Nov. 12, 1963 R. R. JESCHKE ETAL 3,110,255

PLATE CYLINDER CLAMPS FOR PRINTING PRESSES OR THE LIKE

Filed Dec. 15, 1961 3 Sheets-Sheet 1

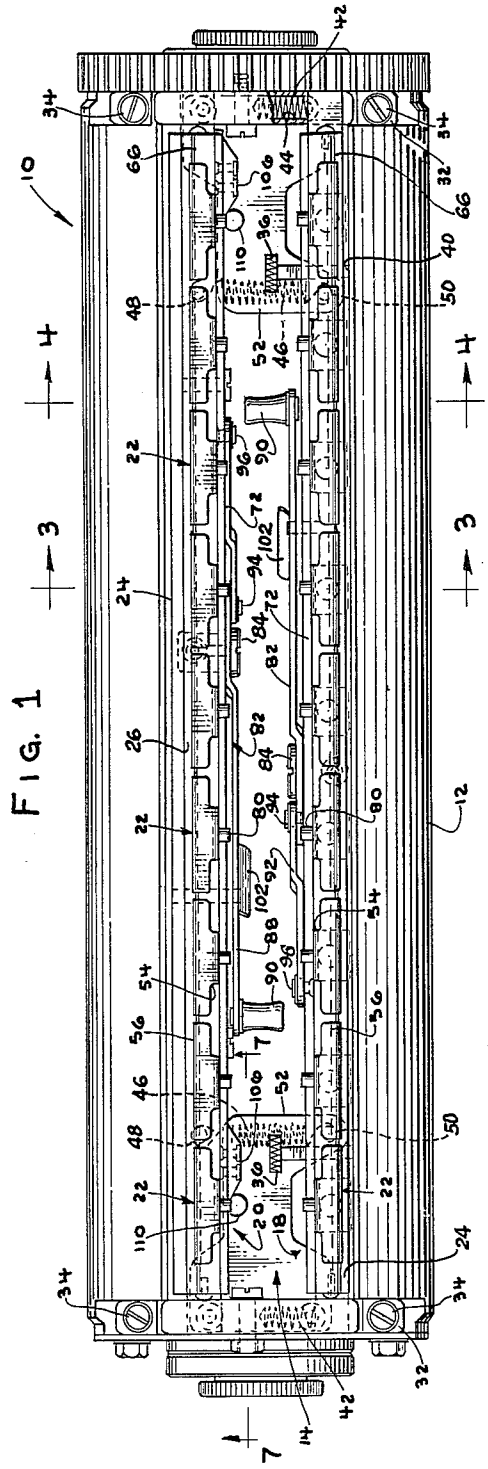


FIG. 1

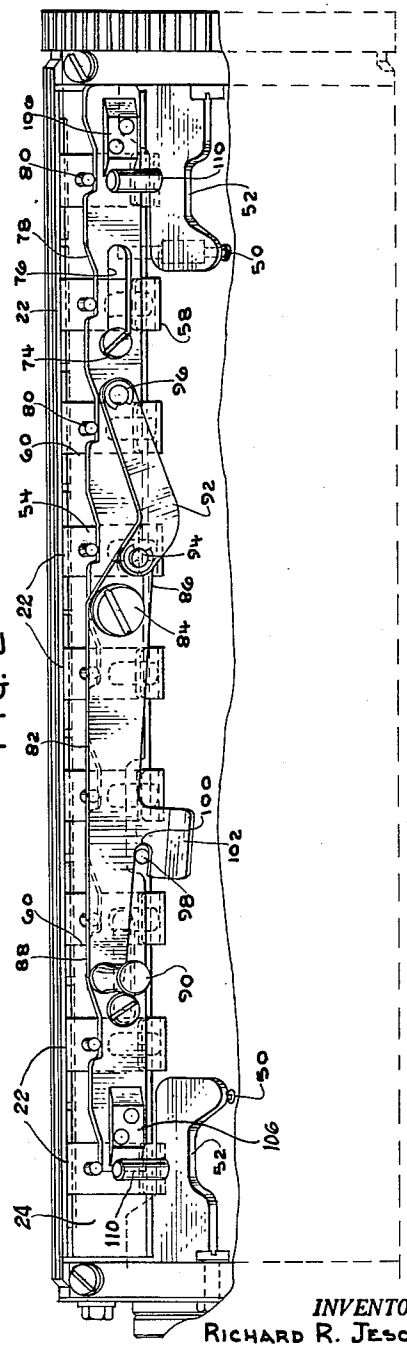


FIG. 2

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FIG. 3

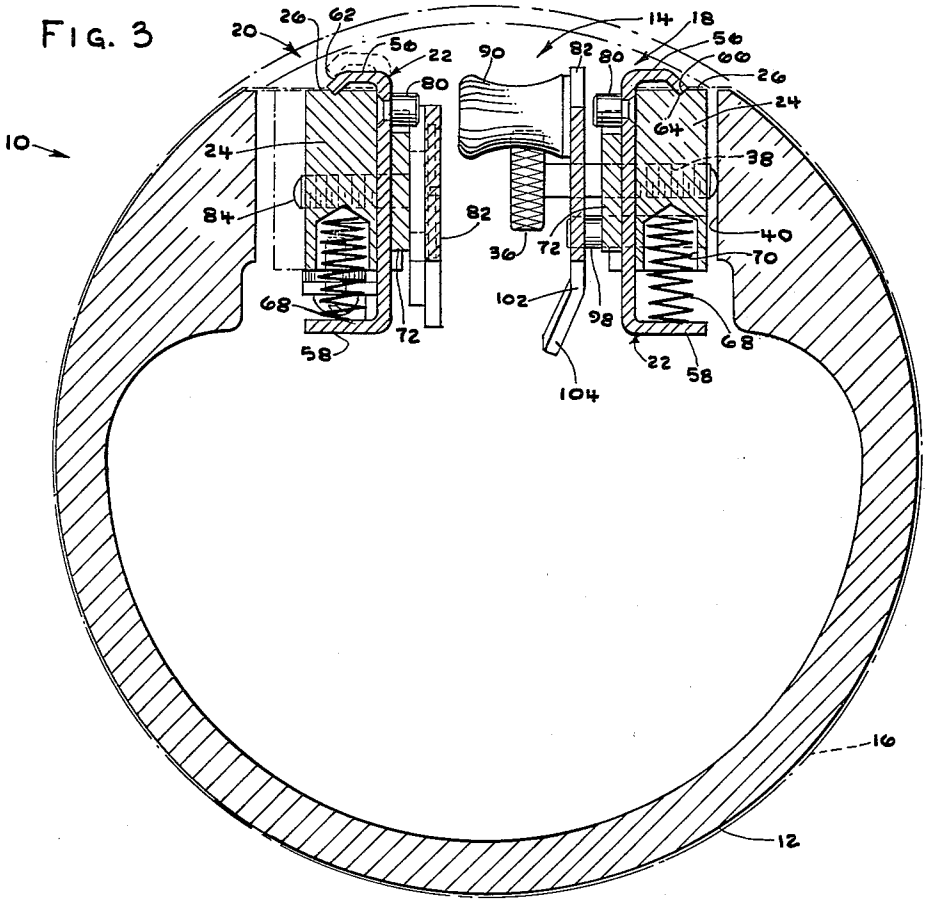
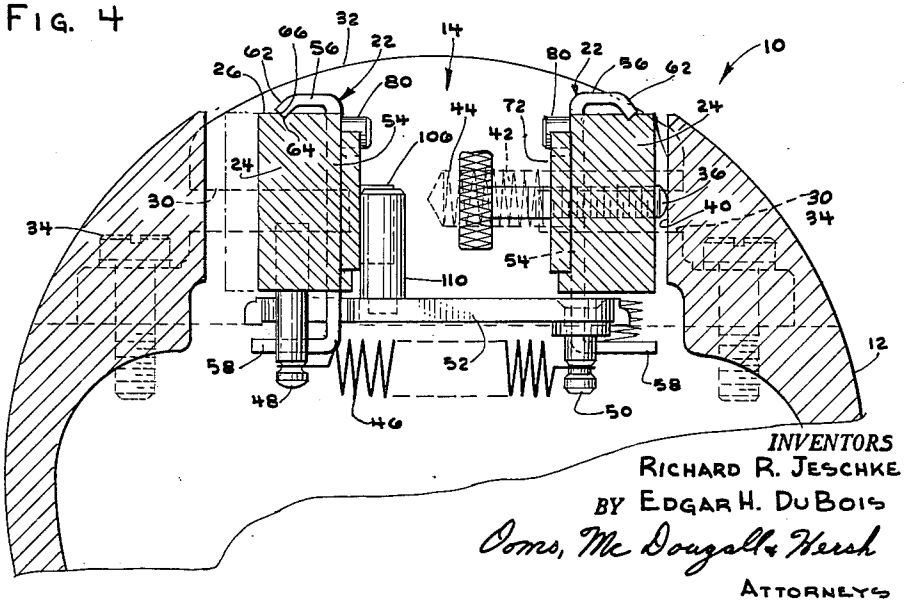


FIG. 4



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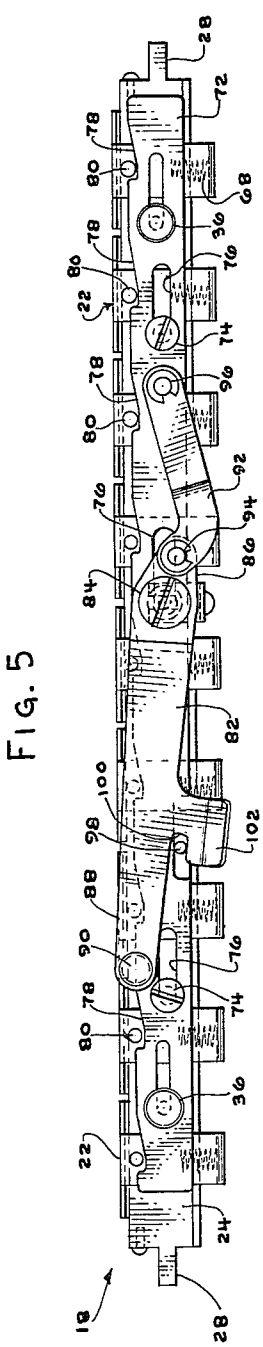


FIG. 5

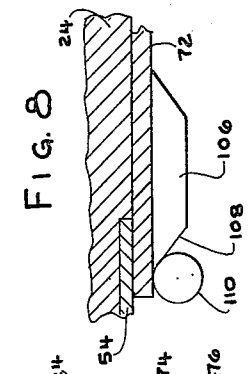


FIG. 8

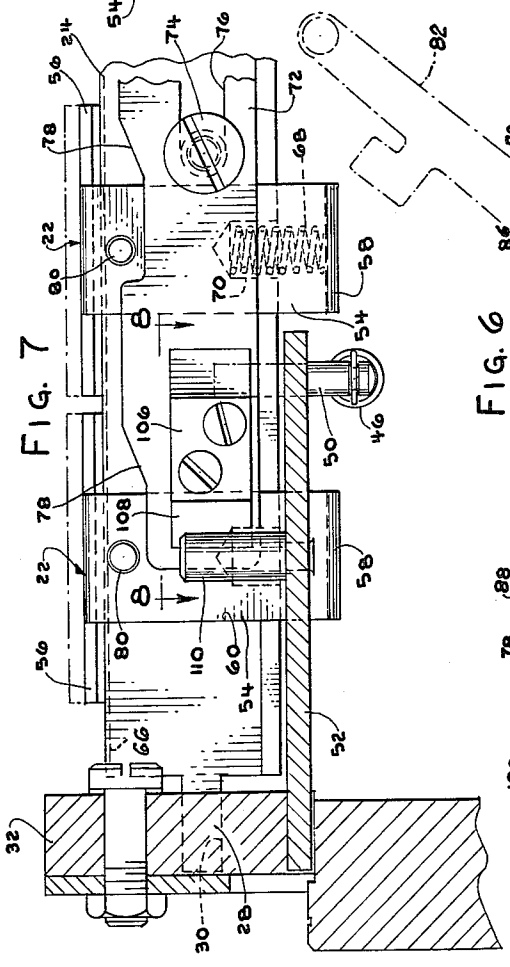


FIG. 7

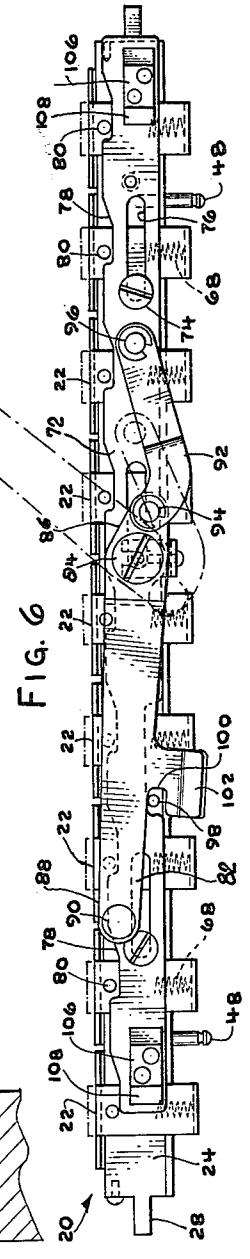


FIG. 6

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United States Patent Office 3,110,255 Patented Nov. 12, 1963

3,110,255

PLATE CYLINDER CLAMPS FOR PRINTING PRESSES OR THE LIKE

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Filed Dec. 15, 1961, Ser. No. 159,683
8 Claims. (Cl. 101—415.1)

This invention relates to printing presses, duplicators and similar machines, and pertains particularly to mechanisms for securing printing plates, masters or the like to the plate or master cylinder of such a machine.

One object of the present invention is to provide a new and improved mechanism having a plurality of clamps for securing each end of a thin flexible printing plate or master to a master cylinder, together with a single lever or the like whereby all of the clamps may be simultaneously moved between clamping releasing positions.

A further object is to provide a new and improved plate clamping mechanism of the foregoing character which is arranged so that spring tension is applied to the printing plate, and so that the spring tension is released by initial movement of the lever or other member which releases the plate clamps. In this way, the spring tension is released before the clamps are disengaged from the plate, and is reapplied after the clamps have again been engaged with the plate.

Another object is to provide a new and improved mechanism of the foregoing character, having means for adjusting the registration of the printing plate on the printing cylinder.

A further object is to provide a plate clamping mechanism of the foregoing character which is extremely easy to operate and low in cost.

Further objects and advantages of the present invention will appear from the following description, taken with the accompanying drawings, in which:

FIG. 1 is a plan view of a plate or master cylinder which is equipped with a plate clamping mechanism constituting an illustrative embodiment of the present invention.

FIG. 2 is a fragmentary perspective view showing the mechanism for securing the tail end of the printing plate to the plate cylinder.

FIG. 3 is a cross-sectional view taken through the cylinder, generally along the line 3—3 in FIG. 1.

FIG. 4 is a fragmentary cross-sectional view, taken generally along a line 4—4 in FIG. 1.

FIG. 5 is an elevational view of the clamping mechanism for securing the head end of the printing plate to the cylinder.

FIG. 6 is an elevational view of the clamping mechanism for securing the tail end of the plate to the cylinder.

FIG. 7 is a fragmentary enlarged sectional view, taken generally along a line 7—7 in FIG. 1.

FIG. 8 is a fragmentary sectional view taken along a line 8—8 in FIG. 7.

It will be seen that FIG. 1 illustrates a plate or master cylinder 10 adapted to be employed on a printing press, duplicator or other similar machine. As shown to advantage in FIG. 3, the cylinder 10 has a cylindrical surface 12 which extends around the major portion of the periphery of the cylinder but is interrupted by a gap 14 in the cylinder. A thin flexible printing plate or master 16 is adapted to be mounted on the cylinder 10. The plate 16 may be made of metal, paper, plastic, or any other suitable material. It will be understood that the printing plate 16 may be of the lithographic type, or any other suitable type.

The head or leading end of the printing plate 16 is

secured to the cylinder 10 by means of a head clamping mechanism 18 mounted in the gap 14 which is formed in the cylinder 10. It will be seen that the flexible plate 16 is wrapped around the cylindrical surface 12 of the cylinder 10. The tail or trailing end of the plate 16 is secured to the cylinder 10 by means of a tail clamping mechanism 20, also disposed in the gap 14. The tail clamping mechanism 20 is adapted to apply tension to the plate 16 so that the plate will be pulled tightly against the cylindrical surface 12.

To a considerable extent, the head and tail clamping mechanisms 18 and 20 are alike, so that a single description of many of the details will suffice. Thus, each of the clamping mechanisms 18 and 20 comprises a plurality of clamps 22 which are movably mounted upon an elongated clamping bar 24 extending generally parallel to the axis of the cylinder in the gap 14. The bars 24 extend for nearly the entire length of the plate cylinder 10. On its outer edge, each bar 24 is formed with an anvil surface 26 against which the printing plate 16 is adapted to be pressed by the clamps 22. The clamps 22 and the bars are recessed below the cylindrical surface of the cylinder 10.

Each of the clamping bars 24 is mounted on the plate cylinder 10 for movement in a generally peripheral direction relative to the cylinder.

Each bar 24 is movable transverse to its own length. In this case, each of the bars 24 is formed with tongues 28 at its opposite ends (FIGS. 5 and 6). As shown to advantage in FIG. 7, the tongues 28 are slidably received in slots or grooves 30 which are formed in blocks 32 secured to the cylinder 10 at the ends of the gap 14. Screws 34 or the like may be employed to secure the blocks 32 to the cylinder 10. The clamping mechanisms 18 and 20 may readily be disassembled by removing the blocks 32 from the cylinder.

Provision is made for moving the bar 24 of the head clamping mechanism 18 along the corresponding guide slots 30 so that the registration or position of the printing plate 16 may be adjusted. Thus, the head clamping mechanism 18 comprises a pair of adjusting screws 36 which are threaded through openings 38 formed in the corresponding bar 24. The ends of the screws 36 are engageable with a flat abutment 40 formed on the cylinder 10. When the screws 36 are advanced through the openings 38, the bar 24 is moved away from the abutment 40. By adjusting the screws 36 to different positions, the bar 24 may be moved into a position which is skewed to an appreciable extent relative to the longitudinal abutment 40. To prevent slack from developing between the ends of the adjusting screws 36 and the abutment 40, the bar 24 of the head clamping mechanism 18 is biased toward the abutment 40. In the illustrated arrangement, the biasing action is brought about by a pair of compression springs 42 (FIG. 4) which act against the tongues 28 at the ends of the bar 24. The springs 42 are received in bores or sockets 44 formed in the end blocks 32. It will be apparent that the springs 42 are compressed between the blocks 32 and the ends of the clamping bar 24. Thus, the springs 42 bias the head clamping bar 24 to the right, as seen in FIGS. 3 and 4, so that the clamping bar 24 will be moved to the right when the adjusting screws 36 are retracted through the openings 38. Thus, the head clamping bar 24 is moved to the left in a positive manner by the screws 36 when they are advanced into the openings 38. The springs 42 move the head clamping bar 24 to the right when the screws 36 are retracted through the openings 38.

As previously indicated, the tail clamping mechanism 20 is arranged so that the printing plate 16 may be tensioned on the cylinder 10. Thus, the tail clamping

mechanism 20 comprises a pair of springs 46 (FIG. 4) adapted to bias the tail clamping bar 24 to the right, as seen in FIGS. 3 and 4. In this case, the springs 46 are of the coiled extension type and are stretched between pins 48 on the bar 24 and anchor pins 50 which are mounted on brackets 52 secured to the cylinder 10. As shown to advantage in FIG. 6, the pins 48 are mounted on the tail clamping bar 24 near the opposite ends thereof.

All of the clamps 22 on the head and tail clamping bars 24 may be substantially the same in construction. Thus, each clamp 22 comprises a shank or guide portion 54, a clamping flange 56 formed integrally with the outer end of the shank 54, and a spring abutment 58 formed integrally with the inner end of the shank 54. The clamping flange 56 is substantially wider than the shank 54. Each of the clamping bars 24 is formed with a plurality of parallel guide channels or grooves 60 in which the shanks 54 of the clamps 22 are slidably received. In this way, the clamps 22 are movable inwardly and outwardly relative to the clamping bars 24. The clamping flanges 56 are bent substantially at right angles to the shank portions 54 so as to extend substantially parallel to the anvil surfaces 26 on the clamping bars 24. The outer end of each clamping flange 56 is turned inwardly to form a slanting lip 62 having an angular corner 64 which is adapted to be received in a V-shaped longitudinal groove 66 formed in the corresponding anvil surface 26. The angular corner 64 of the clamping flange 56 is adapted to force the end of the printing plate 16 into the V-shaped groove 66 so that the clamps 22 will take a firm grip on the printing plate.

Means are provided to bias each clamp 22 individually into its clamping position, with its clamping flange 56 against the anvil surface 26. For this purpose, each of the clamping mechanisms 18 and 20 is provided with a plurality of springs 68 (FIG. 3) which act between the corresponding clamping bar 24 and the clamps 22. In this case, each of the springs 68 is of the coiled compression type and is compressed between the clamping bar 24 and the spring abutment flange 58 of the corresponding clamp 22. Bores or sockets 70 are formed in the clamping bars 24 to receive and locate the springs 68.

Each of the clamping mechanisms 18 and 20 is provided with means whereby all of the clamps 22 may be moved simultaneously to their plate releasing positions, with the clamping flanges 56 moved outwardly away from the anvil surface 26 of the corresponding clamping bar 24. In FIGS. 3 and 7, the clamping positions of the clamps 22 are shown in full lines, while the released positions are shown in broken lines. In the illustrated construction, each of the clamping mechanisms 18 and 20 is provided with a longitudinally movable camming member 72 for releasing the clamp 22. Each camming member 72 is slidable longitudinally along the corresponding clamping bar 24. In this case, each camming member 72 is secured to the corresponding bar 24 by means of screws 74 or the like which extend through longitudinal slots 76 formed in the member 72. It will be evident that the member 72 retains the shank portions 54 of the clamps 22 in the guide slots 60 formed in the bar 24.

As shown to advantage in FIGS. 5 and 6, each of the camming members 72 is formed with a plurality of slanting cams 78 adapted to release the clamps 22. Pins 80 or other cam followers are mounted on the shank portions 54 of the clamps 22 for engagement by the cams 78. On FIGS. 5 and 6, each of the camming members 72 is shown in its ineffective or unactuated position in which the cams 78 are out of engagement with the cam follower pins 80. The members 72 may be moved so as to lift the clamps 22 away from the corresponding anvil surfaces 26. In this way, the printing plate 16 will be released.

Various means may be provided for actuating the plate releasing cam members 72. In this case, each of the clamping mechanisms 18 and 20 is provided with a clamp releasing lever 82 which is secured to the corresponding clamping bar 24 by means of a pivot screw 84 or the like. It will be evident that the pivot screw 84 extends through one of the longitudinal slots 76 in the camming member 72. The lever 82 has a relatively short arm 86 and a relatively long arm 88 with an operating handle 90 thereon. A link 92 may be employed to connect the lever 82 to the camming member 72. Thus, one end of the link 92 is connected to the short lever arm 86 by means of a pivot 94. The other end of the link 92 is connected to the camming member 72 by means of a pivot 96.

The ineffective or unactuated position of the lever 82 is shown in full lines in FIGS. 5 and 6. The lever 82 may be swung to its actuated position, as shown in broken lines in FIG. 6, so as to move the camming member 72 to the left, whereby the clamps 22 will be released from the printing plate 16.

A latching arrangement is employed to prevent the lever 82 from being moved to its clamp releasing position by the action of gravity or centrifugal force. Thus, each of the clamping bars 24 is fitted with a latching pin or other catch 98 which is normally received in a slot 100 formed between the long lever arm 88 and a tab 102 on the lever 82. The lever 82 may be released, for movement to its actuated position, by flexing the arm 88 away from the clamping bar 24 until the tab 102 clears the end of the latching pin 98. When the lever 82 is returned to its initial position, the tab 102 engages the latching pin 98 and flexes the lever arm 88 so that the tab will slide over the latching pin. For this purpose, the tab 102 is formed with an outwardly bent slanting end portion 104, as shown to advantage in FIG. 3.

The tail clamping mechanism 20 differs from the head clamping mechanism 18 in that means are provided in the tail clamping mechanism to release the tension on the plate by the operation of the lever 82, but before the clamps 22 are released from the printing plate 16. This is accomplished by providing a pair of cam blocks 106 on the camming member 72 of the tail clamping mechanism 20, as shown to advantage in FIGS. 6, 7 and 8. The camming blocks 106 are formed with slanting cam surfaces 108 which are engageable with pins 110 or other abutments secured to the brackets 52. Thus, the pins 110 are rigidly connected to the cylinder 10. The initial movement of the cam member 72 on the tail clamping mechanism 20 causes the camming blocks 106 to engage the pins 110, whereby the tail clamping bar 24 is displaced to the left, as seen in FIGS. 3 and 4, against the action of the plate tensioning springs 46. In this way, the tension on the printing plate 16 is released. Further movement of the camming member 72 causes the cams 78 to engage the pins 80 so as to release the clamping pressure between the clamp 22 and the tail end of the plate 16. The cams 78 of the tail clamping mechanism 20 may be somewhat different in shape from the cams of the head clamping mechanism 18 in order to provide the desired coordination with the cam blocks 106.

The general operation of the plate clamping arrangement may be summarized by indicating the manner in which a new printing plate is installed on the cylinder 10. First of all, the head clamping mechanism 18 is released by swinging the actuating lever 82 in a clockwise direction, as seen in FIG. 5, so as to slide the camming member 72 to the left. The cams 78 engage the pins 80 and lift the clamps 22 away from the anvil surface 26 on the clamping bar 24. The head end of the printing plate 16 may then be inserted between the clamping flanges 56 and the anvil surface 26. It will be evident from FIG. 3 that the shank portions 54 of the clamps serve as stops against which the leading edge of the plate may be engaged.

Next, the actuating lever 82 of the head clamping mechanism 18 is swung counterclockwise to its initial position so as to disengage the camming member 72 from the clamp 22. By the force of the springs 68, the head end of the plate is clamped between the clamping flanges 56 and the anvil surface 26. The exact position or registration of the plate may be adjusted by turning the screws 36 so as to shift the position of the clamping bar 24. When the screws 36 are advanced to the right, the bar 24 is shifted to the left. When the screws 36 are retracted to the left, the springs 42 move the bar 24 to the right.

The printing plate 16 is next wrapped around the cylindrical surface 12 of the cylinder 10. The lever 82 of the tail clamping mechanism 20 is then swung to its actuated position, as shown in broken lines in FIG. 6, so as to lift the clamps 22 outwardly away from the anvil surface 26. The tail end of the printing plate 16 may then be inserted between the clamping flanges 56 and the anvil surface 26.

Finally, the lever 82 of the tail clamping mechanism 20 is returned to its initial position, shown in full lines in FIG. 6. In this way, the camming member 72 is moved to the right. The cams 78 are disengaged from the pins 80, whereupon the springs 68 move the clamps 22 into clamping engagement with the plate. Further movement of the camming member 72 causes the camming blocks 106 to be disengaged from the abutment pins 110, whereupon the plate tensioning springs 46 pull the bar 24 to the right, as seen in FIG. 4, so as to tension the printing plate 16. The catches 98 retain the actuating levers 82 in their retracted positions.

It will be evident that the plate clamping arrangement of the present invention is efficient and easy to operate. Nevertheless, it is remarkably simple in construction and low in cost.

Various modifications, alternative constructions and equivalents may be employed without departing from the true spirit and scope of the invention, as exemplified in the foregoing description and defined in the following claims.

We claim:

1. In a printing machine, the combination comprising a plate cylinder adapted to hold a thin flexible printing plate,

a bar mounted on said cylinder and extending generally parallel to the surface thereof,

said bar having an anvil portion adapted to be engaged by one end of the printing plate,

a plurality of clamps mounted on said bar for movement toward and away from said anvil portion for clamping the end of the printing plate against said anvil portion,

springs acting between said clamps and said bar and biasing each of said clamps into plate clamping relation to said bar,

an elongated camming member mounted on said bar for sliding movement longitudinally thereof,

said camming member having a plurality of cams formed thereon, each of said clamps having a cam follower thereon engageable by one of said cams upon longitudinal movement of said camming member in one direction for moving said clamps out of clamping relation with said bar to release the end of the printing plate,

a lever swingably mounted on said bar for moving said camming member longitudinally,

a link connected between said lever and said camming member,

and a catch for releasably retaining said lever in its ineffective position to prevent inadvertent clamp releasing movement of said lever.

2. In a printing press, the combination comprising a cylinder for holding a thin flexible printing member,

said cylinder having a cylindrical surface with a gap therein,

a plate clamping bar mounted in said gap in said cylinder and extending generally longitudinally thereof,

means mounting said bar for transverse bodily movement in a peripheral direction relative to said cylinder for tightening and loosening the printing member,

tensioning spring means acting between said bar and said cylinder and biasing said bar in a direction to tension the printing member,

said bar having an anvil portion engageable by one end of the printing member,

a plurality of clamps mounted on said bar for movement into and out of clamping relation with said anvil portion for clamping the printing member against said anvil portion,

clamping springs acting between said clamps and said bar and biasing said clamps into clamping relation with said anvil portion,

a camming member mounted on said bar for longitudinal sliding movement thereon,

each of said clamps having a cam follower thereon operable by said camming member,

said camming member having a plurality of cams thereon for engaging said cam followers and moving said clamps out of clamping relation with said anvil portion upon movement of said camming member in one longitudinal direction between an ineffective position and a clamp releasing position,

a lever mounted on said bar,

a link connected between said lever and said camming member,

said lever being swingable between retracted and actuated positions for moving said camming member between its ineffective and clamp releasing positions,

a catch for releasably retaining said lever in its retracted position,

abutment means on said cylinder adjacent said camming member,

and additional camming means on said camming member and engageable with said abutment means for moving said bar bodily against the action of said tensioning spring means in a direction to release the tension on said printing member upon movement of said camming member toward said clamp releasing position but prior to the release of said clamps by said cams.

3. In a printing press, the combination comprising a cylinder for holding a thin printing master,

a master securing bar mounted on said cylinder for generally peripheral movement thereon to tension and release the master,

said bar having an anvil portion engageable by one end of the master,

a plurality of clamps movably mounted on said bar for clamping the master against said anvil portion,

tensioning spring means acting between said cylinder and said bar and biasing said bar in a direction to tension the master,

a releasing member mounted on said bar for longitudinal movement,

means for moving said releasing member between first and second positions,

abutment means on said cylinder,

first cams mounted on said releasing member and engageable with said abutment means upon movement of said releasing member between said first and second positions for translating said bar against the action of said tensioning springs to release the tension on the master,

and second cams on said releasing member and engageable with said clamps for moving the clamps out of clamping relation with said anvil portion during the movement of said releasing member between said

first and second positions but subsequent to the action of said first cams.

4. In a printing press, the combination comprising a cylinder for holding a thin printing master,

a master securing bar mounted on said cylinder for generally peripheral movement thereon to tension and release the master,

a plurality of clamps movably mounted on said bar for clamping the master against said bar,

tensioning spring means acting between said cylinder and said bar and biasing said bar in a direction to tension the master,

a releasing member mounted on said bar for movement between first and second positions,

first cams operable by said releasing member upon movement of said releasing member between said first and second positions for translating said bar against the action of said tensioning springs to release the tension on the master,

and second cams operable by said releasing member for moving the clamps out of clamping relation with said bar in response to the movement of said releasing member between said first and second positions but subsequent to the action of said first cams.

5. In a printing press, the combination comprising a cylinder for holding a thin printing master,

a master securing bar mounted on said cylinder for generally peripheral movement thereon to tension and release the master,

a plurality of clamps movably mounted on said bar for clamping the master against said bar,

tensioning spring means acting between said cylinder and said bar and biasing said bar in a direction to tension the master,

a releasing member movably mounted on said bar,

means for moving said releasing member between first and second positions,

first means operable by said releasing member upon movement of said releasing member between said first and second positions for translating said bar against the action of said tensioning springs to release the tension on the master,

and second means operable by said releasing member for moving the clamps out of clamping relation with said bar responsive to the movement of said releasing member between said first and second positions but subsequent to the action of said first means.

6. In a printing press, the combination comprising a cylinder for holding a thin printing master,

a master securing bar mounted on said cylinder,

a plurality of clamps movably mounted on said bar for clamping the master against said bar,

a releasing member mounted on said bar for longitudinal movement,

means for moving said releasing member longitudinally between first and second positions,

and cams on said releasing member and engageable with said clamps for moving the clamps out of clamping relation with said bar during the movement of said releasing member between said first and second positions.

7. In a printing machine, the combination comprising a plate cylinder adapted to hold a thin flexible printing plate,

a bar mounted on said cylinder and extending generally parallel to the surface thereof,

said bar having an anvil portion adapted to be engaged by one end of the printing plate,

a plurality of clamps mounted on said bar for movement toward and away from said anvil portion for clamping the end of the printing plate against said anvil portion,

springs acting between said clamps and said bar and biasing each of said clamps into plate clamping relation to said bar,

an elongated camming member mounted on said bar for sliding movement longitudinally thereof,

and means for moving said camming member longitudinally between first and second positions,

said camming member having a plurality of cams formed thereon,

each of said clamps having a cam follower thereon engageable by one of said cams upon longitudinal movement of said camming member between said positions for moving said clamps out of clamping relation with said bar to release the end of the printing plate.

8. In a printing press, the combination comprising a cylinder for holding a thin flexible printing member,

a plate clamping bar mounted on said cylinder and extending generally longitudinally thereof,

means mounting said bar for transverse bodily movement in a peripheral direction relative to said cylinder for tightening and loosening the printing member,

tensioning spring means acting between said bar and said cylinder and biasing said bar in a direction to tension the printing member,

a plurality of clamps mounted on said bar for movement into and out of clamping relation therewith for clamping the printing member against said bar,

clamping springs acting between said clamps and said bar and biasing said clamps into clamping relation therewith,

a camming member mounted on said bar for longitudinal sliding movement thereon,

each of said clamps having a cam follower thereon operable by said camming member,

said camming member having a plurality of cams thereon for engaging said cam followers and moving said clamps out of clamping relation with said bar upon movement of said camming member in one longitudinal direction between an ineffective position and a clamp releasing position,

abutment means on said cylinder adjacent said camming member,

and additional camming means on said camming member and engageable with said abutment means for moving said bar bodily against the action of said tensioning spring means in a direction to release the tension on said printing member upon movement of said camming member toward said clamp releasing position but prior to the release of said clamps by said cams.

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