

[54] **DEVICE FOR FASTENING FLEXIBLE PRINTING PLATES**

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[58] **Field of Search**..... 101/415, 1, 378

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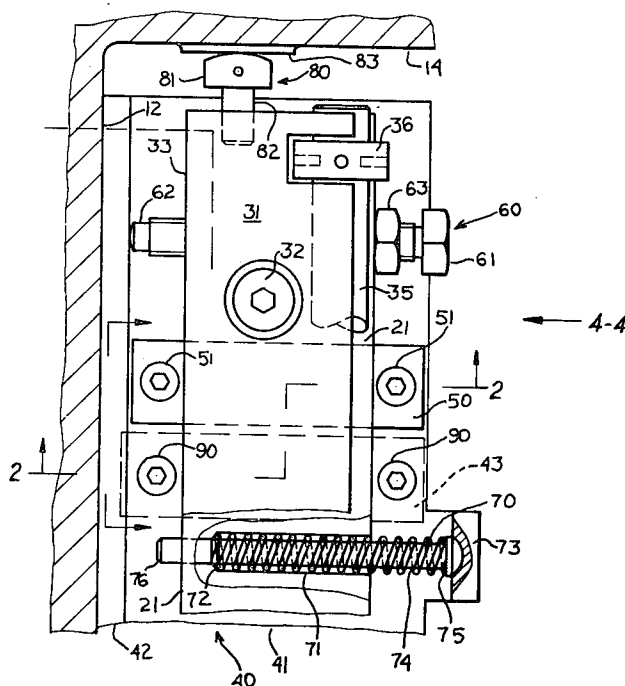
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[57] **ABSTRACT**

A plate lock-up mechanism for securing and adjusting a flexible printing plate upon a plate cylinder which includes a supporting plate flatly seated in a groove formed in the cylinder and which extends the length of the groove. Mounting bars are spaced end to end above the supporting plate, each of the mounting bars having a clamping rail for holding the edge of a printing plate and the mounting bars being captively shiftable on the supporting plate. Each mounting bar has provision for circumferential and axial adjustment. The supporting plate is clamped in the bottom of the groove by readily accessible screws which permit removal, as a unit, of the supporting plate, the captive mounting bars, and associated parts. This permits substitution of an alternative single, elongated mounting bar for accommodating a single plate which extends the length of the groove.

1 Claim, 6 Drawing Figures



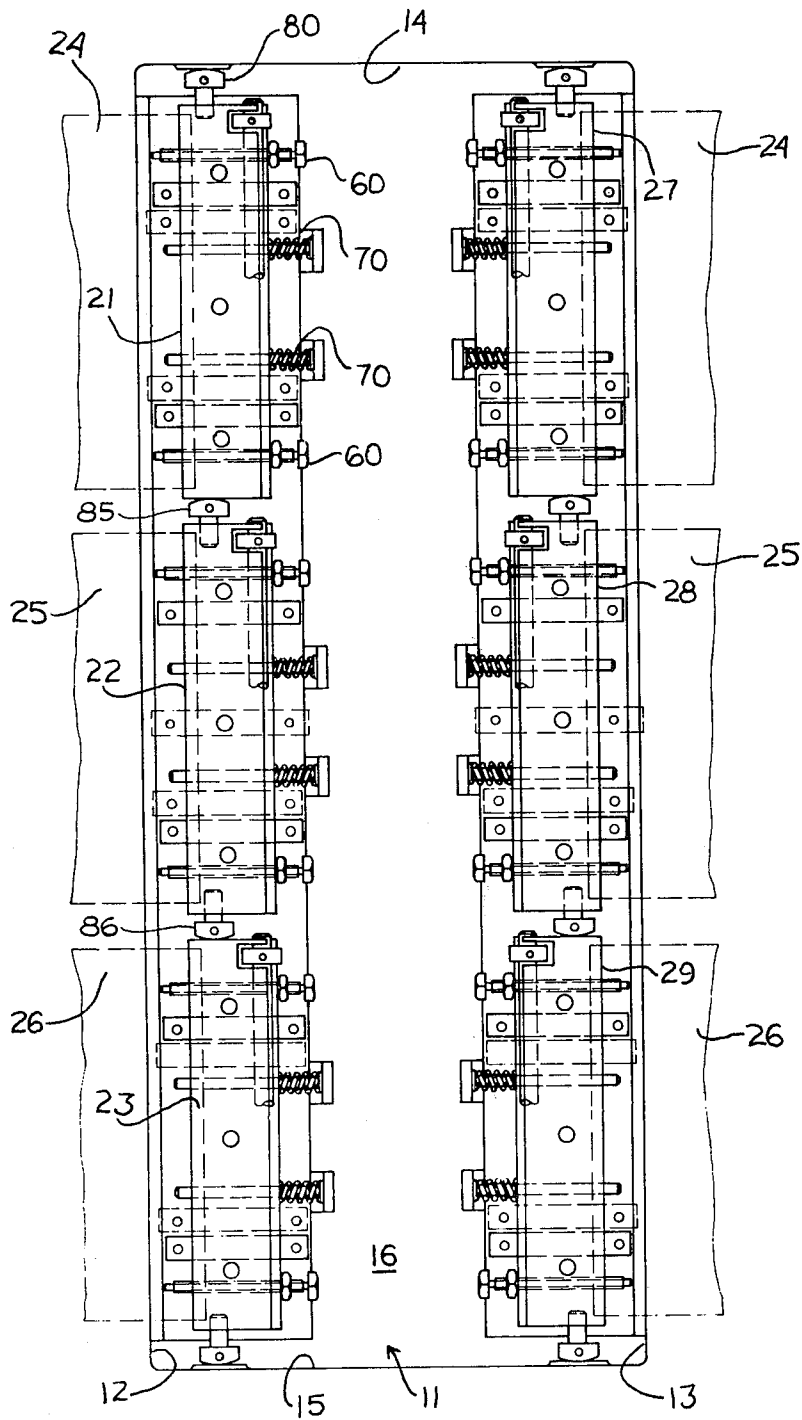


Fig. 1

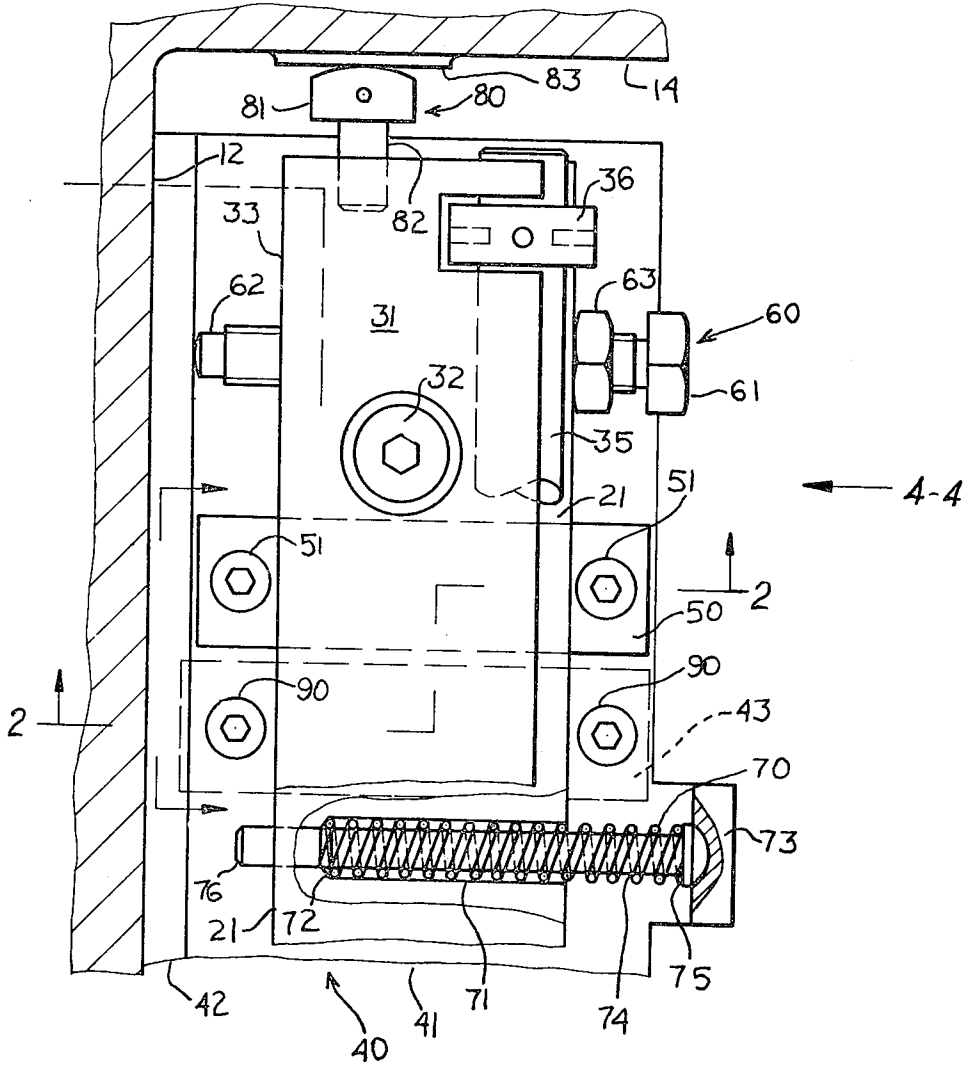
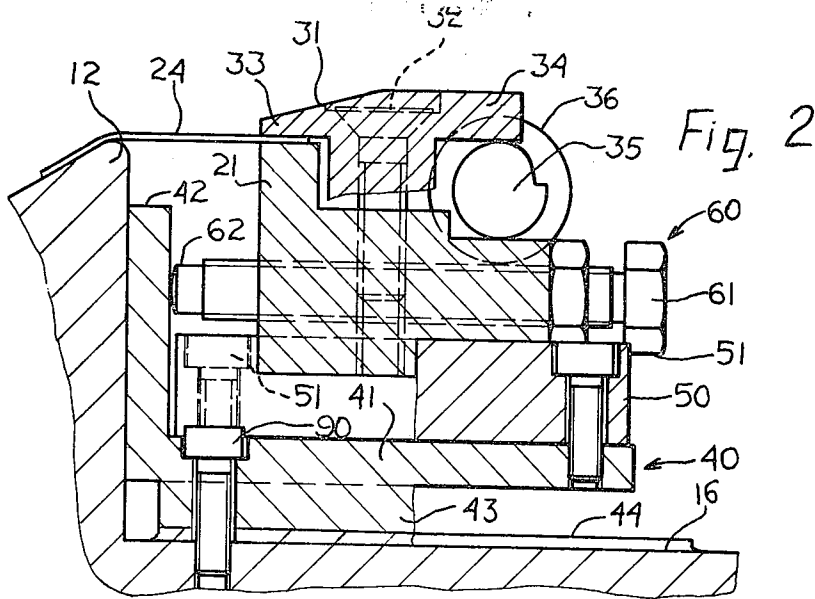
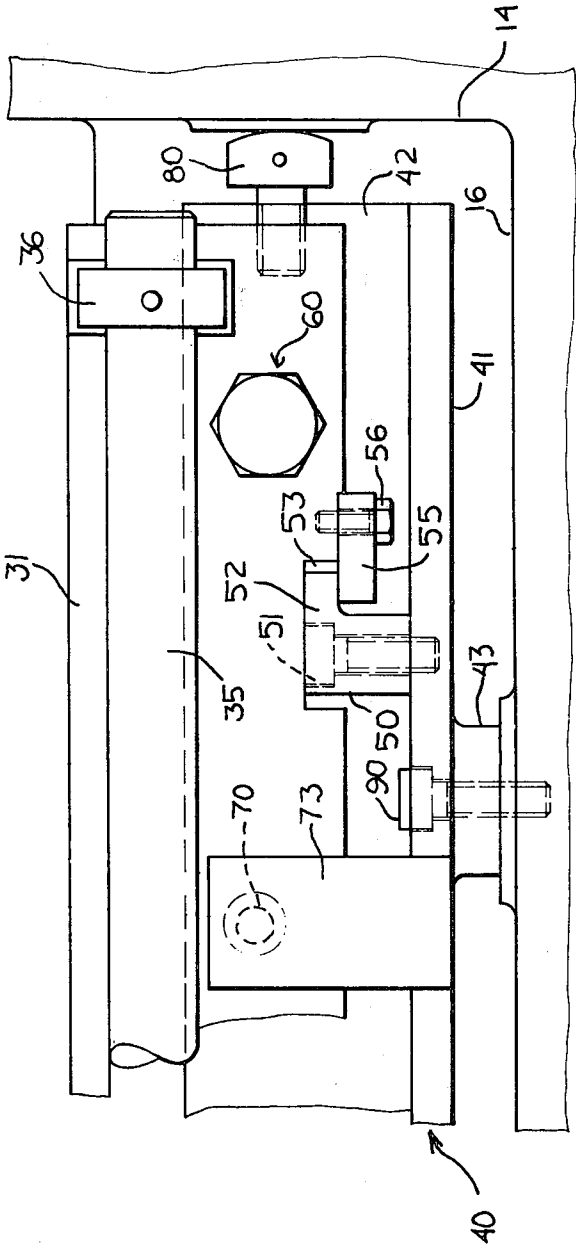


Fig. 3

Fig. 4



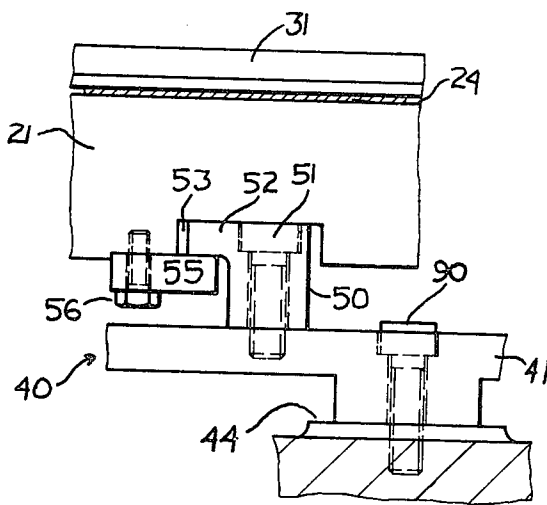


Fig. 5

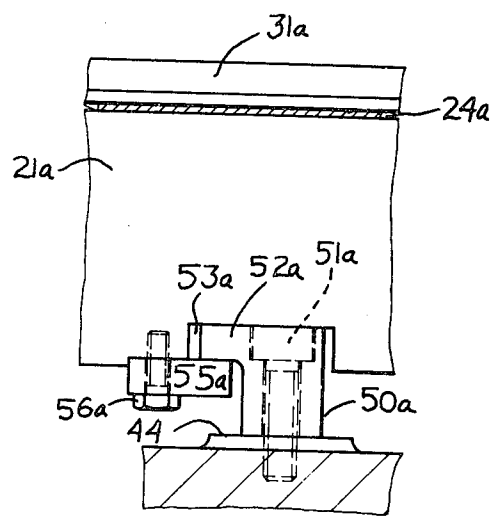


Fig. 6

DEVICE FOR FASTENING FLEXIBLE PRINTING PLATES

It is an object of the present invention to provide a plate lock-up mechanism for flexible printing plates which permits a plurality of plates to be individually secured and adjusted in side-by-side relation and which permits alternate accommodation, on the same cylinder, of a single printing plate which extends substantially the full length of the cylinder.

It is a more specific object of the present invention to provide a plate lock-up mechanism which is distinguished by the use of a supporting plate which runs the length of the groove and which has a plurality of printing plate mounting bars captive thereon with means for individual circumferential and axial adjustment, with the supporting plate and captive mounting bars being removable from the cylinder as a unit by loosening a few screws so that a single printing plate mounting bar may be alternatively mounted in place easily and quickly as a single mechanical step without exercise of skill.

It is another specific object of the invention to provide a supporting plate construction distinguished by an L cross section and having a plurality of plate mounting bars which are individually biased and in which the supporting plate and mounting bars, together with the biasing means, may all be removed as a unit from the cylinder without affecting the biasing forces.

Other objects and advantages of the invention will become apparent upon reading the attached detailed description and upon reference to the drawings in which:

FIG. 1 is a plan view of a plate lock-up mechanism constructed in accordance with the present invention with provision for mounting three plates side by side on a plate cylinder.

FIG. 2 is a fragmentary transverse section taken along the line 2—2 in FIG. 3.

FIG. 3 is a fragmentary plan view showing a portion of one of the mounting bars.

FIG. 4 is a fragmentary elevational view looking along the line 4—4 in FIG. 3.

FIG. 5 is a fragmentary section looking along the line 5—5 in FIG. 3.

FIG. 6 is a fragmentary view corresponding to FIG. 5 but showing the substitution, in the groove, of a single plate mounting bar.

While the invention has been described in connection with a preferred embodiment, it will be understood that I do not intend to be limited to the particular embodiment shown but intend, on the contrary, to cover the various alternative and equivalent forms of the invention included within the spirit and scope of the appended claims.

Turning now to the drawings, there is shown a portion of a printing cylinder 10. This cylinder will be understood to form a part of a conventional lithographic printing unit consisting of a printing cylinder, blanket cylinder and impression cylinder, which latter have not been illustrated. Formed in the printing cylinder is a longitudinally extending groove 11 having parallel side walls 12, 13, end walls 14, 15, and a flat bottom wall 16.

Mounted in the groove are plate mounting bars 21, 22, 23 for holding the ends of flexible printing plates 24, 25, 26, respectively, the three plates, in the present

embodiment, being arranged side by side. For securing and adjusting the other ends of these plates, similar mounting bars 27, 28, 29 are provided. Since all of the mounting bars are of similar construction, it will suffice to take the bar 21 by way of example, as set forth in some detail in FIGS. 2, 3 and 4.

To grip the end of the plate 24 against the mounting bar 21, there is superimposed, upon the bar, a coextensive clamping rail 31 which is loosely secured to the bar by means of a set of screws 32 and which has a clamping lip 33 as well as a heel 34. Mounted under the heel 34, and bearing against the bar 21, is a non-circular, or eccentric, shaft 35 having a capstan 36 at its end. It will be apparent that rotating the capstan twists the shaft 35 to cam the heel of the clamping rail upwardly which serves to rock the rail so as to bring the lip 33 tightly down against the engaged end of the plate.

It is one of the primary features of the present invention that the mounting bars 21–23 rather than being mounted directly in the groove 11 are, instead, mounted upon an interposed supporting plate which extends the length of the groove. Thus I provide a supporting plate 40 having a “horizontal” portion 41 and a “vertical” portion 42 to define an L shape. The portion 41 of the supporting plate is of flat construction seating flatly in the bottom of the groove. Preferably, the supporting plate is provided with integral pedestals 43 of shallow dimension which engage mounting pads 44 having machined surfaces spaced registering on the bottom of the groove.

For the purpose of maintaining the mounting bar 21 captive against the effect of centrifugal forces while permitting limited circumferential and axial movement required for register of the plate, a pair of guide bars, individually indicated at 50, are interposed between the mounting bar 21 and the horizontal portion 41 of the supporting plate. Each guide bar 50 is secured by a pair of screws 51 to the horizontal portion 41 of the supporting plate, with its length dimension oriented circumferentially as shown in FIG. 3. The guide bar is of inverted L shape, (FIGS. 4 and 5), having a horizontal or lip portion 52 which is received in an oversized, circumferentially extending groove 53 formed on the underside of the mounting bar. To keep the guide bar captive in such groove, a retaining member 55 is provided, which is held in place by a pair of screws 56. It will be apparent, then, that the mounting bar 21 may be shifted circumferentially along the guide bar and may, in addition, be shifted axially with respect to the guide bar and supporting plate while still remaining securely captive.

In order to adjust the position of the mounting bar 21 with respect to the supporting plate, a pair of adjusting screws 60 are circumferentially threaded into the bar at its respective ends, each screw having a head 61, a tip 62 and a locking nut 63.

In accordance with one of the aspects of the present invention biasing springs are interposed between the supporting plate and mounting bar for biasing the mounting bar in the direction of the printing plate so that the tips of the circumferential adjusting screws are continuously bottomed against the vertical portion 42 of the supporting plate. Taking one of the springs, indicated at 70, by way of example, the spring is received in a circumferentially extending bore 71 formed in the mounting bar. The spring is supported at its left-hand end at the base 72 of the bore and is supported at its

right-hand end upon a small bracket 73 which is integral with the supporting plate 40. For guiding the spring, a pin or rod 74 is preferably telescoped within it, the right-hand end of the spring being seated upon the head 75 of the pin while the tip 76 of the pin extends clear through a suitable clearance opening.

It will be apparent, then, that when the locking nuts 63 are loosened and the circumferential adjusting screws 70 are turned in a clockwise direction, the mounting bar will be shifted relatively away from the vertical portion 42 of the supporting plate and in a direction to tension the printing plate. Or the screws may be turned in the opposite direction. The adjusting screws 60, employed as a pair, may therefore be used to register the printing plate in the circumferential direction, as well as tensioning it, and by adjusting the screws differentially, a limited amount of skew may be imparted to the plate as required under certain conditions.

To adjust the mounting bar 21 endwise, that is, in the axial direction, adjusting screws are provided at the ends of the bar. Referring to the end of the bar visible in FIG. 3, an adjusting screw 80 is provided having a head 81 and a shank 82 which is axially threaded into the bar, the head engaging a land surface 83 at the end of the groove. A tight thread is used so that a locking nut may be dispensed with. Since the adjusting screws 60, 80 are arranged at right angles to one another, axial and circumferential adjustment may be imparted to the bar individually.

To enable axial adjustment of all of the mounting bars, while at the same time taking up end play between them, additional axial adjusting screws 85, 86 interposed between the opposed spaced ends of the bars as shown in FIG. 1.

In carrying out the present invention, a readily accessible set of screws is provided for clamping the mounting plate 40 in the bottom of the groove, with the vertical portion 42 of the plate flatly seated against the groove sidewall. The screws for the supporting plate, which are preferably socket-headed, and indicated at 90, are provided in pairs and spaced on opposite sides of the mounting bar and well clear thereof so as to permit direct access by a turning tool which may, conveniently, be in the form of an Allen type wrench.

Thus, when it is desired to accommodate a single printing plate which extends the length of the groove in the cylinder, rather than employing the three narrower printing plates in side-by-side relation, the screws 90 are unscrewed, thereby freeing the supporting plate 40 so that it may be lifted from the groove, with all of the locking mechanism thereon, as a unit. It is to be particularly noted that when the mechanism is thus removed it is removed complete with the (a) series of mounting bars, (b) the guide bars which hold the mounting bars captive, (c) the rails and clamping means for the rails and (d) the biasing springs, without any necessity for releasing the biasing forces. The biasing forces remain internally confined between the vertical portion 42 of the supporting plate and the opposed brackets 73, along the opposite edge of the supporting plate and which are integral with it. It is also to be noted that the entire assembly may be removed, following disengagement of the plate, without having to disturb any of the circumferential or axial adjusting screws.

With the unitary lock-up mechanism removed, it may be replaced by a single plate mounting bar which ex-

tends the length of the groove and which is believed to be adequately shown in FIG. 6. Here it will be noted that the single, elongated mounting bar 21a is mounted upon a guide bar 50a held in place by a pair of screws 51a (only one of which is shown) which serve to clamp the guide bar directly against the pad 44 previously referred to and which is formed on the bottom of the cylinder groove. The guide bar 50a has a horizontally extending portion 52a which is registering received in an oversized groove 53a, with the guide bar being held captive in the groove by means of a retainer 55a which is secured to the bar by a pair of screws 56a. Identical guide bars 50a may be spaced at convenient intervals.

For the purpose of registering and tensioning the single plate 24a which is engaged by the bar 22a, circumferential adjusting screws are threaded into the bar adjacent its ends, adjusting screws which are similar to the adjusting screws 60 previously described, with the difference that the tips of the screws, instead of engaging a supporting plate, will directly engage the sidewall 12 of the groove. For the purpose of adjusting the mounting bar 21a endwise, it will be understood that axial adjusting screws (not shown) are provided at the respective ends of the bar and which are similar to the axial adjusting screws 80 described above.

In addition to the flexibility provided by the three-across lock-up illustrated in FIG. 1 and the "single bar" lock-up alternatively used and indicated in FIG. 6, it will be understood that the flexibility may be extended to include supporting plates having different numbers of mounting bars; for example, an assembly may be provided similar to that shown in FIG. 1 but which has two, rather than three, plate mounting bars for mounting of plates "two-across."

While the discussion has been restricted to a lock-up mechanism for engaging corresponding ends of a set of printing plates, it will be understood that a similar lock-up assembly may be symmetrically provided, in the same groove in the cylinder, for engaging the opposite ends of the same plates or for engaging the ends of a second set of plates where the cylinder has a second groove and where plates are mounted "two around". Corresponding reference numerals are used, for convenience, to designate corresponding parts of the second mechanism.

It is preferred to provide a supporting plate 40 which is of L configuration for a number of reasons. Such configuration not only maintains the biasing forces exerted by the spring 70 self-contained, as discussed, but it is of high inherent strength and more protective of the mechanism once it is removed from the cylinder.

In installation of a typical plate, the leading and trailing edges are securely clamped by respective clamping rails 31. One end of the plate may be then registered, both circumferentially and axially, by turning the screws 60, 80. Following this the axial screws at the other end of the plate may be adjusted and then, as a final step, the circumferential screws at the other end of the plate may be tightened as necessary to impart the desired degree of tension, following which the lock nuts are turned tight to preserve the adjustment.

What is claimed is:

1. In a plate lock-up mechanism for securing and adjusting a flexible printing plate upon a plate cylinder which has a longitudinal groove formed therein defined by side walls, end walls and generally flat bottom wall, the combination comprising a supporting plate member

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of L cross section made up of horizontal and vertical portions at right angles to one another respectively seated against the bottom and side wall of the groove and extending substantially the length thereof, the supporting plate member having bracket means along one edge in spaced opposition to the vertical portion, a plurality of mounting bars spaced end to end in the groove above the supporting plate member, means including guide bars interposed between the mounting bars and the supporting plate member for holding the mounting bars individually captive thereon while permitting limited shifting movement both circumferentially and axially, each of the mounting bars having a coextensive rail for tightly holding the edge of a printing plate, circumferentially oriented springs interposingly compressed between the bracket means and the individual mounting bars for biasing the mounting bars circumferentially in the direction of the vertical portion of the supporting plate member, first screw means in each bar extending circumferentially bearing against the vertical portion of the supporting plate member for adjusting each bar and its printing plate circumferentially with

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respect to the cylinder, second screw means in each bar for adjusting each bar and plate axially with respect to the cylinder, and a set of supporting screws for clamping the supporting plate member securely against the bottom of the groove, the supporting plate screws being positioned such that the axes of the screws, when extended past the head ends of the screws, are substantially free of any obstruction by any other part of the plate lock-up mechanism so that the screws are readily accessible for easy and unobstructed application of an unscrewing tool notwithstanding the presence of the plate mounting bars whereby, upon removal of the screws, the supporting plate member and the mounting bars and associated biasing springs which are captive thereon may be removed as a unit from the cylinder while preserving the adjusted positions of the bars relative to the supporting plate member and while preserving the compressed condition of the biasing springs for substitution in the groove of a single plate mounting bar extending the length thereof.

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