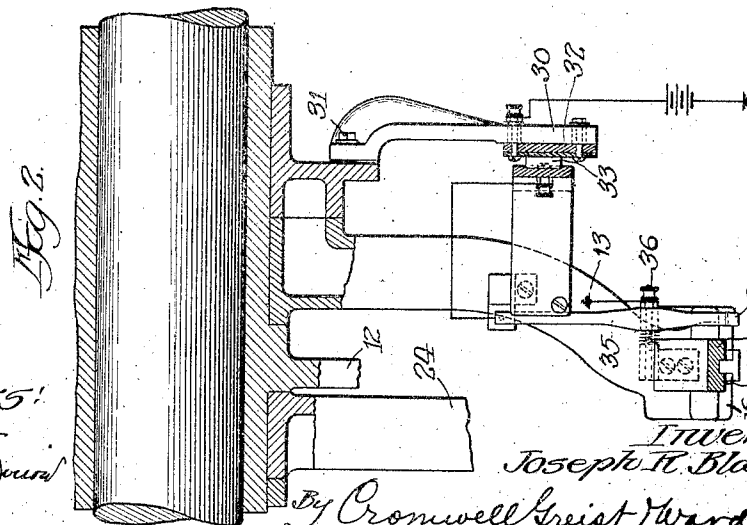
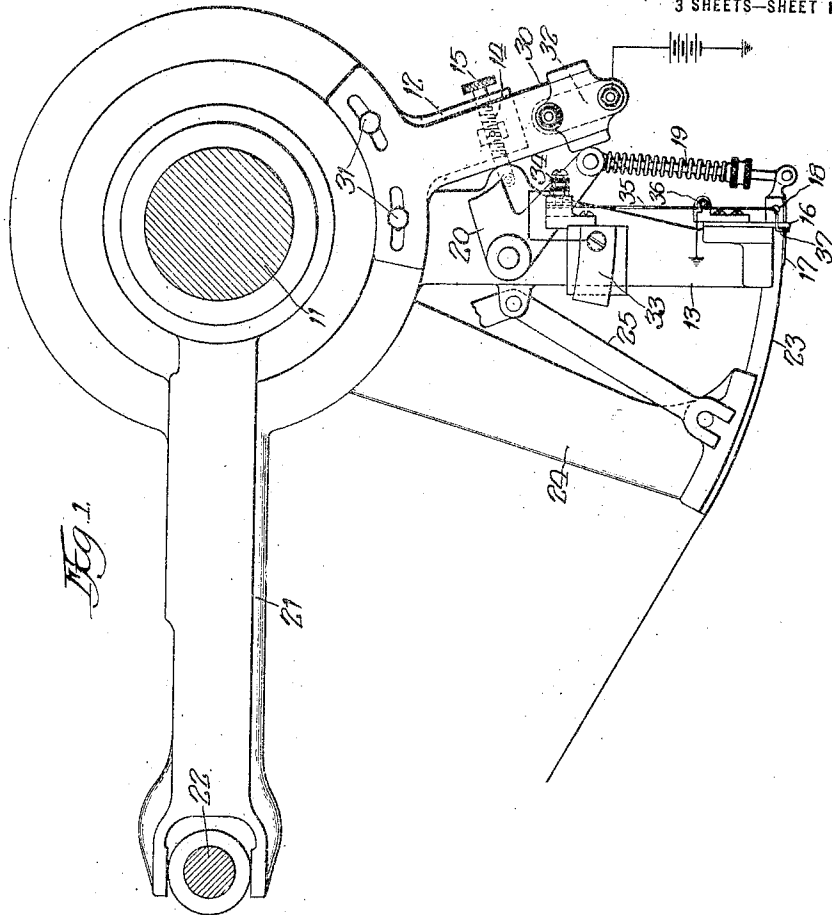


J. R. BLAINE.
SHEET REGISTER DETECTOR.
APPLICATION FILED SEPT. 10, 1917.

1,374,137.

Patented Apr. 5, 1921.
3 SHEETS—SHEET 1.



Witness:
W. S. [Signature]

Inventor
Joseph R. Blaine
By *Cromwell Geist Warden*
Atty.

1,374,137.

Patented Apr. 5, 1921.
3 SHEETS—SHEET 2.

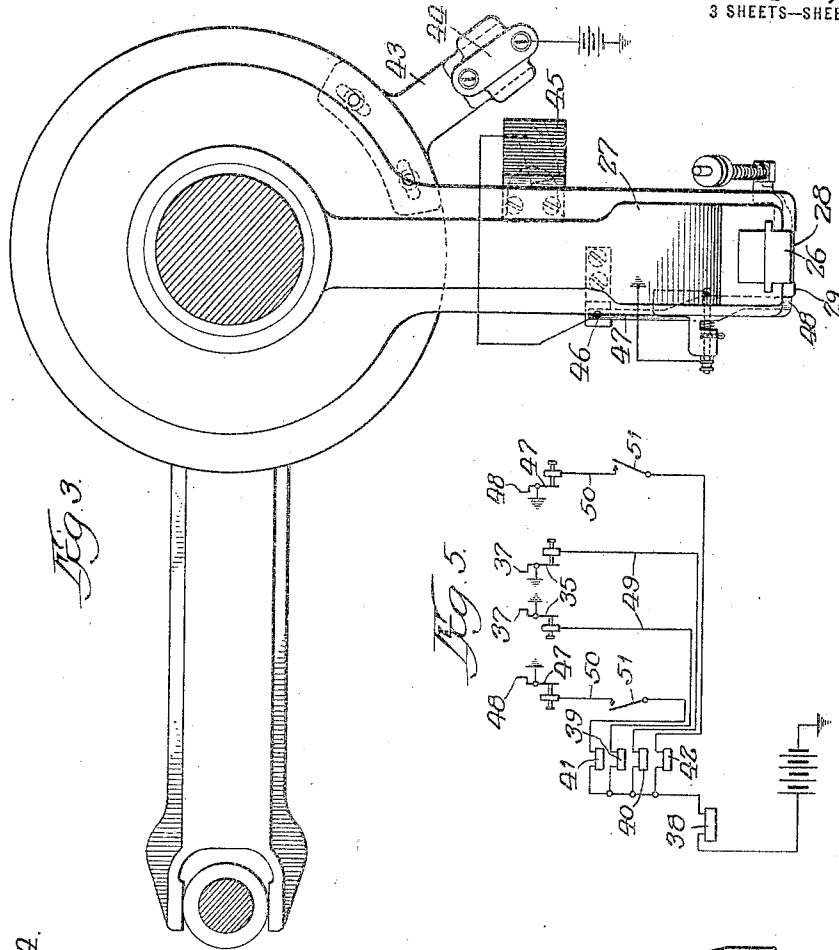


Fig. 3.

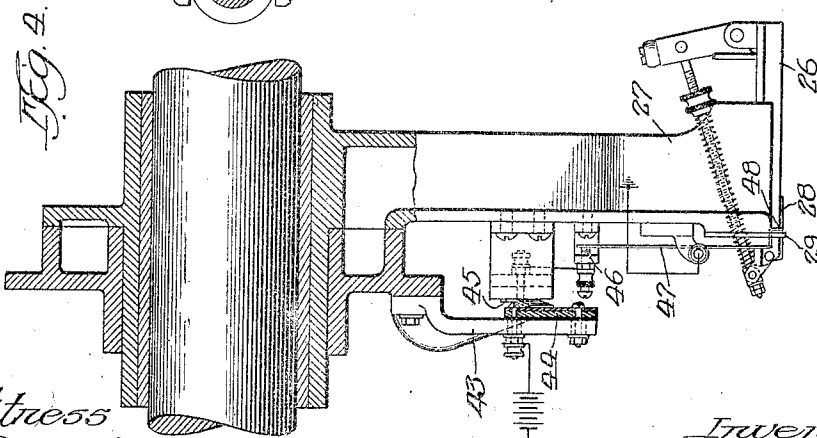


Fig. 4.

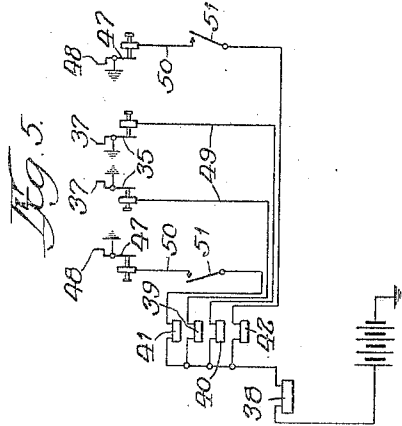


Fig. 5.

Witness
J. R. Blaine

Inventor
Joseph R. Blaine
By Cromwell Geist Warden
Atty's

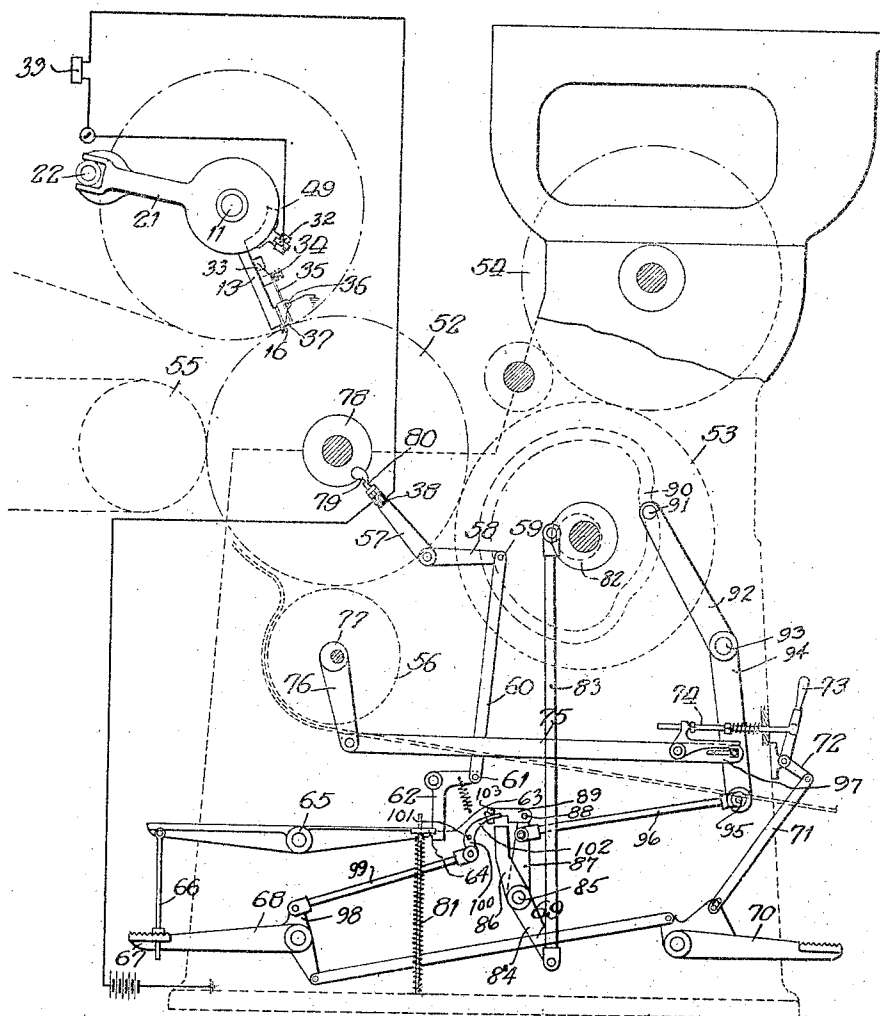
J. R. BLAINE.
SHEET REGISTER DETECTOR.
APPLICATION FILED SEPT. 10, 1917.

1,374,137.

Patented Apr. 5, 1921.

3 SHEETS—SHEET 3.

Fig. 6.



Witness:
Ed. C. Brown

Inventor
Joseph R. Blaine
By *Cromwell, Grist & Warden*
Atty

UNITED STATES PATENT OFFICE.

JOSEPH R. BLAINE, OF CHICAGO, ILLINOIS, ASSIGNOR TO MIEHLE PRINTING PRESS & MANUFACTURING COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

SHEET-REGISTER DETECTOR.

1,374,137.

Specification of Letters Patent.

Patented Apr. 5, 1921.

Application filed September 10, 1917. Serial No. 190,473.

To all whom it may concern:

Be it known that I, JOSEPH R. BLAINE, a citizen of the United States, residing at Chicago, county of Cook, and State of Illinois, have invented certain new and useful Improvements in Sheet-Register Detectors, of which the following is a specification.

In the operation of printing presses it is important not only that the press shall be tripped in case a sheet fed therethrough is not in proper register but that the operator may know wherein the difficulty lies in order that he may intelligently proceed to the correction of the same and thus insure the proper register of succeeding sheets.

According to the present invention provision is made for automatically tripping the press in case a sheet is out of front or side register and also for announcing to the pressman the particular point at which such failure of register occurs.

To facilitate a proper understanding of the invention, a preferred embodiment is set forth in the accompanying drawings and in the following detailed description. Obviously, however, the invention is susceptible of embodiment in other varied constructional forms, wherefore the drawing and description are to be taken in an illustrative and not in an unnecessarily limiting sense. In the drawings—

Figure 1 is a side elevation of the front register mechanism with which the present invention is incorporated;

Fig. 2 is an edge elevation partly in section of the construction shown in Fig. 1;

Fig. 3 is a side elevation of the side register mechanism and sheet detector feature;

Fig. 4 is an edge elevation partly in section of the construction shown in Fig. 3;

Fig. 5 is a wiring diagram;

Fig. 6 is an assembly diagram showing the relation of the invention to the operative parts of the printing press at large including the tripping mechanism.

The invention is herein shown as embodied in register mechanism such as that forming the subject matter of my co-pending application Serial No. 105,323 and my Patents No. 1,300,561, 1,300,562 and 1,300,563 issued April 15, 1919 and my Patent No. 1,339,316 issued May 4, 1920, not herein illustrated or described in detail although

for the sake of clearness a general description of the same is given.

Having reference to Figs. 1 and 2 of the drawings, and describing briefly the register mechanism aside from the detector mechanism constituting the present invention, the shaft 11 is geared to rotate in synchronism with the impression cylinder and has adjustably fixed thereon an arm 12, while a gage-carrying arm 13 is loosely mounted on said shaft and adjustably tied to the arm 12 by means of the threaded spindle 14 having the knurled operating head 15 whereby to position the front gage 16. A sheet engaging flipper 17 pivoted at 18 is actuated at timed intervals through the spring controlled link 19 and the angle lever 20 by means of a cam roller carried by the lever and travelling on a fixed cam positioned about the shaft 11 by means of the arm 21 engaging the cross rod 22, the cam roller and cams not being herein shown. A sheet feeding shoe 23, to which the flipper 17 is pivoted, is mounted for traverse movement relative to the arm 13 by means of the cam controlled angle lever 25.

It will be understood that the shaft 11 extends up over the press and that a counterpart of the mechanism above described is mounted upon the said shaft 11 and the rod 22 adjacent the two sides of the press, that is to say separated a distance slightly less than the width of the paper to be fed, so that a front gage is provided for effecting register of the sheet at the front edge and adjacent each side. The arms 12 are slidable longitudinally upon the shaft 11 so that to properly position the two registering mechanisms in order to act upon the sheet at the proper point, the position of the sheet having been determined, the arm 12 is clamped upon the shaft 11 in an obvious manner. The knurled head 15 of the spindle 14 is then manipulated in order to position the gage arm 13 of the two mechanisms in exact transverse alinement and in the proper position longitudinally to effect the proper front register of the sheet.

The press being in motion, the gage arm 13 revolves and carries with it the front gage 16 at a peripheral speed corresponding exactly to that of the grippers upon the impression cylinder by reason of it being tied

to the arm 12 by means of the screw spindle 14. The angle levers 20 and 25 likewise revolve with the arm 13, being fulcrumed thereto.

5 As the sheet is fed to the press by the sheet feeder its front edge comes against the front gage 16 or approximately in that relation, usually within a sixteenth to a quarter of an inch therefrom. The cam acting
10 through the angle lever 20 and compressing the spring upon the link 19 now operates upon the flipper 17, previously open, whereby it is closed upon the forward end of the sheet, lightly gripping the same between the flipper and the lower surface of the shoe 23.
15 Immediately thereafter the roller of the angle lever 25 riding upon its cam moves the said angle lever and advances the shoe 23 and the flipper 17 relative to the gage arm 13 and the gage 16, the gage traveling at the speed of the grippers and the shoe 23 at a slightly greater speed by reason of the action of the said lever 25. The sheet, gripped at its forward edge between the flipper 17
20 and the shoe 23 is likewise advanced until it comes in contact with the gage 16 whereupon, meeting with this obstruction, the sheet continues its movement at the same speed as the gage whereas the shoe 23 and the flipper 17 move at a faster speed.

30 The front gage 16 now continues its movement at the speed of the grippers on the impression cylinder, the sheet being held against the shoe 23 and abutting the gage 16
35 by the flipper 17 until the grippers on the impression cylinder have gripped the forward end of the sheet. Thereupon the cam acts upon the angle lever 20 to open the flipper 17, and it together with the shoe 23 is retracted to a position in readiness to receive the next sheet.

The side register mechanism is similar in its operation. A brief description will suffice. Here the shoe 26 (Figs. 3 and 4) is
45 caused to slide relative to the gage carrying arm 27 by means of a suitable cam device not shown, the sheet being held against said shoe by means of the flipper 28 which is similarly opened and closed, the sheet being
50 brought into side register against the side gage 29 and thereafter released in a manner similar to that described with reference to the front gages. The registering mechanism is arranged in duplicate, one upon each
55 side of the press so that the sheet may be registered either from the left or the right hand side in its travel to the impression cylinder.

60 In order that the press may be automatically tripped in case the sheet fed thereto is not in proper register with the side gage or with any one of the front gages, and that the pressman may be notified of such fact of non-register and of the particular gage with

which the edge of the sheet is not in contact, the following mechanism is provided:

Upon an arm 30 mounted in stationary adjustable relation to the press by means of the bolts 31 is fixed a contact plate 32, (Figs. 1 and 2), which plate is in an electric circuit which also includes a wiper plate 33
70 carried by the gage arm 13, the wiper plate 33 being arranged to wipe across the contact plate 32 during a period corresponding to the gaging of the sheet and its delivery to the grippers of the impression cylinder. Included in this electric circuit is a contact 34
75 and a detector finger 35, the latter being pivoted at 36 to the gage arm 13 and having its lower end 37 offset and disposed a small fraction of an inch in front of the front gage 16 and in the path of the said sheet. The circuit also includes a magnet or solenoid 38 (Fig. 5). There are other circuits arranged in parallel with that just described
85 each including annunciators 39, 40, 41 and 42, the magnet 38 being common to all.

The side registering mechanisms (Figs. 3 and 4) are both similarly equipped with the adjustable stationary arm 43, the contact
90 plate 44, the wiper plate 45, the contact 46, the detector finger 47 having the lower offset end 48. The circuits of the front register detector mechanism indicated at 49 (Fig. 5) include the annunciators 39 and 40
95 whereas the circuits 50 of the side register detector mechanism include the annunciators 41 and 42. The last named circuits also include hand switches 51 which may be opened to throw either side register detector mechanism out of operation when the sheet is being fed to the press in register with the side gages upon the opposite side of the press.

Having reference to Fig. 6 of the drawing, the impression cylinder of the press is indicated at 52, the blanket cylinder at 53
105 and the form cylinder at 54, the delivery at 55 and the auxiliary delivery at 56. The magnet 38 is mounted upon one arm 57 of an angle lever the other arm of which, 58, is pivoted at 59 to a link 60 the other end of which is pivoted at 61 to an angle lever 62 having a notch 63 formed in its free end. The notch 63 normally engages the end 64
110 of the lever 65 the other end of which engages by means of a link 66 in the end 67 of the foot lever 68 connected by means of link 69 to the corresponding foot lever 70 which is connected by means of a link 71
115 with an angle lever 72 provided with a handle 73 connected by means of a latch 74 with the trip lever 75 pivoted to the arm 76 of the eccentric 77 on the hub of the auxiliary delivery cylinder 56.

Upon the hub 78 of the impression cylinder 52 is a stud 79 which projects into such a position that, traversing its orbit, it would engage the core 80 of the energized magnet

38 which magnet is in series with all of the detector fingers 37 and 47.

It will be observed, however, that as the forward edge of the sheet is brought into register against the two front gages 16 it pushes the lower end of the detector finger 36 forwardly and in so doing breaks the electrical connection between the detector finger and the contact 34. Likewise, as the edge of the sheet is brought into side register against the gage 29 it pushes the lower end 48 of the detector finger 47 outwardly and breaks the electric circuit between the detector finger and the contact 46. The failure of the sheet to register with the side gage or with either of the front gages maintains the circuit through the magnet. It follows that if proper register is made at each of the front gages and at the side gage the magnet 38 will remain deenergized, permitting the core 80 to remain retracted within the magnet so as to clear the stud 79; but if, on the other hand, the sheet fails to register at either of the front gages or at the side gage the magnet will become energized and the core 80 will project into the path of the revolving stud 79. In the latter case, angle lever 57, 58 will rock, lifting the link 60, rocking the angle lever 62, and permitting the end 64 of the lever 65 to move upwardly out of the notch 63 under the influence of the compression spring 81. This will force the foot lever 68 downward and with it the link 71. The trip rod 75 then moves to the left, causing the non-registered sheet to be delivered at the auxiliary delivery 56 instead of at the regular delivery 55.

For the purpose of simultaneously tripping the blanket cylinder out of operative relation to both the form cylinder and the impression cylinder, the blanket cylinder has its bearings in blocks eccentrically mounted. This eccentric bearing is indicated at 82 in Fig. 6 and is connected by means of a rod 83 with an arm 84 fixed upon the shaft 85. The shaft 85 also has fastened thereon a latch plate 86. An arm 87 is loosely mounted upon the shaft 85 and in turn has pivoted thereto at 88 a latch 89 the purpose of which will be shortly described. A cam groove 90 is formed on the end of the blanket cylinder 53 for traverse by a rotor 91 carried by one arm 92 of an angle lever fulcrumed at 93 and having another arm 94 pivoted at 95 to a link 96 connected to the arm 87 which is loose on the shaft 85. The lever arm 94 has a guiding pin and slot connection at 97 with the trip lever 75. The foot lever 68 has a projection 98 connected by means of a link 99 with an arm 100 of an angle lever pivoted at 101, the other arm 102 of which angle lever underlies a lug 103 upon the latch 89.

Upon the engagement, previously de-

scribed, of the stud 79 with the projected core 80 of the magnet and the releasing of the lever 65 the downward movement of the foot lever 68 causes the lowering of the lever arm 102 so as to permit the latch 89 to engage with the latch plate 86 thus coupling the train of members between the eccentric 82 and the cam roller 91. It will be understood that in the normal operation of the press the cam groove 90 imparts a constant oscillating movement to the lever 92, 94, which in turn imparts a continuous reciprocating motion to the link 96, which motion, by reason of the latch 89 being held out of engagement with the latch plate 86, is functionless. As soon however as the latch 80 is dropped into engagement with the latch plate upon the tripping of the auxiliary delivery cylinder, the latch plate 86 and the arm 84 partake of the oscillating movement caused by the cam groove 90, the result being that the eccentric 82 is angularly adjusted by the rod 83 to trip the blanket cylinder concurrently with the tripping in of the auxiliary delivery. At the same time, one of the annunciators 39, 40, 41 or 42 will be operated to indicate which of the detector fingers maintains the circuit closed thus locating the difficulty to the pressman. The difficulty having been remedied, the operator presses down upon the outer end of the lever 67, bringing the end 64 of the lever 65 into the notch 63 of the angle lever 62, also releasing the latch 89 from the latch plate 86, whereupon the normal delivery of the press will ensue.

I claim:

1. In a printing press, the combination with the usual sheet-register gages, of means to automatically trip the press upon failure of the sheet to register at any one of the gages, and means to indicate to the pressman the particular gage at which such failure occurs, said indicating means comprising a normally open electric circuit for each gage including an annunciator, each of said circuits arranged to be closed upon the failure of the sheet to register at its particular gage.

2. In a printing press including normal and auxiliary delivery and front and side sheet-register gages, means to automatically trip the press and deliver the sheet at the auxiliary delivery upon failure of the sheet to register at any one of the gages, and means to indicate to the pressman the particular gage at which such failure occurs, said indicating means comprising a normally open electric circuit for each gage including an annunciator, each of said circuits arranged to be closed upon the failure of the sheet to register at its particular gage.

3. In a printing press, the combination with the sheet-register gages, of electro-mag-

netic means to automatically trip the press upon failure of the sheet to register at any one of the gages and to indicate to the pressman the particular gage at which such failure occurs, said indicating means comprising a normally open electric circuit for each gage including an annunciator, each of said circuits arranged to be closed upon the failure of the sheet to register at its particular gage.

4. In a printing press, the combination with the usual cooperating printing elements, tripping mechanism, and sheet-registering gages, the tripping mechanism including an element adapted to be shifted into the path of a moving part of the press, of electro-magnetic means associated with each of the gages and arranged to be moved by the sheet upon registration at that point to open an electric circuit and upon failure of the registration to maintain the circuit closed and thereby to shift the said element of the tripping mechanism into the path of the moving part of the press and to actuate the tripping mechanism whereby to automatically trip the press upon failure of the sheet to register at such gage, and electro-magnetic means under the control of the detector finger to indicate to the pressman the particular gage at which such failure occurs.

5. In a printing press, the combination with the sheet register gages, of an electric circuit for each of the gages comprising an annunciator, electro-magnetic means included in said circuit for tripping the press, said circuit including a normally open switch arranged to be closed during each cycle of press operation coincident with the registering of the sheets fed thereto, said circuit also including a normally closed switch associated with each of the gages and arranged to be moved by the sheet upon registration at that point to open the electric circuit and maintain the same open during the time the first mentioned switch is closed, whereby upon failure of the sheet to register at any gage the electro-magnetic tripping means will be actuated upon the closing of the circuit at the normally open switch and the annunciator will indicate to the pressman the particular gage at which such failure occurs.

6. In a printing press, the combination with the usual sheet register gages, of means to automatically trip the press upon failure of the sheet to register at any one of the gages, and means to indicate to the pressman the particular gage at which such failure occurs, comprising an electric circuit including a normally open switch arranged to be closed during each cycle of press operation coincident with the registering of sheets fed thereto, and a normally closed switch associated with each of the gages and arranged to be opened by the registering of the

sheet thereat, electrically operated press tripping means included in said circuit, said circuit including branches in parallel for each gage and containing an annunciator, whereby upon the failure of a sheet to register at any gage the circuit will remain closed thereat and upon the closing of the circuit at the normally open switch the press-tripping means will be actuated and the annunciator vitalized.

7. In a printing press including the usual cooperating cylinders, tripping mechanism and front and side sheet-registering gages, the combination of electric circuits corresponding in number to the gages, a solenoid common to all the circuits, a detector finger arranged as a switch in each of the circuits and disposed adjacent one of the gages, the detector finger arranged to be actuated by the sheet in the act of being registered, and a moving part of the press engaging in its path the core of the solenoid when projecting and clearing the same when retracted, the solenoid carried by a lever included in the tripping mechanism, whereby the failure of the sheet to register at any one of the gages moves the solenoid core to its projected position in the path of the said moving part thus automatically actuating the tripping mechanism.

8. In a printing press including the usual cooperating cylinders, tripping mechanism and front and side sheet-registering gages, the combination of electric circuits corresponding in number to the gages, a solenoid common to all the circuits, a detector finger included as a switch in each of the circuits and disposed adjacent one of the gages, the detector finger arranged to be actuated by the sheet in the act of being registered, and a moving part of the press engaging in its path the core of the solenoid when projecting and clearing the same when retracted, the solenoid carried by a lever included in the tripping mechanism, whereby the failure of the sheet to register at any one of the gages moves the solenoid core to its projected position in the path of the said moving part thus automatically actuating the tripping mechanism, and electro-magnetic means under the control of each of the detector fingers to indicate to the pressman the particular gage at which such failure to register occurs.

9. In a printing press including the usual cooperating cylinders, tripping mechanism, and front and side sheet-registering gages, the combination of electric circuits corresponding in number to the gages, a solenoid common to all of the circuits, a detector finger in each of the circuits disposed adjacent one of the gages and arranged to be actuated by the sheet in the act of being registered to open its circuit, and a moving

part of the press engaging in its path the core of the solenoid when energized and clearing the same when deenergized, the solenoid carried by a lever included in the tripping mechanism, whereby the failure of the sheet to register at any one of the gages maintains a circuit through the magnet and automatically actuates the tripping mechanism.

10 10. In a printing press including the usual cooperating cylinders, tripping mechanism and front and side sheet-registering gages, the combination of electric circuits corresponding in number to the gages, a solenoid
15 common to all of the circuits, a detector finger in each of the circuits disposed adjacent one of the gages and arranged to be actuated by the sheet in the act of being registered to open its circuit, a moving part
20 of the press engaging in its path the core of the solenoid when energized and clearing the same when deenergized, the solenoid carried by a lever included in the tripping mechanism, whereby the failure of the sheet
25 to register at any one of the gages maintains a circuit through the magnet and automatically actuates the tripping mechanism, and an annunciator also included in each of the circuits, whereby the locus of the failure
30 to register at any one of the gages will be indicated to the pressman.

11. In a printing press including sheet register gages for normal and auxiliary delivery, means to automatically trip the press
35 and deliver the sheet at the auxiliary delivery upon failure of the sheet to register at any one of the gages, and means to indicate to the pressman the particular gage at which such failure occurs, said indicating means
40 comprising a normally open electric circuit for each gage including an annunciator, each of said circuits arranged to be closed upon the failure of the sheet to register at its particular gage.

45 12. In a printing press including the usual

cooperating cylinders, tripping mechanism and sheet-registering gages, the combination of electric circuits corresponding in number to the gages, a magnet common to all of the circuits, a detector finger in each
50 of the circuits disposed adjacent one of the gages and arranged to be actuated by the sheet in the act of being registered to open its circuit, and a moving part of the press engaging in its path an element of the trip-
55 ping mechanism when the magnet is energized and clearing the same when the magnet is deenergized, whereby the failure of the sheet to register at any one of the gages maintains a circuit through the magnet and
60 automatically actuates the tripping mechanism.

13. In a printing press including the usual cooperating cylinders, tripping mechanism and sheet-registering gages, the combination
65 of electric circuits corresponding in number to the gages, a magnet common to all of the circuits, a detector finger in each of the circuits disposed adjacent one of the gages and arranged to be actuated by the sheet in the
70 act of being registered to open its circuit, a moving part of the press engaging in its path an element of the tripping mechanism when the magnet is energized and clearing the same when the magnet is deenergized,
75 whereby the failure of the sheet to register at any one of the gages maintains a circuit through the magnet and automatically actuates the tripping mechanism, and an annunciator also included in each of the cir-
80 cuits, whereby the locus of the failure to register at any one of the gages will be indicated to the pressman.

In testimony whereof I have hereunto signed my name in the presence of two sub-
85 scribing witnesses.

JOSEPH R. BLAINE.

Witnesses:

A. G. FISCHER,

ARTHUR G. JACOBSON.