Sept. 9, 1952 W. E. BRIGHAM, JR. 2,609,748

SHEET CONTROLLED TRIPPING MECHANISM FOR ROTARY PRINTING PRESSES

Filed March 31, 1949 4 Sheets-Sheet 1

Fig. 2.

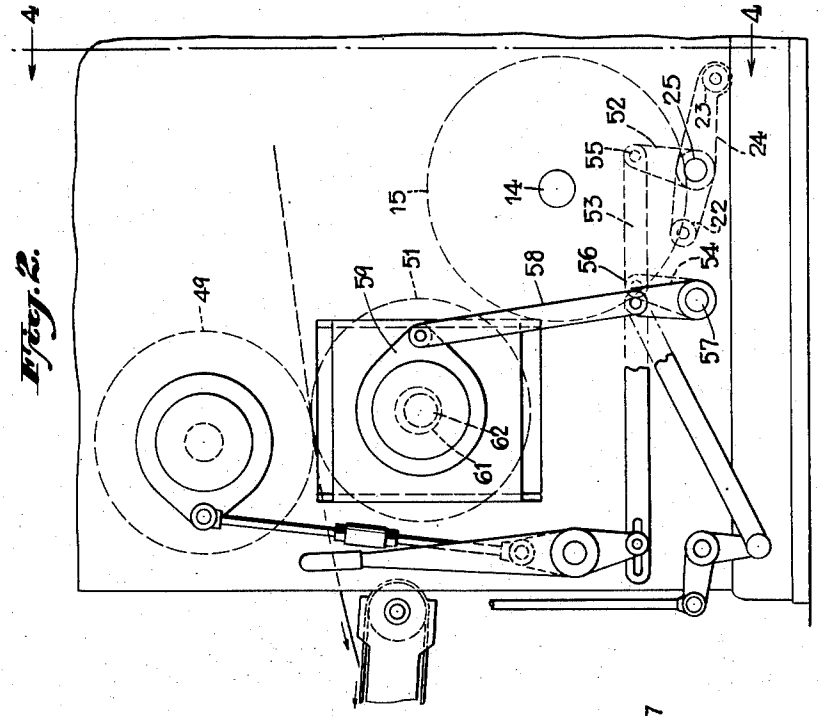
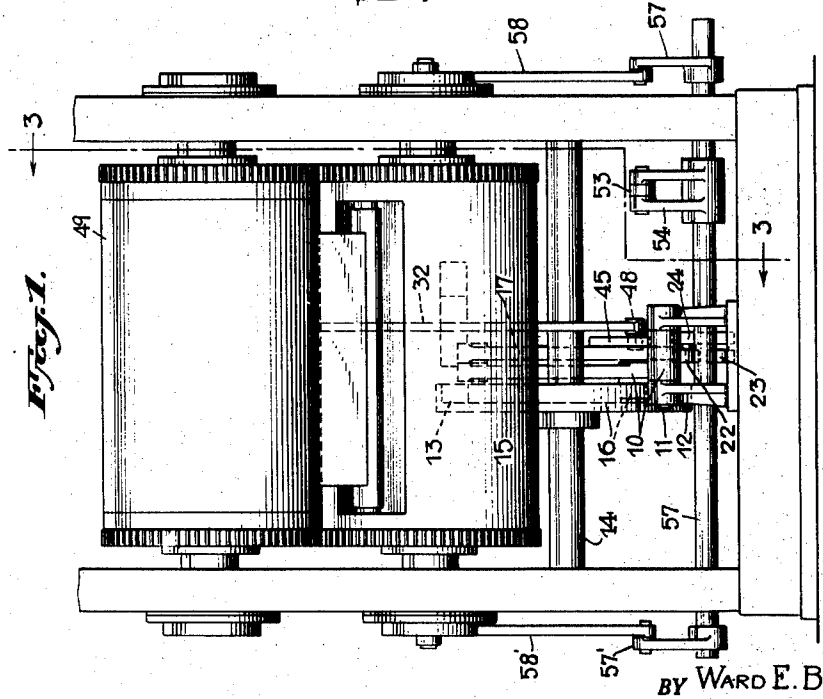


Fig. 1.



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SHEET CONTROLLED TRIPPING MECHANISM
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Filed March 31, 1949 4 Sheets-Sheet 2

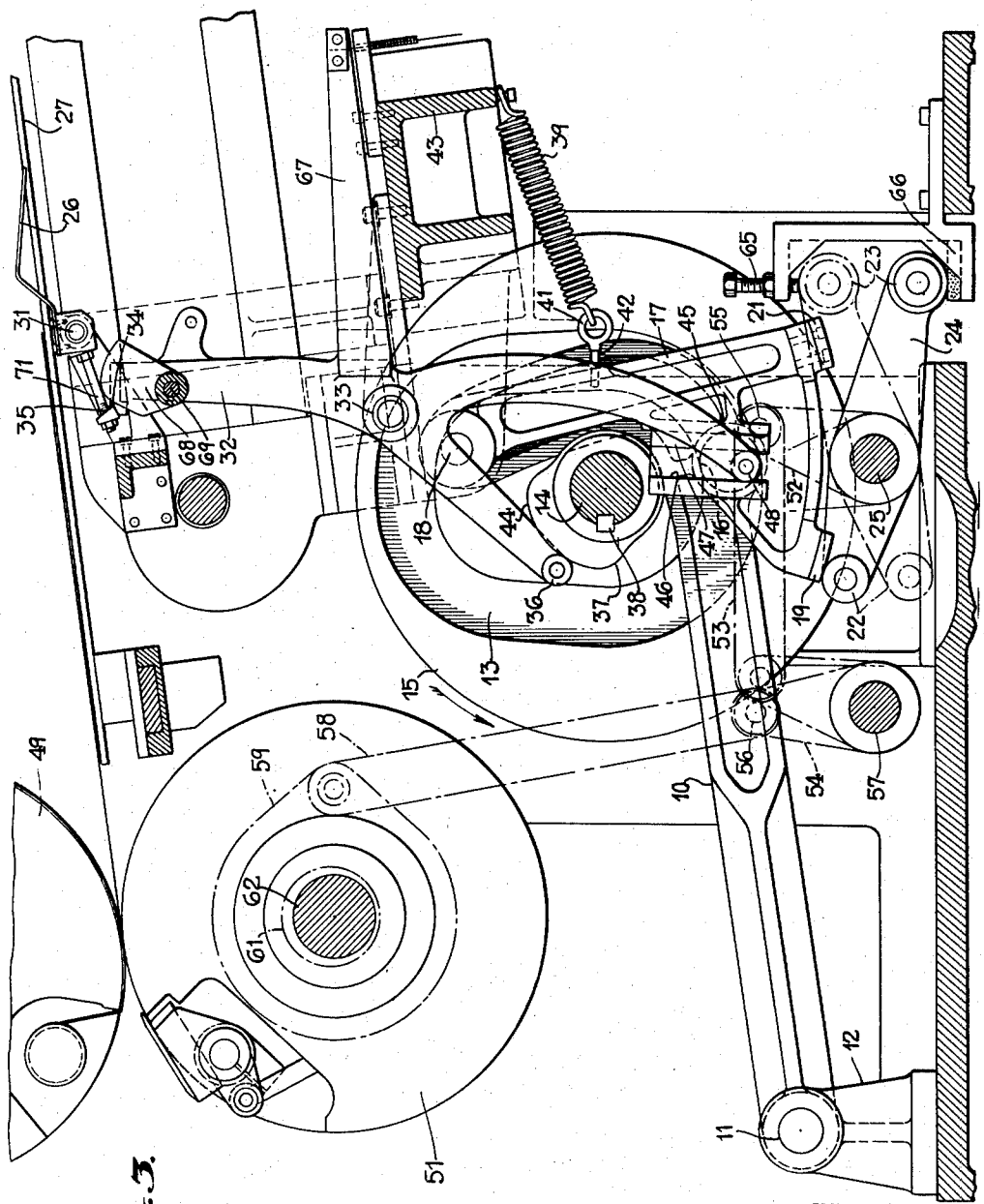


Fig. 3.

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SHEET CONTROLLED TRIPPING MECHANISM FOR ROTARY PRINTING PRESSES

Filed March 31, 1949 4 Sheets-Sheet 3

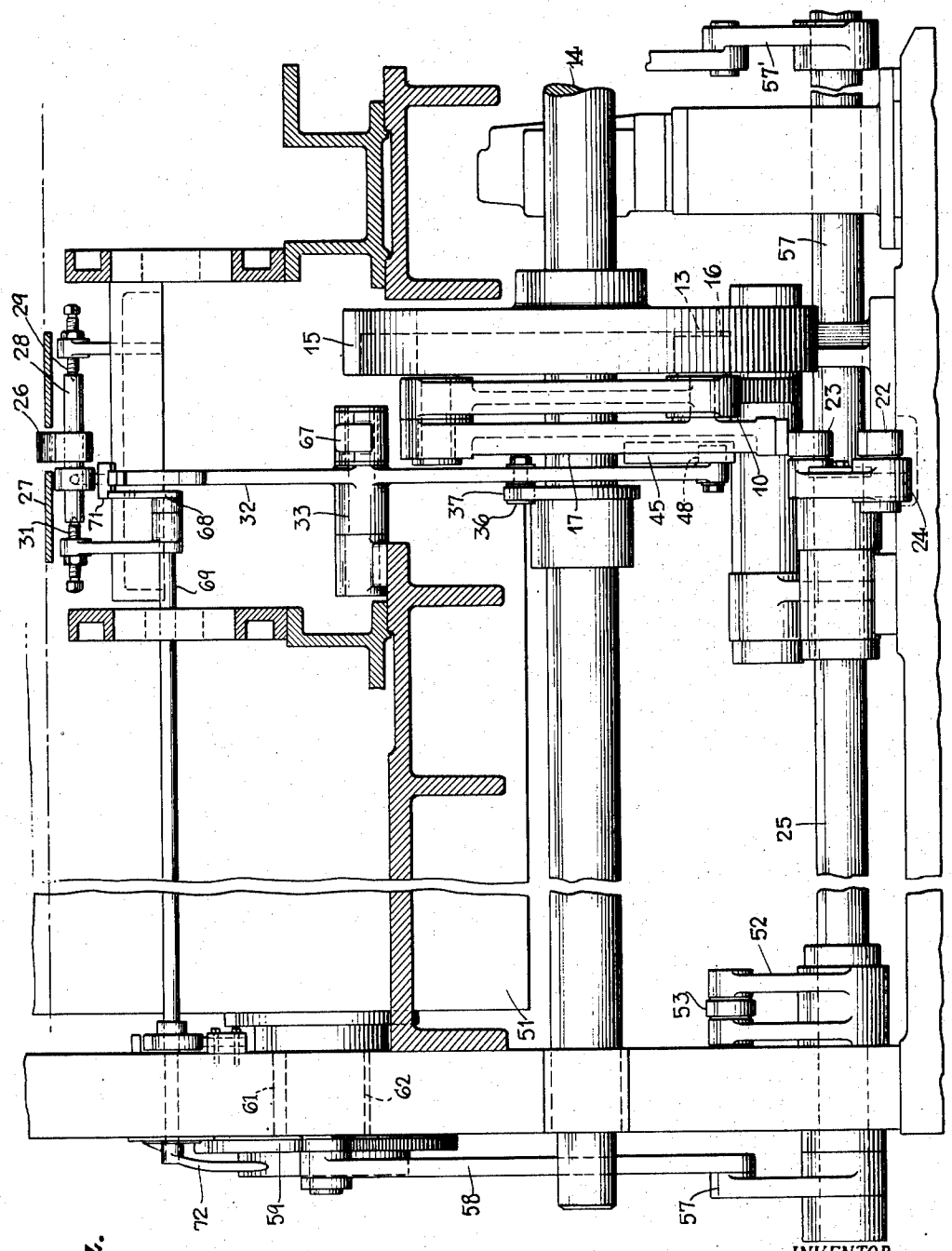


Fig. 4.

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Filed March 31, 1949 4 Sheets-Sheet 4

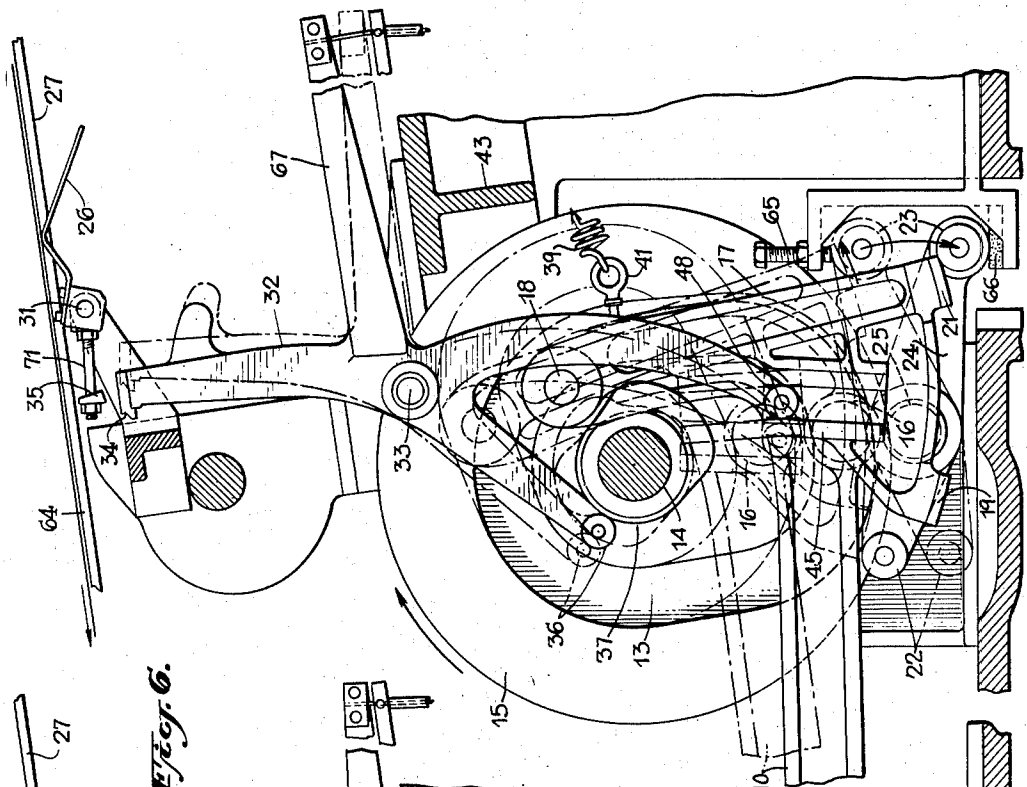


Fig. 6.

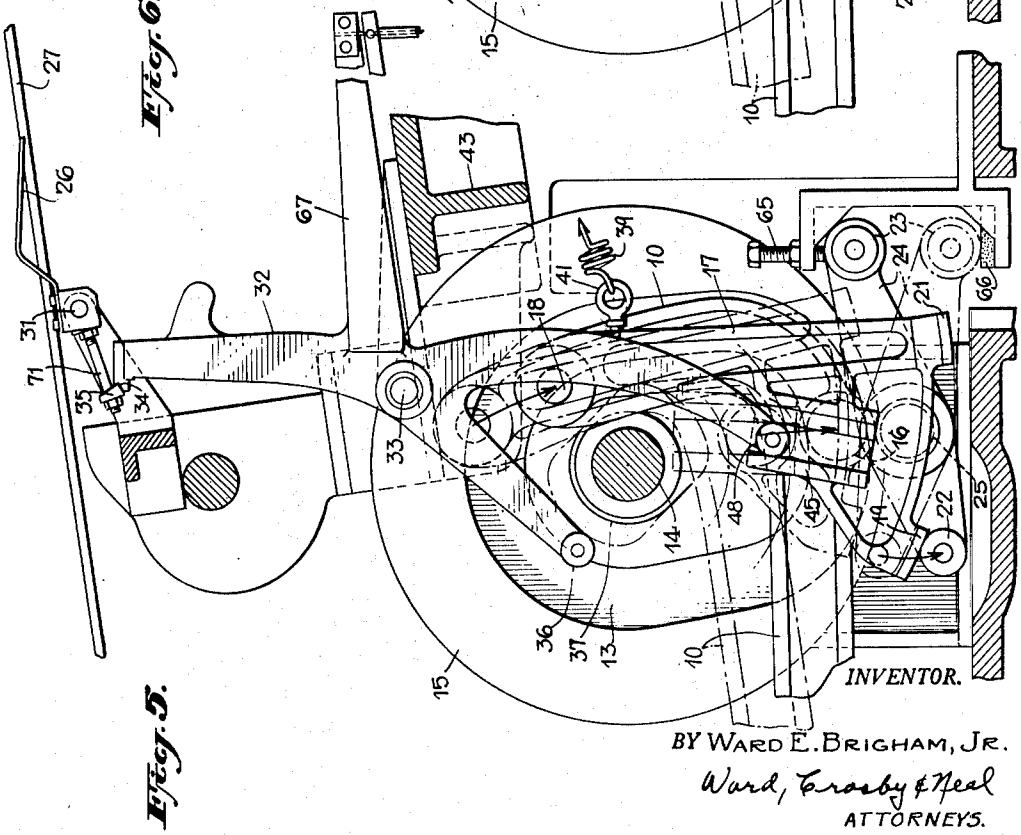


Fig. 5.

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UNITED STATES PATENT OFFICE

2,609,748

SHEET CONTROLLED TRIPPING MECHANISM FOR ROTARY PRINTING PRESSES

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Application March 31, 1949, Serial No. 84,541

3 Claims. (Cl. 101—233)

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This invention relates generally to printing presses of the type wherein sheets of material to be printed are fed along a shelf to a pair of driven printing cylinders. More particularly, the invention relates to mechanisms adapted for use with printing presses of the above type and operable to cause the printing cylinders to move into and out of contiguous printing relationship with each other.

As a sheet of material to be printed is moved along the shelf to the printing cylinders, the cylinders must, of course, be in printing relationship with each other when the sheet is disposed therebetween. However, when there is no sheet between the cylinders, it is desirable that the cylinders be separated in order to prevent the printing ink from spreading from the printing cylinder to its cooperating cylinder and being picked up by the next succeeding sheet to pass through the cylinders. Accordingly, the present invention aims to provide a new and improved mechanism for moving the printing cylinders into operative printing relationship with each other as the sheet of material is moved along the feeding shelf and which will operate to separate the cylinders as the printed sheet passes out of them. The mechanism is intended to be accurate and positive in operation and both simple and economical to manufacture. Further objects and advantages of the invention will be in part obvious and in part specifically referred to in the description hereinafter contained which, taken in conjunction with the accompanying drawings, discloses a control mechanism constructed to operate in accordance with the preferred form of the invention.

In the drawings:

Fig. 1 is an end view of a printing press embodying a preferred form of the invention;

Fig. 2 is a side elevation of the printing press shown in Fig. 1;

Fig. 3 is a vertical sectional view taken substantially along line 3—3 of Fig. 1 and showing the constituent elements of the control mechanism;

Fig. 4 is a view looking in at the opposite end of the printing press shown in Fig. 1 with certain parts shown in section at line 4—4 of Fig. 2; and

Figs. 5 and 6 are generally similar to Fig. 3 and show different moved positions of certain elements of the invention.

The present invention comprise a vertically reciprocating member pivotally carrying at one end thereof a member having laterally spaced striking portions thereon adapted to drivingly engage respectively opposite free ends of a pivotally mounted arm in successive order, thereby to cause the arm to move in one direction or another depending upon which end thereof is drivingly engaged. A detecting element is disposed in the path of the sheets of material as they move along the feeding shelf and is adapted to be depressed thereby from a normal position to release for angular movement a pivotally mounted lever which operates to position the striking portions with respect to the arm in such a manner that one end of the arm will be drivingly engaged as the detecting element is in its normal position and the other end thereof will be drivingly engaged as the detecting element is depressed. Suitable linkage interconnecting the arm and one of the printing cylinders operates to move the cylinders into and out of printing relationship selectively in accordance with the direction of movement.

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Referring now to the drawings and more particularly to Figs. 1–4 thereof inclusive, a reciprocating member is shown in the form of a gooseneck lever 10, one end of which is pivotally mounted as at 11 to a stationary supporting member 12. Driving motion for the gooseneck lever is provided by an eccentric box cam 13 affixed to a driven shaft 14 which is enclosed within a suitable cover 15. A roller 16 carried on lever 10 is adapted to move within the driven box cam in a well known manner such that as the cam rotates, the lever is reciprocated through an arcuate path about its pivot point 11. A quadrant member 17 is pivotally mounted as at 18 to the free end of the lever 10 and is adapted to move therewith in an up and down path, the quadrant member being provided with laterally spaced striking portions 19 and 21 adapted to drivingly engage rollers 22 and 23 respectively, carried on opposite ends of an arm 24 secured to shaft 25. It should be understood that while the quadrant member and its striking portions move through a substantially vertical path, the striking portions are spaced together more closely than the respectively corresponding rollers carried on the arm such that during the downward movement of the quadrant member, only one of the rollers will be engaged by its corresponding striking portion.

To predetermine which of the striking portions will actuate the arm 24, the following mechanism is provided. A detecting element shown in the form of an inclined finger 26 is disposed adjacent the top surface of the printing press feeding

shelf indicated at 27, the finger being secured to a pivotal shaft 28 (Fig. 4), the ends of which are supported by pins 29 and 31. The finger 26 is inclined in the direction of the receiving end of the feeding shelf 27 to thereby improve the sensitivity of the finger by reason of the fact that the sheets moving along the shelf will engage the entire surface of the finger to positively cause depression thereof. To shift the quadrant member 17 between positions wherein the striking portions thereof will drivingly engage the different ends of the arm 24, I have provided a lever 32 pivotally mounted on a shaft 33 and provided with a bifurcated lower end. The upper end of the bifurcated lever 32 is provided with a notch 34 adapted to receive in locking engagement therewith a shoulder or detent 35 formed on the pivotally mounted finger 26 whereby the lever is prevented from moving in a counter-clockwise direction when the finger is in its normal or uppermost position above the feed surface of the table 27. A roller 36 is carried on one of the bifurcations on the lower end of lever 32 and is adapted to engage a cam 37 secured to shaft 14 as by a key 38.

As the upper end of the bifurcated lever is released upon the depression of the finger 26, the lever 32 is urged in a counter-clockwise direction about its pivot 33 by means of a tension spring 39. The spring 39 is secured at one end to the eye 41 of a pin 42 securely embedded in the bifurcated lever and its other end is affixed to a supplemental shelf 43 which in turn may be suitably supported upon the main structure of the printing press. So long as the trip finger 26 is in raised position with the detent locking the lever 32 against movement, the roller 36 is merely swept as the lobe of cam 37 rotates. When, however, the detent is raised by the depression of the finger 26, the bifurcated lever will be moved by the spring 39 in a counter-clockwise direction as the dwell portion 44 of the cam rotates out of engagement with the roller 36, and as the roller again engages the dwell portion of the cam, the angular movement of the bifurcated lever will be reversed until the notch 34 in the upper end thereof comes into vertical alignment with the detent 35 of the finger to lock the lever against further movement when the finger is restored to its normal position.

In order that the quadrant member 17 may follow the angular movement of the bifurcated lever produced by the cam 37 during the upward and downward movement of the quadrant, I have provided a guideway 45 on the quadrant member having parallel sides 46 and 47 between which a roller 48 affixed to the other bifurcation on the lower end of lever 32 is adapted to move during the up and down motion of the quadrant member produced by the lever 10 and its associated box cam 13. Therefore, as the bifurcated lever is reciprocated through an angular path by cam 37, the quadrant member will be caused to follow this movement and will move angularly with respect to the gooseneck lever, it being understood that the design of the track 45 within which roller 48 on the bifurcated lever moves is of such a construction that the up and down movement of the quadrant member is not interfered with, irrespective of the angular position of the quadrant member with respect to the gooseneck lever.

The printing cylinders of the printing press are shown in Fig. 3 of the drawings with the blanket cylinder being indicated at 49 and the

impression cylinder at 51. Since the pivotal movement of arm 24 in either of two directions is adapted to control the separation of the cylinders in a manner hereinafter to be described in greater detail, it is necessary to provide suitable means for imparting this motion to the cylinders to cause them to move into and out of printing relationship and for this purpose, I provide a series of links 52, 53 and 54 (Fig. 2), the link 52 being secured to the arm shaft 25 and movable therewith. One end of link 53 is pivotally mounted to link 52 as at 55 and the other end is pivotally mounted to link 54 as at 56. One end of link 54 is secured to shaft 57 and the other end is secured to an additional link 58 which connects with a sleeve 59 having an inwardly extending lug 61 with a bore therein for receiving eccentrically the impression cylinder shaft 62. As the link 58 moves in a counter-clockwise direction, it causes the sleeve 59 to rotate in a clockwise direction to move the center thereof into substantial alignment with the center of the impression cylinder shaft, the effect of which is to separate the impression cylinder from the blanket cylinder. It will be noted that the shafts 25 and 57 and the pivot points 55 and 56 are arranged to form the four corners of a parallelogram whereby the pivotal movement of the arm may be transmitted to link 58 without enlarging or diminishing the degree of movement of the arm during the transmission thereof.

A similar series of links are provided on the opposite side of shaft 57 and, together with link 58′ which connects with another sleeve 59′, operates in the manner heretofore described such that the motion of arm 24 is imparted to the opposite ends of the impression cylinder to lower the same from the blanket cylinder a uniform distance throughout its longitudinal extent.

The operation of the control mechanism of the invention may best be understood from a consideration of Figs. 5 and 6 of the drawings wherein the constituent elements of the control mechanism are shown in different moved positions. In Fig. 5, the finger 26 is shown in its normal position with the detent 35 thereon in locking engagement with its complementary notch 34 formed in the upper end of the bifurcated lever 32, thus preventing any movement of the lever by its driving cam 37. As is shown in this figure, the finger will be in its normal position when no sheet of material is passing over the surface thereof. Under these conditions, the quadrant member 17 is caused to move in an arcuate, up and down path by the lever 10 in such a manner that the striking portion 19 thereon is caused to merely engage the surface of roller 22 on the arm 24, it being understood that this engagement between the striking portion 19 and roller 22 is not a driving engagement but that the two parts merely touch.

Further, in the figure, the quadrant and gooseneck lever are shown in two moved positions, viz. the down positions thereof which are shown in solid outline and the up positions thereof which are shown in dot-dash outline. Similarly, the arm 24 is shown in its two moved positions, the solid outline corresponding to the position thereof in which the printing cylinders will be maintained apart and out of printing relationship by the linkage and in the manner heretofore described. The dot-dash outline of the arm is intended to show its other position, the movement of the arm from its solid outline position to its dot-dash position being transmitted to the cylin-

ders to cause them to be moved into printing relationship. As stated above, the striking portions of the quadrant are more closely spaced than the rollers carried on the ends of the arm such that when the quadrant is in the position shown in Fig. 5, the striking portion 21 thereof will not, during the up and down motion of the quadrant member, drivingly engage its corresponding roller 23.

Fig. 6 shows a sheet of material 64 moving along the feeding shelf of the printing press in the region of the finger such that the finger will be depressed thereby into the position shown in this figure of the drawings. When this occurs, the detent on the finger is disengaged from its complementary notch in the upper end of the bifurcated lever, thereby releasing the lever for pivotal movement under the influence of its driving cam, the moved position of the bifurcated lever being shown in solid outline and the locked position thereof being shown in dot-dash outline. As the lever is driven by its cam in a counter-clockwise direction, the quadrant member is caused to move therewith by reason of the fact that these two elements are interconnected by the guideway 45 on the quadrant within which the roller 48 on the bifurcated lever is adapted to move. The dot-dash outline position of the quadrant member in this figure corresponds to the dot-dash outline position thereof, shown in Fig. 5, while the dotted outline of the quadrant in Fig. 6 represents its moved position caused by the counter-clockwise movement of the bifurcated lever. The solid outline showing of the quadrant and gooseneck lever illustrates the down positions thereof while the dotted outline shows the up positions thereof. Thus, it can be seen that as the quadrant member moves with the bifurcated lever into the dotted outline position thereof, the striking portions thereof become so positioned that striking portion 21 will drivingly engage its corresponding roller 23 to move the arm 24 from the position shown in dot-dash outline thereof (corresponding to the solid outline thereof shown in Fig. 5) into the position shown in solid outline and that striking portion 19 will not engage its corresponding roller in this moved position of the quadrant.

In summary, when the finger is in its normal position, the quadrant member will be maintained by the bifurcated lever in a position with respect to arm 24 to cause the arm to move in a direction to disengage the printing cylinders. When, however, the finger is depressed by a sheet of material moving thereover, the bifurcated lever is released for movement and is driven by its associated cam to so position the quadrant member that the arm may be pivotally moved thereby in a direction to cause the printing cylinders to move into printing relationship. It should be understood that cam 37 is constructed and designed to reciprocate the bifurcated lever between the positions thereof, shown in Fig. 6, during one complete rotation of the printing cylinders, the rotational speed of the cam shaft 14 being the same as the rotational speed of the driven printing cylinders. Each time the finger is depressed and is restored to its normal position after the sheet has moved thereover, the quadrant member 17 will be reciprocated through an arcuate path by the bifurcated lever 32 to cause arm 24 to move first in one direction during one rotation of the cylinders to move them into printing relationship and subsequently in another direction during the next rotation of the cylinders to separate them when no further sheet is moved along the shelf.

It should be understood that in practice the length of the sheets of material fed along the feeding shelf is less than the circumference of the printing cylinders and further that the sheets of material preferably are deposited on and moved along the feeding shelf at a rate of speed substantially corresponding to the rotational speed of the printing cylinders. Under these conditions, therefore, and with sheets of material continuously being moved along the shelf to the cylinders, the cylinders will be maintained continuously in printing relationship until the last sheet moves out of them. Although the finger will be restored to its normal position as each sheet moves beyond it and before the next succeeding sheet moves over it the bifurcated lever will not be returned to its initial locking position before the finger is again depressed by the next succeeding sheet, it being remembered that the bifurcated lever is reciprocated through its angular path but once during each rotation of the printing cylinders. As the last sheet moves beyond the finger, the finger is, of course, restored to its normal position and thereafter, the last sheet is printed by the cylinders. During the next succeeding rotation of the cylinders following the printing of the last sheet and specifically just before the printing surfaces of the cylinders contact each other, the control mechanism of the invention operates to separate the cylinders and prevent the ink from spreading to the blanket cylinder.

I employ an adjustable stop member 65 (Fig. 3) and a resilient stop member 66 which stops are to be engaged by arm roller 23 in order to prevent overtravel of the arm which might otherwise interfere with the touching engagement thereof heretofore described. A supplemental arm 67 is provided for the purpose of actuating a suitable counting mechanism each time a sheet moves over and depresses the finger.

Should it be desired to render the control mechanism of the present invention inoperable for any reason, I have provided a cam plate member 68 (Fig. 4) fixed on a rotatable shaft 69 and mounted to engage the portion 71 (see also Fig. 3) of the finger upon rotation of the shaft 69 to cause the finger to be depressed into the position shown in Fig. 6 of the drawings, thereby causing the printing cylinders to move into and be maintained in printing relationship with each other. For convenience in manually rotating shaft 69, I have provided a handle 72 suitably attached to the outer extremity of the shaft, as shown in Fig. 4 of the drawings.

While the invention has been described in particularity with reference to the preferred form thereof, it readily will be apparent to those skilled in the art after understanding the invention that further modifications and changes may be made therein without departing from the spirit and scope thereof, as defined by the claims appended hereto.

What is claimed as new and desired to be secured by Letters Patent of the United States is:

1. In a printing press having a shelf along which sheets of material are fed in successive order to a pair of driven printing cylinders, a control mechanism comprising the combination of, a member mounted for pivotal movement and having a roller on one end thereof, cam driving means for angularly moving said member alternately in two directions, a finger in the path of

movement of the sheets and depressible thereby from a normal position, said finger also being mounted in the path of movement of said member and engageable therewith when in its normal position for preventing movement of said member and upon the depression thereof being mounted out of said path to release the member for angular movement under the influence of the cam driving means, a driving member, a quadrant pivotally carried on said driving member and movable therewith, an arm having free ends and mounted for pivotal movement, said quadrant having spaced striking portions thereon one of which is adapted to drivingly engage one end of said arm when the finger is in its normal position with the other portion adapted to drivingly engage the other end of said arm when the finger is depressed, both of said striking portions being spaced a fixed distance from the pivot point of said quadrant and both being movable with respect to said free ends of said arm during engagement therewith, a guideway having parallel sides mounted on said quadrant and within which said roller is adapted to move as the quadrant is moved by the driving member, said guideway being moved a predetermined distance with said quadrant by said driving member and said sides having a length at least equal to said distance and having a spacing approximately equal to the diameter of said roller, the roller and its associated guideway serving to interconnect said quadrant and said first-mentioned member whereby the quadrant may be moved angularly by said first-mentioned member to drivingly engage the ends of said arm selectively in accordance with the position of said finger, and linkage interconnecting said arm and one of the printing cylinders for moving the latter into and out of printing relationship with the other cylinder selectively in accordance with the direction of movement of the arm.

2. In a printing press having a shelf along which sheets of material are to be fed in successive order to a pair of printing cylinders, a control mechanism comprising a pivotally mounted member having spaced striking portions thereon, means for reciprocally moving said member in either of two paths, an arm pivotally mounted with two free ends, one end being mounted in the path of one of said striking portions when said member is moved along one of said two paths, the other end being mounted in the path of the other of said striking portions when the said member is moved along the other of said two paths, means for determining the path followed by said member comprising a pivotally mounted actuating member, means for angularly moving said actuating member in either of two directions and means for slidably connecting said actuating member with said first-mentioned member, said last-mentioned means comprising a guideway having a pair of guide surfaces which are equidistant from each other throughout their lengths and which have lengths at least equal to the length of one of said two paths and a guide member in engagement with said surfaces, whereby said first-mentioned member is positioned in accordance with the movement of said actuating arm, a two-position finger normally

engageable with said actuating member for preventing movement thereof and mounted in the path of said sheets for movement by said sheets out of engagement with said actuating member for release thereof, means for controlling the separation of said cylinders and a linkage interconnecting said arm and said controlling means.

3. In a printing press having a shelf along which sheets of material are to be fed in successive order to a pair of printing cylinders, a control mechanism comprising a pair of driven cams, a first pivotally mounted member having a cam follower thereon engageable with one of said cams, a pivotally mounted arm having two free ends and contact portions on opposite sides of its pivot point, a second member pivotally mounted on said first member at a point spaced from the pivot point of said first member, said second member being reciprocally movable a predetermined distance by said first member and comprising a pair of striking portions spaced from each other at a distance less than the distance between said contact portions but substantially equal thereto and a guide portion, said striking portions being slidably engageable with said contact portions, a third pivotally mounted member having a cam follower thereon engageable with the other of said cams, said third member comprising a guide engaging portion engageable with said guide portion but movable with respect thereto for causing in its normal position one striking portion of said second member to engage one of said contact portions and for causing in a second position the other striking portion to engage the other of said contact portions, one of said guide and guide engaging portions comprising a pair of guide surfaces which are equidistant throughout their lengths and which have lengths at least equal to said distance and the other of said guide and guide engaging portions comprising a member in engagement with said surfaces, a trip finger mounted in the path of said sheets, said finger having a portion normally engageable with said third member for preventing movement thereof from said normal position and movable by said sheets out of engagement therewith for permitting motion thereof to said second position, means for moving said cylinders into and out of printing relationship with each other, and a linkage for interconnecting said arm and said moving means whereby said moving means is moved in response to movement of said arm.

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