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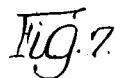
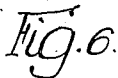
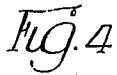
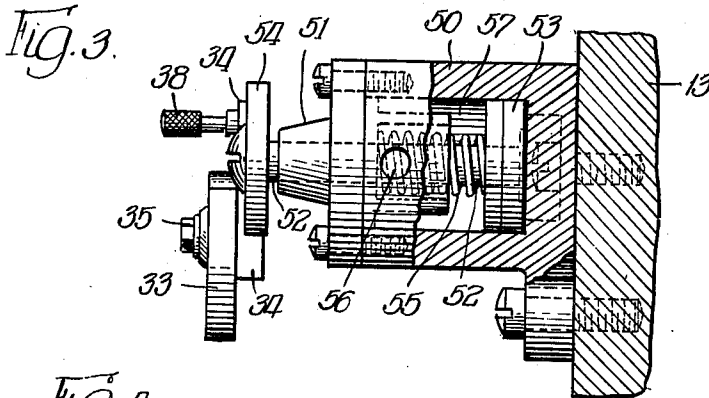
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TRIPPING MECHANISM

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2 Sheets-Sheet 2



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TRIPPING MECHANISM

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This invention relates to improvements in the control mechanism for printing presses in which the impression cylinder, in addition to its rotary movement, is given a bodily reciprocatory movement. The invention more particularly pertains to automatic tripping means whereby the operation of the printing press is controlled dependent on the feeding condition of the sheets to be printed.

In order to illustrate my invention, merely by way of example, I have selected to show it as applied in connection with a vertical type of printing press such as are well known in the trade. It shall be understood, however, that the principle of the invention may be embodied in any other type of printing press where it will prove of advantage.

Presses of the vertical class embody an impression cylinder and a type bed which reciprocate in opposite directions in a vertical plane. The sheets which are to receive an impression are placed onto a sheet transfer table which is supported on the cylinder carriage so as to follow the up and down movement of said cylinder. The registering of the sheets takes place during the down-stroke of the cylinder which, after its grippers have engaged a sheet at the end of the down-stroke, rotates to print a sheet during its up-stroke. After a sheet is printed, it is removed from the impression cylinder when the latter has reached its uppermost position and the sheet is then deposited onto a delivery table as is common practice in the art of sheet handling machinery.

In the operation of such presses, it sometimes happens that a sheet, which might have become mispositioned on the sheet transfer table, will not be taken by the grippers of the impression cylinder prior to its up-stroke and, therefore, it will remain on said table while the cylinder travels upward instead of receiving an impression during that stroke. Upon continued running of the press, sheets might become accumulated in superimposed relation on the sheet transfer table without being noticed by the operator and eventually these accumulated sheets might be grasped by the impression cylinder grippers and pulled through the press. This usually results in smashing of the type form because of the excess thickness of such plurality of sheets as compared with the single sheet thickness for which the press was made ready.

To forestall such a condition, it has been suggested that a pneumatically actuated tripping means be provided whereby the drive of the press shall be rendered ineffective in the event that a

sheet remains on the sheet transfer table during the up-stroke of the impression cylinder.

When handling stock which is difficult to feed, it frequently happens that a sheet fails to reach the transfer table, or that it becomes mispositioned on the table. The desirability of stopping the operation of the press automatically in such an event is quite evident. Therefore, in addition to the tripping means whereby the operation of the press is interrupted or whereby the drive for the press is rendered ineffective when a sheet remains on the sheet transfer table during the up-stroke of the impression cylinder, I propose to provide means whereby the press is tripped in the event that a sheet is not fed onto or becomes mispositioned on the sheet transfer table during the down-stroke of the cylinder and table.

While the device whereby the drive of the press is rendered inoperative during the up-stroke of the impression cylinder is intended to trip the press, if a sheet remains on the transfer table, it is possible never-the-less that the sheet does not fully cover the air passages in the transfer table and, consequently, during the up-stroke of the cylinder and table the tripping means would remain ineffective. This means that a succeeding sheet would be placed onto a sheet which already is on the transfer table and it might occur that, during the down-stroke of the cylinder, the air passages in the transfer table would become sealed, consequently the two superimposed sheets would be taken by the impression cylinder grippers and carried through the press resulting in the smashing of the form.

One of the primary objects of my invention, therefore, resides in the provision of automatic means dependent on the feeding condition of the sheets to be printed and whereby tripping of the printing press is accomplished both in the event that a sheet fails to be fed to or becomes mispositioned on the sheet transfer table during the down-stroke of the impression cylinder as well as when a sheet happens to remain on said table during the printing stroke, i. e. the up-stroke of the impression cylinder.

Another salient object of my invention is to provide automatic tripping mechanism which will function reliably and which shall not depend on the rotation or non-rotation of the impression cylinder, but which shall become operative entirely dependent on the feeding condition of the sheets to be printed.

Other objects of and advantages which my invention provides shall be apparent from the following specifications and appended claims read

in conjunction with the accompanying drawings, of which:

Figure 1 is a fragmentary view, in side elevation, of a vertical printing press embodying the improved tripping mechanism which constitutes my invention;

Figure 2 is a fragmentary view, similar to Figure 1, but with the tripping levers and associated parts shown in their respective positions when the press is tripped during the down-stroke of the cylinder in the event that a sheet is missing, or has become mispositioned on the transfer table;

Figure 3 is a view, partly in section, of a preferred, pneumatically actuated device whereby the tripping mechanism is operated dependent on the feeding condition of the sheets to be printed and the figure indicates the relative position of the tripping latches to the tripping member of the device;

Figure 4 is a detail view and depicts the position of the tripping latches when a sheet is properly fed onto the sheet transfer table and remains in registered position on said table while the impression cylinder moves downwardly;

Figure 5 illustrates the position of the tripping latches during the upward stroke of the cylinder and after a sheet has been regularly removed from the sheet transfer table;

Figure 6 is a view of the same parts as shown in Figure 2, but indicating their relative positions during the up-stroke of the impression cylinder when a sheet fails to be removed from the transfer table, and,

Figure 7 represents a modification whereby convenient adjustment of the tripping latches with relation to the tripping member of the pneumatically actuated device may be accomplished.

Referring to Figure 1 of the drawings and briefly stated, the printing press, in connection with which I have chosen to illustrate the principle of my invention, includes a base frame 10 and a way frame 11. The impression cylinder 12 is mounted on a cylinder carriage 13 which is arranged to reciprocate vertically with the cylinder on said way frame. To a stud 14, provided on the base frame 10, is pivoted a belt tightener trip lever 15. A belt tightener lever 16 is arranged to rock about a pivot 17 provided in a bracket 18. The lever 16 has formed thereon a lug 19 which is provided with a bore in order to accommodate and guide a belt tightener lever latch 20. The latter is arranged on the lever 16 so that it may be withdrawn from its operative position by depressing a belt tightener lever latch handle 21. The arm 22 of the trip lever 15 is formed with a locking latch 23 and the second arm 25 of said lever is formed with a ratchet rack 26 both for the purpose hereinafter to be described. In the way frame 11 is provided a stud 27 to which is pivoted a bell crank lever 28, the arm 29 of which is formed with a retaining notch 30, whereas its arm 31 carries a stud 32 provided in the free end of the arm and to this stud is pivoted a trip latch 33 which in turn has pivoted thereto a second trip latch 34 arranged to be swung about the pivot point 35. The trip latch 33 normally rests on a stop pin 36 while the downward movement of the latch 34 is limited by the stud 32.

By means of a tension spring 37, the bell crank lever is swung upwardly in the clockwise direction, as viewed in Figure 1, so that the retaining notch 30 will engage the latch 23 and therewith hold the lever 15 against movement. In order

that the tripping latch 34 may be swung out of its operative position, so that during making ready of the press, pre-inking, etc., the tripping device shall be rendered ineffective, a knurled handle 38 is provided on said latch.

To the cylinder carriage 13 is bolted by any suitable means a suction actuated device 40 which, by means of the air hose 41, is connected to the vacuum system of the press, which system may be of any approved type suitable for use on sheet fed printing presses and therefore is not illustrated or described herein.

The sheet transfer table 45, for the purpose of detecting whether or not a sheet has been properly placed onto the table by the feeding means, not shown, is provided with a series of air passages 46 also connected by means of the air hose 47 to the air pipe 48 leading from the vacuum system of the press, see Figure 1. The sheet S, after having been registered on the transfer table 45, will be engaged by the impression cylinder grippers 49 prior to the commencement of the cylinder's rotation and just before the beginning of the up-stroke, i. e. printing stroke, of the cylinder.

The position of the parts, such as are depicted in Figure 1, are those assumed during the normal operation of the press and during the down-stroke of the impression cylinder 12.

In Figure 3, I have illustrated in detail the suction operated device which performs the required functions for the purpose of actuating the tripping latches 33 and 34. This device is comprised of a cylinder 50 which preferably is carried by a base plate suitably secured by means of bolts or otherwise to the cylinder carriage 13 of the press. A cap plate 51 closes the cylinder and has formed therein a bore to accommodate the stem 52 which, at its inner end, has secured thereto a piston 53. The outer end of said stem carries a disc 54 and, by means of an expansion spring 55, the piston is urged against the inner wall of the cylinder 50.

Through the cylinder wall extends a nipple 56 to which is attached an air hose 41, see Figure 1, connected to the air pipe 48.

In the operation of the press, it will be seen that, so long as no vacuum is created within the air chamber 57 of the cylinder 50, the stem 52 remains withdrawn so that the disc 54 assumes a position in alignment with the tripping latch 34. However, when vacuum is created within said chamber, then the piston 53, and therewith the stem 52 and disc 54, is moved outwardly and will assume a position in which said disc shall be in alignment with the tripping latch 33.

The respective positions of the tripping latches 33 and 34 and the disc 54 maintained during the down-stroke of the impression cylinder when a sheet is properly fed to and positioned on the transfer table 45 are illustrated in Figure 4. In that event, the sheet seals the air passages 46 provided in said table, see Figure 1. Accordingly, the piston 53 has been drawn outwardly because of the vacuum set up in the chamber 57 and the disc 54 is then aligned with the tripping latch 33 so that, during the downward movement of the disc 54, it will engage the latch 33 and pivot it about its stud 32 upwardly without actuating the tripping device and, consequently, the levers 28 and 15 are maintained in their operative positions illustrated in Figure 1.

According to Figure 5, the travel of the cylinder and therewith the disc 54 is in the upward direction and it is assumed that the sheet has

been removed from the transfer table by the grippers of the impression cylinder so that the air passages 46 remain unsealed. Therefore, the piston 53 is urged inwardly against the inner wall of the cylinder 50 by the spring 55 and the disc 54 has assumed its position in alignment with the tripping latch 34. Accordingly, during the upward movement of the cylinder, the disc 54 engages the tripping latch 34 and swings it freely about the stud 35 and consequently no tripping of the press will take place.

However, assuming that a sheet is not properly positioned on the transfer table 45 or fails to be fed to it and consequently the air passages 46 remain unsealed, the disc 54 maintains its alignment with the tripping latch 34 and, accordingly, during the down-stroke of said disc, it engages the cam surface 60 and thereby urges the latch downwardly against the stud 32, consequently the lever 31 is swung about its stud 27 in the anticlockwise direction, thereby disengaging the locking latch 23 from the notch 30 and permitting the belt tightener trip lever 15 to swing about its stud 14 to a sufficient extent that the belt tightener lever latch 20 becomes released from the ratchet 26, a position illustrated in Figure 2, in which the press drive is rendered ineffective, the tension of the driving belt having been released by the tripping of lever 15.

The complete mechanism and function thereof, whereby the drive of the press is rendered ineffective, is described in the U. S. Letters Patent No. 1,582,553 to B. D. Stevens and, therefore, I have not deemed it essential to describe and illustrate said mechanism in its full details.

In the event that a sheet remains on the transfer table 45 during the up-stroke of the cylinder 12, the tripping parts are caused to assume the position as illustrated in Figure 6. The air passages 46, in such event, remain sealed, vacuum is maintained in the cylinder 50, and the disc 54 retains its alignment with the locking latch 33. During its upward movement said disc engages the cam face 61 of the latch 33, urging it upwards, thereby displacing it to the left, due to its engagement with the pin 36 carried by the lever 31, thereby swinging the arm 29 downwardly and releasing the locking latch 23 from the notch 30.

In Figure 7 is disclosed a modification in the arrangement of the tripping latches 33 and 34, the latch 34 having been swung out of its operative position for the purpose of more clearly illustrating the improvement. This modification has for its object to provide a convenient adjustment of said tripping latches with relation to the disc 54 and it includes an eccentric bearing bushing 65 for the stud 32 which bushing fits loosely in a bore of the latch 34 and can be turned about its axis in order to adjust the position of the cam faces 60 and 61 of said latches toward or away from the disc 54. After the required adjustment has been made, the bushing 65 is locked in its position, preferably by means of a set screw 56 threaded into latch 34.

While I have illustrated and described one preferred and specific form of mechanism whereby the objects of my invention may be carried into effect, it will be understood that modifications in the design and in the function of the device may be introduced without departing from the basic principle of the invention. It is also evident that the usefulness of my invention may be readily extended to sheet handling machinery other than printing presses. Therefore, I intend to cover any such constructional modifica-

tions and uses of the invention that will come within the scope and meaning of the appended claims.

I claim:

1. In a printing press of the class having a rotary impression cylinder mounted to reciprocate in a linear path, the provision of automatic tripping means, and means actuating said latter means and operative dependent on the feeding condition of the sheets to be printed, to render the press drive ineffective during either one of the reciprocatory strokes of said cylinder.

2. In a printing press of the class having a rotary impression cylinder mounted to reciprocate in a vertical linear path, the provision of automatic tripping means, and means associated with said latter means and responsive to the feeding condition of sheets to cause tripping of the press both during the down-stroke as well as during the up-stroke of the impression cylinder.

3. In a printing press of the class having a rotary impression cylinder mounted to reciprocate in a linear path, the provision of pneumatically controlled tripping means, a sheet transfer table, means provided on said table and associated with pneumatically actuated means effective to initiate the actuation of said tripping means in the event that a sheet is not fed to or becomes mispositioned on said table during the down-stroke of said cylinder and also if a sheet remains on said table during the up-stroke of the cylinder.

4. In a printing press of the class having a rotary impression cylinder, and a sheet transfer table mounted for reciprocation in a linear path, the provision of means for rendering the press drive ineffective during the travel of said table in one direction when a sheet is not properly fed onto the table, and means for tripping the press during the travel of said table in the other direction when a sheet remains thereon.

5. In a printing press of the class having a rotary impression cylinder mounted for reciprocation, and a sheet transfer table arranged to follow the reciprocatory movement of said cylinder, the provision of means for rendering the press drive ineffective during the stroke of said cylinder and table in one direction when a sheet is not properly fed onto said table, and means for tripping the press during the stroke of said cylinder and table in the other direction when a sheet remains on said table.

6. In a printing press of the class having a rotary impression cylinder mounted to reciprocate in a linear path, the provision of automatic tripping means having in combination a pair of tripping latches, actuating means therefor dependent on the feeding condition of the sheets to be printed to render the press drive ineffective during both reciprocatory strokes of said cylinder and means for rendering at least one of said latches ineffective.

7. In a printing press of the class having a rotary impression cylinder mounted to reciprocate in a linear path, the provision of automatic tripping means having in combination a pair of tripping latches, actuating means therefor dependent on the feeding condition of the sheets to be printed to render the press drive ineffective during both reciprocatory strokes of said cylinder, and means whereby adjustment of said latches with relation to said actuating means can be effected.

8. In a printing press of the class having a rotary impression cylinder mounted to reciprocate

in a linear path, the provision of automatic tripping means having in combination a pair of tripping latches, pneumatic actuating means therefor dependent on the feeding condition of the sheets to be printed to render the press drive ineffective during both reciprocatory strokes of said cylinder, and means provided on one of said latches whereby adjustment of said latches with relation to said pneumatic actuating means can be effected.

9. In a printing press of the class having a rotary impression cylinder mounted to reciprocate in a linear path, the provision of automatic tripping means having in combination a pair of tripping latches, pneumatic actuating means therefor dependent on the feeding condition of the sheet to be printed to render the press drive ineffective during both reciprocatory strokes of said cylinder, means provided on one of said latches whereby adjustment of said latches with relation to said pneumatic actuating means can

be effected, and means for rendering at least one of said latches ineffective.

10. In a printing press of the class having a rotary impression cylinder mounted to reciprocate in a linear path, the provision of automatic tripping means having in combination a pair of tripping latches, pneumatic actuating means operative to assume positions in which said latches shall be rendered ineffective during both reciprocatory strokes of said cylinder when the feeding condition of a sheet is normal.

11. In a sheet fed printing press of the class including an impression cylinder mounted for rotation and having a printing stroke and an idle stroke, the novel combination of pneumatically controlled means with tripping mechanism for interrupting the operation of the press during the printing stroke as well as during the idle stroke of said cylinder when sheet feeding conditions are not normal.

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