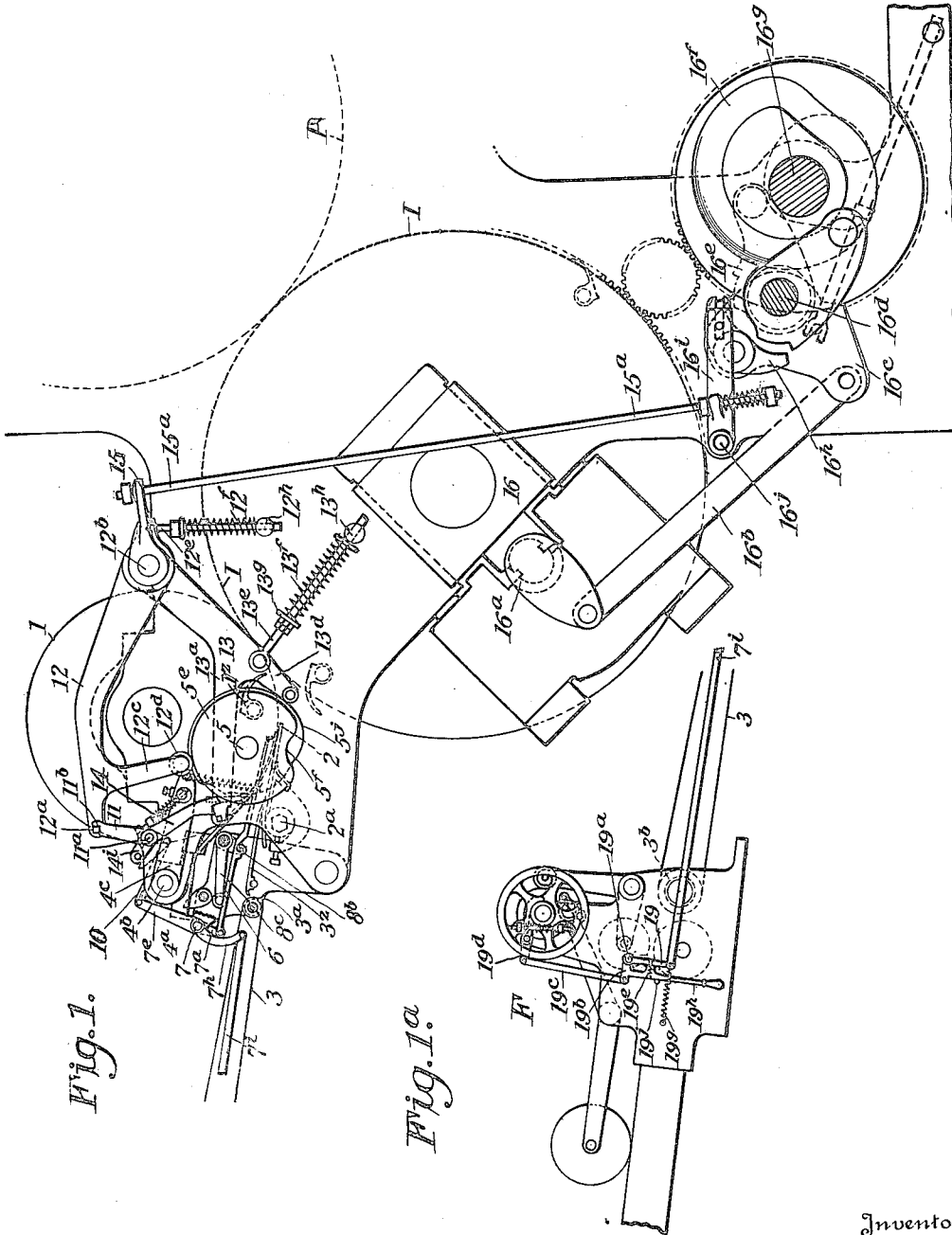


1,305,181.



Witnesses

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SHEET FEEDING AND CONTROLLING APPARATUS.
APPLICATION FILED JAN. 2, 1917.

1,305,181.

Patented May 27, 1919.
4 SHEETS—SHEET 2.

Fig. 2.

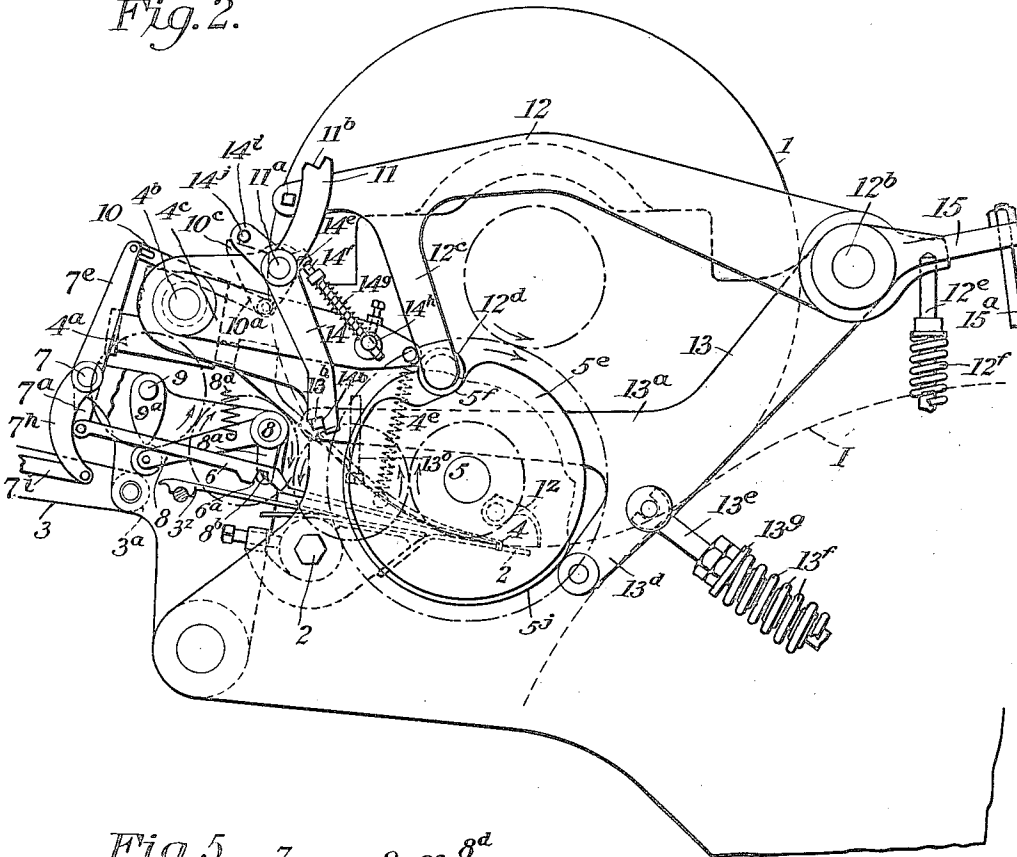


Fig. 5.

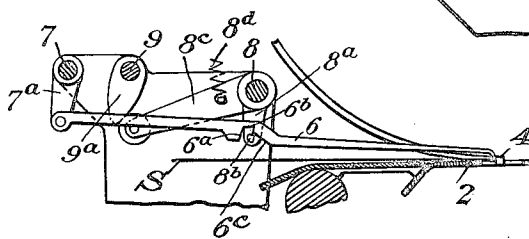
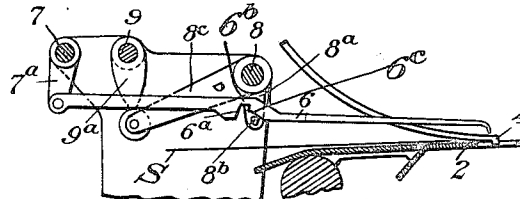


Fig. 6.



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4 SHEETS—SHEET 3.

1,305,181.

Fig. 3.

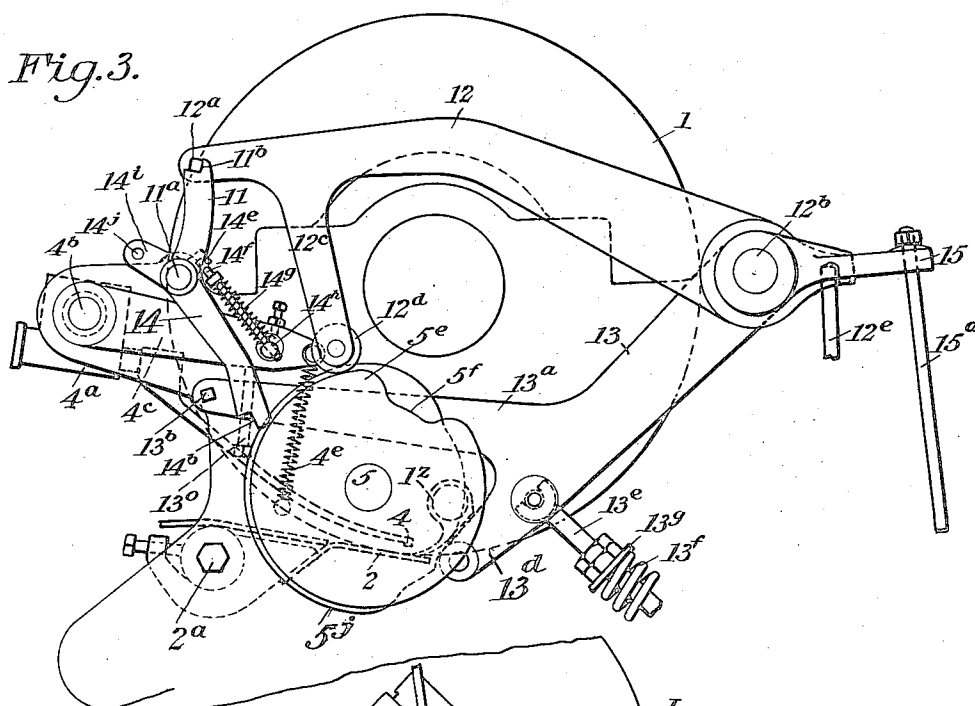
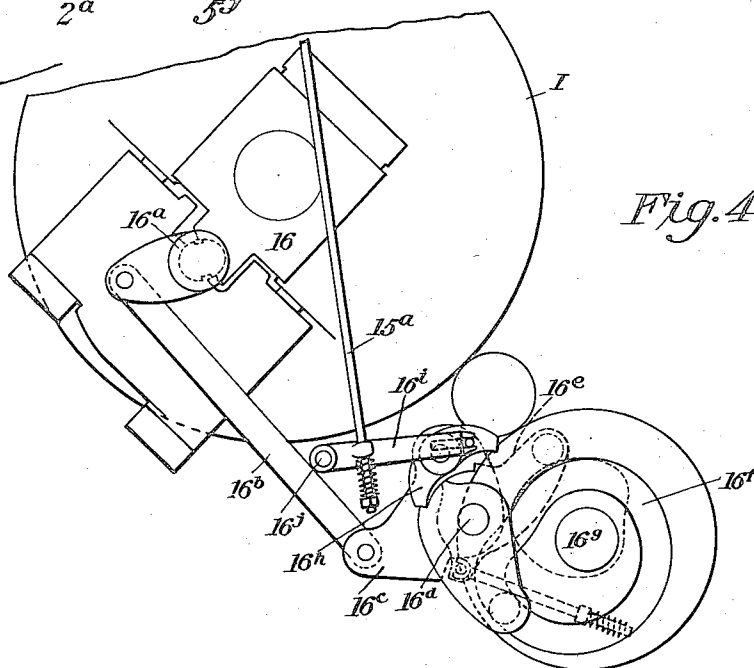


Fig. 4.



Witnesses

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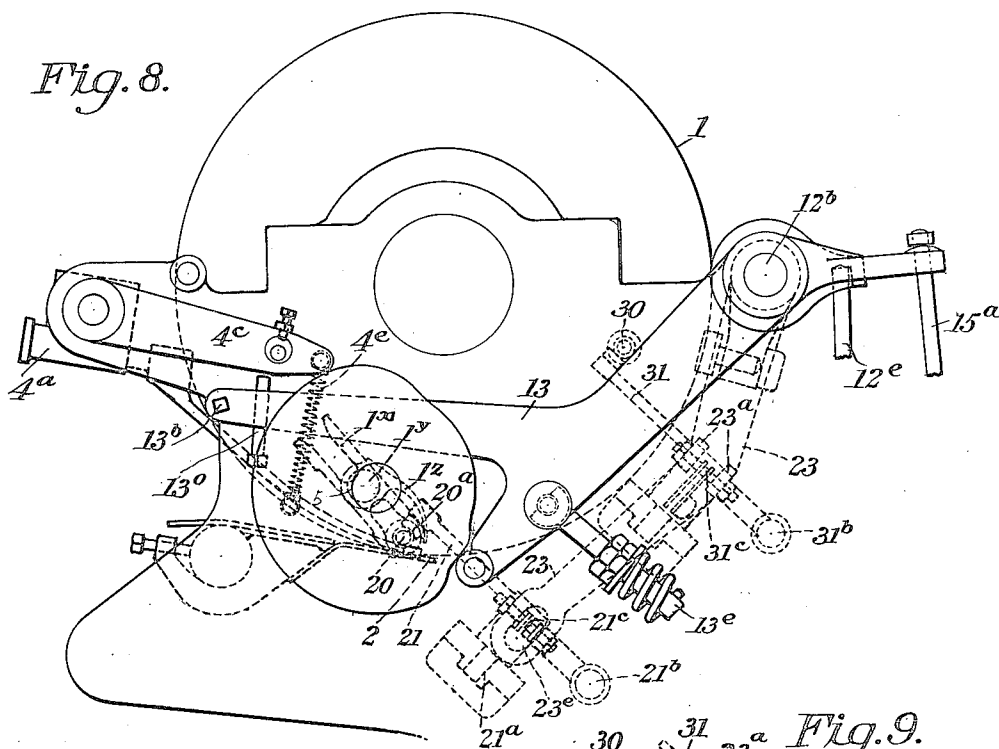
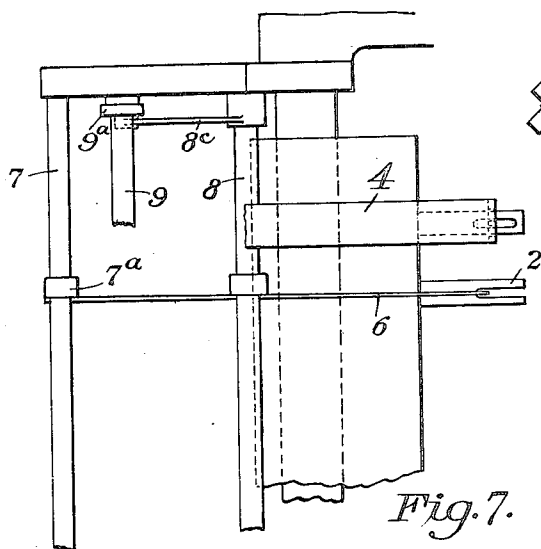
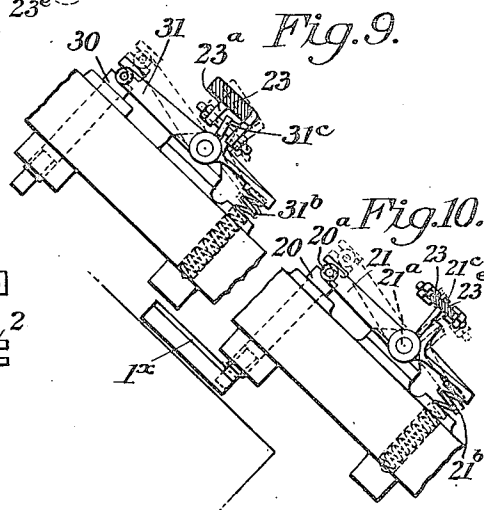
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Fig. 8.



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UNITED STATES PATENT OFFICE.

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TO CROSS PAPER FEEDER COMPANY, OF PORTLAND, MAINE, A CORPORATION OF
MAINE.

SHEET FEEDING AND CONTROLLING APPARATUS.

1,305,181.

Specification of Letters Patent.

Patented May 27, 1919.

Application filed January 2, 1917. Serial No. 140,129.

To all whom it may concern:

Be it known that I, BURT F. UPHAM, a citizen of the United States, residing at Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Sheet Feeding and Controlling Apparatus; and I hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, which form part of this specification.

This invention is a novel improvement in automatic sheet feeding and controlling mechanisms particularly designed for use with and in sheet printing presses.

The principal object of the invention is to enable sheets to be automatically fed to a printing press or other operating mechanism, and to prevent defective or misplaced sheets detected by the detectors when fed up to the point where they should be taken by such press or operating mechanism being delivered thereto or taken thereby; and, to accomplish this, the invention provides means whereby when an imperfect or misplaced sheet is detected by the automatic mechanism, the feeding of following sheets will be automatically suspended, the further advance of such imperfect or misplaced sheet will be arrested, the grippers on the taking reel or cylinder will be rendered ineffective to take such sheet, and the impression will be thrown off during the time that such detected sheet should have been printed all without necessarily stopping the main heavy portions of the feeding and printing mechanisms going through their cycle of movements, but rendering such movements ineffectual until the defective sheet is removed or the misplaced sheet properly positioned.

The invention further provides that in case a perfect but misplaced sheet is detected the press and feed of sheets will be suspended and the further progress of such misplaced sheet arrested, but if such sheet is thereafter automatically or manually properly positioned at the taking point, the feed of sheets will be automatically resumed, and the other sheet controlling and handling mechanisms of the machine automatically permitted to perform their proper

functions and handle such sheet and like following sheets.

The invention therefore includes means whereby if either a misplaced or defective sheet is fed it will be detected, and thereupon the feed of following sheets will be suspended; also such sheet will be arrested by gages or stops interposed in its path; also the cylinder grippers will be rendered ineffective to take such sheet; also the impression will be thrown off. In case of a defective or imperfect sheet it is necessary for the operator to remove such defective sheet from the table before the feed of sheets is again started; but in case of a perfect sheet, misplaced or out of register, such sheet may be adjusted or properly positioned automatically or manually without removing it from the table or tapes, and when so positioned the detectors will permit such sheet to pass and it will be automatically put through the machine and printed and the feeding of sheets automatically resumed. Such automatic taking and printing of perfect sheets after properly positioning them avoids the waste of perfect sheets of paper and loss of time which has been and would be caused if perfect but misplaced sheets had to be withdrawn from the feed table or tapes.

I will explain one practical embodiment of the invention, illustrated in the accompanying drawings, to enable those skilled in the art to more readily comprehend and understand the same; and the general applicability and utility thereof; but I do not consider the invention restricted to the specific construction of parts illustrated, and refer to the appended claims for summaries of the essential features of the invention and novel combination of parts therein for which protection is desired.

In said drawings:

Figures 1 and 1^a conventionally illustrate a side elevation of the feeding mechanism of a printing press showing one embodiment of the invention, and showing the parts in normal working position ready for the feed of a sheet.

Fig. 2 is a similar enlarged view showing the positions assumed by the parts when the detectors find an imperfect or misplaced sheet.

Fig. 3 is a detail view similar to Fig. 2 but showing the position assumed by the parts when the detectors have found a perfect sheet.

Fig. 4 is a detail view of the devices for throwing the cylinder on and off impression, the impression being thrown off.

Fig. 5 is an enlarged detailed view showing the detector fingers resting on sheet S.

Pin 8^b has finished about half its forward stroke and is about to engage surface 6^c and raise detector fingers.

Fig. 6 is a similar view showing the position of the detecting fingers at the end of a detecting operation after a proper sheet has been fed.

Fig. 7 is a detail plan view of part of Fig. 5.

Fig. 8 is a detail view illustrating the devices for controlling the reel grippers.

Figs. 9 and 10 are detail views showing the reel tumbler pins in operative position in full lines, and in inoperative position in dotted lines.

In the embodiment of the invention illustrated in the drawings 1 represents a feed reel or cylinder adapted to transfer sheets from the sheet feeding devices to the impression cylinder I.

The machine as shown has sheet feeding mechanism F; an impression cylinder I, a plate cylinder P, a transfer reel 1 adapted to receive sheets from a table or tapes 3 over which they are transferred from the feeder F to the reel 1.

The feed reel 1 is provided with suitably operated grippers 1^a adapted to take sheets from the fingers 2 on the inner end of the sheet feeding devices; these fingers 2 may be adjustably mounted on the shaft or rod 2^a in the usual manner. The sheets are fed forward to these fingers preferably by means of tapes 3 running over a roller 3^a adjacent the fingers 2 and roller 3^b adjacent the automatic feeder. Said tapes being adapted to carry sheets fed forward from the automatic feeder in the usual manner to the reel 1. Any suitable automatic sheet feeding mechanism may be used to deliver sheets onto the forwarding tapes 3 and the sheets may be directed from the tapes onto fingers 2 by usual bridge pieces 3^c.

The leading edges of the sheet are adapted to be arrested by gages 4 (which may be of usual type) in position to be taken by the grippers of the feed reel. As shown the sheet stops or gages 4 are adjustably connected to castings 4^a strung upon a shaft 4^b on which any suitable number of the gages may be mounted. The shaft 4^b is rocked at the proper time to raise and lower the gages by means of an arm 4^c operated as hereinafter described so that at the proper time during the rotation of the reel, the gages 4 will be held in raised or lowered positions.

Detector fingers 6 are pivotally connected at their rear ends to arms 7^a on a rock shaft 7 suitably mounted in the framing of the press; and said rock shaft is returned to and yieldingly held in normal position.

The forward end of the fingers 6 are adapted to rest upon the sheets of paper fed over the fingers 2, which fingers are preferably slotted. If a sheet is properly positioned the free ends of these fingers will rest on and slide upon the sheet in the usual manner, but if a sheet is missing or defective, the free ends of the fingers will drop and this will cause the tripping of the sheet stop, the feed and the throw-off mechanisms hereinafter explained.

Each detector finger 6 is provided with a notch 6^b on its under side, this notch having its outer and longer side 6^a inclined or beveled as shown (Figs. 5 and 6) and said notch is adapted to be engaged by a pin 8^b on an arm 8^a attached to a rock shaft 8 mounted in the framing. The bottom and inner edge of the notch 6^b is adapted to be engaged by the pin 8^b if the free ends of the detector fingers 6 are allowed to drop below the plane of a sheet on fingers 2; by the absence of a sheet, or the presence of a defective or improperly positioned sheet, on the fingers 2 as hereinafter explained.

The shaft 8 is rocked so as to swing the pin 8^b back and forth once for each rotation of the impression cylinder. As shown (Figs. 5 and 6) an arm 8^c on the shaft 8, preferably carrying a roller, is adapted to be engaged by a cam 9^a on the shaft 9; and this shaft 9 is rotated by any suitable means, as gearing indicated in dotted lines in Fig. 2, so as to turn in unison with the impression cylinder I. The arm 8^c may be held in contact with the cam 9^a by means of a spring as 8^d arranged at any convenient point. This spring normally tends to rock shaft 8 so as to swing arm 8^a and cause pin 8^b to engage and raise the detector fingers, as indicated in Figs. 5 and 6.

If the fingers 6 should find an imperfect or misplaced sheet, or there should be no sheet present, the detector fingers would move downward causing the pin 8^b to engage the notch 6^b, and such engagement would cause shaft 7 to be rocked, and such rocking of the shaft 7 will, through connections hereinafter described, stop the automatic feed of sheets, and also through connections hereinafter described release the mechanism for throwing off the impression; also will cause the gages or sheet stops to remain in the path of the sheet; and also will prevent the reel grippers taking the sheet so that if no sheet is delivered to the impression surface of the impression cylinder such surface will not be printed upon.

When a sheet is being fed down toward the guides, the detector fingers 6 are lifted

from the path of the sheet, as the arm 8^c is then engaged with the low part of the cam 9^a. When the sheet gets to the drop guides 4, lever 8^a starts moving inward (to-
 5 ward the drop guides) thus allowing surface 6^a on the detector finger to follow up pin 8^b; and as the arm 8^a moves inward detector fingers 6 drop on the sheet. If a perfect sheet is properly positioned at the
 10 drop guides, the detector fingers will rest on said sheet for part of the time required for the forward movement of lever 8^a until pin 8^b engages the surface 6^c of the detector fingers, (Fig. 5) thereby lifting said fingers
 15 (see Fig. 6). Upon completion of its inward stroke arm 8^a immediately starts backward, by means of spring 8^d, and during this movement backward the detector fingers will
 20 again be lifted by the pin 8^b engaging surface 6^a (Fig. 1). This backward moving of the pin 8^b occurs while the sheet S is still at the drop guides.

The reel grippers 1^z are timed to take the sheet after the backward movement of
 25 lever 8^a has lifted the detector fingers 6. The fingers 6 are then upheld until the next sheet comes down to the drop guides 4 during the time that the cam lever 8^c is against the low part of cam face 9^a.

30 In the construction illustrated the shaft 7 carries an arm 7^e which has a pin and slot engagement with one end of a link 10, the other end of which link is pivotally connected to one arm 10^a (Figs. 1-2) of an oscillating lever loosely mounted on a stub
 35 shaft 11^a mounted in the framing. On shaft 11^a is fixed a catch lever 11 having a notch 11^b in its upper end, which notch when the parts are in normal position as in Fig. 1,
 40 engages a pin 12^a on a lever 12, which is mounted loosely on a shaft 12^b, journaled in the framing of the machine adjacent the reel. This lever 12 has an arm 12^c, preferably carrying a roller 12^d, that engages with
 45 a cam 5^e fast to a stub shaft 5, journaled in the framing, and said cam is provided with a depression or notch 5^f which passes the arm 12^c once during each rotation of the impression cylinder.

50 The lever 12 may be normally depressed so as to keep roller 12^d in contact with cam 5^e by suitable means. As shown the lever 12 projects in rear of the shaft 12^b, and the rear end of this lever is connected to a
 55 rod 12^e which is normally pressed upward by means of a spring 12^f interposed between a washer on this rod and a guide stud 12^h, on the framing (Fig. 1) with which stub the free end of the rod is slidably engaged.

60 An arm 15 is fixed to, or forms part of lever 12; said arm 15 is loosely engaged with the upper end of a rod 15^a that controls the dog of the throw off mechanism, hereinafter explained, said dog being nor-
 65 mally held in such position, (see Fig. 1) that

the impression will remain on unless the lever 12 is rocked so as to cause rod 15^a to trip the throw off mechanism as hereinafter explained.

On the shaft 12^b is fixed a lever 13 which 70 has an arm 13^a extending beside the cam 5^e and having on its forward end a pin 13^b which is adapted to engage a notch 14^b in a latch arm 14 fast to the shaft 11^a. The lever 13 has an arm 13^d preferably carrying 75 a roller which engages with a cam 5^j on shaft 5, and rotating in unison with the impression cylinder I. The lever 13 is normally pressed so as to engage arm 13^d with cam 5^j by means of a rod 13^e on which are 80 strung expansion springs 13^f, interposed between an adjustable washer 13^g on rod 13^e and a guide stud 13^h on the frame, with which the free end of the rod 13^e slidably engages. When the latch 14 is engaged with 85 the pin 13^b, as indicated in Fig. 2, the springs 13^f are held under compression and lever 13 cannot be moved by said springs even though the low part of the cam 5^j should come opposite the arm 13^d; but when latch 90 14 is disengaged from pin 13^b (Figs. 1 and 3) then lever 13 will be swung upward by spring 13^f, when the low part of the cam 5^j comes opposite arm 13^d.

The latch 14 has a short arm 14^e which 95 is engaged by rod 14^f guided in a slotted stud 14^h attached to the framing. An expansion spring 14^g is strung on this rod between the stud 14^h and washers on rod 14^f so as to normally tend to swing the latch 14 100 in a direction out of engagement with pin 13^b.

On the shaft 11^a is an arm 14ⁱ, which may be part of latch 14, provided with a pin 14^j which extends opposite and is adapted to be 105 engaged by the arm 10^c of the lever 10^a when the latter is actuated by the outward throw of the lever 7^e (see Figs. 1 and 2).

The arm 4^e is adapted to be operated by the arm 13^a of lever 13 when the latter is 110 permitted to be raised by the spring 13^f. As shown a bolt 13^g (Fig. 8) is tapped through arm 13^a in position to engage arm 4^e and raise the latter, as indicated in Fig. 3, when the latch 14 is disengaged from the 115 pin 13^b, thereby lifting the gages 4. The arm 4^e may be normally held down, and returned to normal position so as to lower the gages, by means of a spring 4^e connected to said lever and to a fixed point on the 120 frame, as indicated in the drawings.

The shaft 5 may be rotated by suitable means, (as gearing indicated in dotted lines in Fig. 2) so as to rotate cams 5^e and 5^j uniformly with the impression cylinder I. 125

When the parts are in normal operative position (Fig. 1) the lever 12 is upheld by the latch 11; while the lever 13 is free from the latch 14.

To shaft 7 is connected an arm 7^a, which is 130

connected by a rod 7ⁱ to an arm 19, pivoted on a stud 19^a on the frame of the automatic feeder (Fig. 1^a). A lever 19^b is loosely mounted on stud 19^a, and is held against lever 19 by the pressure of spring 19^c connected to lever 19 and 19^c. To lever 19^a is pivotally connected a link 19^e, which is also connected to the control lever 19^d of the automatic sheet feeding devices, which may be of any suitable construction provided that if the lever 19^d is shifted by the rocking of shaft 7, the automatic feeder will be either stopped or thrown out of effective operation and the feed of sheets will be suspended. A spring 19^f is connected to lever 19 and to a pin in the feeder frame, and will cause resetting of shaft 7 and hold same in normal position. On lever 19^b is a handle 19^h which stops against a pin 19ⁱ on the frame of the feeder which pin 19ⁱ also acts as a stop to limit the return movement, or normal position, of shaft 7.

When shaft 7 returns to normal position, control lever 19^d is rocked into its normal operative position, which, if maintained, will cause the sheet feeder to be thrown into effective action at the proper time. The movement of these parts is timed so that just before the feeder is again put into effective operation to feed sheets, the detector fingers 6 move inward and feel for a sheet, and if they find a sheet is properly at the drop guides, the feeder will be allowed to be thrown in action. If a sheet is not properly at the drop guides, shaft 7 will be again rocked as above described and control lever 19^d will be again moved to such position that the feed of sheets will be suspended, although the major parts of the feeder may continue to go through their motions ineffectively.

As shown in Figs. 1 and 2 the impression cylinder is journaled in sliding boxes 16 which can be raised and lowered by cams 16^a in the usual manner. Cam 16^a is operated by a link 16^b connected to a lever 16^c pivoted on a stud 16^d, on which is also pivoted a lever 16^e which is oscillated by means of a rotary cam 16^f on a shaft 16^g. Lever 16^e is adapted to be engaged by a dog 16^h pivoted on the lever 16^c but this dog is normally held disengaged from the lever 16^e by means of a slotted lever 16ⁱ pivoted at 16^j and yieldably connected to the lower end of the rod 15^a. This throw off mechanism may in general be constructed and operated as shown and described in my Patent No. 1,087,055 dated February 10, 1914, and as the particular construction thereof is not a feature of the present invention further detailed description thereof is unnecessary herein.

If the detector fingers should find an imperfect or misplaced sheet and therefore trip the mechanism as above described it is

desirable that the reel grippers should be prevented from closing upon the sheet lying on the fingers 2. Any suitable means may be provided which will prevent the closing of the gripper fingers in case a sheet is not in position to be taken thereby or is imperfect, such means however being controlled by the detector mechanism.

As shown in Figs. 8-10 the reel gripper fingers 1^z are mounted as usual on a rocking shaft 1^y provided with a tumbler 1^x. The tumbler 1^x is adapted to be engaged at the sheet taking point (to close the grippers) by a pin 20 slidably mounted in the framing adjacent one end of the reel. Said tumbler is also adapted to be engaged (to open the grippers) at the point where the reel transfers the sheet to the impression cylinder I, by means of a pin 30, also slidably mounted in the framing.

The closing tumbler pin 20 has a groove 20^a in its outer end (see Figs. 9-10) which is engaged by one end of a rocking lever 21 pivoted at 21^a and having its opposite end engaged by spring 21^b which normally tends to press pin 20 inward in position to engage the tumbler 1^x and at the proper time cause the grippers 1^z to close on the sheet. Lever 21 has a finger 21^c which is adapted to be engaged with a bifurcation or slot 23^e in a lever 23 attached to shaft 12^b. If this lever 23 is moved in one direction it will rock lever 21 and cause it to withdraw pin 20 out of the path of the tumbler 1^x so that said tumbler would not be tripped and the grippers not closed in case a sheet was not properly presented for them to take from the fingers 2. The tumbler pin 30 is similarly engaged and operated by a lever 31 (see Fig. 9) controlled by a spring 31^b and having a short arm 31^c which is engaged in a slot or between lugs, 23^a on lever 23 (see Fig. 9). The construction is such that the pins 30 will be properly thrown into or out of operative positions by the movement of lever 23. Said lever 23 is normally operated so that the pins 20 and 30 will be engaged at the proper time by the tumbler 1^x and cause it to properly operate the reel grippers so long as the parts are operating normally. But when the parts are tripped as described by the action of the detector devices then lever 23 is stopped so as to hold both pins 20 and 30 out of operative position.

Lever 13^d follows cam 5ⁱ each revolution, causing shaft 12^b to rock once for each revolution of the impression cylinder, unless pin 13^b is engaged with latch 14. Lever 23, Fig. 8, is fixed to shaft 12^b and rocks once for each revolution of the impression cylinder, unless pin 13^b engages notch 14^b in latch arm 14. When the press is running normally, lever 23 rocks once for each revolution of the impression cylinder and is timed so that tumbler pins 20 and 30 are moved

into their respective operative positions, thereby allowing tumbler 1^x to engage the pins at the proper times. If pin 13^b engages notch 14^b, (which is caused by detector fingers not finding sheets at the drop guides 4) lever 13 cannot follow cam 5^j, thereby causing shaft 12^b to remain inactive, which prevents lever 23 from operating tumbler pins 20 and 30. The result is that tumbler 1^x does not engage the pins, thereby preventing grippers 1^z from closing.

The parts are shown in normal position in Fig. 1, and in such case the lever 12 is upheld by engagement with arm 11, and lever 13 is free to vibrate, but is controlled by engagement of the arm 13^d with cam 5^j.

When the press is first put in operation there is no sheet lying on the tapes of the feeding machine; therefore there is no sheet at the drop guides 4. When the detector fingers drop to feel for a sheet, they find none, thereby causing the press to trip as above described and the feeder to remain ineffective. It is necessary, therefore, to have a sheet fed to the drop guides. That is done by the operator holding handle 19^a against pin 19ⁱ (see Fig. 1^a) which in turn holds lever 19^d in such a position that the sheet feeder becomes effectively operative and a sheet is thus fed down to the drop guides 4. The operator may then release handle 19^a.

If perfect sheets are properly fed against the gages 4 the detector fingers will not operate shaft 7, consequently lever 12 will remain raised, and be held raised by the arm 11 while the dwell 5ⁱ in cam 5^e is passing arm 12^c, and arm 13 will be rocked by the action of spring 13^f and cam 5^j so as to vibrate for each rotation of the cam or reel 1. At the proper time in the revolution of reel 1 cam 5^j permits the upward movement of lever 13 by spring 13^f and pin 13^e engages arm 4^e and lifts the gages 4 out of the path of the sheet which is to be taken by the grippers on the reel 1 and transferred therefrom at the proper time to the grippers on the impression cylinder I; and the impression remains on and the feed of sheets continues in regular sequence.

If however an imperfect or misplaced sheet is found by the detector fingers, the shaft 7 is rocked by the positive cam-actuated movement of the detector fingers, as above described, thereby stopping the feed and simultaneously, (through arm 7^e and link 10) disengaging arm 11 from lever 12, (as in Fig. 2) and through lever 10 rocking shaft 11^a so as to move arm 14 into position to engage pin 13^b and lock lever 13 so that it cannot be shifted by the spring 13^f when arm 13^d comes opposite the low portion of the cam 5^j, therefore as arm 13 cannot rise the gages 4 remain down; and the tumbler pin 20 is prevented from moving into an operative position as it is held out of path of

tumbler by lever 23 which does not move when arm 13 is engaged by latch 14; which also will hold lever 23 and tumbler pins in position to keep the cylinder grippers from closing. Lever 12 will drop because arm 12^c can then enter the low portion 5ⁱ of cam 5^e and when lever 12 drops it raises arm 15, which through rod 15^a and its connections shifts dog 16^b so that it engages rocking lever 16^d and thereby causes the latter to actuate lever 16^e and through cylinder 1 throw off impression as above described, see Fig. 4; cam 5^e will lift lever 12 at each revolution; but unless the parts have been restored to normal position, and sheets are properly taken by the reel, the impression will be again thrown off at the proper time during each revolution of the impression cylinder, until lever 12 is again upheld by the engagement of arm 11 with pin 12^a, which will not occur until a sheet is properly positioned.

At each cycle of operation of the parts the detector fingers 6 feel for a sheet, and if the sheet is perfect and is properly positioned against the drop guides 4, the detector fingers 6 lie idly on the sheet over the slots in fingers 2 and the shaft 7 is not rocked, and therefore the press is not tripped and the feeder remains in action.

If a sheet, being fed to the drop guides, is defective, or a perfect sheet is for some reason delayed or misplaced so that its front edge is not properly positioned against the drop guides 4; then when arm 8^a starts its forward movement and allows the detector fingers 6 to drop, such fingers will drop below the plane of the sheet into the slots in the fingers and pin 8^b will engage notch 6^b, (see Fig. 2) thereby pulling detector fingers 6 forward and rocking shaft 7, and causing the press to trip, and the feeder to be thrown out of action, as hereinbefore explained.

Immediately after the detector fingers are pulled forward, they start to return to normal position, allowing shaft 7 to reset to its normal position, which, if maintained, will allow the feeder to automatically become operative, and the press automatically resume printing. To enable shaft 7 to remain in its normal position, the sheets must be properly fed to the guides 4 and if a sheet is defective, or is delayed or misplaced for some reason, the detectors will again cause the rocking of shaft 7, and render the press and feeder ineffective as described above.

An important feature of the invention is that if in any following cycle of operations a perfect but misplaced sheet is properly positioned against the guides by the friction of the tapes, or otherwise, the detectors, when next feeling for the sheet, will find it in position and allow the drop guides on the press to lift and the press grippers to take the sheet. This condition also allows the feeder to become automatically operative, so that on

the next cycle of the machine there will be a sheet fed to the drop guides. As long as the sheets are fed to the drop guides correctly, the feeder and press will remain in operation, as shaft 7 will not rock.

After the press and feeder have been tripped, as above described, (the parts being then in the position indicated in Fig. 2) if a perfect sheet should be automatically fed and properly positioned, either automatically or manually, against the stops or gages 4 the detector fingers will, during the next cycle of operations, find such sheet and just before the time that it should be taken, cam 5ⁱ engages arm 13^d and puts such compression on spring 13^f as will relieve pressure of pin 13^b on latch 14; and also the cam 5^d will at the same time raise lever 12 so that there is practically nothing to prevent the rocking of shaft 11^a; simultaneously the shaft 7 will be returned to normal position under the action of spring 19^e so as to throw the feeder in operation, arm 14 will be disengaged from pin 13^b by the action of spring 14^e, and arm 11 will be thrown into position to engage pin 12^a; so that the parts will resume their normal positions as shown in Fig. 1; and thereupon, at the proper time in the revolution of reel 1, the gages 4 will be raised, the lifting of lever 13^e permitted by cam 5ⁱ, and such perfect sheet will be taken by the reel grippers and printed and the press automatically perform its feeding and printing operations on perfect sheets.

If instead of a defective sheet the detectors had found a misplaced but otherwise perfect sheet they would trip the mechanisms as above described, causing automatic stopping of the feed, throwing off of impression, preventing the reel grippers taking such misplaced sheet, and allowing the stops or gages to remain in the path of the sheet and prevent its advance; although the major parts of the press and feeder continue to ineffectively go through their cycle of operations.

Under the combing action of the tapes 3, or jarring of the press, the misplaced perfect sheet may be properly positioned against the gages, (or the operator may manually properly position such sheet against the gages) and as soon as such perfect but misplaced sheet is properly positioned (either automatically or manually) the detector fingers will during the next cycle of operations find such sheet and be upheld so that as a result shaft 7 will not be rocked by the pull on the fingers; consequently the feed will be automatically started into operation, the gages will be raised at the proper time to permit such sheet to be taken by the reel grippers, the tumbler pins will be automatically properly positioned to engage and operate the reel grippers at the proper time and the

press will be thrown on and the sheet properly printed. All the operator has to do if the sheet is merely misplaced is to see that such misplaced sheet is properly positioned whereupon both the printing mechanism and feeder will automatically resume their operation; and if a perfect misplaced sheet is properly positioned by the action of the mechanism the machine will automatically resume and perform its printing and feeding functions without any attention on the part of the pressman.

With this invention the loss of perfect but misplaced sheets is prevented; the loss of time caused by the necessity of removing a misplaced perfect sheet is obviated; the loss of time heretofore required to manually restart the feeder because a misplaced sheet had to be removed is obviated; and a press equipped with this invention will practically only require manual attention in case defective sheets should be fed.

From the foregoing it will be seen that the press is automatically controlled by the presence or absence of a properly positioned perfect sheet. If an imperfect sheet is presented the detector fingers will find it and will through the described connections automatically stop the feed; also permit the guides or stops 4 to remain in the path of the sheet and prevent its forward movement beyond the registering point, also render the reel grippers ineffective to take the sheet from the table; also trip the throw off mechanism so that the related impression surface will not be printed; and such conditions will be maintained until the imperfect sheet is removed from the table. After such imperfect sheet has been removed the operator by throwing hand lever 19^h over against pin 19^j can start the feed in operation as above described; and if a perfect sheet is properly fed the press will resume its normal automatic cycle of operations.

What I claim is:

1. In combination mechanism for operating upon sheets; means for feeding sheets thereto; and means whereby upon the presentation of a misplaced or defective sheet the feed of sheets is automatically suspended; with means whereby upon proper presentation of a perfect sheet the feed of sheets is automatically resumed.

2. In combination sheet printing mechanism; means for feeding sheets to said printing mechanism; and co-acting means whereby upon the presentation of a misplaced or defective sheet the feed of sheets is automatically suspended; with means whereby upon proper presentation of a perfect sheet the feed of sheets is automatically resumed.

3. In combination mechanism for operating upon sheets; means for feeding sheets thereto; means whereby upon the presentation of a misplaced or defective sheet the ad-

vance of such sheet is prevented and the feed of sheets is automatically suspended; and means whereby upon subsequent proper presentation of a perfect sheet the feed of sheets is automatically resumed.

4. In combination sheet printing mechanism; means for feeding sheets to said printing mechanism; means for arresting sheets; and co-acting means whereby upon the presentation of a misplaced or defective sheet the feed of sheets is automatically suspended and such sheet arrested; with means whereby upon proper presentation of a perfect sheet the feed of sheets is automatically resumed.

5. In combination mechanism for operating upon sheets; means for feeding sheets thereto; and means whereby upon the presentation of a misplaced perfect sheet the feed of sheets is automatically suspended; with means whereby when such misplaced sheet is properly positioned the feed of sheets is automatically resumed and such sheet operated upon.

6. In combination sheet printing mechanism; means for feeding sheets to said printing mechanism; and co-acting means whereby upon the presentation of a misplaced perfect sheet the feed of sheets is automatically suspended; with means whereby when such misplaced sheet is subsequently properly positioned, the feed of sheets is automatically resumed and the mechanism permitted to print such sheets.

7. In combination sheet printing mechanism having throw off devices; means for feeding sheets to said printing mechanism; and co-acting means whereby upon the presentation of a misplaced or defective sheet the feed of sheets is automatically suspended and the impression is thrown off; with means whereby when a misplaced perfect sheet is subsequently properly positioned the feed of sheets is automatically resumed and the mechanism permitted to print such sheets.

8. In combination mechanism for printing on sheets; means for feeding sheets to such mechanism; means for detecting defective or misplaced sheets; and co-acting means whereby upon the presentation of a misplaced or defective sheet the feed of sheets is automatically suspended, such sheet is arrested and the taking of such sheet by said mechanism is prevented; with means whereby when the feed is suspended because of the presence of a misplaced perfect sheet and such sheet is subsequently properly positioned the feed of sheets is automatically resumed and the mechanism permitted to print such sheet.

9. In combination sheet printing mechanism having throw off devices; means for feeding sheets to said printing mechanism; and co-acting means whereby upon the presentation of a misplaced or defective sheet

the feed of sheets is automatically stopped, and the impression is thrown off; with means whereby upon presentation of a properly positioned perfect sheet the feed of sheets is automatically restarted and the printing mechanism permitted to print such sheet.

10. In combination mechanism for operating upon sheets including a member having grippers; means for feeding sheets thereto; and co-acting means whereby upon the presentation of a misplaced or defective sheet the feed of sheets is automatically stopped and the grippers on said member are rendered ineffective to take such sheet; with means whereby upon subsequent presentation of a properly positioned sheet the feed of sheets is automatically resumed and the grippers rendered effective to take such sheet.

11. In combination mechanism for operating upon sheets including a member having grippers; means for feeding sheets thereto; sheet arresting devices; and co-acting means whereby upon the presentation of a misplaced or defective sheet the feed of sheets is automatically stopped and such sheet is arrested and the grippers on said member are rendered ineffective to take such sheet; with means whereby upon subsequent presentation of a properly positioned sheet the feed of sheets is automatically restarted, and the grippers permitted to take such sheet.

12. In combination sheet printing mechanism; means for feeding sheets to said printing mechanism; a sheet stop; and co-acting means whereby upon the presentation of a misplaced or defective sheet the feed of sheets is automatically stopped, said stop arrests the sheet, and the taking of such sheet by the printing mechanism is prevented; with means whereby upon presentation of a properly positioned sheet the feed of sheets is automatically restarted, the stop withdrawn, and the printing mechanisms permitted to take such sheets.

13. In combination sheet printing mechanism having throw off devices; means for feeding sheets to said printing mechanism; means for arresting sheets; and co-acting means whereby upon the presentation of a misplaced or defective sheet the feed of sheets is automatically stopped, said arresting means are introduced into the path of such sheet, and the impression is thrown off; with means whereby upon presentation of a properly positioned perfect sheet the feed of sheets is automatically restarted, the arresting means withdrawn, and the printing mechanism permitted to print such sheets.

14. In combination sheet printing mechanism having throw off devices; means for feeding sheets to said printing mechanism; means for arresting sheets; and co-acting means whereby upon the presentation of a misplaced or defective sheet the feed of

5 sheets is automatically stopped, said arresting means is introduced into the path of such sheet to arrest it, the taking of such sheet by the printing mechanism is prevented, and the impression is also thrown
10 off; with means whereby upon presentation of a properly positioned perfect sheet the feed of sheets is automatically restarted, the arresting devices are withdrawn from the path of the sheets, and the printing mechanisms permitted to print such sheets.

15 15. In combination mechanism for operating on sheets; means for feeding sheets to such mechanism; means for detecting defective or improperly placed sheets; means whereby upon the presentation of a misplaced or defective sheet the sheet is arrested and the feed of sheets stopped; and
20 means whereby upon subsequent proper presentation of a perfect sheet the feeder is automatically thrown into effective operation.

16. In combination mechanism for printing on sheets; means for feeding sheets to such mechanism; means for detecting defective or misplaced sheets; and co-acting
25 means whereby upon the presentation of a misplaced or defective sheet the feed of sheets is stopped, such sheet is arrested and the taking of such sheet by said mechanism is prevented; with means whereby upon presentation of a properly positioned sheet the feed of sheets is automatically restarted, and the printing mechanism permitted to print such sheets.

30 17. In combination mechanism for printing sheets provided with devices for taking sheets, means for feeding sheets to said mechanism; means for detecting misplaced or defective sheets; a sheet stop; and co-acting means, controlled by the detecting
40 mechanism, whereby upon the presentation of a misplaced or defective sheet the stop prevents such sheet passing the registering point, and the devices for taking the sheet are rendered ineffective, and the feed of sheets is automatically stopped; with means whereby upon proper presentation of a perfect sheet the feed of sheets is automatically resumed and the printing mechanism permitted to print such sheets.

45 18. In combination sheet printing mechanism; means for feeding sheets to the printing mechanism; means for detecting misplaced or defective sheets; a sheet stop; and co-acting means whereby upon the presentation of a misplaced or defective sheet the feed of sheets is automatically stopped, the stop prevents such sheet passing the registering point, the sheet taking devices of said printing mechanism are rendered ineffective, and the impression is thrown off; with means whereby upon presentation of a properly positioned perfect sheet the feed of sheets is automatically restarted, the
60 stop is withdrawn, and the printing mechanism permitted to take and print such sheets.

19. In combination sheet printing mechanism including sheet grippers; means for feeding sheets to the printing mechanism; means for detecting misplaced or defective sheets; a sheet stop; and co-acting means controlled by the detecting mechanism whereby upon the presentation of a misplaced or defective sheet the stop prevents such sheet passing the registering point, the sheet grippers are rendered ineffective, and the feed of the sheets is automatically stopped; with means whereby upon presentation of a properly positioned perfect sheet the feed of sheets is automatically restarted, the stop is withdrawn, the grippers become effective, and the printing mechanism permitted to print such sheets.

20. In combination sheet printing mechanism including a gripper cylinder and impression throw off mechanism; means for feeding sheets to the printing mechanism; means for detecting misplaced or defective sheets; a sheet stop; and co-acting means, controlled by the detecting mechanism, whereby upon the presentation of a misplaced or defective sheet the stop prevents such sheet passing the registering point, the feed of sheets is automatically stopped, the sheet grippers on the cylinder are rendered ineffective, and the impression is thrown off; with means whereby upon presentation of a properly positioned perfect sheet the feed of sheets is automatically restarted, the stop is withdrawn, the grippers become effective, and the printing mechanism permitted to print such sheets.

21. In combination mechanism for operating upon sheets; means for feeding sheets thereto; a sheet stop; means for automatically moving such stop into and out of the path of the sheets; and means whereby upon the presentation of a misplaced or defective sheet the feed is automatically stopped and such stop is allowed to remain in the path of such sheet to prevent its forward movement; with means whereby upon the proper presentation of a perfect sheet such stop is removed from the path of the sheet and the feed of sheets automatically restarted.

22. In combination sheet printing mechanism; means for feeding sheets to said printing mechanism; a sheet stop; means for automatically moving such stop into and out of the path of the sheets; and co-acting means whereby upon the presentation of a misplaced or defective sheet the feed of sheets is automatically stopped, said stop is permitted to remain in the path of the sheet to arrest it, and the taking of such sheet by the printing mechanism is prevented; with means whereby upon proper presentation of a perfect sheet the feed of sheets is automatically resumed, the sheet stop is withdrawn, and the printing mechanism permitted to take and print such sheets.

23. In combination sheet printing mechanism including sheet grippers; means for feeding sheets to the printing mechanism; means for detecting misplaced or defective sheets; a sheet stop; and co-acting means controlled by the detecting mechanism whereby upon the presentation of a misplaced or defective sheet the stop prevents such sheet passing the registering point, the sheet grippers are rendered ineffective, and the feed of the sheets is automatically stopped; with means whereby upon presentation of a properly positioned perfect sheet the feed of sheets is automatically restarted, the stop is withdrawn, the grippers become effective, and the printing mechanism permitted to print such sheets.

drawn from the path of such sheet, and the parts automatically permitted to print such sheet and like following sheets.

23. In combination sheet printing mechanism; means for feeding sheets to the printing mechanism; means for detecting misplaced or defective sheets; a sheet stop; and co-acting means whereby upon the presentation of a misplaced or defective sheet the feed of sheets is automatically stopped, the stop is permitted to remain in the path of such sheet, the sheet taking devices of said mechanism are rendered ineffective, and the impression is thrown off; with means whereby upon proper presentation of a perfect sheet the feed of sheets is automatically resumed, the sheet stop is withdrawn from the path of such sheet, and the parts automatically positioned to print such sheet and like following sheets.

24. In combination sheet printing mechanism including a gripper cylinder; means for feeding sheets to the printing mechanism; means for detecting misplaced or defective sheets; a sheet stop; and co-acting means controlled by the detecting mechanism whereby upon the presentation of a misplaced or defective sheet the feed of sheets is automatically stopped, the stop prevents such sheet passing the registering point, the sheet taking devices or grippers on the cylinder are rendered ineffective, and the impression is thrown off; with means whereby upon proper presentation of a perfect sheet the feed of sheets is automatically resumed, the sheet stop is withdrawn from the path of such sheet, the grippers are rendered effective, the impression is thrown on, and the parts automatically print such sheet and like following sheets.

25. In sheet detecting mechanism, in combination a detector finger having a notch; tripping devices adapted to be operated by the abnormal movement of said finger; a lever having a pin adapted to engage the notch in said finger; and means for rocking said lever; the pin being adapted to shift the finger and cause it to actuate the tripping devices if the finger finds a defective or misplaced sheet, substantially as described.

26. In a printing press the combination of sheet gages; a swinging lever and connections for raising and lowering the gages; a spring for moving the lever in one direction; a cam for moving the lever in the opposite direction for each operation of the press; sheet detecting devices, and means controlled by the sheet detecting devices adapted to lock the lever and prevent lifting of the gages if an imperfect or misplaced sheet is presented to the gages, substantially as described.

27. In a printing press the combination of a rock shaft, sheet gages operated thereby,

an arm on said shaft, an oscillating lever adapted to raise and lower said arm; a spring for moving the lever in one direction; a cam for moving the lever in the opposite direction; and means for locking the lever to prevent its actuating the arm and lifting the gages if an imperfect or misplaced sheet is presented to the gages; with sheet detecting devices, and means controlled by said detectors for throwing the locking means into operative position, substantially as described.

28. In combination with a member having grippers, and a tumbler for operating the grippers; a pin adjacent the member adapted to engage said tumbler; an oscillating lever engaging the pin, a spring engaging said lever for holding the pin in one position, a swinging lever adapted to cause said oscillating lever to move the pin against the spring, and a cam for actuating said oscillating lever.

29. In combination a member having grippers, and a tumbler for operating the grippers; pins adjacent the member engaging said tumbler; an oscillating lever engaging each pin; springs engaging said levers for holding the pins in one position; a swinging lever engaging said oscillating levers to move them against the springs, and means for operating said swinging lever.

30. In combination with a member having grippers, and a tumbler for operating the grippers; a pin adjacent the member engaging said tumbler; an oscillating lever engaging the pin, a spring engaging said lever for holding the pin in one position, a swinging lever adapted to cause said oscillating lever to move the pin against the spring, and a cam and connections for operating the swinging lever; with sheet detecting devices, and means controlled by said detecting devices whereby upon the presentation of a defective or misplaced sheet said swinging lever is stopped and the pin held ineffective, substantially as described.

31. In combination a member having grippers, and a tumbler for operating the grippers; pins adjacent the member engaging said tumbler; an oscillating lever engaging each pin; springs engaging said oscillating levers for holding the pins in one position; a swinging lever engaging said oscillating levers to cause them to move the pins against the springs, and a cam and connections for operating the swinging levers; with sheet detecting devices, and means controlled by said detecting devices whereby upon the presentation of a defective or misplaced sheet said swinging lever is stopped and the pins held ineffective, substantially as described.

32. In a printing mechanism the combination of plate and impression members, means for throwing off impression; a lever, connec-

tions between said lever and the throw off devices whereby the movement of said lever trips the throw off mechanism; a cam for returning said lever to normal position, and a latch for locking said lever in normal position to prevent operation of the throw off devices; with sheet detecting devices, and means controlled by said devices whereby upon the presentation of a defective or misplaced sheet the latch is disengaged from said lever, and the throw off means permitted to throw off impression.

33. In printing mechanism, the combination of plate and impression members; means for throwing off impression; a rock shaft, connections between said rock shaft and the throw off means whereby the rocking of said shaft in one direction trips the throw off mechanism; a lever for rocking said shaft, a cam for returning said lever to normal position; and a latch for locking said lever in normal position to prevent operation of the throw off devices; with sheet detecting devices, and means controlled by said devices whereby upon the presentation of a defective or misplaced sheet the latch is disengaged from said lever and the throw off means permitted to throw off impression.

34. In a printing mechanism the combination of plate and impression members; means for throwing off impression; a rock lever; and connections between said lever and the throw off devices whereby the movement of said lever controls the throw off mechanism; a latch for locking said lever in normal position to prevent operation of the throw off devices; sheet gages; an oscillating lever

adapted to raise and lower the gages; a spring for moving said lever in one direction; and a cam for moving the lever in the opposite direction; with sheet detecting devices, and means controlled by said devices whereby upon the presentation of the defective or misplaced sheet the throw off devices are permitted to throw off impression, and the gages permitted to remain down, substantially as described.

35. In a printing mechanism the combination of plate and impression members; means for feeding sheets thereto; grippers for taking sheets from the feeding means, and means for actuating the grippers; means for throwing off impression; a lever; and connections between said lever and the throw off devices whereby the movement of said lever controls the throw off mechanism; a latch for locking said lever in normal position to prevent operation of the throw off devices; sheet gages; an oscillating lever adapted to raise and lower the gages; a spring for moving said lever in one direction; and a cam for moving the lever in the opposite direction; with sheet detecting devices, and means controlled by said devices whereby upon the presentation of the defective or misplaced sheet the throw off devices are permitted to throw off impression, the gages are permitted to remain down, and the grippers are prevented from taking a sheet, substantially as described.

In testimony that I claim the foregoing as my own, I affix my signature.

BURT F. UPHAM.