

April 11, 1939.

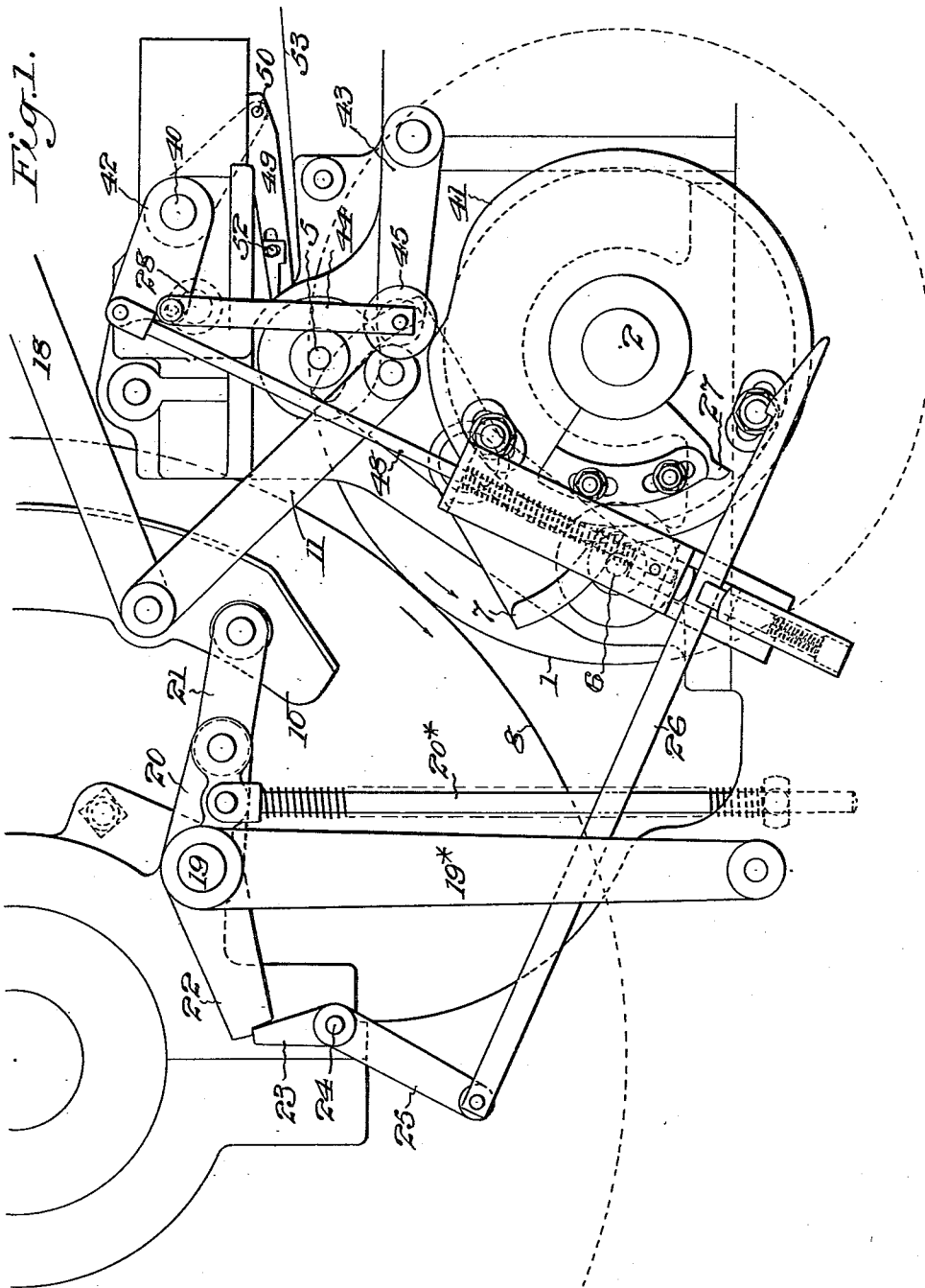
W. K. ECKHARD

2,153,979

SHEET FEED ROTARY PRINTING PRESS

Filed Nov. 17, 1937

4 Sheets-Sheet 1



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April 11, 1939.

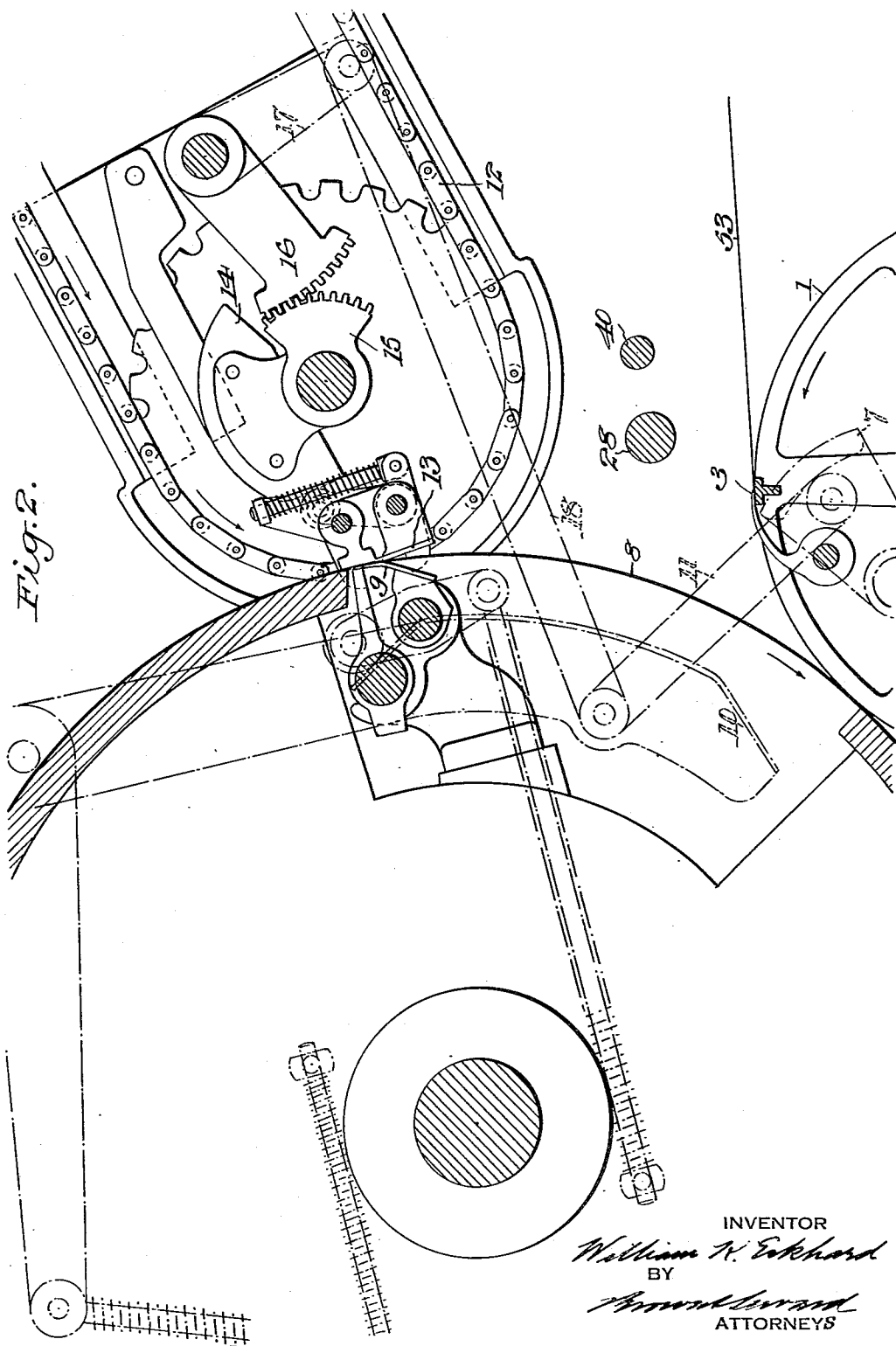
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4 Sheets-Sheet 2



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SHEET FEED ROTARY PRINTING PRESS

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4 Sheets-Sheet 3

Fig. 4.

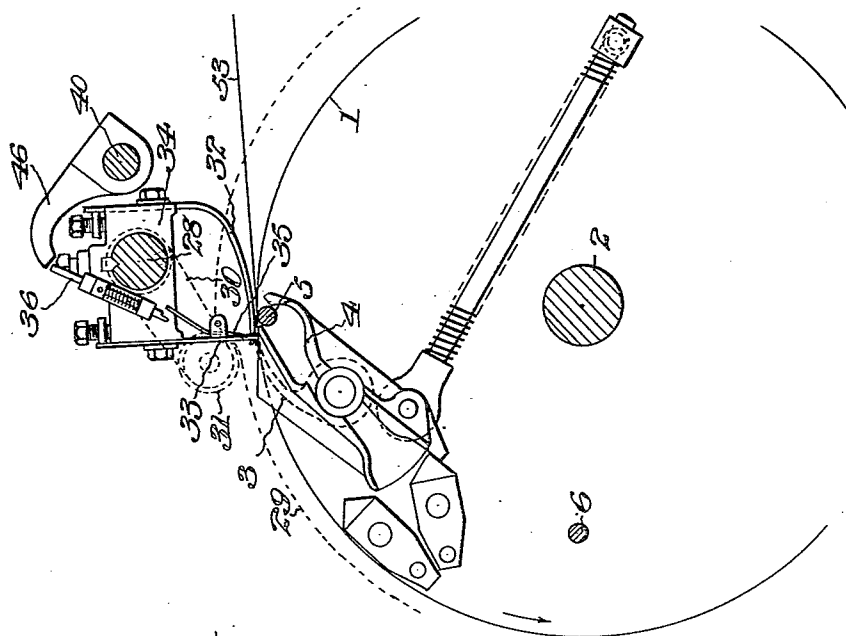
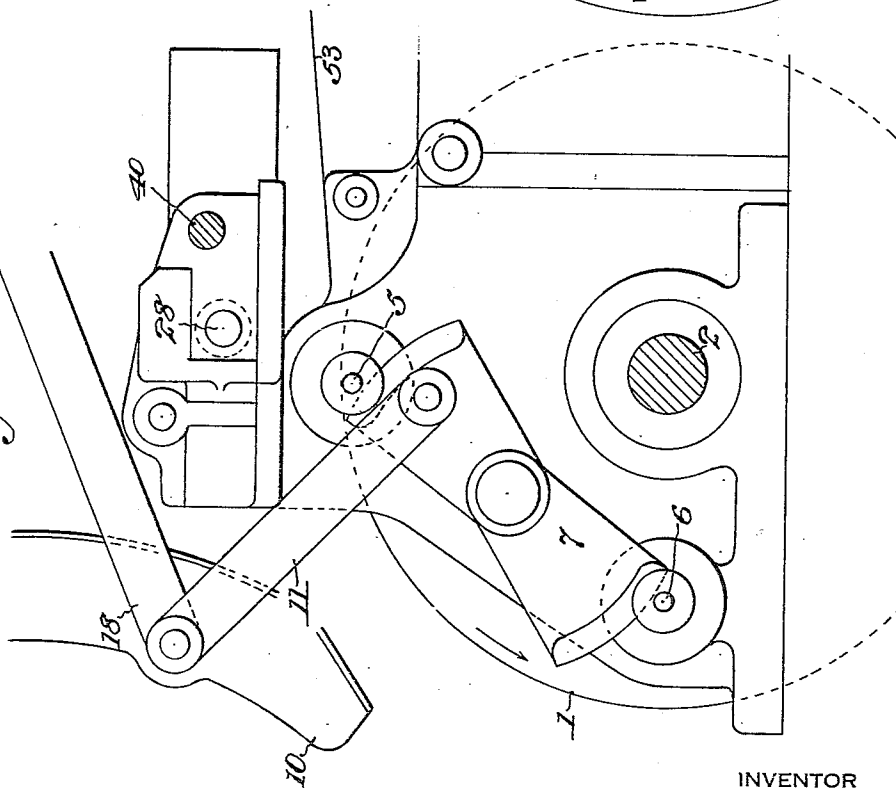


Fig. 3.



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4 Sheets-Sheet 4

Fig. 6.

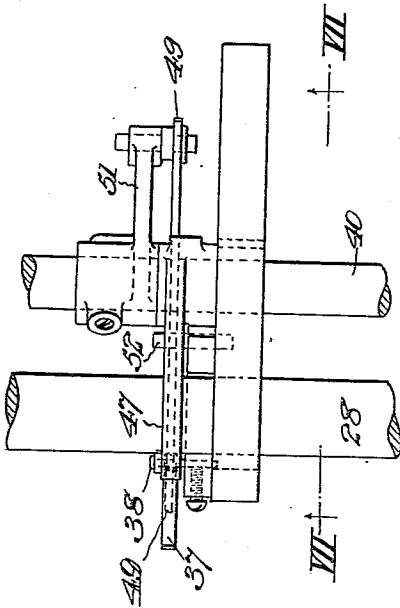


Fig. 5.

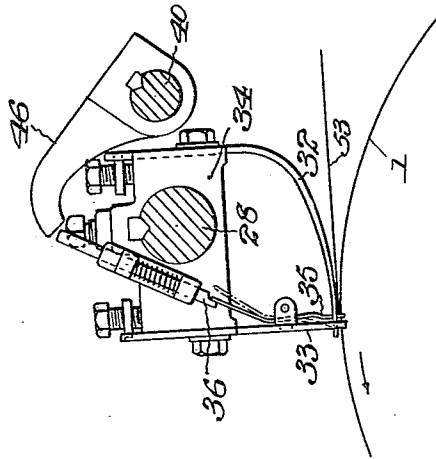
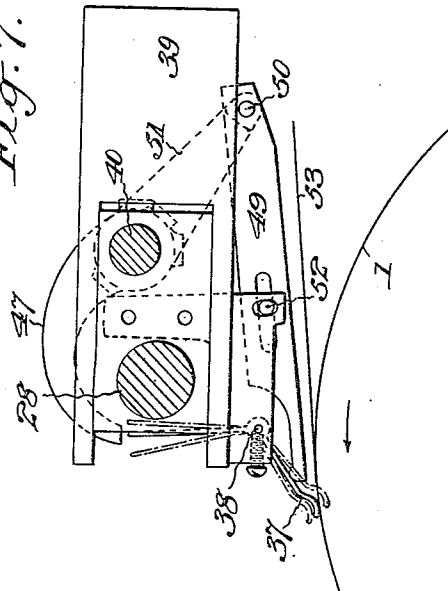


Fig. 7.



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UNITED STATES PATENT OFFICE

2,153,979

SHEET FEED ROTARY PRINTING PRESS

William K. Eckhard, Westerly, R. I., assignor to
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a corporation of Delaware

Application November 17, 1937, Serial No. 174,927

10 Claims. (Cl. 101—233)

In high speed sheet feed rotary presses there is a possibility of a sheet over-traveling its position with respect to the preceding sheet as it is being fed into the press and thereby passing under the front sheet guide in its unregistered position. This causes considerable damage to the press by the battering of the printing plates and also causes considerable delay and loss of production.

To positively overcome this possibility I have provided, in addition to the primary detector, a secondary detector arranged to prevent an over-fed sheet from passing into and through the press.

My invention more particularly comprises a secondary detector arranged in position to operate the gripper tripping mechanism of the press when an over-fed sheet is presented thereto, whereby the grippers will be rendered inoperative to take the over-fed sheet.

A practical embodiment of my invention is represented in the accompanying drawings, in which

Fig. 1 represents a detail side elevation of so much of a sheet feed rotary printing press as includes my invention;

Fig. 2 represents a detail longitudinal section more particularly illustrating the several sets of cooperating grippers for passing the sheets through the press;

Fig. 3 represents a detail side view illustrating more particularly the mechanism for throwing the tumbler cam pins into and out of their operative positions;

Fig. 4 represents a detail section illustrating more particularly the tumbler cam, the front sheet guide, and the primary detector.

Fig. 5 represents a detail section on an enlarged scale of the front sheet guide and primary detector;

Fig. 6 represents a detail plan view on the same scale of the secondary detector; and

Fig. 7 represents a detail vertical longitudinal section taken in the plane of the line VII—VII of Fig. 6, looking in the direction of the arrows.

The sheet feed rotary cylinder is denoted by 1, its shaft by 2, and its set of tumbler actuated grippers by 3. The operation of the tumbler cam 4 of the grippers 3 is controlled by the pins 5 and 6, which are moved into and out of the path of the tumbler cam 4 by the wobble cam 7.

The impression cylinder 8 may be provided with two diametrically opposed sets of grippers 9 (one set only being illustrated herein), the operation of which grippers is controlled by a rocking cam

10. A rod 11 connects the wobble cam 7 with the impression cylinder gripper cam 10.

The endless delivery carrier 12 is provided with spaced sets of grippers 13 (one set only of the grippers being shown herein), the operation of which grippers is controlled by a cam 14. This cam is provided with a gear segment 15 which meshes with a gear segment 16 on one arm of a rock lever, the other arm 17 of which is connected by a rod 18 to the impression cylinder gripper cam 10.

This cam 10 is moved under predetermined conditions to be hereinafter described. A latch lever is pivoted at 19, one arm 20 being connected to a link 21 pivoted to the free end of the movable cam 10 to form a toggle. Another arm 22 is arranged in position to be engaged by one arm 23 of a locking lever pivoted at 24, the other arm 25 of which lever carries a hook bar 26, arranged to be brought into and out of the path of a rotatively adjustable lug 27, carried by the sheet feed cylinder 1. A spring pressed rod 20* serves to break the toggle connection between the arm 20 and link 21 when the arm 23 is released from its engagement with the arm 22 and thereby swing the cam 10 inwardly to its inoperative position. A hand lever 19* is provided for manually resetting the toggle joint when so desired.

The front sheet guide, the primary and secondary detectors, and their tripping mechanism may be constructed, arranged, and operated as follows: A cross shaft 28 is rocked by a cam 29 on the shaft 2 of the sheet feed cylinder 1, through a rock arm 30 fixed on the cross shaft 28 and the stud or roller 31 which travels on the face of the cam 29.

The two pairs of front sheet guide fingers 32 and 33 are adjustably carried by their respective rocking supports 34, fixed to the cross shaft 28 at the opposite sides of the press.

The two fingers 35 of the primary detector are pivoted for a slight swinging movement to their respective front guide fingers 33. The lower ends of these primary detector fingers 35 are arranged to be brought into and out of the path of the incoming sheets as the front guide fingers are moved by the rocking of the cross shaft 28. The upper ends of these primary detector fingers 35 are arranged to be swung into and out of their locking engagement with the lower ends of their respective spring pressed bars 36 slidably mounted on the supports 34.

The finger 37 of the secondary detector may be mounted on the center line of the press or two or more fingers may be furnished, for more sensi-

tive detection at either side of the press. This finger 37 is pivoted at 38 for a slight swinging movement on the fixed support 39. The lower end of this secondary detector finger 37 is arranged to be brought into and out of the path of the incoming sheets.

The gripper tripping mechanism, the operation of which is controlled by either the primary or secondary detector, may be constructed, arranged, and operated as follows: A cross shaft 40 is rocked by a rotatively adjustable cam 41 on the sheet feed cylinder 1 through rock arms 42, 43 and their connecting rod 44, the rock arm 43 carrying a stud or roller 45 which bears on the face of the cam 41.

Primary detector arms 46 are fixed to the rock shaft 40, the throw of which arms is limited when the upper ends of the primary detector fingers 35 are engaged with their sliding bars 36. The secondary detector arm 47 is also fixed to the rock shaft 40, the throw of which arm is limited when the upper end of the secondary detector finger 37 is swung into the path of the said arm.

A spring pressed longitudinally movable rod 48 is pivoted at its upper end to the arm 42 of the cross shaft 40, which rod 48 serves as a sliding support for the hook bar 26.

A bar 49 is pivoted at 50 to the arm 51 fixed to the cross shaft 40, the intermediate portions of which bar is slidably supported at 52 in the fixed support 39. The free end of this bar is arranged to engage the lower end of the secondary detector finger 37 to lift it out of the path of the sheet under certain conditions.

The sheets 53 may be fed to the front sheet guide by any well known or approved means not shown herein.

In operation: As the sheet is fed to the front guide for registry it will engage the lower ends of the primary detector fingers 35, thereby causing the upper ends of said fingers to swing out of the path of the sliding bars 36 and permit the arms 46 and cross shafts 40 and 28 to rock their full stroke. This will permit the grippers 3 on the feed cylinder 1, the grippers 9 on the impression cylinder 8, and the grippers 13 on the endless delivery carrier 12 to operate, to forward the sheet through the press. Should no sheet be fed the detector fingers 35 will remain in the path of the sliding bars 36, thereby limiting the rocking movement of the arms 46, 47 and the cross shafts 40 and 28. This limited rocking movement will cause the tripping mechanism to act, to cause the feed cylinder grippers 3 to remain open, the impression cylinder grippers 9 to remain closed, and the delivery grippers 13 to remain open as they pass their receiving and transfer points. This is accomplished because the bar 48 carried by the arm 42 on the cross shaft 40 holds the hook bar 26 in the path of the lug 27 carried by the feed cylinder 1, thereby causing the lever arm 23 to be swung out of its locking engagement with the lever arm 22 and thereby permitting the spring pressed bar 20* to swing the arm 20 and link 21 of the toggle upwardly. This breaking of the toggle will swing the cam 10 inwardly, out of its operative position, and at the same time move the rod 11 to operate the wobble cam 7, withdraw the tumbler cam operating pins 5 and 6, and render the feed cylinder grippers 3 inoperative. At the same time also, the bar 18 is moved by the impression cylinder gripper cam 10 to rock the cam 14 out of operative position and thus leave the grippers 13 open until they pass their transfer point.

Should an unregistered over-fed sheet pass un-

der the front sheet guide and the first detector, the sheet will come into engagement with the secondary detector finger 37. The movement of this finger 37, by the over-fed sheet, into the path of its arm 47 will limit the rocking movement of the cross shaft 40, thus causing the tripping mechanism to operate as above described, to prevent the passage of the over-fed sheet through the press.

It will be, of course, understood that when a properly registered sheet is fed to the sheet feed cylinder grippers, the detector finger 37 is swung out of the way of the sheet by the sliding bar 49 and its arm 50 carried by the rock shaft 40.

It will be seen from the above description that an over-fed sheet is prevented, by the action of the secondary detector on the tripping mechanism, from being passed through the press, thus preventing damage to the press and the consequent delay and reduced production.

It will also be seen that a common tripping mechanism is employed for both the primary and secondary detectors.

It will be understood that where I use the term "cylinder", I intend to cover any rotary carrier capable of performing the functions set forth.

It is evident that various changes may be resorted to in the construction, form and arrangement of the several parts without departing from the spirit and scope of my invention, and hence I do not intend to be limited to the particular embodiment herein shown and described, but

What I claim is:

1. In a sheet feed rotary printing press, a front sheet guide and primary sheet detector, a secondary sheet detector and means for bringing it into and out of the normal sheet path beyond the primary sheet detector for preventing the passage of over-fed unregistered sheets into the press.

2. In a sheet feed rotary printing press, a front sheet guide and primary sheet detector, a secondary sheet detector, means for bringing it into and out of the normal sheet path beyond the primary sheet detector for preventing the passage of over-fed unregistered sheets into the press, and a tripping mechanism, operable by both the primary and secondary sheet detectors.

3. In a sheet feed rotary printing press, a front sheet guide and primary sheet detector, sheet feed cylinder grippers, a secondary sheet detector and means for bringing it into and out of the normal sheet path beyond the primary sheet detector for preventing the passage of over-fed unregistered sheets to the said sheet feed cylinder grippers.

4. In a sheet feed rotary printing press, a front sheet guide and primary sheet detector, sheet feed cylinder grippers, a secondary sheet detector, means for bringing it into and out of the normal sheet path beyond the primary sheet detector, and a tripping mechanism for said sheet feed cylinder grippers, operable by both the primary and secondary sheet detectors.

5. In a sheet feed rotary printing press, a front sheet guide and primary sheet detector, sheet feed cylinder grippers, impression cylinder grippers, a secondary sheet detector, means for bringing it into and out of the normal sheet path beyond the primary sheet detector, and a tripping mechanism for said sheet feed and impression cylinder grippers, operable by both said primary and secondary detectors.

6. In a sheet feed rotary printing press, a front sheet guide and primary sheet detector, sheet

feed cylinder grippers, impression cylinder grippers, delivery carrier grippers, a secondary sheet detector, means for bringing it into and out of the normal sheet path beyond the primary sheet detector, and a tripping mechanism for said sheet feed, impression and delivery carrier grippers, operable by both said primary and secondary detectors.

7. In a sheet feed rotary printing press, a front sheet guide, primary and secondary sheet detector fingers, and a tripping mechanism including a cross rock shaft and arms fixed thereon, said primary and secondary detector fingers being arranged to be moved into the paths of their respective arms, to limit their rocking movement and thereby operate the tripping mechanism.

8. In a sheet feed rotary printing press, a front sheet guide and primary detector fingers, a rocking support therefor, a secondary detector finger, a stationary support therefor, and a tripping mechanism including a cross rock shaft and arms fixed thereon, said primary and secondary detector fingers being arranged to be moved into the paths of their respective arms, to limit their rocking movement and thereby operate the tripping mechanism.

9. In a sheet feed rotary printing press, a front sheet guide and primary detector, a rocking support therefor, a secondary detector, a stationary support therefor, and a tripping mechanism including a cross rock shaft and an arm fixed thereon, said secondary detector being arranged to be brought into the path of the said arm to limit its rocking movement, another arm fixed to said cross rock shaft and a bar pivoted to said last named arm and slidable in said stationary support in position to engage and rock the secondary detector out of the path of the first named arm.

10. In a sheet feed rotary printing press, two sets of front sheet guide and primary detector fingers located at opposite sides of the press, a secondary detector finger located between the sets of primary detector fingers, and a tripping mechanism operated by the primary and secondary detector fingers, said tripping mechanism including a cross rock shaft and arms fixed thereon, and means for moving said primary and secondary detector fingers into the paths of said arms to limit their rocking movement.

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