

Feb. 5, 1963

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3,076,407

PLATE CYLINDER SEPARATING ATTACHMENT FOR OFFSET PRESSES

Filed Aug. 28, 1958

6 Sheets-Sheet 1

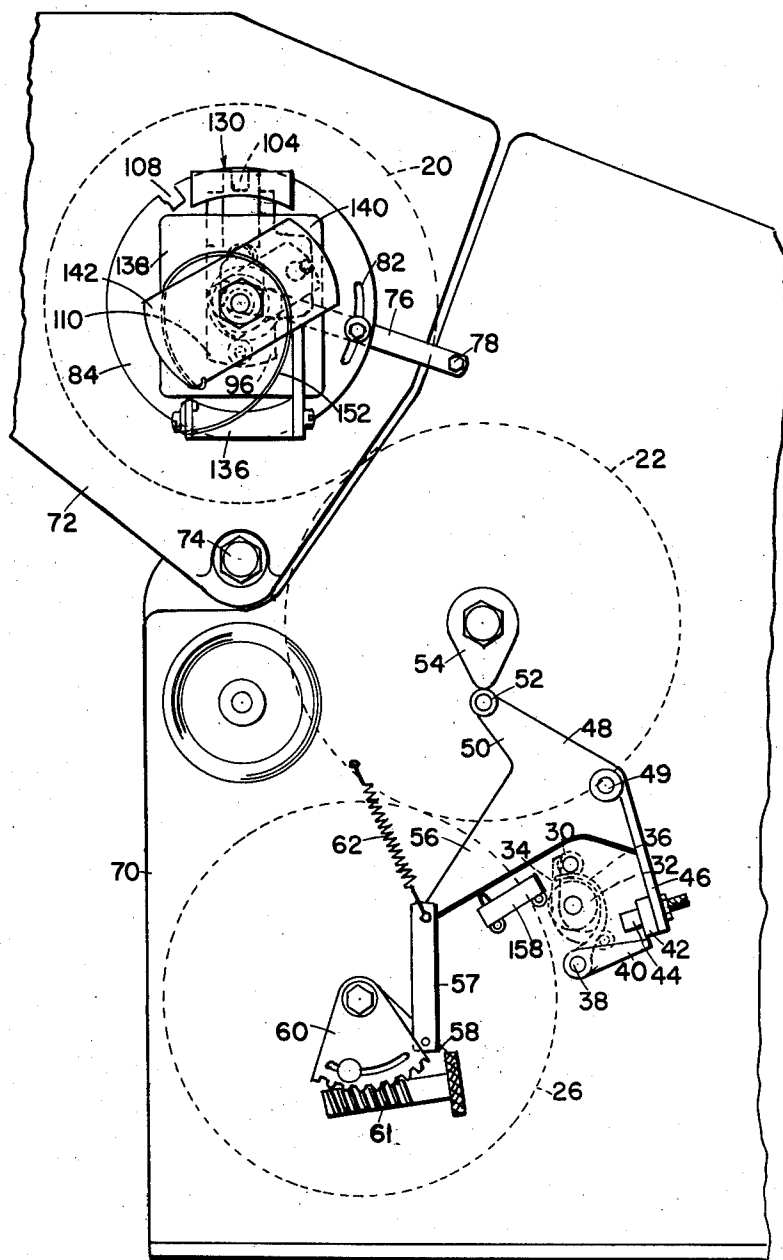


FIG. 1

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6 Sheets-Sheet 2

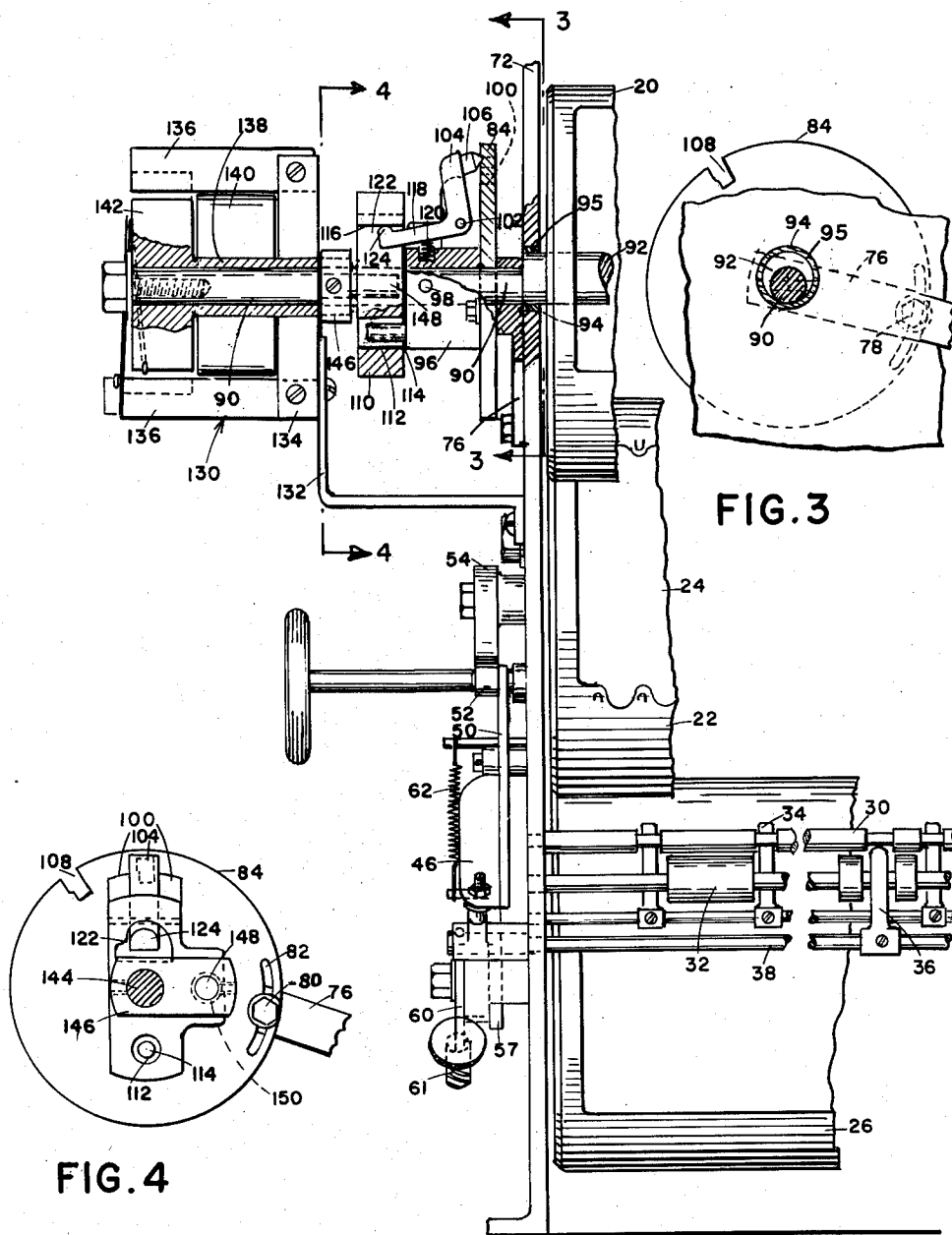


FIG. 4

FIG. 2

FIG. 3

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6 Sheets-Sheet 3

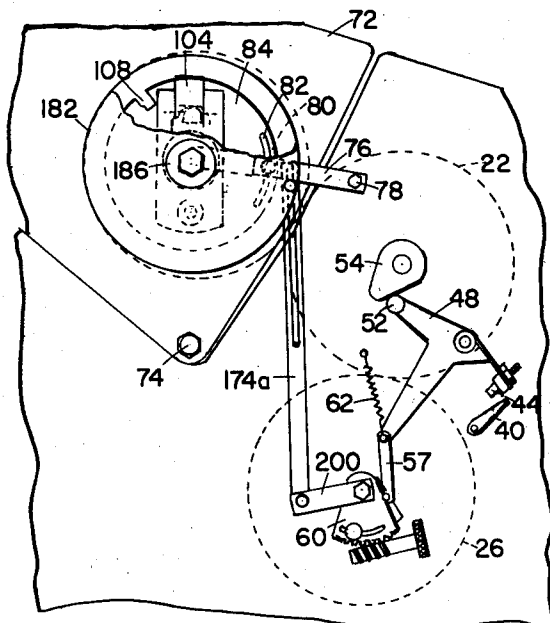


FIG. 6

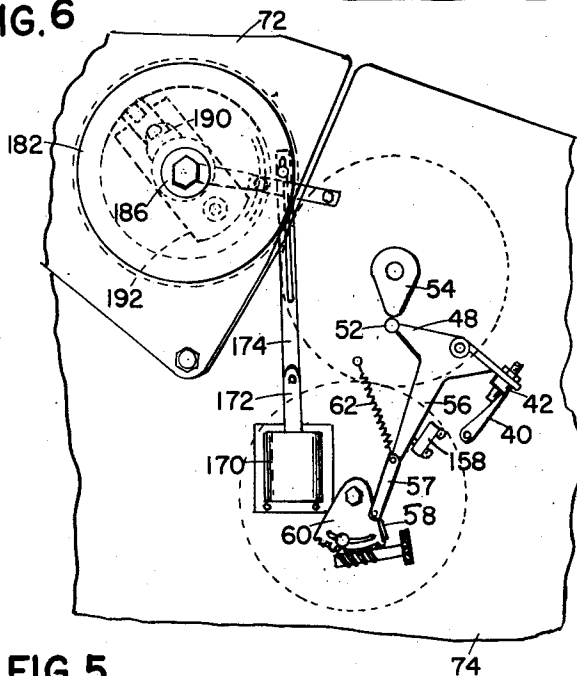


FIG. 5

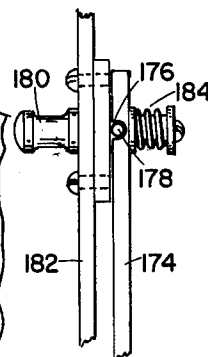


FIG. 7

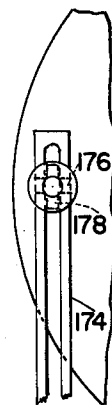


FIG. 8

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6 Sheets-Sheet 4

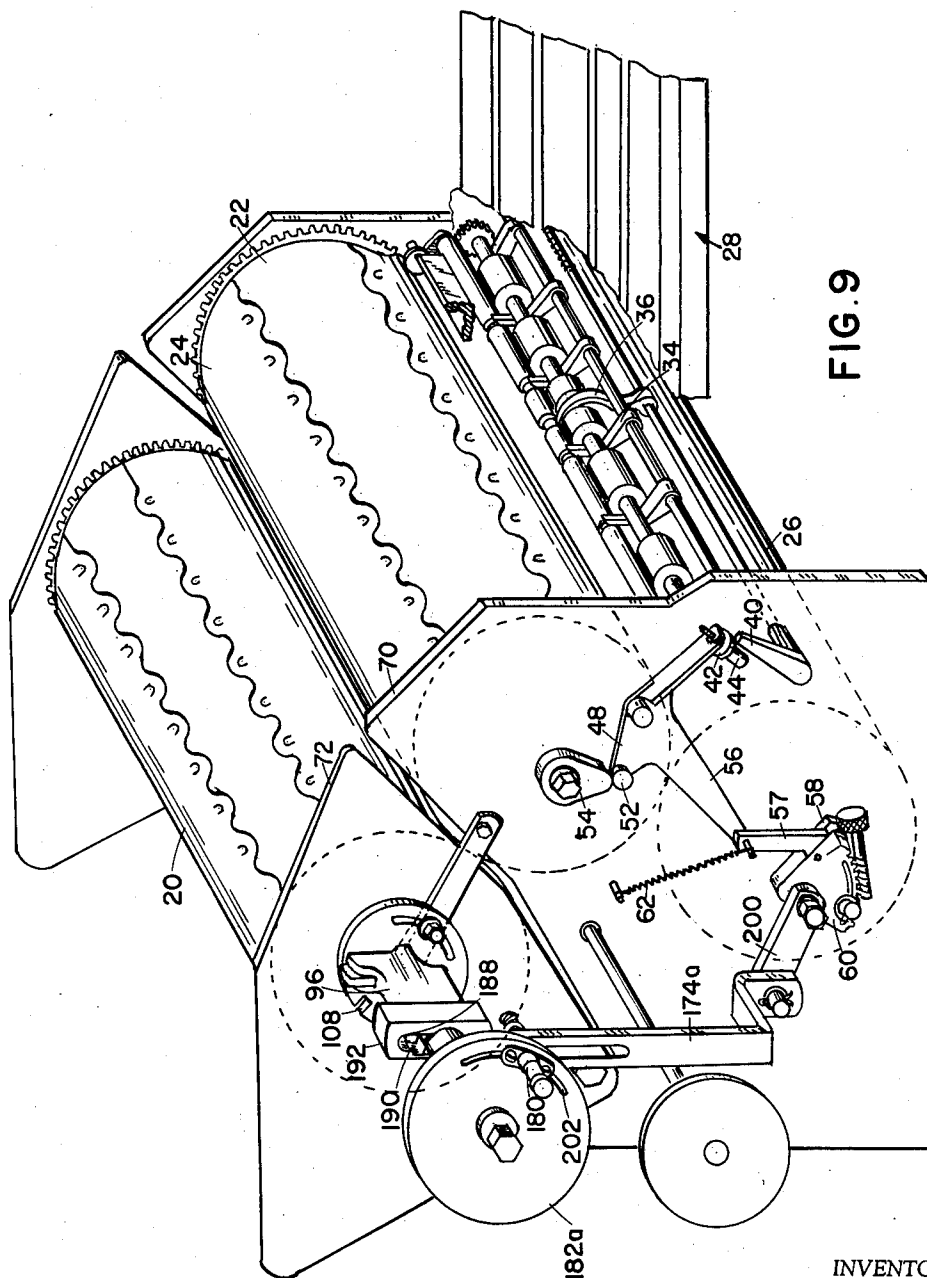


FIG. 9

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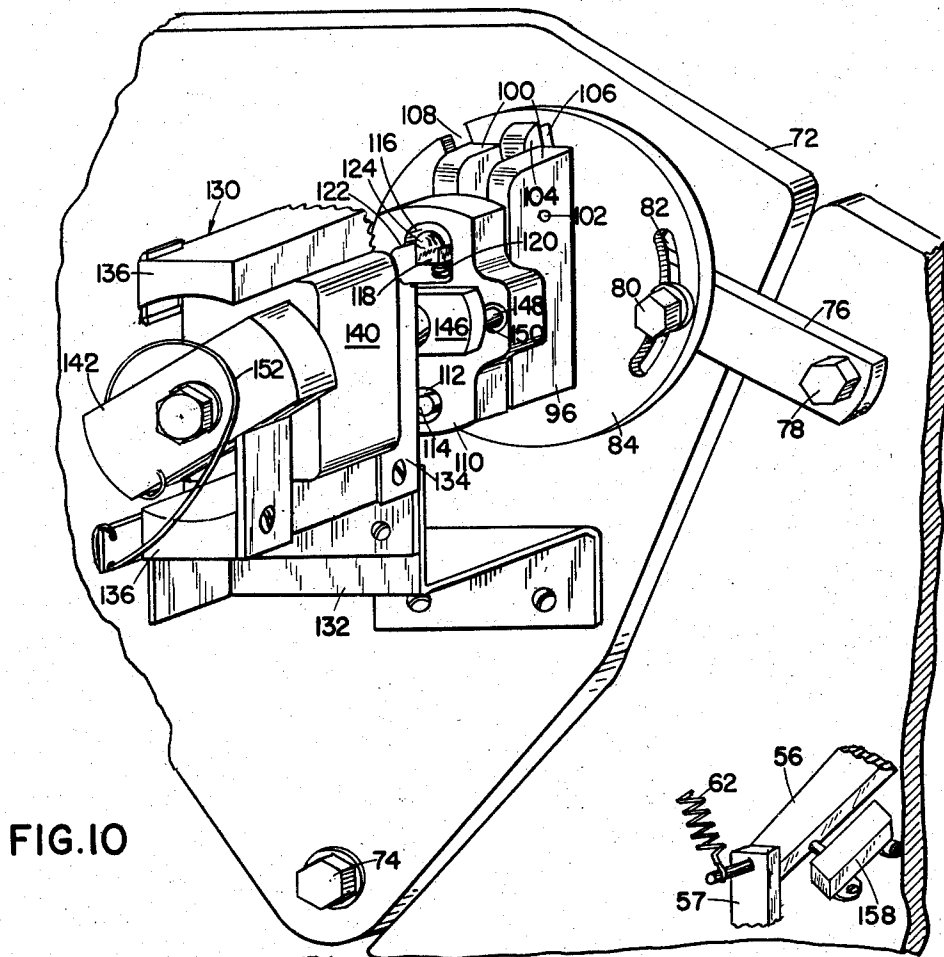
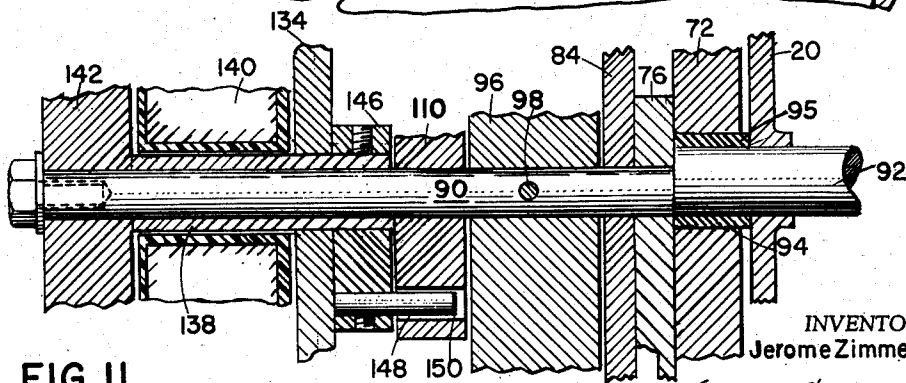
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PLATE CYLINDER SEPARATING ATTACHMENT FOR OFFSET PRESSES

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6 Sheets-Sheet 5



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PLATE CYLINDER SEPARATING ATTACHMENT FOR OFFSET PRESSES

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6 Sheets-Sheet 6

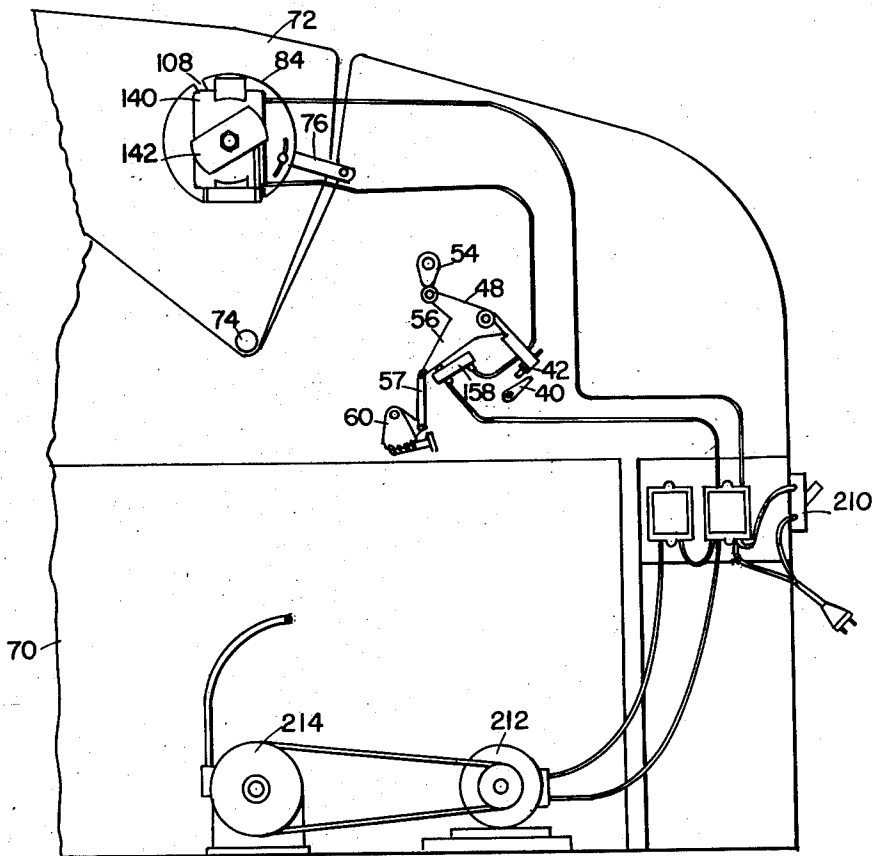


FIG. 12

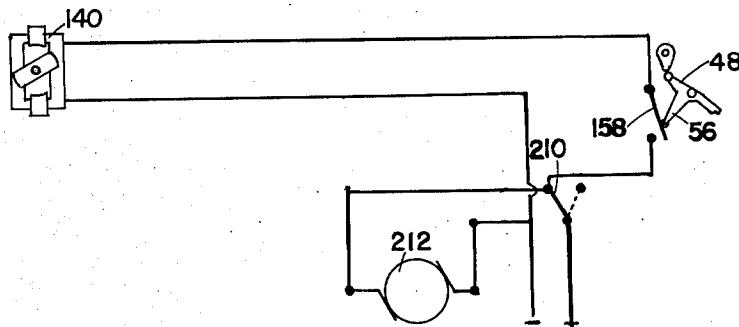


FIG. 13

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PLATE CYLINDER SEPARATING ATTACHMENT FOR OFFSET PRESSES

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10 Claims. (Cl. 101-218)

This invention relates to presses for offset printing and particularly to a construction for automatically separating the plate cylinder and the blanket cylinder in the event of a cessation of sheet feeding. It is the practice to provide automatic means to separate the blanket cylinder and the impression cylinder when a sheet is not being fed but contact is usually maintained between the plate cylinder and the blanket cylinder until a manual operation is performed to separate such cylinders. Consequently, it frequently happens that the plate cylinder and the blanket cylinder will continue to make revolutions in contact after the cessation of paper feed with the result that a multiple impression will be made upon the blanket cylinder. This will build up a surplus of ink on the blanket cylinder and also the multiple impressions do not necessarily register exactly. Accordingly, when paper feeding is resumed, extra heavy and blurred impressions will be produced on several sheets. Thus considerable paper may be wasted before the blanket cylinder is brought to a condition to make a properly perfect impression on the paper.

Elaborate constructions have been designed whereby automatic mechanism was provided by which separation of the plate cylinder, blanket cylinder and impression cylinder was intended to be accomplished by cessation of paper feed. The present invention, however, provides a very simple and effective means for separating the plate cylinder from the blanket cylinder capable of easy application to standard types of offset printing presses in common use which may be applied to existing presses without necessitating reconstruction thereof. This makes it practical for any owner of a standard offset type press of the character to which the attachment is applicable to quickly equip that press with means for automatically separating the plate and blanket cylinders. This result is accomplished in a preferred form of the invention by electrical means such as a solenoid connected to the plate cylinder shaft which will cause the plate cylinder to move out of engagement with the blanket cylinder upon the tripping of an electrical contact by mechanism sensitive to the presence or absence of a sheet of paper being fed to the impression cylinder. A similar action may be also accomplished by means of a mechanical connection from the paper feed sensitive means to a mechanical device for separating the plate cylinder from the blanket cylinder.

In the accompanying drawings forming a part of this specification:

FIG. 1 is an end elevation of a part of a standard offset press showing one form of the invention applied thereto;

FIG. 2 is a view partly in front elevation and partly in vertical section showing one side of the press frame and portions of the cylinders of the construction shown in FIG. 1;

FIG. 3 is a fragmentary view in sectional elevation of the inside of one of the side frames and parts carried thereby looking in the direction indicated by arrows 3-3 in FIG. 2;

FIG. 4 is a fragmentary vertical sectional view on line 4-4 of FIG. 2;

FIG. 5 is a fragmentary end elevation similar to FIG. 1 showing a modified form of the invention;

FIG. 6 is a view similar to FIG. 5 showing another modified form of the invention;

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FIGS. 7 and 8 are details in side and end elevations respectively of a part of the linkage mechanism utilized in the constructions of FIGS. 5 and 6;

FIG. 9 is a perspective view showing the cylinders and paper feeding devices and trip mechanism and illustrating particularly the form of the invention shown in FIG. 6;

FIG. 10 is a perspective view, partly diagrammatic, showing the apparatus of the form shown in FIGS. 1 to 4;

FIG. 11 is a fragmentary longitudinal sectional view of the shaft of the plate cylinder and associated parts shown in FIGS. 1, 2 and 10;

FIG. 12 is a side elevation showing the wiring to the solenoid and paper feed air pump motor; and

FIG. 13 is a wiring diagram of the same.

Referring to the drawings in detail, the invention is shown as applied to a typical offset press such as a press manufactured by the Addressograph & Multigraph Corporation of Cleveland, Ohio. In this press, 20 is a plate or master cylinder on which the printed, lithographic or other material to be reproduced is mounted in plate form; 22 is a blanket cylinder to which is attached a rubber blanket 24 which receives the impression from the plate or printed matter on the plate cylinder and 26 is an impression cylinder over which the paper passes, the paper being pressed between the blanket cylinder and the impression cylinder so as to receive the impression from the blanket.

The paper is fed by any suitable paper feeding means as indicated generally by 28 in FIG. 9. The paper is fed between an upper feed roll 30 and a lower feed roll 32. The usual stop fingers 34 are provided which are depressed to permit paper feed to start by well-known mechanism not necessary to be here described. There is also a feeler finger 36 mounted on a shaft 33 and held in depressed position in a groove in the lower feed roll 32 so long as paper is being fed between the rolls. If the supply of paper fails so that no paper is passed between the rolls then the feeler finger moves out of its groove under the influence of a spring, causing shaft 33 to turn and move a latch member 40 fixed to the shaft from under a flange 42 on a block 44 carried by an arm 46 of a lever 48 pivoted at 49 on the frame of the machine. The lever has a second arm 50 carrying a roller 52 which is engaged by a cam 54 on the shaft of the blanket cylinder 22. The lever has a third arm 56 connected by a link 57 to a lever 58 on the eccentric bearings of the shaft of the impression cylinder 26. This mechanism is well known and operates to separate the blanket cylinder from the impression cylinder when the feeding of the paper ceases. Numeral 60 designates a sector and 61 an adjusting screw of a mechanism such as commonly used for adjusting the degree of pressure between the blanket and impression cylinders. Briefly, the presence of a sheet of paper between the paper feed rolls, holds the finger 36 depressed which holds the latch member 40 in a position under the flange 42 on the end of the lever arm 46. In this position of the lever arm the roller 52 clears the high point of the cam 54 so that there is no actuation of the lever 58 and no movement of the impression cylinder away from the blanket cylinder. Between each pair of successive sheets, however, there is a small space and during the passage of this space the finger 36 will move out from the groove in the feed roll and the latch will move out from under the flange 42. This movement, however, is timed with the passage of the high point of the cam 54 past the roller 52 so that the latter will be held down and no substantial movement of the lever 48 takes place provided another sheet of paper immediately follows and depresses the finger 36 so as to again move the latch member 40 under the flange 42. However, if the sheets do not succeed each other in regular sequence, then the latch 40 will remain moved out from under the flange 42 to the

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position shown in FIG. 1 whereupon when the high point of the cam 54 travels beyond roller 52, the lever 48 will be swung about its pivot by a spring 62 and the blanket roll and impression roll will be separated.

In accordance with the present invention a construction is provided for automatically separating the plate cylinder from the blanket cylinder instantly upon stoppage of paper feed. In presses now manufactured, separation of these two cylinders is accomplished manually. In the particular construction illustrated the blanket cylinder and impression cylinder are mounted in the main side frames of the machine indicated at 70. The plate cylinder 20 is mounted in auxiliary side frame members 72 which are pivoted to the main side members at 74. Adjustment of the distance between the plate cylinder and the blanket cylinder is accomplished by mounting the plate cylinder rotatably on shaft 92 which has eccentric extension shaft portions 90 and is mounted in bearings 95 in holes 94 in the auxiliary side frame members 72. The shaft extensions 90 have bearings in the ends of the links 76 which are bolted at 78 to the main frame members 70. Rotation of the shaft extensions 90 through a small arc will cause a shift of the axis of the shaft 92 and the plate of cylinder so as to press it against or separate it from the blanket cylinder.

In the construction shown, means are provided for normally locking the shaft 92 and its extensions 90 against rotation. This means comprises a block 96 fixed to one shaft extension 90 by means of a pin 98 and provided with ears 100 between which is pivoted on a pivot 102 a bell crank lever. The bell crank lever has an upwardly projecting arm 104 having on its end a key 106 which is adapted to move into or out of a notch 108 in a plate or disc 84 thereby holding the plate cylinder locked into contact with the blanket cylinder. However, when the plate cylinder is to be moved out of contact with the blanket cylinder, means are provided for withdrawing the key from notch 108 and rotating the block 96, eccentric shaft extension 90 and shaft 92 sufficiently to separate the plate cylinder from the blanket cylinder.

The mechanism shown for rotating the block 96 and shaft extension 90 comprises a crank plate 110 rotatably mounted on the end of shaft extension 90 and having the recess 112 therein which loosely receives a pin 114 fixed in the block 96. The crank plate 110 also has a cam recess 116 therein which loosely encloses the second arm 118 of the bell crank lever mounted on the pivot pin 102. The bell crank lever comprising the arms 104, 118 is normally urged in a clockwise direction (FIG. 2) by means of a spring 120. The cam recess 116 has a downwardly projecting cam projection 122 which when the crank plate 110 is turned engages a rounded lug 124 on the bell crank arm 118 so that when the crank plate 110 is rotated the bell crank is swung about its pivot so as to disengage the key 106 from the slot 108 and after a slight movement of the crank plate the block 96 is rotated by engagement by the pin 114 in the hole 112. Adjustment of the amount of rotation of the eccentric shaft so as to regulate the final pressure with which the plate cylinder is pressed against the blanket cylinder is accomplished by means of the plate 84 which may be adjusted by means of the slot 82 and bolt 80 which clamps it to the link 76. Adjustment of this disc moves the notch more or less away from vertical and thereby determines the amount of movement of the bell crank lever and block 96 carrying the same when it returns to position.

The mechanism thus far described has been utilized to separate the plate cylinder from the blanket cylinder, a hand wheel or the like having been provided for manually rotating the crank plate 110. In accordance with the present invention automatic means are provided for rotating this crank plate.

In the construction shown in FIGS. 1, 2, 10, 11, 12 and 13, electric means are provided for rotating the crank plate and contacting the plate and blanket cylinders. A

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rotative solenoid indicated generally at 130 is utilized, this being shown as mounted upon a bracket 132 fixed to one of the auxiliary side frame members 72. The solenoid comprises a base 134 carrying pole pieces 136 and a solenoid winding 140. The solenoid armature 142 is fixed to a sleeve 138 mounted on the end of shaft extension 90 so as to oscillate between the pole pieces and thereby rotate the sleeve 138 and a crank 146 fixed thereto which carries a pin 148 loosely received in a hole 150 in the crank plate 110. Thus when the armature 142 is oscillated it will cause separation or bringing together of the plate and blanket rolls through the mechanism described. In the particular form of solenoid illustrated, the armature 142, when deenergized, is held in an inclined position as shown particularly in FIG. 10 by means of a spring 152. When the solenoid coil is energized the armature is rotated towards a vertical position between the pole pieces thereby moving the plate cylinder into contact with the blanket cylinder. The circuit through the solenoid coil is controlled by a micro-switch 158 which is mounted on the main frame member 70 adjacent to the arm 56 of the lever 48. During normal operation of the machine so long as the lever 48 remains in its active position as shown in FIG. 5, the switch 158 remains closed, the solenoid is energized and the plate cylinder is held against the blanket cylinder. On the failure of paper feed, however, the latch 40 will move from under flange 42 moving the lever 48 so that its arm 56 permits the micro-switch 158 to open thereby deenergizing the solenoid and separating the plate cylinder from the blanket cylinder.

Where the delivery of paper is only temporarily interrupted, however, the machine as a whole is not stopped, and therefore the cylinders are still rotating. Accordingly the cam 54 will actuate the lever 48 at each revolution and the microswitch 158 will be opened and closed, resulting in an intermittent action of the solenoid. This is undesirable if continued for any length of time and it is accordingly advantageous to provide means for keeping the solenoid deenergized until paper feed is resumed. Manual switch means are always provided for stopping the action of the motor driving the suction pump which causes the picking up of paper by the usual paper lifting suction arms, this switch being actuated by the operator as soon as paper feeding is temporarily interrupted. FIGS. 12 and 13 show a construction by which the throwing of this switch will at the same time open the circuit through the solenoid irrespective of the action of the lever 48 and the microswitch 158. As shown in FIGS. 12, 13, 210 is the manually actuated switch, which when closed closes the circuit through motor 212 which drives the suction pump 214 and also the circuit through the micro-switch 158 and solenoid 140 so that this will remain energized except when the microswitch is actuated by motion of the lever 48.

It will be seen that the foregoing embodiment of the invention comprises a very simple mechanism which may be readily attached to an offset press of standard construction for accomplishing the automatic separation of the plate cylinder from the blanket cylinder. It is only necessary to remove the usual manual means (not shown) for rotating the crank plate 110 and attach the solenoid 130, the microswitch 158 and the wires connecting the same. No other change in the existing press is required.

FIG. 5 shows a modification of the invention in which in place of utilizing a rotary type of solenoid an ordinary reciprocating plunger type of solenoid 170 is provided which is mounted on the main frame member 70. Pivoted to the plunger 172 is a slotted link 174 the upper end of which is provided with a transverse notch 176 which engages a pin 178 carried on a rotatable stud 180 mounted in a rotary disc 182. The slot 176 and cross pin 178 provide a convenient means for disconnecting the link from the disc 182 when desired. This is accomplished by swinging the link 174 to the right (FIG. 7) thereby com-

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pressing a retaining spring 184 and disconnecting the notch 176 from the cross pin. Stud 180 may now be rotated through 90 deg. so that the pin 178 lies in the longitudinal slot in the link thereby permitting the solenoid plunger link 174 to move without rotating the disc 182. The disc 182 is mounted on a shaft 186 which carries a crank pin 188 working in a slot 190 in a crank plate 192 operatively connected with the block 96 as in the construction previously described. The circuit of the solenoid 170 is controlled in any suitable manner as by a micro-switch 158 as in the construction previously described. The operation of this embodiment of the invention is substantially the same as that shown in FIGS. 1, 2, 10 and 11 except that a reciprocating solenoid is used in place of the rotary type. At present the rotary type of solenoid is believed to be a preferable construction owing to its great simplicity and directness of action.

Entirely mechanical means for accomplishing the objects of the present invention is shown in FIGS. 6 and 9. As illustrated in these figures, the sector 60 attached to the lever 58 which is connected by the link 57 to the arm 56 of the lever 48 is utilized as a means for transmitting motion to the device for separating the plate cylinder from the blanket cylinder. As illustrated, the sector 60 has fixed to it a crank arm 200 to the end of which is pivoted a slotted link 174a. The slotted link 174a operates like the link 174 in the previously described form of the invention and on its upper end actuates the stud 180 carried by a disk 182a. In this instance the stud 180 is adjustably mounted in a slot 202 in the disk 182a. It will be seen that this form of the invention as that previously described in connection with FIG. 5, can be readily attached to existing machines by bolting the arm 200 firmly to the sector 60, applying the disk 182a in place of the hand wheel usually found on existing machines and connecting up the link 174a.

While certain specific embodiments of the invention have been shown and described in detail to illustrate the application of the principles of the invention, it will be understood that the invention may be embodied otherwise without departing from such principles.

What is claimed is:

1. In an offset press having plate, blanket and impression cylinders, at least one of said cylinders being mounted on an eccentric support and means for rotating said support so as to contact said cylinder with one or more of the other cylinders, said means comprising a solenoid having an armature rotatable about an axis lying in substantial parallelism with the axis of rotation of said eccentric support and means for coupling said armature to the means for rotating said support.

2. In an offset press having plate, blanket and impression cylinders, paper feeding means having instrumentalities for sensing the feed of paper, said instrumentalities including a lever pivotally mounted on the frame of the machine, connections from said lever for separating the blanket cylinder and impression cylinder upon failure of paper feed, electrical means for effecting separation of the plate and blanket cylinders and electrical switch means actuated by movement of said lever for controlling the action of the electrical means for separating the plate and blanket cylinders.

3. In an offset press having plate, blanket and impression cylinders, paper feeding means including electric motor operated means for feeding sheets of paper to the press and having instrumentalities for sensing the feed of paper, solenoid means for moving the plate cylinder into and out of contact with the blanket cylinder, electrical circuitry connecting said motor drive paper feed means, said solenoid means and a source of power, manually operated switch means in said circuitry for rendering said paper feed motor driven instrumentalities inoperative and for simultaneously opening the circuit through said solenoid means so as to maintain the plate cylinder out of contact with the blanket cylinder, and means actuated by the instrumentalities for sensing the

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feed of paper for controlling the circuit through said solenoid means so as to actuate the same and cause separation of the plate cylinder from the blanket cylinder at times when said manually operated switch means is set to cause actuation of said paper feeding means.

4. In an offset press having plate, blanket and impression cylinders, a shaft for said plate cylinder having a shaft portion eccentric to the main axis of the shaft, and means for rotating said shaft so as to contact said plate cylinder with said blanket cylinder and for moving it out of contact therewith, said rotating means comprising a solenoid having field poles with means for mounting the same in a stationary position with respect to said shaft, said solenoid having a rotary armature fixed to a sleeve rotatably mounted on said shaft, a crank plate having driving connection with said shaft, and a crank member fixed to said sleeve and having driving connection with said crank plate.

5. In an offset press having plate, blanket and impression cylinders, a shaft for said plate cylinder having a shaft portion eccentric to the main axis of the shaft, and means for rotating said shaft so as to contact said plate cylinder with said blanket cylinder and for moving it out of contact therewith, said rotating means comprising a solenoid having field poles with means for mounting the same in a stationary position with respect to said shaft, said solenoid having a rotary armature fixed to a sleeve rotatably mounted on said shaft, a crank plate having driving connection with said shaft and a crank member fixed to said sleeve and having driving connection with said crank plate, paper feeding means having instrumentalities for sensing the feed of paper, said instrumentalities including a lever pivotally mounted on the frame of the machine, connections from said lever for separating the blanket cylinder and impression cylinder on failure of paper feed and electrical switch means actuated by movement of said lever for controlling the action of said solenoid for separating the plate and blanket cylinders.

6. In an offset press having plate, blanket, and impression cylinders, paper feeding means having instrumentalities for sensing the feed of paper, said instrumentalities including a lever pivotally mounted on the frame of the machine, and connections from said lever for separating the blanket cylinder and impression cylinder upon failure of paper feed: a crank arm connected to the lever, a link extending from the crank arm, and a slotted disc secured to the plate cylinder and connected to said link, whereby upon movement of said lever to effect the separation of the impression and blanket cylinders, said disc will be rotated to cause separation of said plate and blanket cylinders.

7. An attachment for offset presses having plate, blanket and impression cylinders, and having means for sensing the absence of paper feed between the impression and blanket cylinders, and means controlled by said sensing means for effecting separation of the blanket and impression cylinder in the absence of paper feed, said attachment comprising: means for displacing the axis of rotation of the plate cylinder; and a link secured to said axis changing means for actuating same, said link being secured to said means for effecting separation of the blanket and impression cylinders.

8. An attachment for offset presses having plate, blanket and impression cylinders, at least one of said cylinders being mounted on an eccentric support, and means for rotating said support so as to effect contact between said cylinder with one or more of the other cylinders, and means for detecting the absence of paper feed to said press, said attachment comprising: an elongate link having one end secured to said means for rotating said support and the other end connected to said means detecting the absence of paper feed.

9. In an offset press having plate, blanket and impression cylinders, paper feeding means having instrumentalities for sensing the feed of paper, a lever pivotally mounted on the frame of the machine, coupled to

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said instrumentalities, and a link and lever between said first mentioned lever and the impression cylinder for separating same from the blanket cylinder upon failure of paper feed; means responsive to movement of said link; means mounting said plate cylinder for displacement from its normal axis of rotation; and a coupling between said means responsive to movement of said link and said plate cylinder mounting means, said coupling causing displacement of said plate cylinder mounting means upon movement of said link.

10. In an offset press having plate, blanket, and impression cylinders, a shaft for said plate cylinder having a shaft portion eccentric to the main axis of the shaft, and means for rotating said shaft to determine the position of said plate cylinder with respect to said blanket cylinder, said rotating means comprising: a slotted disk mounted on said shaft; a slotted link coupled to said slotted disk;

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a crank arm coupled to said slotted link; a lever on the eccentric bearings of the shaft of the impression cylinder, said lever coupled to said crank arm; paper feeding means having instrumentalities for sensing the feed of paper, said instrumentalities coupled to said lever for separating the blanket and impression cylinder on failure of paper feed whereby upon movement of said lever, said plate cylinder will be displaced from said blanket cylinder.

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