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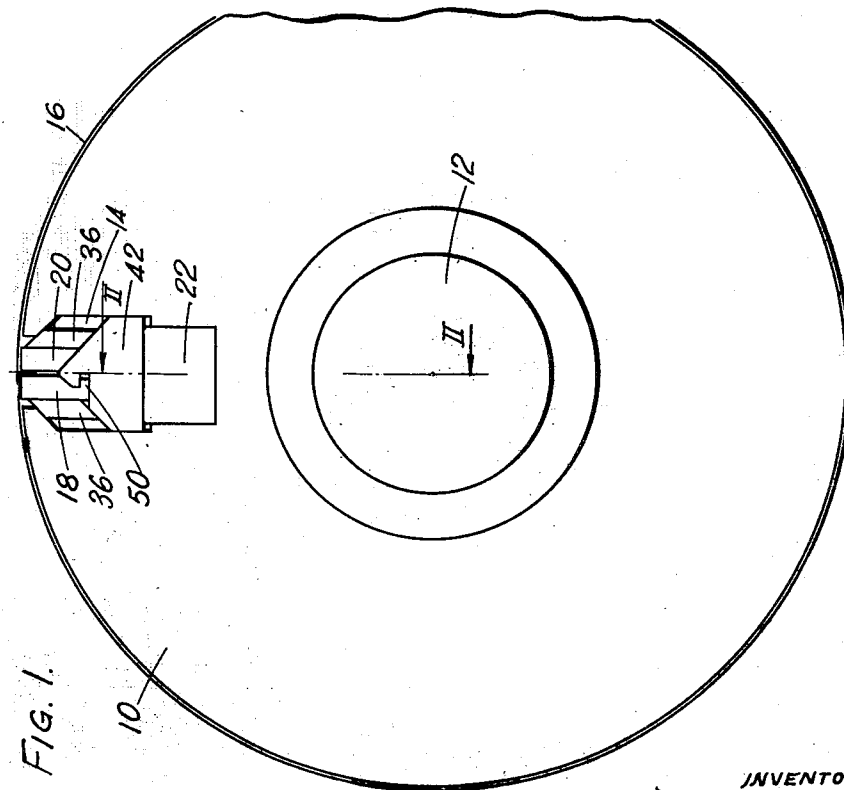
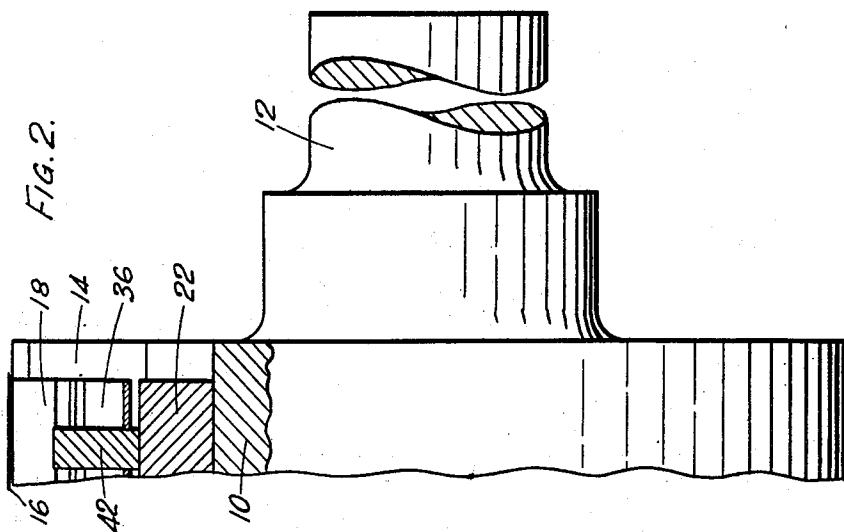
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2,619,904

PLATE STRAINING MECHANISM FOR USE IN PRINTING MACHINES

Filed May 14, 1947

3 Sheets-Sheet 1



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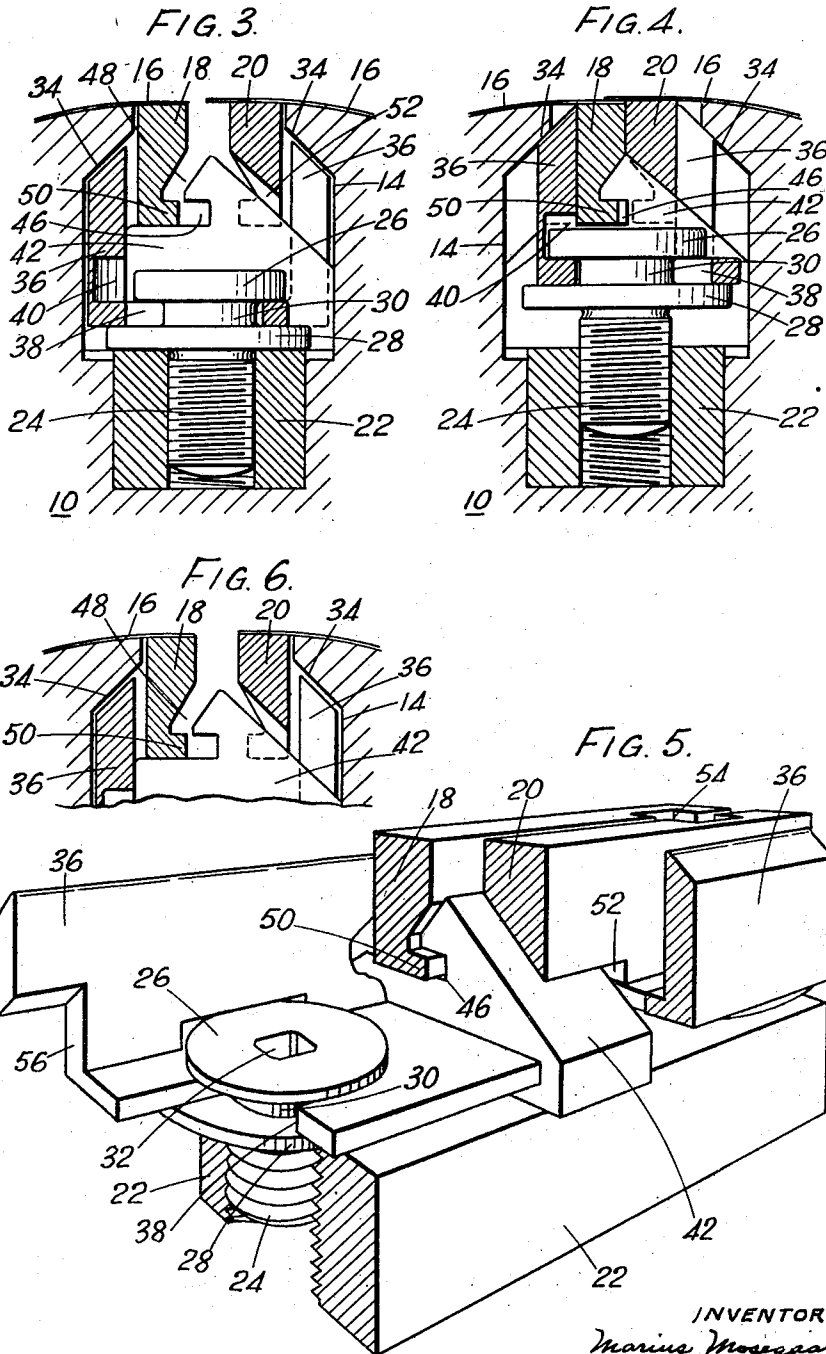
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PLATE STRAINING MECHANISM FOR USE IN PRINTING MACHINES

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3 Sheets-Sheet 2



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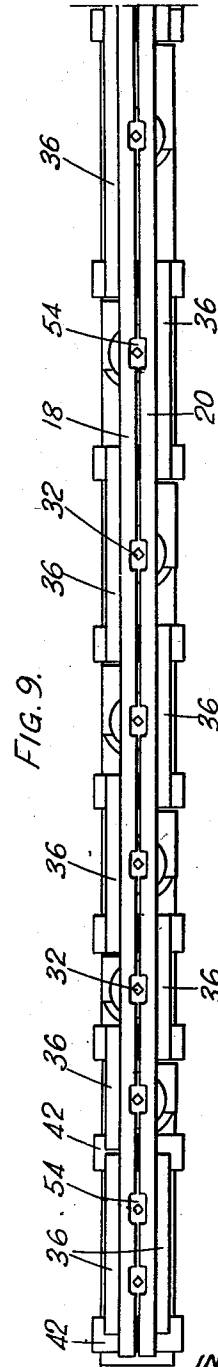
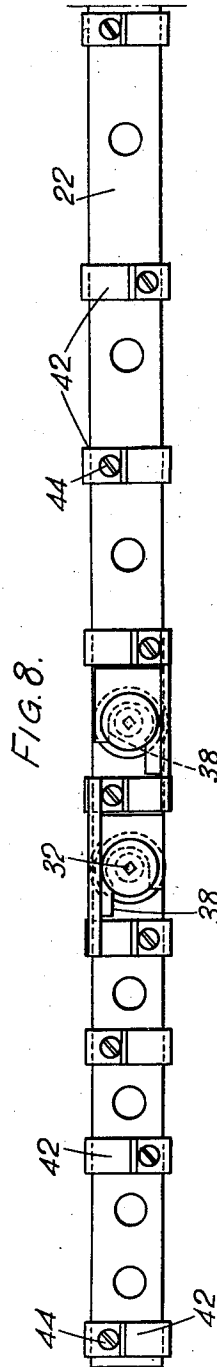
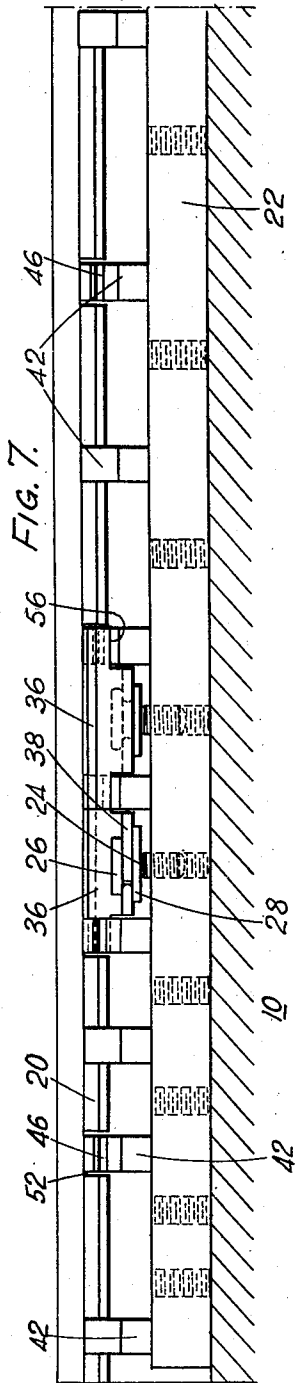
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PLATE STRAINING MECHANISM FOR USE IN PRINTING MACHINES

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3 Sheets-Sheet 3



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UNITED STATES PATENT OFFICE

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PLATE STRAINING MECHANISM FOR USE IN
PRINTING MACHINESMarius Mosegaard, Copenhagen, Denmark, as-
signor to R. Hoe & Co., Inc., New York, N. Y.,
a corporation of New YorkApplication May 14, 1947, Serial No. 747,912
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8 Claims. (Cl. 101—415.1)

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This invention relates to mechanism for the straining of a printing plate around the plate cylinder of a printing machine, especially in high speed rotary presses for planographic and particularly for off-set printing; the invention is concerned with an arrangement in which the ends of the printing plate are secured to clamping bars which are passed into a slot on the cylinder and to which pressure is applied to strain the plate around the cylinder.

The known mechanism has proved unsatisfactory, especially in its application to machines in which the whole periphery of the cylinder is to be utilised, the cylinder having only a slot which admits the two bars secured to the two ends of the printing plate. Such mechanisms have been so arranged as to impart a radial and inwardly directed pressure on the bars, the ends of the plate being bent inwards over rounded edges at the opening of the slot. These edges are thus subjected to considerable wear, the printing plate sliding over these edges during the plates fitting and straining; this is especially the case when the plate is made of a relatively hard and stiff material, as for instance rustless or stainless steel.

Another disadvantage with this known construction is that the opening or mouth of the slot, between the ends of the plate passing over the rounded edges, has to be filled with a bar the exterior surface of which is at the same level as the periphery of the plate cylinder; however with the wearing of the rounded edges, this bar passes too far into the slot so producing on the surface of the cylinder a recess which may accumulate liquid during the printing and also set up hammer or shock in the working of the press.

According to this invention the ends of the plate have secured to their under surfaces clamping bars the plate-engaging faces of which when in position form substantially a continuation of the periphery of the cylinder; these bars which when in position extend below the circumference of the cylinder are movable relatively towards one another about the cylinder so as to draw the plate ends towards one another to strain the plate about the periphery of the cylinder.

This arrangement avoids the defects which arise from bending the ends of the plate about the clamping bars and lends itself to an arrangement in which either the one end of the plate can overlap the other end when a continuous printing surface is required or the two ends can be brought extremely close together for the same reason. Moreover of course the ends of the plate

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are supported at the circumferential level of the cylinder by the bars.

Other characteristics of the invention will be described hereinafter with reference to the drawings, of which Figure 1 is an end view of the cylinder of a rotary printing machine having in its periphery one slot containing a mechanism according to the invention. Figure 2 is a local sectional elevation taken on the line II—II, Figure 1.

Figures 3 and 4 show on an enlarged scale a cross-section of the cylinder at the region of the slot in which the straining mechanism is arranged; the two figures showing the mechanism respectively in non-straining and strained state.

Figure 5 shows a portion of the mechanism in perspective some of the parts being cut away in order to provide greater clearness. Figure 6 is a local sectional view of a modification. Figure 7 is a longitudinal section taken through one half of the length of the cylinder and of the rail and having certain parts mounted thereon the plate also being indicated in the figure and Figure 8 is a plan view of the rail and parts mounted thereon as shown in Figure 7; Figure 9 is a plan view of one half length of the whole mechanism according to the invention withdrawn from the cylinder.

As appears from Figures 1-5, an axial slot 14 is formed in the periphery of the plate cylinder 10 having at the ends a shaft 12. On the peripheral surface of the cylinder 10 is laid a printing plate 16 of a convenient metal, for instance stainless steel. The under surface of the ends of this plate are respectively spot welded to one face of two clamping bars 18 and 20 accommodated in the slot 14 and these bars are moved towards one another to effect the straining of the plate by means of the mechanism of the invention, that mechanism being also mounted in the slot 14.

As illustrated the face of the upper side of the bars 18 and 20 (to which face the plate is secured) forms substantially a continuation of the circumference of the cylinder 10; in the arrangement shown in Figures 1 and 2 that end of the plate which is secured to the bar 18 has its extremity at or within the lateral surface of the bar 18 which is opposed to the bar 20. In the case of the end secured to the bar 20, the edge of the plate extends beyond the corresponding lateral surface, so that the end borders of the plate, after the straining operation, extend over one another slightly.

In Figure 6, both ends of the plate terminate at or within the opposed faces of the two bars

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18, 20 so that in this case the ends of the plate do not overlap; in this case the straining operation brings the two extremities of the plate into close relationship and indeed the separation after straining of the opposed faces of the bars 18, 20 and of the two extreme edges of the plate may be of the order of only a few thousandths of an inch.

In both arrangements, the outer faces of the bars 18, 20 afford a support over the slot 14 for the ends of the plate at substantially the circumferential level of the periphery of the cylinder.

Referring now to the straining mechanism itself, at the base of the slot 14 is a bar 22 which is secured to the cylinder 10 in a convenient way, for instance by means of screws, not shown.

Screwed into the bar 22 is a series of screws 24, the axes of which lie in the axial central plane of the slot, and the heads of the screws are formed with two flanges 26 and 28 providing an intermediate neck 30, see Figures 3-5. A square recess or hole 32 is provided in the screws to receive a key to turn the screws.

The slot 14 is recessed back from the opening so providing two sloping undercut surfaces 34, Figures 3 and 4, lying relatively near the circumference of the cylinder 10. In the slot 14 are provided under the sloping surfaces 34, wedge pieces 36 having outer faces formed to the same angle as that of the sloping surfaces 34. These wedge pieces are of angle of L form having the one limb extending up the radially directed side of the slot 14, and the other limb is formed to sit around the neck 30 of the screw 24, between the flanges 26 and 28.

A number of these wedge pieces is provided at both sides of the slot 14 these various pieces being independently adjustable. The wedge pieces at both sides are staggered as seen in Figures 8 and 9 for which reason the wedge piece shown at the left of Figures 3 and 4 appears in section while that shown to the right lies behind the plane of the section, each wedge piece 36 having its own screw 24. The limb of each wedge piece which seats about the screw neck 30 has an extension 38, see Figures 5, 7 and 8 and having an opening to receive the neck and is of such size as to allow a certain displacement of the wedge piece 36 longitudinally to slot 14. A recess 40 in each wedge piece 36 is provided to accommodate or clear a portion of the flange 26 during the straining operation which involves a shifting of the wedge pieces.

Between the consecutive wedge pieces 36 are arranged guide blocks 42 these blocks being screwed to the bar 22 by means of screws 44, see Figure 8. The upper portion of the blocks 42 has substantially the form of an isosceles triangle, the one leg having a recess 46 at right angles to the axial mid-plane of the slot, for a purpose to be described later. The consecutive blocks are secured respectively in reverse sense as shown in Figures 7 and 8.

On the opposed faces of the bars 18 and 20 grooves 48 (Figure 6) are formed to produce on the lower side of the bars, a rib or locking component 50 to enter the recesses 46 of the blocks 42. In order that the sloping faces of the guide blocks 42, which do not contain the grooves 46 shall not foul the bar inserted in this side, for example the bar 20 in Figure 5, the bar 20 is notched at 52 in register with the said slanting sides or faces.

When the mechanism is not in plate-strain-

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ing condition, as shown in Figure 3, the vertical faces of the wedge pieces 36 lie along the lateral walls of the slot 14, and the screws 24 are screwed to their limit into the bar 22. When the printing plate 16 is now laid round the plate cylinder 10, the bars 18 and 20 can be passed into the opening of the slot 14 into the position shown in Figure 3. The printing plate now lies loose round the plate cylinder its ends being free from one another.

To strain the printing plate 16 the screws 24 are screwed upwards by the key to engage in the recess 32 for the passage of which key excisions are made either at the ends of the plate or in the bars 18 and 20, as illustrated in Figures 5 and 9 where said excisions are designated 54. By screwing a screw 24 upwards, the corresponding wedge piece 36 will also be moved upwards and simultaneously it will be forced inwards of the slot 14 by the co-operation of its outer sloping face with the inclined surface 34 of the slot. When the wedge piece 36 has passed a small distance inwards from the position shown in Figure 3, it comes into contact with the opposed face of the bar 18 (or the bar 20) and thereafter in its continued movement it pushes the bar 18 (or the bar 20) in front of it and the rib 50 is caused to pass into the groove 46 in the associated block 42.

Obviously the bars 18, 20 will have a tendency to cant i. e. in the case of the bars 18 to turn in counterclockwise, since the printing plate 16 exerts at the top a pressure to the left, while the wedge piece 36, especially its upper end, exerts lower down a pressure to the right. This canting is however prevented by the co-operation of the rib 50 with the groove 46, whereby it is possible to produce a couple to oppose the turning couple. The moment of the couple tending to cant the bar becomes smaller as the wedge-piece 36 passes outwardly in the slot 14. It is convenient to construct the mechanism in such a manner that the outer faces of the wedge pieces 36 reach the printing plate 16 near the circumference of the cylinder 10, when the opposed faces of the bars 18 and 20 are substantially in engagement at which time the printing plate is fully strained round the cylinder 10, see Figure 4.

Figure 5 illustrates how the bars 18 and 20 pass beyond a block 42. Bar 18 (or 20) passes its tongue 50 into the slit 46 on one inclined side of a cross piece 42, while the notches 52 of the bar 20 (or of the bar 18) are clear of the other inclined side of the cross pieces 42 engaged by the bars 18 (or 20). The same figure illustrates two adjacent wedge pieces 36 on opposite sides of the bars 18 and 20. These wedge pieces, as before mentioned, lie in continuation. The front end of the wedge piece 36 at the right of the drawing, is cut away in order to make the associated bar 20 visible. As also appears from Figure 5 the wedge pieces 36 shown at the left of the figure have excisions 55 to clear the blocks 42. The horizontal limb of a wedge piece 36 occupies approximately the distance between two consecutive blocks 42.

In Figures 7-9 the chain dotted line at the right denotes the transverse centre line of the rail 22 and of the cylinder 10. There being one wedge piece 36 at the one or the other side of the rail 22 between each two consecutive blocks 42, see Figure 9, and there being one screw 24 for each wedge piece, there will be found in the direction of the ends of the rail 22 relatively more screws 24 for the adjustment of the wedge pieces

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36 and consequently for the straining of the printing plate, than in the middle of the rail. This is due to the fact that at the ends a greater force is necessary for the straining of the printing plate, and in addition with a row of screws there exists the possibility of adjusting the bars 18 and 20 to be parallel with or inclined to the axial direction. The two ends of the plate may be adjusted independently, namely respectively with the screws 24 acting on wedge pieces 36 of one side of the slot, and the screws acting on the wedge pieces of the other side; thus with the mechanism according to the invention it is possible to obtain an exact "register" in the adjustment of the printing plate relatively to the underlying cylinder surface. It is possible not only the shift the printing plate a little forwards or backwards in tangential direction, but such an adjustment is also realisable so that the extremities of the printing plate lie either in a straight line parallel with the axis of the cylinder or along a helix having a slight gradient in the one or the other direction, a feature which is of considerable practical value. Further, the mechanism according to the invention involves that the printing plate can be mounted and strained very quickly on a plate cylinder.

It will be seen that the distance between the blocks 42 diminishes from the middle of the cylinder to the end, with the exclusion of the two outer blocks which are placed with greater distance.

This greater spacing enables two wedge pieces 36 facing each other to be provided at the ends of the rail 22 (see Figure 9). Both these wedge pieces are placed between the two terminal blocks 42, and in the intermediate space between these there are two screws 24 for the adjustment of each particular wedge piece.

The invention may be used whether or not the bars 18, 20 at the printing plate ends are accommodated in the same slot this depending on the extent to which the plate is required to extend around the plate cylinder; thus the invention can be applied to those planographic printing presses in which the printing plate only extends over, for instance, three-quarters of the surface of the circumference of the cylinder, while the remaining part of the cylinder is out of action during printing. While the invention is useful preferably for printing plates of hard and relatively stiff material, for instance rustless steel, it may also be employed in cases in which the printing plate consists of a softer material, such as zinc, aluminium or copper.

What I claim is:

1. A cylinder, a printing plate having clamping bars attached to its under surface at its ends, the said bars extending within the periphery of the cylinder, independently operable straining components extending as a series longitudinally within the cylinder, the said straining components having wedge surfaces extending towards the periphery of the cylinder and co-operating with similar wedge surfaces formed in the cylinder, and radial screw means arranged to force said straining components outward towards the periphery of the cylinder and against the clamping bars to engage and then move at least one clamping bar towards the other clamping bar and strain the plate about the cylinder.

2. A cylinder, a printing plate having a clamping bar attached to its under surface at each of its ends, the said bars extending within the periphery of the cylinder and in combination, a

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plurality of independently operable straining components having sloping surfaces arranged to engage the clamping bar at one end of the plate, a plurality of similar straining components disposed to engage the clamping bar at the other end of the plate, and radial screw means to move each of the straining components individually outward and about the cylinder whereby the straining components are caused to engage the clamping bars and draw them together to strain the plate about the cylinder.

3. A cylinder, and apparatus to strain a flexible printing plate about the cylinder, the said apparatus comprising two sets of straining components disposed within the periphery of the cylinder, one set being disposed to engage a clamping bar secured to one end of the plate and the other set being disposed to engage a clamping bar secured to the other end of the plate and the straining components of one set being arranged in alternation with the straining components of the other set, each straining component having a wedge surface slidable against a relatively fixed wedge surface in the cylinder, and screw means acting in a direction radial to the cylinder and co-operating with the wedge surfaces to move the straining components in a direction oblique to radial and thereby draw the clamping bars together to strain the plate.

4. In combination, a cylinder, a flexible printing plate having tensioning bars secured to its under surface at the longitudinal edges of the plate, independently operable straining components for each bar disposed in a longitudinal series in a sloping surfaced undercut recess in the cylinder, each straining component having a wedge surface formed to engage a sloping surface of the recess and radial screws operable by a tool inserted between the tensioning bars to move the various straining components individually and outwardly towards the periphery of the cylinder whereby each straining component is moved by wedge action into engagement with a bar and then moves that bar towards the other bar to strain the plate about the cylinder.

5. In a printing cylinder for use with a flexible printing plate, a longitudinal slot having a sloping undercut wall, a clamping bar secured to one edge of the printing plate, a guide block fixed in the slot and having a sloping surface parallel with the sloping wall, a wedge piece formed with opposite parallel surfaces arranged to engage the sloping wall of the slot and the sloping surface of the guide block and having another surface arranged to engage the clamping bar, and a screw adjusting means operable to move the wedge piece between the parallel surfaces to effect movement of the clamping bar peripherally of the cylinder.

6. In a printing cylinder for use with a flexible printing plate, a longitudinal slot having a sloping undercut wall, a clamping bar secured to one edge of the printing plate and having a rib, a guide block fixed in the slot and having a groove arranged to interlock with the rib and a sloping surface parallel with the sloping wall, a wedge piece formed with opposite parallel surfaces arranged to engage the sloping wall of the slot and the sloping surface of the guide block and having another surface arranged to engage the clamping bar, and a screw adjusting means operable to move the wedge piece between the parallel surfaces to effect interlocking of the groove and the rib, and cause movement of the clamping bar peripherally of the cylinder.

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7. In a printing cylinder for use with a flexible printing plate, a longitudinal slot having opposed sloping undercut walls, clamping bars secured to opposite edges of the printing plate and each having a rib, a plurality of guide blocks fixed in the slot each having a groove arranged to interlock with a rib and a sloping surface parallel with a sloping wall, a plurality of wedge pieces formed with opposite parallel surfaces arranged to engage the sloping walls of the slot and the sloping surfaces of the guide blocks and each having another surface arranged to engage a clamping bar, and a plurality of screw adjusting means operable to move the wedge pieces between the parallel surfaces to effect interlocking of the grooves with the ribs, and cause movement of the clamping bars peripherally of the cylinder in opposite directions.

8. A printing cylinder having an axially extending slot in its periphery, and means to strain a flexible printing plate about the cylinder, including a pair of clamping bars flush with the peripheral surface of the cylinder and movable transversely in the slot, one bar being secured to each end of the plate, two sets of independently operable straining components located in the slot, within the periphery of the cylinder and aligned axially thereof, each set being disposed to engage a clamping bar, the straining compo-

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nents of one set being arranged in alternation with the straining components of the other set, and radial screw means arranged to move the straining components of each set individually, and draw the clamping bars and the ends of the plate together at the periphery of the cylinder.

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