UNITED STATES PATENT OFFICE.

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FEEDING ATTACHMENT FOR PRINTING-PRESSES.


To all whom it may concern:

Be it known that I, BURT F. UPHAM, of Evanston, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Feeding Attachments for Printing-Presses; 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 an improvement in automatic sheet feeding apparatus, especially those used in connection with printing presses—of that class in which the sheets are automatically fed to the point of delivery, or seizure, by the impression cylinder grippers, and which are provided with means whereby if a sheet is not fed in time, or is improperly presented, the feeding mechanism is automatically tripped so as to stop the feed, and the press throw-off impression mechanism is also usually tripped by the same means—or at the same time—so as to prevent any offset impression from the type upon the packing of the impression cylinder.

The invention is particularly designed for use in connection with the so-called Dexter or Cross feeders, such for example as are illustrated in patents to Cross No. 709,457 of September 12, 1906 and No. 812,280 of February 13, 1906.

The principal object of my invention is to cause the sheet to be withdrawn out of reach of the grippers if it should be misplaced so that no projecting portion of a misplaced sheet will be liable to be caught by the grippers and carried into the press; and in carrying out this invention I utilize part of the sheet feeding devices of the known automatic feeders, such as the Cross feeder, to produce a quick reverse or backward movement of the improperly fed sheet at the instant that the feeder is tripped.

I will now describe the invention as applied to a Cross feeder, and in the description shall refer by numerals to the parts of such feeder as are already in use, and by reference letters to the novel parts which I have applied thereto; but as my invention is a small part of such feeder and practically an attachment thereto, I will only illustrate and describe so much of such a feeder as will enable those familiar therewith to readily adapt and apply my invention thereto.

While I show the invention as particularly designed for use in connection with the Cross and Dexter feeders I do not wish to be restricted to its use in connection therewith for the invention may be usefully adapted for use in connection with other types of sheet feeding machines.

In the drawings—Figure 1 is a side elevation of parts of a printing press and an automatic sheet feeding and tripping mechanism with my invention applied thereto, showing the parts in normal working position. Fig. 2 is a plan view of the parts shown in Fig. 1, partly broken away and partly in section. Fig. 3 is a view similar to Fig. 1 showing the parts in tipped position. Fig. 4 is a view similar to Fig. 1 partly broken away showing the normal operative positions of the parts. Fig. 5 is an enlarged view showing the normal positions of parts when the paper is being fed by rollers 103 and 105. Fig. 6 is a similar view showing the second position of the cam, and means for keeping the roller 105 from contacting with roller 103 when the parts are in normal working operation and the sheet is properly presented. Fig. 7 is a similar view showing the position of the cam when the parts are tripped. Figs. 8 and 9 are detail views of the catch and latch lever. Figs. 10 and 11 are detail views of the devices for locking rolls 98 in raised position. Fig. 12 is an enlarged detail view of the detector and trip actuating devices. Fig. 13 is a reverse view of Fig. 12. Fig. 14 is a vertical sectional view of Fig. 12. Figs. 15 and 16 are enlarged detail sectional views of the camber controlling devices, showing same in different positions. Fig. 17 is a detail plan view of Fig. 16.

In the drawings 1 designates a feed table on which the sheets of paper S are fed forward to the impression cylinder 15. Above this table adjacent the feed cylinder is a rocking shaft 50; to said shaft 50 is attached a segment 52 and on the shaft is a loose arm 53, beside the segment 52, to which arm 53 is connected one end of a rod 54 that is pivotally connected at its forward end to a pivoted lever 49 which is oscillated by a cam 48 attached to a driven shaft 49 (see Patent 812,280) by which arm 53 will be
continuously rocked back and forth. To prevent the arm 5 from pivoting a pawl 5 which is provided with a pin 5 on one side adapted to engage a notch in the upper end of an arm 5 is placed beside segment 5 and fast on a sleeve 5 loosely surrounding shaft 5. Arm 5 is normally held against the pin 5 as by means of a spring 5 attached to the hub of arm 5 and to a suitable fixed point. As arm 5 is oscillated by link 5 the pawl 5 is oscillated back and forth above the segment 5 but is held out of engagement therewith by pin 5 engaging arm 5 as the spring 5 causes arm 5 to keep in contact with pin 5 and hold pawl 5 raised; and also causes sleeve 5 to rock with arm 5, unless prevented. To the sleeve 5 is attached depending arm 5 to which detector fingers 5 are attached. Said fingers normally rest upon the sheet of paper 3 fed forward upon the table 1, but if any sheet is not in position to be taken by the cylinder grippers at the proper time the end of the detector fingers 5 will drop into holes 1 in the metal plate or strip 1 on the end of table 1 and will arrest the sleeve and arm 5, and prevent the latter arm returning when arm 5 moves backward and therefore pin 5 will disengage arm 5 and pawl 5 will thereupon drop into engagement with segment 5 and the latter will thereupon be moved with arm 5 thereby rocking shaft 5 thereby causing the trip of the throw-off devices by means of an arm 5 on shaft 5 to which is connected a rod 1 that controls the tripping device. The pin 5 will automatically reengage the notch in arm 5 as arm 5 rocks.

The shaft 5 and tripping rod "a" are kept in normal position and returned to normal position when permitted by means of a spring "a" springing on the rod between a stop "a" attached to the frame and roller "a" on the rod, see Fig. 1.

The sheets of paper 3 are fed forward in the usual manner by means of the rollers 95 and 108 and 105 (see Patent 812,200) the shaft of rollers 95 and 105 may be driven by mechanism described in said Patent No. 812,200, so as to feed the sheets forward until just before they reach the point of delivery where the rollers 105 and 95 are lifted from the rollers 95 and 105 had remain lifted until after the sheets are removed by the grippers; but the rollers 103 and 95 are given a partial reverse rotation so as to tend to slow down the sheet and prevent it overrunning the point of delivery. The rollers 105 are shown as attached to arms on a rock-shaft 10 to which is attached an arm 10 to which is connected a rod 10 that is normally actuated by a spring 10 so as to hold rollers 105 in contact with rollers 103. The rear end of rod 10 engages a lever 5 which is pivoted at 5 and has a roller 5 adapted to engage a cam 9 on shaft 9, which cam 9 is provided with a dwell 9 when opposite the roller 9 which will permit spring 10 to lower rollers 103 into engagement with rollers 105 and thus assist in feeding the sheet downward but the cam causes the lifting of the rollers 105 prior to and during the taking of a sheet by the grippers on cylinder 1; I have attached to this lever 5 an arm 5 to which is connected an extension 5 and to this latter I pivotally attach a latch lever 5 which is provided with a roller 5 that is adapted to be engaged by a lug 5 attached to the side of the cam 9 at the moment that the grippers would close upon the sheet if properly fed. The outer end of this latch lever 5 is provided with upper tooth 5 and a lower tooth 5. The upper tooth 5 is adapted to engage the upper edge 5 of a slotted guide or catch 5 attached to a stud 5 to one arm 5 of a compound lever pivoted at 5 on the frame, which arm 5 and catch 5 is normally held in depressed position, Fig. 1, by means of a rod 5 pivoted to the arm 5 and having its lower end entered into a guide 5 attached to the frame; and the lower end of rod 5 is notched as shown at 5 and this notch is normally engaged by the pointed end 5 of rod 5 which is also entered into the guide 5 at right angles to the rod 5. A spring 5 is sprung on rod 5 between the guide 5 and the collar 5 on the rod, spring 5 normally tending to throw the rod 5 and arm 5 upward if the rod 5 is released by rod 5.

It will be observed that the spring 10 always tends to move the lever 5 toward cam 9 and keep roller 9 in close contact with the periphery of cam 9; and this rocking movement of lever 5 tends to pull latch lever 5 inward; and this movement can occur at any time that the dwell 9 in the cam comes opposite roller 9 because at that time the latch lever 5 is in an intermediate position.

In the ordinary construction of the feeder the rolls 105 and rollers 108 are slowed down before the sheet reaches the delivery position and are raised before the rollers 105 are reversed and until the sheet has been taken by the cylinder grippers. Or if a sheet is misplaced and the tripping mechanism operates these rollers 105 will remain raised. In my invention I utilize rollers 105 and 108 to pull back the sheet in case it is misplaced immediately following the tripping of the feeding mechanism, and for this purpose I provide cam 9 with a short dwell or recess 5 which comes opposite the roller 9 just before the moment that the grippers would ordinarily seize a sheet, and just after the moment that the feeder would be tripped by the detector fingers 5 if they had been arrested as above described. In such case the rod 5 is actuated so as to release rod 5 so as to release rod 5.
whereupon spring e throws rod e and arm d upward and thus prevents the engaging of catch c with the tooth b just at the instant that the notch 9 comes opposite roller 9; consequently spring 10 throws lever 9 inward until roller 9 passes notch 9 and momentarily lowers rollers 105 into contact with rollers 103 which latter rollers are at that moment being rotated in a reverse direction as above described and consequently the misplaced sheet is momentarily nipped by rollers 103 and 105 and is quickly moved or jerked back away from feeding position, so that the cylinder grippers will not catch any part of the sheet. This action takes place very rapidly but is most efficient in practice in preventing any part of the misplaced sheet being caught and carried into the press. It sometimes happens that a sheet is damaged or torn at one side on its leading edge so that the detectors 5° at that point will cause tripping but the other portions of the sheet may be projected sufficiently into the path of the grippers to be caught thereby or a sheet might be slightly misplaced and lie at such an angle that part of it would be caught by the grippers, but by having the sheet drawn backward away from the feeding position simultaneously with the tripping operation the danger of such sheet being caught by the cylinder grippers, with the resulting annoyance and delay caused by the carriage of a partial sheet into the press is obviated.

In the normal operation of the machine as long as sheets are properly fed to the cylinder, the latch-lever 130 is locked by tooth b0 of catch c at the moment dwell 9 in cam 9 comes opposite roller 9, by reason of lug b1 which then momentarily engages roller b2, (see Fig. 6) and consequently spring 106 cannot at that moment throw lever 9 outward because the latch lever 9 then prevents it; although as soon as cam lug b1 passes roller b2, catch lever b0 drops sufficiently to lower tooth b0 clear of catch c and leaves lever 9 free to be operated by spring 104 under control of cam 9. But when the parts are tripped by the rocking shaft 9b as above described, rod a′ releases rod e and arm d is thrown upward by rod e, thereby preventing the engaging of catch c with tooth b0 of the latch lever just in time to permit roller 9 to enter dwell 9 in cam 9. Consequently although the lug b1 is then upholding latch-lever b2, the latch-lever is not locked to anything, and can be freely moved under the action of the spring 104a and lever 9.

The finger i normally rests upon the upper end of a lever 1a which is fulcrummed on a stud 2 below shaft 9d (see Figs. 15-17); said lever has a roller 1n on its lower end engaging a cam 49n on shaft 49. When the parts are tripped (Fig. 3) arm d rises until finger i drops into a notch 1n in the lever 1a (Fig. 16) and will hold the combers away from the paper while the feeder remains tripped. The lever 1a when not locked by pin i follows the cams 49a through suitable connections and raises and lowers the combers in and out of contact with the paper, the combers combing the paper forward when they are held at the lowest point. When the lever 1a is locked by the fall of pin i the combers are held up as long as the feeder remains tripped and the feeder may be again put into operation by hand lever d. All of the foregoing parts are parts of the Cross feeder.

In the interval following the falling of finger i and its catching in notch on lever 5a (Fig. 16) the sheet is pulled back by rollers 105 and 106, as already described. After finger i has fallen into notch in lever 5a (Fig. 16) then arm d rises and the lower lip c′ of catch c is raised; and as soon as roller 9b runs out of dwell 9a—thereby giving a slight inward movement to the lever d, and the latch lever b0, the tooth b0 of lever b0 becomes locked with the lip c′ of catch c and will prevent roller 9b again engaging the dwell b0 until the parts have been reset and there is another tripping operation of the shaft 9b.

To the shaft 100 is connected a lever 6 which is provided with a roller 6a adapted to engage a cam 6b on shaft 49 whereby shaft 100 is rocked at the proper times to raise and lower rollers 98 over rollers 95. In order to lock rollers 98 in raised position so as to prevent feeding of a sheet when the parts are tripped, I provide lever 6 with a pin f, which may be an extension of the pin upon which roller 6a is journaled. Beside this lever 6 I locate a sliding block g provided with a lug g′ adapted to come under the pin f when the parts are tripped and lever 6 is raised, and thus hold the rollers 98 elevated. The block g is pressed by a spring g′ adapted to move it, when permitted, to bring lug g′ under pin f, see Fig. 2. The slide g also has a projection g2 which is adapted to be engaged by a dog d3 pivoted to an arm d2 of the compound lever d. When the parts are in working position, Fig. 1, this dog d3 engages the projection g′ on the slide g and forces the slide in retraced position, so that the lug g′ is out of position to engage pin f and therefore will not interfere with the proper operation of the shaft 100 and rollers 98.

When the parts are tripped by the actuation of the shaft 9b, as above described, and rod a′ disengages rod e, the lever d is rocked upward by spring e′ as described, and dog d3 is moved out of the way of projection g′ and spring g′ moves the slide g so as to bring lug g′ under pin f.

A lever 8 is pivoted at 8a below lever d.
and has a tooth \( z \) which is adapted to be engaged by a tooth \( z \) on dog \( \alpha \) so that when the parts are in working position this lever \( 8 \) is freed from the dog \( \alpha \) but when the parts are tripped from the dog \( \alpha \) engages lever \( 8 \) and offers the latter. Lever \( 8 \) is part of the Cross feeder mechanism and forms no part of the present invention.

The piece \( \beta \) of the lever \( \alpha \) is preferably a rectangular to retain well thereon is attached one of the rocking arms \( 3 \) which is connected a rod \( \alpha \) which is connected with the sheet guide \( \delta \). A weight roller \( \delta \) is a piece of sheet placed on the surface which is pressed by the lever \( \beta \) and by which the weight roller \( \delta \) is maintained in an upright position. The parts are in working order until the parts are tripped and then the sheet is released and the feed resumes its normal position.

Lever \( \beta \) drops down to the position shown in Fig. 1 and holds it and the parts in this position until a sheet has been properly fed down past rollers \( 25 \) and \( 103 \), and under detecter fingers \( 205 \) into gripping position.

Thereafter so long as the sheets are properly fed, rod \( \alpha \) will be locked by rod \( \alpha \), and the parts will remain in operating position.

Operation: As above stated the general operation of the sheet feeding device is as follows explained in the Origin Patent No. 100,000 and No. 619,339, and I refer there to as more fully explaining and exhibiting one form of feeder to which the invention is especially applicable and any one familiar with these feeders will readily understand the present invention and its ability in connection with automatic feeders. Assuming that the parts are in the position shown in Fig. 1, then so long as the sheets are properly fed down and into position the arms \( \gamma \) being disengaged from the rocking arms \( \delta \) will move in such a manner that the rocking arms \( \delta \) being held in position by the rocking arms \( \delta \), the rocking arms \( \delta \) and the rocking arms \( \delta \) will move in step with feed rollers \( 25 \) and \( 103 \) and under detecter fingers \( 205 \) into gripping position.

But the instant is met with or defective, so that the feed roller \( 25 \) is not in a line \( \beta \), and detecter fingers \( 205 \) do not engage with any of the sheets, the rocking arms \( \delta \) will be disengaged by a mechanism not rendered to the present.

But the instant is met with or defective, so that the feed roller \( 25 \) is not in a line \( \beta \), and detecter fingers \( 205 \) do not engage with any of the sheets, the rocking arms \( \delta \) will be disengaged by a mechanism not rendered to the present. Which is raised by springs \( \gamma \) and actuates lever \( \delta \), as described, with the result that the feeding devices are thrown out of operation, and at the same moment the rollers \( 105 \) are momentarily dropped into engagement with rollers \( 108 \) and the misplaced sheet is thereby pulled back out of the way, and the weight lever \( \beta \) is dropped upon the withdrawn sheet. The further sheet feeding operations of such feeder are suspended until the defective sheet is removed. Then the operator grasps lever \( \delta \) and returns the parts to the position shown in Fig. 1, and the feeder resumes its operation and continues in operation so long as sheets are properly fed to the cylindrical rollers. In the Cross feeder the distance between the sheet feeding rollers \( 95 \) and the feeder guide \( 7 \) is such that if a defective misplaced sheet is removed from the nip, the operator should hold lever \( \delta \) depressed until a sheet has passed under the fingers \( 205 \), so as to prevent a trip of the feed rollers before a sheet can be fed down in position for advance by the cylindrical rollers. Suitable mechanism may be provided to prevent any application of force March 17, 1899, Ser. No. 650,005, whereby a misfed sheet \( 25 \) is rocked, this also being grasped by the press.

What I claim is:

1. In an automatic paper feeding mechanism, the combination of upper and lower paper feeding rollers, means for rotating the lower rollers alternately in opposite directions, devices adapted to detect a misplaced or defective sheet, and means for raising and lowering the upper rollers, comprising a pivoted lever and a cam; with means for momentarily bringing the upper rollers into contact with the lower rollers when the detecting mechanism finds such a sheet, said means comprising a sheet dwell in the actuating cam for said rollers, and means to prevent said dwell so operating upper paper rollers except when the detecting mechanism finds a defective sheet, substantially as described.

2. In an automatic paper feeding mechanism, a set of paper feeding rollers, means for rotating the lower rollers alternately in opposite directions, an actuating cam, a lever and connections for raising and lowering the upper rollers; devices adapted to detect a misplaced or defective sheet; means for momentarily bringing the said rollers into contact with the said paper rollers, and means comprising a sheet dwell in the actuating cam for said rollers, said dwell except when the detecting mechanism finds a defective sheet, substantially as described.

3. In automatic paper feeding mechanism, sets of opposed paper feeding rollers, substantially as described.
devices for detecting a misplaced or defective sheet, means for rotating one set of rollers alternately in opposite directions, means for raising and lowering the opposed set of rollers comprising a cam, a pivoted lever and connections, said cam having a short dwell for momentarily bringing the rollers into contact when the feeding mechanism is tripped; a latch lever connected with the roller-actuating lever, a catch for normally engaging said latch lever to prevent operation of said dwell except when the detector mechanism finds a defective sheet; a tripping rod controlled by the detector mechanism, a rocking lever carrying said catch, a spring actuated rod for vibrating said lever, said tripping rod engaging said spring actuated rod, substantially as described.

4. In automatic paper feeding mechanism, the combination of a set of paper feeding rollers, means for rotating the lower rollers alternately in opposite directions, means for raising and lowering the upper rollers comprising a pivoted lever and connections, and a cam for operating said lever, and devices adapted to detect a misplaced or defective sheet; a second set of rollers, a cam, a lever engaging said cam for separating the rollers in the second set, and a spring actuated slide adapted to engage said lever to prevent closing of the said rollers when the mechanism is tripped; with means for momentarily bringing the rollers in the first set into contact when the detector mechanism operates, said means comprising a short dwell in the actuating cam for said rollers, a latch lever connected with the roller actuating lever, a catch for normally engaging said latch lever to prevent operation of said dwell except when the detector mechanism finds a defective sheet, and tripping mechanism controlled by the detector mechanism whereby said latch lever is released when the tripping mechanism is activated.

In testimony that I claim the foregoing as my own, I affix my signature in presence of two witnesses.

BURT F. UPHAM.

Witnesses:
Percy G. Shaw,
Harry J. Welsh.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."