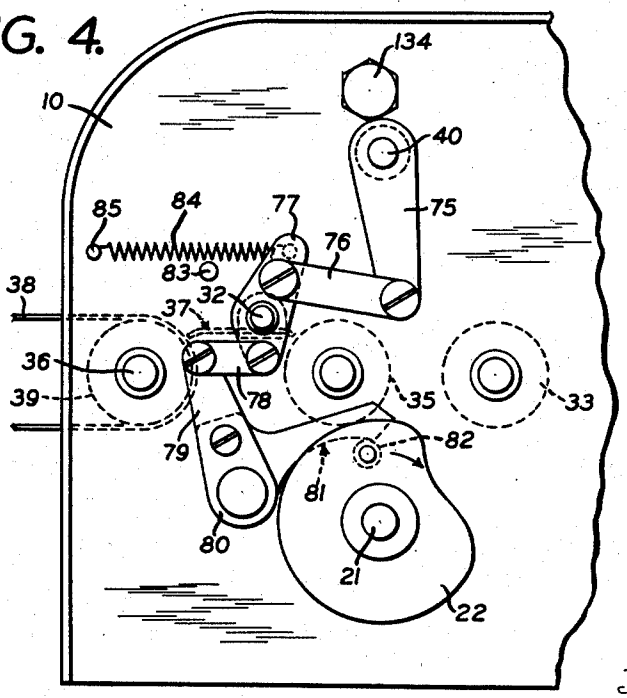
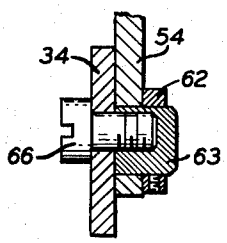


FIG. 8.



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Original Filed Oct. 12, 1953 3 Sheets-Sheet 3

FIG. 5.

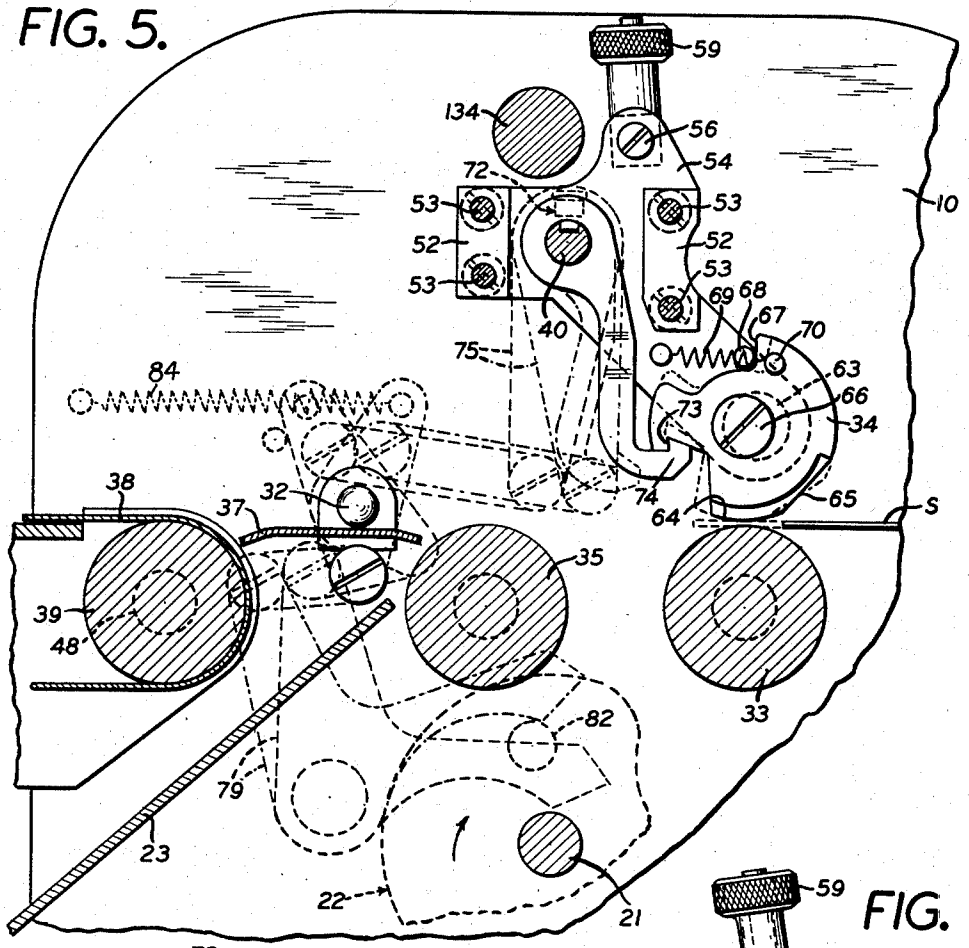


FIG. 6.

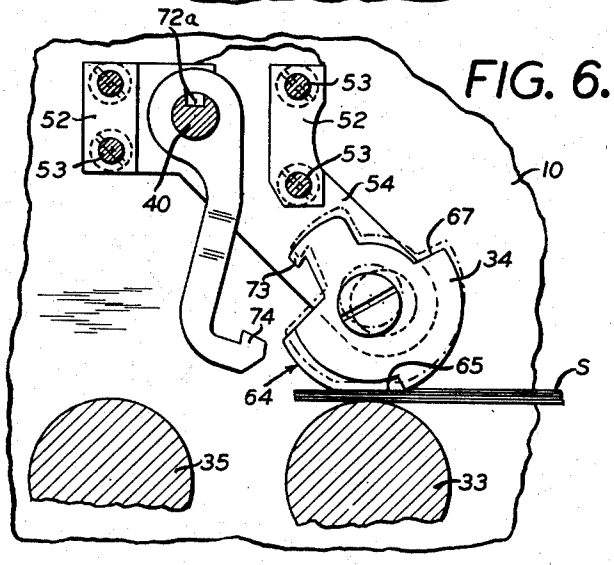
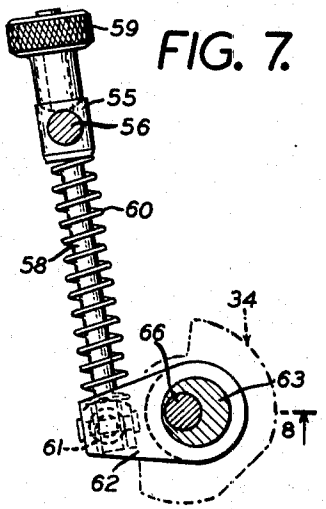


FIG. 7.



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United States Patent Office 2,890,884 Patented June 16, 1959

2,890,884

MULTIPLE SHEET EJECTING MECHANISM

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Original application October 12, 1953, Serial No. 385,430, now Patent No. 2,846,220, dated August 5, 1958. Divided and this application May 15, 1956, Serial No. 585,051

16 Claims. (Cl. 271—56)

The present invention relates to a multiple sheet ejector mechanism for use in connection with a sheet feeder mechanism such as used on a printing press in which single sheets are to be fed to the press. Sometimes more than one sheet is picked up from the stack of sheets and it is undesirable to forward them to the press. Such multiple sheets should be ejected or deflected before they reach the printing cylinders.

The principal object of the invention is to provide novel and advantageous means for ejecting or deflecting sheets when more than one of said sheets are advanced at one time to the sheet feeding means.

Another object is to construct multiple sheet deflecting means which is simple yet effective to reject multiple sheets.

A further object is to provide a multiple sheet ejecting or deflecting means which is automatically reset after a set of multiple sheets has been deflected from the normal sheet feed path.

Other objects, features and advantages will appear upon consideration of the following detail description and of the drawings showing a preferred construction in which:

Fig. 1 is a fragmentary longitudinal section taken on line 1—1 of Fig. 2 illustrating sheet feeding and ejecting or deflecting mechanism;

Fig. 2 is a section taken along the line 2—2 of Fig. 1 looking at the entrance end of the mechanism;

Fig. 3 is a view taken along the line 3—3 of Fig. 2 showing the driving means;

Fig. 4 is a view taken along the line 4—4 of Fig. 2 showing part of the operating means for deflecting multiple sheets and the restoring means for the operating means;

Fig. 5 is a section taken along the line 5—5 of Fig. 2 showing the multiple sheet detector;

Fig. 6 is a fragmentary view of Fig. 5, certain parts being omitted and showing the multiple sheet detector in detected positions;

Fig. 7 is a device for adjusting the position of the detecting means or detector and also for yieldably supporting the detecting means; and

Fig. 8 is a section through the detector mounting taken on line 8—8 of Fig. 7.

This application is a division of application, S.N. 385,430 filed October 12, 1953, now Patent No. 2,846,220, issued Aug. 5, 1958.

A sheet S such as of paper is fed from the top of a stack of sheets (not shown) by suitable means usually sucker means (not shown) and presented to sheet feeding means which feeds the sheets through the multiple sheet detector. The sheet feeding means is mounted upon a suitable main frame shown as spaced plates **10** and a cross member **11**. The sheet feeding means includes at least a first feed roll **33** although a second feed roll **35** spaced from the first may be and is provided. These rolls are rotatably mounted in the frame. The

sheet passes over the feed rolls and a deflector or ejector member **37** to means for passing each sheet to printing means or cylinders, the means shown being a conveyor **38** passing around a roll **39** mounted on a shaft **36**. The deflector is movably mounted on the main frame and preferably is pivotally mounted by pivot means **32** at each end thereof and located generally between the edges of the deflector and carried by the main frame. A pressure roll **31** is mounted for contact with feed roll **33** and a sheet to hold each sheet in frictional contact with the feed roll and also to assure that the sheet does not contact a multiple sheet detector **34**.

The sheet feeding means or rolls **33** and **35** are driven by any desirable drive means connected with the printing press. The drive means (Fig. 3) includes a gear **14** carried on the end of the roll **33** which meshes with a gear **15** rotatably mounted on one plate **10** of the main frame. This gear **15** meshes with a gear **16** carried by roll **35** so that both feed rolls are driven at the same speed and in the same direction. The roll **35** or gear **16** is driven by a gear **17** carried on the main frame which in turn is driven by a sprocket **18** and chain **19** which is connected with another part of the press drive so as to be operated in synchronism with the press. The gear **16** also carries a gear **19** which meshes with a larger gear **20** secured to and which turns the shaft **21**, the purpose for which will appear more fully hereinafter.

The sheet feeding means includes means for pressing a sheet S against feed rolls **33** and **35** for effecting satisfactory friction drive for the sheet. Means is also provided for ejecting or deflecting multiple sheets from the normal path as will appear more fully hereinafter. The means for pressing the sheet on the feed roll is mounted on a shaft or bar **134** which is secured to the main frame plates **10**. A parallel pivotal shaft or bar **40** is pivotally mounted on the main frame plates. A parallel fixed shaft or bar **41** is secured to the frame plates and spaced from bar **134**. A detector and pressure roller frame or frame **42** is mounted on said bars or shafts **134**, **40** and **41**, the latter serving as a guide for the frame. The frame may be clamped to the bar **134** by a set screw **49**. Mounted on a pivot **43**, carried by the frame **42**, is a lever **44** rotatably carrying at one end said pressure roll **31**. A spring **45** is connected at its lower end to the other end of said lever **44** and its upper end is attached to a fixed pin on said frame **42**, thus pressing the pressure roll **31** in contact with feed roll **33** or pressing a sheet passing therebetween against the feed roll. The bars **134** and **41** in being secured to the main frame plates **10** may be considered as constituting a part of the main frame.

An upright plunger or finger bar **46** in the form of a plate is pivoted at its lower end to the end of the lever **44** to which spring **45** is connected. A pin **47** extends through a slot **48** and is secured in the frame **42**. Said slot **48** has a vertical part and a horizontal part at the upper end of said vertical part. The spring **45** normally keeps pin **47** in the lower end of the vertical part of the slot but roll **31** can be raised and held raised by pressing the plunger **46** down until the horizontal part of the slot is opposite pin **47**, and then pressing the plunger so that the horizontal part of the slot contains the pin. The plunger may be released by moving it forwardly and roll **31** will return to effective pressure position. Means of any suitable sort presses the sheet against feed roll **35** such as balls **50** each carried in a well **51** carried on opposite sides of the frame **42**. Each sheet is held in suitable engagement with roll **35** merely by the free weight of the balls.

The frame **42** is connected by cross members **52** and screws **53** with a frame **54** (Figs. 5 and 7). The frame

member is essentially a part of the frame 42. At the top of frame member 54 is a block or guide 55 which may be pivotally supported thereon by means of a pin 56. The block 55 has a bore therethrough slidably receiving a rod 58 the upper end of which is screw threaded and carries a nut 59. Below block 55, helical compression spring 60 surrounds said rod 58 and is compressed between block 55 and a pivotal connection 61 between rod 58 and an arm 62 fixed on shaft 63. The shaft 63 is mounted for turning in a bearing in the frame member 54. Eccentrically carried on the end of a shaft is a detector or detector shoe 34, the detector 34 being mounted on a pivot 66 eccentrically carried on the end of the shaft 63. The detector 34 has a circular periphery 64 and a clearance periphery 65 shown as a flat.

It will be seen that by adjusting the nut 59, the distance of the pivot 66 and of the periphery of the detector or detector shoe from the top of feed roll 33 may be adjusted. Usually it is set at a distance above the roller so that a sheet will pass freely underneath, a clearance of about one thousandth of an inch greater than the sheet thickness being sufficient. The spring 60 urges the pivot 66 and the detector 34 toward the top of the feed roll 33 limited by the nut 59 engaging the block 55. By adjusting the nut 59, the pivot 66 and detector may be kept at the desired distance from the top of roller 33. The spring 60 also permits the detector to yield upwardly under the pressure of the multiple sheets in the event the clearance periphery does not sufficiently space. The detector 34 has an upwardly projecting part or shoulder 67 normally held in engagement with a stop or pin 68 projecting from the frame member 54, by means of a spring 69 attached to a pin 70 on the detector 34 and a pin 71 on the frame member 54. The periphery of said detector 34 is relatively broad as shown in Fig. 2.

Operating means are provided to pivot the deflector or deflector plate 37 under control of the detector which operating means may take many forms. Means are also provided connected with the feeding means to restore the deflector to normal or sheet passing position. The detector is provided with a downwardly turned hook or projection 73 which obstructs movement of the deflector operating means by engaging the lower upturned end of a hook 74. The hooks 73, 74 form interengaging means which retains the deflector in feeding position until released. The upper end of the hook 74 is attached on the shaft or bar 40 and is shown keyed thereto by a set screw 72 engaging in a key slot 72*a* so that it and the frame 42 may be moved along the bar. Said shaft 40 is provided at its end with a downwardly extending arm 75 (Fig. 4). The lower end of the arm 75 is connected by a generally horizontal link 76 with the upper arm of a lever 77 which is secured to a deflector pivot 32. The pivot 32 may be carried by flanges 30 secured to the deflector 37. Means are provided to restore the operating means to initial position which means includes the lower end of said lever 77 connected by a generally horizontal link 78 with an upwardly extending arm 79 of a bell crank 80 of which a second arm 81 may be actuated by a stud 82 on the cam 22 carried by the cam shaft 21. The upper arm of lever 77 is urged toward a stop pin 83 by a spring 84 connecting at one end to said lever 77 and at its other end with a fixed pin 85. It is this spring which propels the deflector to its deflecting position when the interengaging means is released. Normally said hook 74 is locked in position by said detector hook 73 and the arm 81 of the bell crank 80 will be held out of the path of the stud 82 which may be in the form of a pin with a sleeve rotatably mounted thereon to avoid friction.

When a plurality of sheets passes between the detector 34 and the forward feed roll 33, the detector will be pivoted thereby from its normal position with the circular periphery 64 adjacent the roll 33 shown in Fig. 5 to the position with the clearance periphery adjacent the roll as shown in Fig. 6. In this movement the hook 73 is turned or lifted and releases the hook 74, thus allowing the spring 84 to act through the connections 40, 75, 76 and 77 and cause the detector to move from its full line position (Figs. 1 and 5) to a tilted position where the sheets engage the underside thereof and will direct the multiple sheets downwardly on a chute 23. When the multiple sheets have passed the feed roll 33, the detector 34 is returned to its original position by the spring 69.

The movement of the operating means to tilt the deflector 37, also swings the bell crank 80 to the dotted line position of Fig. 5 where it is engaged by the stud 82 and presses the same upwardly against the tension of the spring 84. This restores the deflector 37 to horizontal position and the operating means with its hook 74 to initial position. The hook 74 will pass beneath the hook 73 to lift the latter enough for hook 74 to be locked by hook 73. This locks the deflector 37 in horizontal or sheet forwarding position. If only one sheet is fed to the feed roll 33, the detector will not be turned or operated and the sheet will pass over the second feed roll 35 and under balls 50 which assure suitable frictional contact of the sheets with feed roll 35. From the feed roll 35 the single sheet will normally pass over the ejector or deflector 37 and pass on to the conveyor 38 and to printing cylinders.

The drive mechanism for the shaft 21 and cam 22 through gears 19 and 20, is a substantial gear reduction. The ratio is determined by considering the maximum length of sheet which passes through the feed rolls. The rolls, therefore, make a sufficient number of revolutions to pass a plurality of sheets before the deflector restoring mechanism functions to restore the deflector 37 and the operating mechanism to initial position.

The means described for detecting and deflecting multiple sheets and the restoring means therefor may be applied to existing machines such as presses which have feed rolls to which this means may be applied. This means, therefore, is a sub-combination of the complete mechanism described.

This invention is presented to fill a need for improvements in a multiple sheet ejecting mechanism. It is understood that various modifications in structure, as well as changes in mode of operation, assembly, and manner of use, may and often do occur to those skilled in the art, especially after benefiting from the teaching of an invention. Hence, it will be understood that this disclosure is illustrative of preferred means of embodying the invention in useful form by explaining the construction, operation and advantages thereof.

What is claimed is:

1. An ejector mechanism such as for a printing press having a frame and sheet feeding means including at least one driven roller comprising a bracket, a detector having a circular periphery and an adjacent clearance periphery, means mounting the detector upon the bracket for pivotal movement to and from the circular periphery and clearance periphery, spring means propelling the detector to operative position for the circular periphery, a sheet deflector, pivot means carried by the deflector for mounting the same on the exit side of sheet feeding means and movable to and from a feed position and a deflecting position, deflector operating means connected with the deflector and operative to shift the deflector to deflecting position, interengaging means including a projection carried by the detector and engaging the deflector operating means to obstruct the movement thereof to retain the latter in sheet feeding position and movable away from obstructing engagement by pivoting of the detector, and means connected with the sheet feeding means to restore the deflector and deflector operating means to sheet feed position.

2. An ejector mechanism as in claim 1 in which the

interengaging means is a hook carried by the deflector operating means and a hook carried by the detector.

3. An ejector mechanism as in claim 1 including a pressure roll rotatably carried by the bracket adjacent to the detector.

4. An ejector mechanism as in claim 3 including means connected with the pressure roll to raise the same.

5. An ejector mechanism as in claim 1 in which the deflector operating means includes a bar pivotally carried by the bracket and the interengaging means includes a hook carried by the bar and a hook carried by the detector.

6. An ejector mechanism such as for a printing press comprising a main frame, sheet feeding means carried on the frame having a feed side and an exit side including at least one feed roll, a detector having a circular periphery and an adjacent clearance periphery, means mounting the detector adjacent to a feed roll for pivotal movement to and from the circular periphery and clearance periphery adjacent the feed roll, spring means propelling the detector to a position with the circular periphery adjacent the feed roll, a deflector, means mounting the deflector adjacent the exit side of the sheet feeding means for movement to and from a feed position and a deflecting position, deflector operating means connected with the deflector and operative upon pivotal movement of the detector to move the deflector to deflecting position, and means operative with the feed roll to restore the deflector and deflector operating means to feed position.

7. An ejector mechanism such as for a printing press comprising a main frame, sheet feeding means carried on the frame having a feed side and an exit side including at least one feed roll, a detector having a circular periphery and an adjacent clearance periphery, means mounting the detector adjacent to a feed roll for pivotal movement to and from the circular periphery and clearance periphery, spring means propelling the detector to a position with the circular periphery adjacent the feed roll, a sheet deflector, means pivotally mounting the deflector adjacent the exit side of the sheet feeding means and pivotal to and from a feed position and a deflecting position, deflector operating means connected with the detector and operative upon pivotal movement of the detector to shift the deflector to deflecting position, and means operated by the sheet feeding means to restore the deflector and deflector operating means to sheet feeding position.

8. An ejector mechanism as in claim 7 including means for adjusting the position of the detector towards and from the roller.

9. An ejector mechanism as in claim 8 in which the adjusting means includes a spring propelling the detector towards the driven roll.

10. An ejector mechanism such as for a printing press comprising a main frame, sheet feeding means carried on the frame having a feed side and an exit side including at least one feed roll, a detector having a circular periphery and an adjacent clearance periphery, means mounting the detector adjacent to a feed roll for pivotal movement to and from the circular periphery and clearance periphery, spring means propelling the detector to a position with the circular periphery adjacent the feed roll, a deflector, means pivotally mounting the deflector adjacent the exit side of the sheet feeding means and pivotal to and from a feed position and a deflecting position, deflector operating means operative upon pivotal movement of the detector to shift the deflector to deflecting position including separable interengaging means carried by the deflector operating means and the detector to releasably retain the operating means and deflector in sheet feed position, and means operative with the feed roll to restore the deflector and deflector operating means to feed position.

11. An ejector mechanism such as for a printing press

comprising a main frame, sheet feeding means carried on the frame having a feed side and an exit side including at least one feed roll, a detector having a circular periphery and an adjacent clearance periphery and a hook, means mounting the detector adjacent to a feed roll and for pivotal movement to and from the circular periphery and clearance periphery, spring means propelling the detector to a position with the circular periphery adjacent the feed roll, a sheet deflector, means pivotally mounting the deflector adjacent the exit side of the sheet feeding means and pivotal to and from a feed position and a deflecting position, deflector operating means operative upon pivotal movement of the detector to shift the deflector to deflecting position including a first hook pivotally mounted on the frame and interengaging with the hook on the detector to releasably retain the first hook against pivotal movement, and a spring to propel the operating means and deflector to deflecting position, and means operated by the sheet feeding means to restore the deflector and deflector operating means to sheet feeding position.

12. An ejector mechanism such as for a printing press comprising a main frame, sheet feeding means carried on the frame and having a feed side and an exit side including at least one feed roll bracket means mounted on the frame, a pressure roll rotatably mounted on the bracket means and engaging the feed roll, a detector having a circular periphery and an adjacent clearance periphery, means pivotally mounting the detector on the bracket means adjacent to the pressure roll, and with its periphery adjacent to the feed roll, the detector mounting being for pivotal movement to and from the circular periphery and clearance periphery, spring means propelling the detector to a position with the circular periphery adjacent the feed roll, a sheet deflector, means mounting the deflector adjacent the exit side of the sheet feeding means and pivotal to and from a feed position and a deflecting position, deflector operating means connected with the detector and operative upon pivotal movement of the ejector shoe to pivot the deflector to deflecting position, and means operated by the sheet feeding means and connected with the deflector operating means to restore the deflector and deflector operating means to sheet feed position.

13. An ejector mechanism such as for a printing press comprising a main frame, sheet feeding means carried on the frame and having a feed side and an exit side including at least one feed roll, bracket means mounted on the frame, a pressure roll rotatably mounted on the bracket means and engaging the feed roll, a detector having a circular periphery and an adjacent clearance periphery, spring means propelling the detector to a position with the circular periphery adjacent to the feed roll, a sheet deflector, means pivotally mounting the deflector adjacent the exit side of the sheet feeding means and pivotal to and from a feed position and a deflecting position, deflector operating means connected with the deflector and operative upon pivotal movement of the detector to shift the deflector to deflecting position, separable interengaging means carried by the detector and the deflector operating means to releasably retain the latter in sheet feeding position and released upon pivotal movement of the detector, and means operated by the sheet feeding means and connected with the deflector operating means to restore the deflector and the deflector operating means to sheet feeding position.

14. An ejector mechanism as in claim 13 in which the interengaging means includes a hook carried by the detector and a hook carried by the deflector operating means.

15. An ejector mechanism such as for a printing press comprising a main frame, sheet feeding means carried on the frame having a feed side and an exit side including at least one feed roll, a detector having a circular periphery and an adjacent clearance periphery, means

mounting the detector adjacent to the feed roll for pivotal movement to and from the circular periphery and clearance periphery, spring means propelling the detector to a position with the circular periphery adjacent the feed roll, a sheet deflector means pivotally mounting the deflector adjacent the exit side of the sheet feeding means and movable to and from a feed position and a deflecting position, deflector operating means connected with the deflector and operative upon movement of the detector to shift the deflector to deflecting position separable, interengaging means carried by the detector and the deflector operating means to releasably retain the latter in sheet feeding position and released upon pivotal movement of the detector, and means operated by the sheet feeding means to restore the deflector and deflector operating means to sheet feed position including a pivoted lever having a restoring position, and a pin connected with the sheet feeding means for one rotation for the passage of a sheet through the feeding means and engaging the lever when in restoring position.

16. An ejector mechanism such as for a printing press comprising a main frame, sheet feeding means carried on the frame and having a feed side and an exit side including at least one feed roll, bracket means, bars carried by the frame extending parallel to the feed roll upon which the bracket means is slidable, a pressure roll rotatably mounted on the bracket means and engaging the feed roll, a detector having a circular periphery and an adjacent clearance periphery, spring means propelling the detector to a position with the circular periphery adjacent to the feed roll, a sheet deflector, means pivotally mounting the deflector adjacent the exit side of the sheet feeding means and pivotal to and from a feed position and a deflecting position, deflector operating means connected with the deflector and operative upon pivotal movement of the detector to shift the deflector to deflecting position including a bar pivotally mounted upon the frame, a lever slidably carried on the bar and a hook on the lever, a hook carried by the detector and interengaging with the hook on the lever of the deflector operating means to releasably retain the latter and the deflector in sheet feeding position and released upon pivotal movement of the detector, and means operated by the sheet feeding means and connected with the deflector operating means to restore the deflector and the deflector operating means to sheet feeding position.

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