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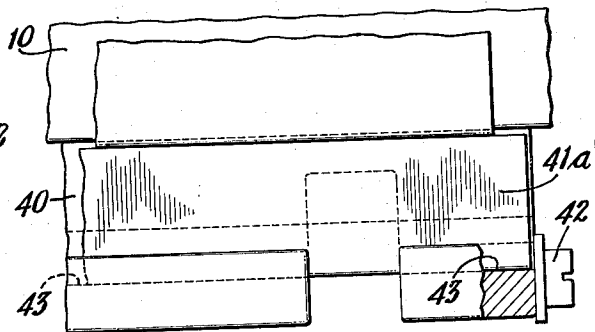
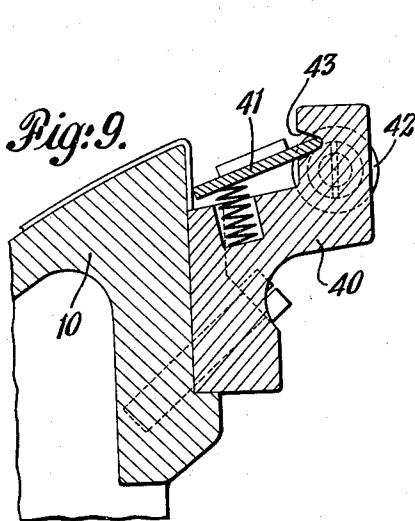
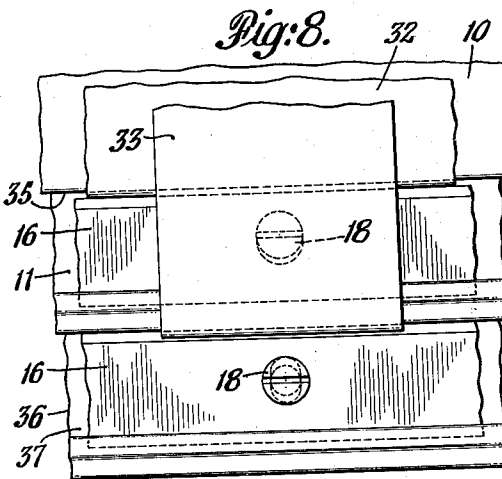
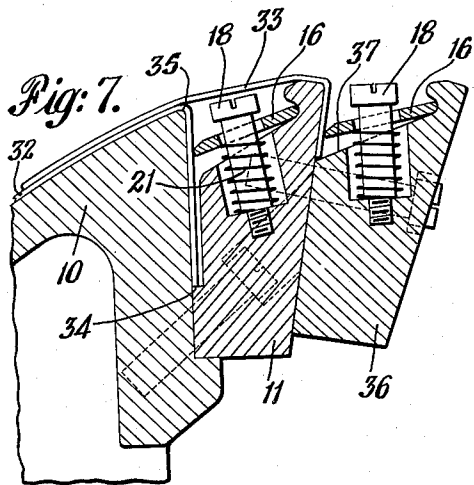
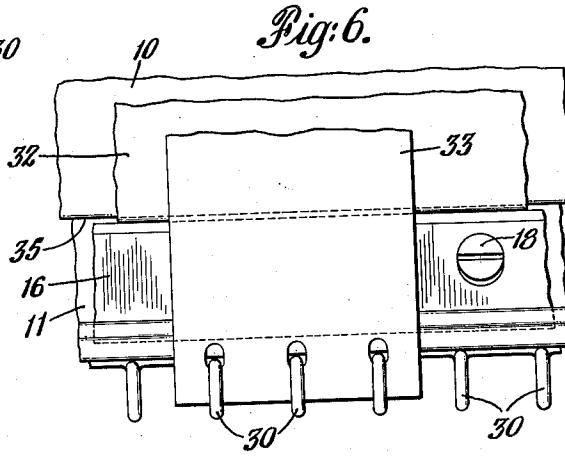
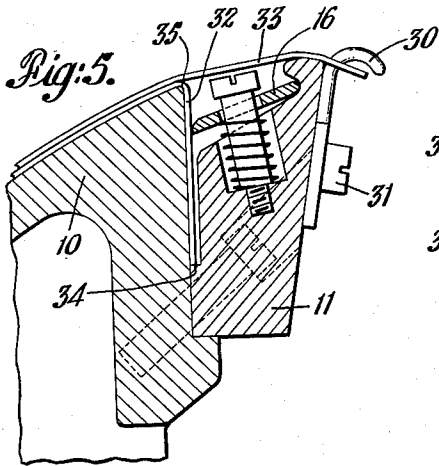
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PLATE CLAMPING MEANS FOR PRINTING MACHINES

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2 Sheets-Sheet 2



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PLATE CLAMPING MEANS FOR PRINTING MACHINES

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This invention relates to rotary printing presses and more particularly to flexible plate clamping means for use with short run duplicators, where rapid replacement of printing plates is essential.

In short run duplication work, only a small number of copies are reproduced from each printing plate or master sheet, however, a large variety of copies are printed. This means that a large number of printing plates will be handled in a single day. Therefore, the time spent replacing these plates could become a substantial portion of the total machine operating time if the plates cannot be changed speedily.

It is desirable, therefore, to employ a mechanism whereby the operator can quickly replace one printing plate, on the printing cylinder, with another and hence, cut machine idle time between plate replacements to a minimum. Toward this end, the plate clamp of this invention permits fast and simple securing of printing plates or master sheets to the printing cylinder, and in addition holds the plates firmly and in accurate registration. This clamp, furthermore permits quick and easy removal of the printing plate.

Very often it is necessary to supplement a portion of a plate already secured to the printing cylinder, before further copies are printed. To accomplish this, a supplementary narrow plate, containing the accompanying data, will overlie the portion of the main plate to be altered, and must be gripped in the clamping mechanism. It is advantageous if this can be done without ruining the registration of the main plate. For this reason, the clamp of this invention may be opened in sections in order that a narrow plate may be gripped without releasing the main plate. A narrow strip employed to blank out a portion of the main plate may be treated in exactly the same manner as a supplementary plate.

In addition, it is possible to utilize main and supplemental plates having perforated leading edges inasmuch as this clamp may be provided with a plurality of prongs or pin bars which are disposed in such a way that perfect registration of plates held thereon is assured.

The invention will now be more fully described with reference to the accompanying drawings, which, it should be understood, represent selected embodiments of the new clamp employed merely for illustrative purposes.

In the drawings:

FIG. 1 is a fragmentary end elevational view of the plate cylinder perpendicular to its axis of rotation, showing a preferred embodiment of the invention;

FIG. 2 is a cross-sectional view taken on line 2-2 of FIG. 1;

FIG. 3 is a plan view of the novel clamping mechanism;

FIG. 4 is a cross-sectional view taken on line 4-4 of FIG. 2;

FIG. 5 is similar to FIG. 1 showing the prongs or pin bars which cooperate with plates having perforated leading edges;

FIG. 6 is a plan view of the clamp shown in FIG. 5;

FIG. 7 is an alternative embodiment of the invention showing two clamping mechanisms disposed in tandem;

FIG. 8 is a plan view of the alternative embodiment of FIG. 7;

FIG. 9 shows an alternative construction of the invention; and

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FIG. 10 is a fragmentary plan view showing one end of the alternative construction of FIG. 9.

Referring to the drawings, particularly FIGS. 1-4, the plate cylinder 10 of a rotary printing press is mounted on a horizontal shaft which is journally supported on both ends in side frames of the printing press and rotated by suitable driving means. Of the above, only a fragment of plate cylinder 10 is shown. A peripheral slot, axially disposed in cylinder 10, contains the improved clamping means of this invention.

The clamping mechanism is composed of a supporting bracket 11, fastened to side 12, of the slot in cylinder 10 by machine screws 13. At the top of bracket 11, an overhang 14 forms a channel 15, which runs the length of bracket 11, and confines clamping member 16 in such a way, that it is pivotable about vertex 15a of channel 15. The width of clamping member 16 is greater than the perpendicular distance from side 12 to vertex 15a. Therefore, when clamping member 16 is rotated in a clockwise direction, its movement will be terminated by the wedging contact of clamping member 16 against side 12 of cylinder 10.

The gripper apparatus of the preferred embodiment of the present clamp comprises three segments, a center clamping member 16; and two end clamping members 16a. The end clamping members 16a are identical to the center member 16 in operation, and differ in form in just one respect, which will be described hereinafter.

Bracket 11 is provided with a tapped hole 17 to accommodate threaded shoulder pin 18 which fits loosely through an aperture in clamping member 16. Clamping members 16a are provided with similar apertures, through which shoulder pins 18a loosely fit. Shoulder 18 serves to prevent lateral translation of clamping member 16, as can be seen clearly in FIGS. 2 and 3. Should it become necessary to remove clamping member 16 from bracket 11, as for example, to replace it, this may be done by removing shoulder pin 18 and sliding clamping member 16 out of channel 15. Clamping members 16a may be removed in a similar manner.

Clamping member 16 is biased against anvil 20, i.e. the upper portion of side 12, by spring 21 which surrounds shoulder pin 18 and is disposed in well 22 of bracket 11. In a like way, clamping members 16a are also biased against anvil 20. Clamping member 16 is provided with ears 26 on each end, which represent the above mentioned dissimilarity between center clamping member 16 and end clamping members 16a. Ears 26 are formed to fit above the inwardmost edges of end clamping members 16a, so that when center clamping member 16 is depressed, the end clamping members 16a will also be depressed. In other words, all the clamping members may be depressed as a unit by pressing just one point on the improved clamp.

However, although the entire unit may be opened by depressing center clamping member 16, enough clearance is allowed between the lower surface of ears 26, and the upper surface of clamping members 16a to enable the center clamping member 16 to be opened independently of the end clamping members 16a. Depressing clamping member 16 a greater distance than the clearance allowed will cause the entire unit to open.

A printing plate or master sheet 23 is placed in the new clamping mechanism by first depressing center clamping member 16, and consequently end clamping members 16a. The clamping members 16 and 16a then pivot about point 15a moving edge 19 arcuately down and away from anvil 20, leaving a space between edge 19 and anvil 20. Plate 23 is then inserted into this space until its leading edge abuts filler piece 25, or bottom wall 24, in the event that filler piece has been removed. Clamping member 16 is then released. Spring 21 urges

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members 16 upward, bringing edge 19 into wedging contact with anvil 20 thus applying a large pressure to printing plate 23, holding it firmly in place. Plate 23 may then be bent around edge 27 of cylinder 10 to ready it for printing.

The wedging action of edge 19 against anvil 20 obviously produces a far greater pressure on plate 23 than the pressure which spring 21 could produce directly. In fact, spring 21 may be made light enough to allow a plate 23 to be placed in the clamp merely by shoving it downward between clamping members 16 and 16a and anvil 20.

In short run duplication work, for which this clamp is intended, the trailing end of the printing plate is ordinarily allowed to follow freely without being secured to the printing cylinder. Therefore, due to the positive wedging action of this clamp, the plate is held so securely that merely inserting the leading edge of the printing plate into the clamp, as hereinbefore described, permits printing to begin immediately.

As was previously mentioned, the clamp of this invention is composed of independent clamping segments 16 and 16a. This type of construction allows a supplemental narrow plate 28, FIG. 3, to be secured to the printing cylinder 10 anywhere along the length of the cylinder without disturbing the registration of the main plate 29 already secured thereon, inasmuch as any clamping segment can be opened without opening the other clamping segments.

After the desired number of copies have been printed, the printing plate 23 is removed from the clamp by first depressing center clamping member 16 to release the pressure, then pulling the plate out.

Referring now to FIGS. 5 and 6, prongs or pin bars 30 fastened to bracket 11 by screws 31 greatly increase the versatility of the improved clamping mechanism. Prongs 30 are designed to cooperate with main and supplemental plates having perforations at their leading edges. It is clear then, that such plates may be secured on cylinder 10, either by gripping them in the clamp itself or by utilizing the prongs 30.

FIGS. 5 and 6 show a main plate 32 secured by the clamp, and an overlying plate or blank out strip 33 carried by prongs 30. Accurate alignment between overlying plate 33 and main plate 32 is obtained by removing filler piece 25 of FIG. 1, and inserting the leading edge of plate 32 to bottom wall 34. When this is done, the distance from the leading edge of plate 32 to the edge 35 of cylinder 10, will be equal to the distance from the leading edge of overlying plate 33 to the edge 35, hence, perfect alignment between the two plates is obtained.

Another situation in which the filler piece 25 will not be used occurs when a serrated edged plate is employed. The reason for this is that the distance from the leading edge of a serrated edge plate to the printing surface of the plate is greater than the similar dimension on a straight edged plate. Therefore, a larger portion of the serrated edged plate must be held in the clamp, and the filler piece is removed to accommodate it. In other words, the height of the filler piece 25 is equal to the above mentioned difference in length between a serrated edged plate and a straight edged plate, and hence, the spacer bar 25 compensates for this difference.

Additional versatility may be obtained with this invention by arranging two of the novel clamping mechanisms in tandem as shown in FIGS. 7 and 8. One of the clamps, comprising bracket 11, clamping member 16, guide pin 18, and spring 21, is identical to the above described clamp shown in FIG. 1. The second clamp resembles the clamp of FIG. 1 in all respects but one, which is that bracket 36 does not possess a slot for accommodating filler piece 25 of FIG. 1. Provision for a filler piece in bracket 36 is unnecessary inasmuch as an overlying plate or blankout strip 33, whose leading edge is inserted into the second clamp to base wall 37, will be

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perfectly aligned with a main plate whose leading edge is inserted to bottom wall 34 of the first clamp, since the distances from base wall 37 and bottom wall 34 to edge 35 of cylinder 10 are equal.

In an alternative embodiment of the invention, shown in FIGS. 9 and 10, there are no guide pins 18 and 18a like those of FIGS. 1-4. Instead, lateral translation of the clamping members 41 and 41a is prevented by closing off both ends of channel 43. This is done by providing supporting bracket 40 with an abutment member at each end, such as machine screws 42.

Many variations and modifications may be made on the present invention, including its mode of application, which will still be comprised within its spirit. It is to be understood, therefore, that the invention is not limited to any specific form or embodiment, except insofar as such limitations are specified in the appended claims.

Having thus described the invention, what is claimed is:

1. In a printing press, a plate cylinder having a peripheral slot disposed parallel to the cylinder axis, and a clamping device secured in said slot for holding the leading edge of a flexible printing plate, said clamping device comprising, a supporting bracket having a groove therein for pivotally supporting a clamping member, said groove being spaced from the sidewall of the slot in which the device is secured and extending parallel thereto, a clamping member having one edge pivotally supported in said groove, said member having a dimension greater than the spacing between the aforesaid bracket groove and the sidewall of the slot, and resilient means acting directly on said clamping member approximately midway between the pivot support for said member and the sidewall of the peripheral slot for biasing the edge of said clamping member opposite to the groove supported edge into wedging engagement with the sidewall of the peripheral slot whereby the leading edge of a printing plate disposed between said clamping members and the sidewall will be gripped.

2. In a printing press, a plate cylinder having a peripheral slot disposed parallel to the cylinder axis, and a clamping device secured in said slot for holding the leading edge of a flexible printing plate, said clamping device comprising, a supporting bracket, a plurality of clamping members arranged side by side across the effective printing width of the plate cylinder, each of said members being individually pivotally supported by said bracket, at least one of said members having an ear which extends over but is spaced from an adjacent clamping member whereby depression of said one member more than a predetermined distance causes said ear to engage the said adjacent member and pivot both members out of plate holding position and resilient means individual to each of said clamping members for biasing said members individually into plate holding position.

3. In a printing press, a plate cylinder having a peripheral slot disposed parallel to the cylinder axis, and a clamping device secured in said slot for holding the leading edge of flexible printing plates, said clamping device comprising, a first supporting bracket having a slot therein wherein the leading edge of a printing plate may be inserted, a filler piece removably placed in said slot, a clamping member pivotally supported by said bracket, resilient means biasing said clamping member into wedging engagement with the sidewall of the peripheral slot whereby the leading edge of a printing plate disposed between said clamping member and the sidewall will be gripped, a second supporting bracket secured in tandem relationship to said first bracket and so positioned with respect thereto that the distance measured along the plate from the leading edge of the plate gripped in the first bracket to a point on the plate cylinder will be equal to the distance measured along the plate from the leading edge of the plate gripped in the second bracket to the same point on the plate cylinder, a clamping member piv-

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otally supported by said second bracket, and resilient means for biasing said clamping member into wedging engagement with the back side of said first bracket whereby the leading edge of a printing plate disposed between said clamping member and said first bracket will be gripped. 5

4. In a printing press, a plate cylinder having a peripheral slot disposed parallel to the cylinder axis, and a clamping device secured in said slot for holding the leading edge of flexible printing plates, said clamping device comprising, a supporting bracket, a clamping member pivotally supported by said bracket, resilient means biasing said clamping member into wedging engagement with the sidewall of the peripheral slot whereby the leading edge of a printing plate disposed between said clamping member and the sidewall will be gripped, and a plurality of prongs secured in tandem relationship to said supporting bracket for holding the leading edge of an additional printing plate, said prongs being so positioned with re- 20

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spect to said bracket that the distances measured along the plates from the leading edges of the plates secured by the clamping member and the prongs respectively to some common point on the plate cylinder will be equal.

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