March 25, 1941. E. P. LACURE ET AL 2,236,146

PLATE CLAMP

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Fig. 1.

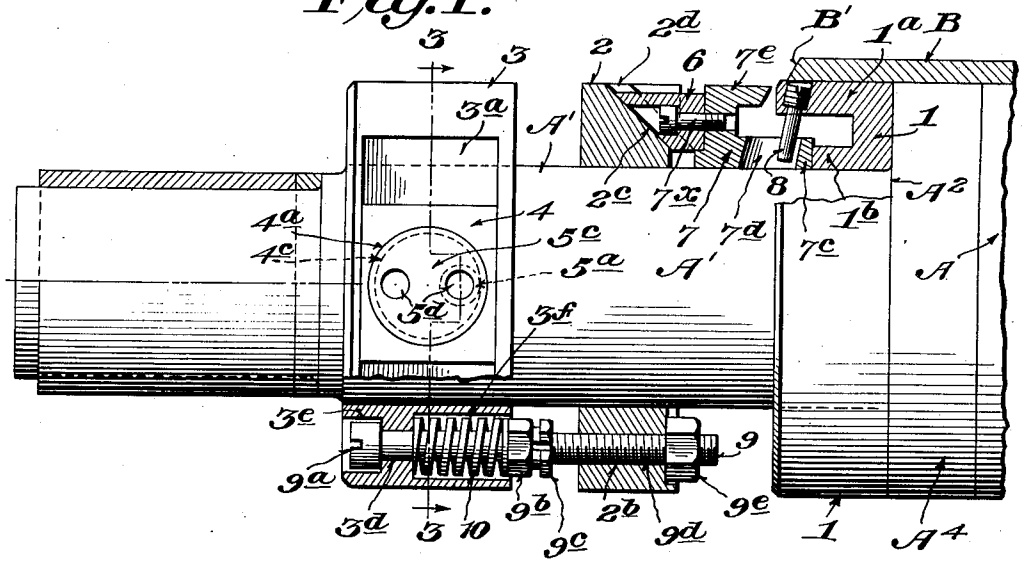
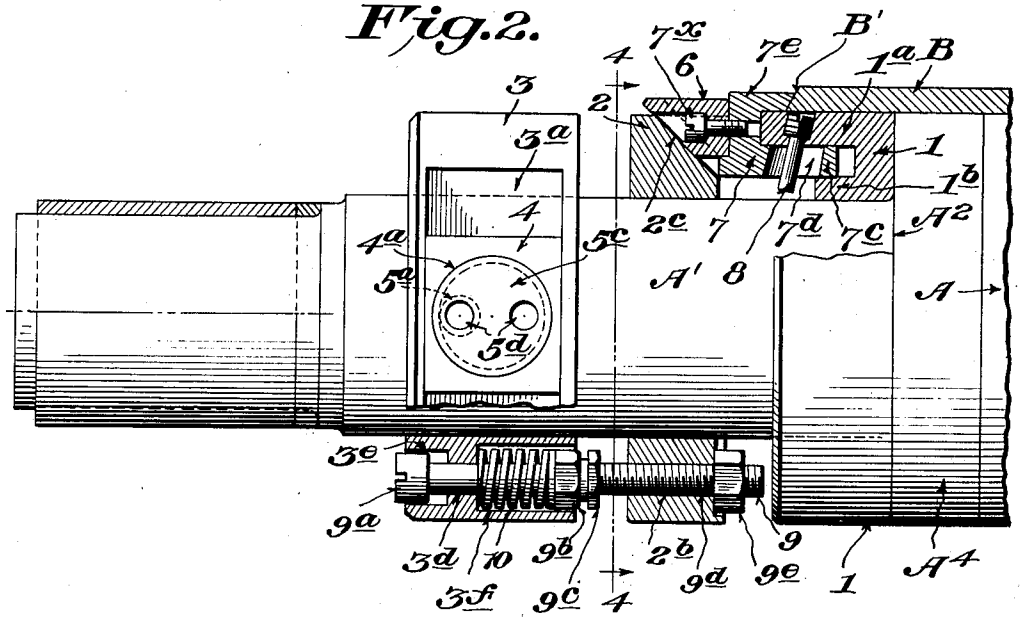



Fig. 2.




Inventors
Earl P. Lacure,
and
Albert F. Carpenter, Jr.
By Snyder & Howard
Attorneys

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Fig. 3.

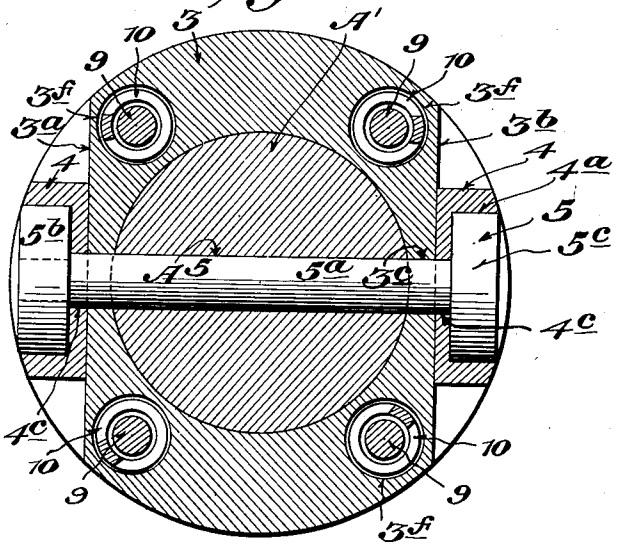



Fig. 4.

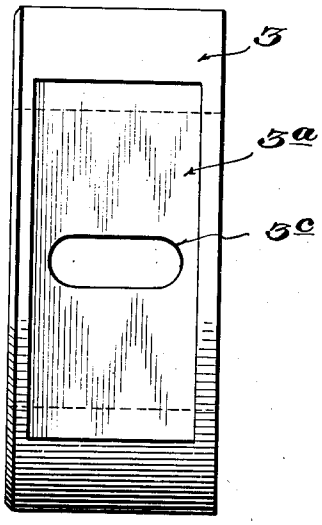



Fig. 5.

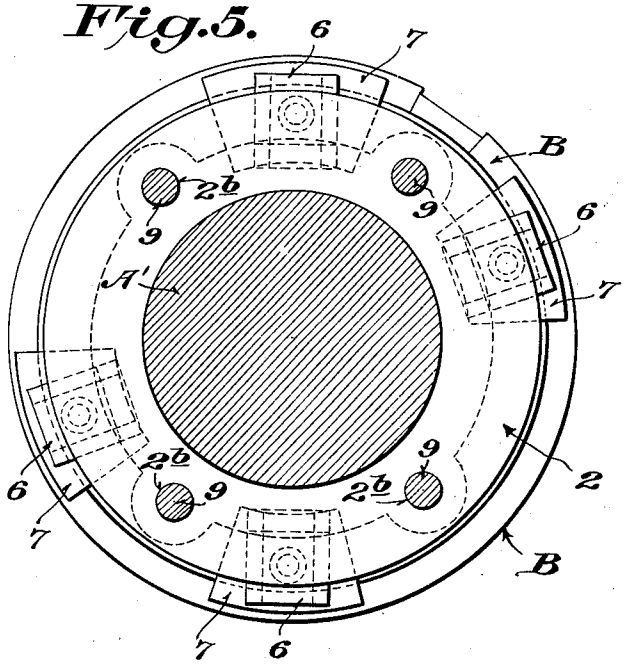
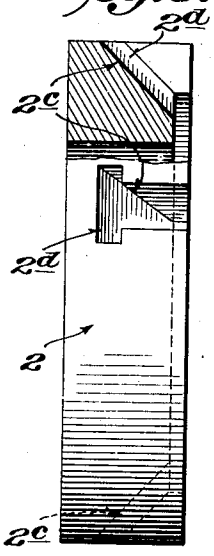



Fig. 6.




Earl P. Lacure and Albert F. Carpenter, Jr. Inventors

By Alexander & Dowell

Attorneys

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Fig. 7.

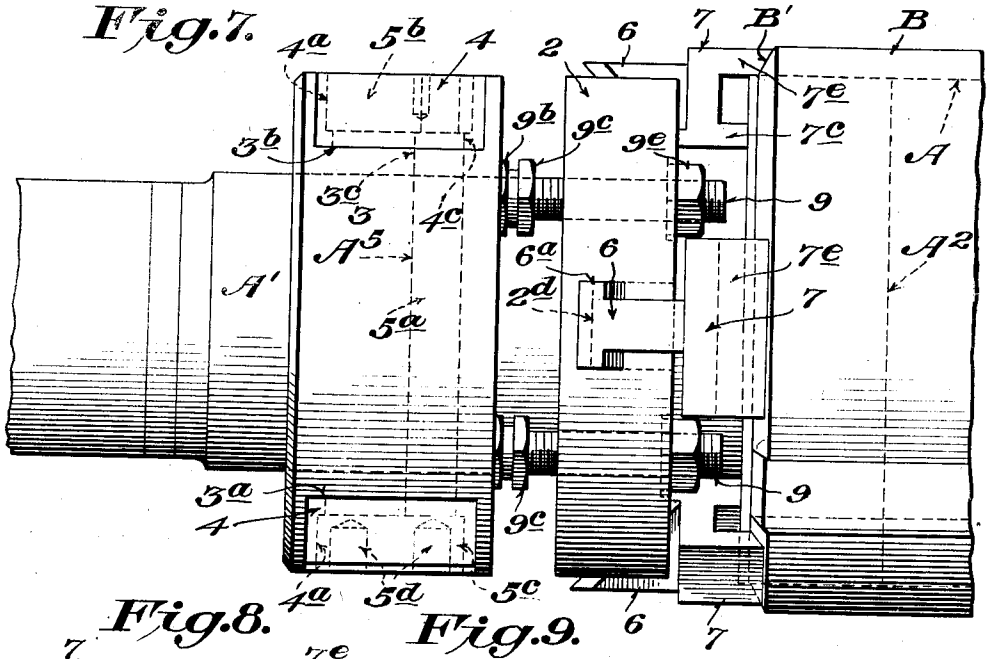



Fig. 8.

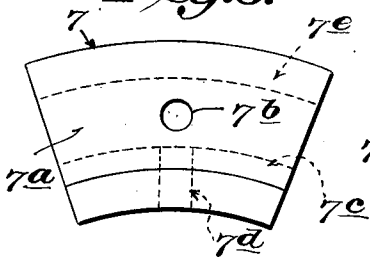



Fig. 9.

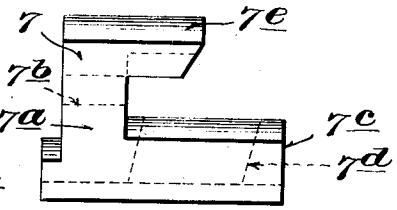



Fig. 10.

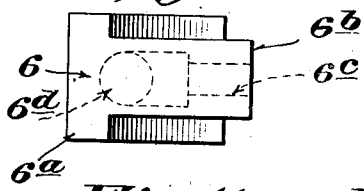



Fig. 11.

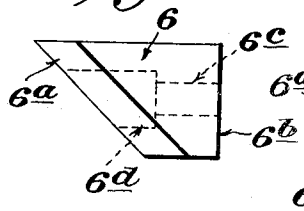
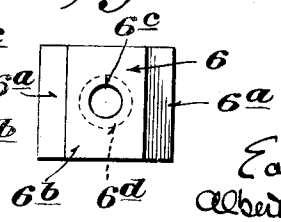



Fig. 12.




Inventors
Earl P. Lacure
and
Albert J. Carpenter, Jr.
By
Attorneys

Patented Mar. 25, 1941 2,236,146

# UNITED STATES PATENT OFFICE

2,236,146

## PLATE CLAMP

Earl P. Lacure and Albert J. Carpenter, Jr., Battle Creek, Mich., assignors to Duplex Printing Press Company, Battle Creek, Mich., a corporation of Michigan

Application June 19, 1940, Serial No. 341,354

19 Claims. (Cl. 101—378)

Our invention is a novel improvement in plate clamps for holding in a positive manner printing plates on the plate cylinders of printing presses when said plates are of arcuate length sufficient to extend more than halfway around the cylinder. Such plates must be entered on and removed from the cylinders by slipping same over the ends thereof, and therefore necessarily require the use of clamps which can be retracted below the plate supporting surfaces of the cylinders.

The principal object of our invention is to provide novel and efficient clamping mechanism applicable to a reduced end of the cylinder, as hereinafter set forth, and having a plurality of retractible clamps thereon operable by simple means to retract the clamps from plate engaging position, into retracted position within the reduced end portion of the cylinder, said clamps having a relative wide arcuate gripping edge not limited as has been heretofore the case, to the width of slots for the clamps customarily provided in the cylinder, our mechanism entirely obviating the necessity of providing said slots in the cylinders into which plate clamps may be retracted.

Other minor objects of the invention will be hereinafter set forth.

We will explain the invention with reference to the accompanying drawings, which illustrate one practical embodiment thereof, to enable others familiar with the art to adopt and use the same; and will summarize in the claims, the novel features of construction, and novel combinations of parts, for which protection is desired.

In said drawings—

Fig. 1 is an elevation partly in section showing our novel plate clamping mechanism applied to the reduced end of a plate cylinder of a printing press, and showing the clamps in retracted or unlocked position with respect to the plate, in which position the plate may be slipped on or off the cylinder over said mechanism.

Fig. 2 is a view similar to Fig. 1, but showing the clamps projected into plate clamping position.

Fig. 3 is an enlarged transverse section on the line 3—3, Fig. 1, showing the shift collar mounted on the reduced portion of the cylinder.

Fig. 4 is a side elevation of the shift collar, detached.

Fig. 5 is an enlarged transverse section on the line 4—4, Fig. 2.

Fig. 6 is a side elevation of the clip slide collar, partly in section.

Fig. 7 is a top plan view of the clamping mechanism with the parts in the position shown in Fig. 2.

Fig. 8 is an enlarged rear elevation of the plate clip, detached.

Fig. 9 is a side elevation of the plate clip shown in Fig. 8.

Fig. 10 is a top plan view of a clip slide, detached.

Fig. 11 is a side elevation of the clip slide shown in Fig. 10.

Fig. 12 is a front elevation of the clip slide.

The plate cylinder A is adapted to slidably support the arcuate printing plate B of usual form extending more than half-way around the circumference of the cylinder, which plate B must necessarily be slipped over the end of the cylinder A when inserting or removing the plate therefrom. One end of the plate cylinder is provided with the usual fixed plate engaging devices (not shown), the opposite end of cylinder A being provided with our novel plate clamping mechanism, which is designed to have a wide gripping edge for engagement with the plate, which edge is not limited to the width of the customary slots usually provided in such cylinders for receiving retractable plate clamps at said end of the cylinder, our mechanism however involving means whereby the plate clamps may be retracted below the plate supporting surface of cylinder A so as to permit printing plate B to be readily inserted or removed from the cylinder by slipping same over the end of the cylinder to which our mechanism is applied.

As shown in Figs. 1, 2 and 7, plate cylinder A is provided with a plate supporting peripheral surface directly contacting the arcuate printing plate B; and one end of cylinder A is reduced in diameter as at A' to permit installation of our plate clamping mechanism, thereby providing a squared shoulder A2 between the portion A' and the main body of the cylinder normal to the axis of the cylinder.

Axially slidably mounted on the reduced portion A' of cylinder A, adjacent its outer end, is a shift collar 3 (Figs. 3 and 4) of exterior diameter slightly less than the normal diameter of the body of cylinder A, whereby plate B may be slipped thereover when inserting or removing same from cylinder A. In opposite sides of shift collar 3 are diametrically opposed cuts 3a—3b forming recesses of substantial width extending nearly to the ends of said shift collar, the

bottoms of the opposed cuts 3a—3b forming parallel surfaces adapted to engage cam shoes 4 of width to fit between the side walls of the cuts 3a—3b so that same may slide along the bottoms of the said cuts, the length of the cam shoes being less than the lengths of the cuts as shown in Fig. 3. In the outer face of each cam shoe 4 is a circular recess 4a of relatively large diameter adapted to receive the head of a shift cam, and in the bottom of each recess 4b is a relative bore 4c for the passage of the shaft of the shift cam. In the bottoms of the cuts 3a—3b in shift collar 3 are longitudinally disposed elongated slots 3c (Fig. 4) which are diametrically opposed, said slots 3c being of sufficient diameter to receive the shaft of the shift cam, which shaft extends through the slots 3c and through a transversely diametrical bore A5 (Fig. 3) in the reduced portion A' of cylinder A.

As shown in Figs. 1, 2, 3 and 7, the shift cam preferably comprises a shaft 5a extending through bore A5 in reduced portion A', and through the opposed slots 3c in shift collar 3, said shaft 5a having eccentric cam heads 5b—5c at its ends disposed respectively in the circular recesses 4a of the cam shoes 4, the heads 5b—5c being locked to shaft 5a in any desired manner, and thus serving to maintain the cam shoes 4 in their respective cuts 3a—3b in the shift collar 3. In one of the cam heads 5c, are a pair of spaced holes 5d accessible from the exterior of the shift collar 3, adapted to be engaged by a pronged wrench or other tool, whereby the cam shaft can be readily rotated to move the shift collar 3 axially of the reduced portion A' from its retracted position shown in Fig. 1, to its projected position shown in Fig. 2 to actuate the plate clamps of the mechanism, as hereinafter described. One half turn of cam shaft 5a will shift collar 3 from one extreme position to the other.

On shaft extension A' between shift collar 3 and the shoulder A2 is a clip slide collar 2 of exterior diameter slightly less than the internal diameter of printing plate B, collar 2 being yieldably slidably connected with shift collar 3. As shown in Figs. 1 and 2, shift collar 3 is provided with spaced holes 3d parallel with the axis of cylinder A, said holes registering with tapped bores 2b in clip slide collar 2, receiving bolts 9 having heads 9a housed in enlarged recesses 3e in the outer ends of bores 3d and carrying nuts 9b to lock nuts 9c on the threaded portions 9d intermediate the ends of the bolts, the threaded portion 9d also engaging the threads in the tapped bores 2b of collar 2, and being provided with nuts 9e on their outer ends whereby bolts 9 are adjustably anchored in clip slide collar 2. As shown, four such bolts 9 are arranged around the periphery of the collars 2 and 3. Each bore 3d in shift collar 3 has an enlarged portion 3f at its inner end, and within said enlargement is a coiled spring 10 around the bolt interposed between the inner end of said enlargement and the nut 9b, said spring normally urging collar 3 away from collar 2 so that the heads 9a of the bolts 9 will be seated at the bases of the enlarged recesses 3e, the spring 10 thus yieldably mounting the clip slide collar 2 with respect to shift collar 3.

In the face of clip slide collar 2 towards the shoulder A2, are a series of slots 2c (Fig. 6), the bases of which slots slope upwardly and outwardly away from the shoulder A2. The lower portions of the slots are undercut as at 2d so as to retain clip slides 6 therein, the slots being substantially of inverted T-shaped cross-section. As shown in Fig. 5, four such slots are provided about the circumference of clip slide collar 2.

Within each of the slots 2c is a clip slide 6 (Figs. 1, 2, 6, 10, 11 and 12) of normal width to fit between the side walls of slots 2c, and having T-shaped enlargements 6a at their lower ends to slidably engage the correspondingly shaped enlargements 2d of slots 2c, whereby the slides will be prevented from being lifted directly out of said slots. Preferably the outer face 6b of each clip 6 adjacent shoulder A2 is normal to the axis of the cylinder, and extending through the clip slides 6, on the axis thereof, normal to the face 6b, is a bore 6c having an enlarged inner end 6d adapted to receive the head of a bolt or screw which connects the clip slide to its respective plate clip 7. By the above construction each clip slide 6 is free to slide along the inclined lower face of the slot 2c towards or from the shoulder A2 of the cylinder, and in so doing the clip will be correspondingly shifted radially of the axis of the cylinder A.

Mounted on each clip slide 6 is a plate clip 7 shown in Figs. 1, 2, 5, 7, 8 and 9, said clip being of slightly arcuate shape, as shown, and having an inner end wall 7a normal to the axis of the cylinder A provided with a hole 7b for the reception of a bolt 7x or the like whereby the clip is secured to the vertical face 6b of clip slide 6 as shown in Figs. 1 and 2. At the lower end of the wall 7a is an arcuate base portion 7c adapted to conform with the curvature of the reduced portion A' of the cylinder, and in base 7c is an elongated slot 7d, for the purpose hereinafter described. At the upper end of the wall 7a is an arcuate flange 7e extending towards the shoulder A2, and the outer end of the flange 7e adjacent the wall A2 is beveled at an angle of approximately 30° to the vertical so as to engage the complementary flanged end B' of the printing plate B on the cylinder A; and the outer end is preferably knurled.

Secured to the shoulder A2 of the cylinder is a clip collar 1 having a web preferably secured by bolts or the like passing through holes therein and into the shoulder A2. Clip collar 1 is provided with an outer annular flange 1a of same external diameter as the main body portion of cylinder A, said flange forming a continuation of the body of said cylinder and underlying and supporting the beveled edge B' of the plate B on the cylinder, the flange 1a projecting slightly beyond the beveled edge B' of the plate, as shown in Figs. 1 and 2. The thickness of flange 1a is slightly less than the distance between adjacent faces of portions 7c and 7e of each plate clip 7.

Clip collar 1 is also provided with an inner annular flange 1b seating upon the reduced portion A' of the cylinder A, said flange extending along said portion A' and normally contacting the adjacent end of the base 7c of the plate clip 7, as shown in Fig. 1, when the parts are in unlocked position shown therein. The distance between the adjacent faces of flanges 1a and 1b of clip collar 1 is slightly greater than the thickness of the base 7c of plate clip 7. Extending diagonally downward through the outer flange 1a of clip collar 1 are pins or studs 8 which are preferably threaded into inclined tapped bores in the outer end of flange 1a, said pins or studs entering the elongated slots 7d in the bases 7c of the respective plate clips 7 to maintain the clips 7 aligned with the axes of their slots 2c in collar 2.

The unthreaded portions of studs 8 which project into the slots 7d in the clips 7 prevent the latter from moving circumferentially, thus eliminating bending strains on the studs 9.

In operation, assuming the parts are in position shown in Fig. 1 of the drawings, the plate B is shoved onto the cylinder from the end over the retracted parts. Suitable stops and clamps are carried by the cylinder to hold the end of plate B opposite from our clamping mechanism, these being of the usual style and not shown in our present application. When the plate is entered onto the cylinder the shift cam 5a—5b—5c is rotated by a wrench having projections which enter the two holes 5d therein. One non-circular hole however could be used instead of the two holes 5d. As the cam shaft 5a is rotated the eccentric heads 5b—5c force the shift collar 3 toward the shoulder A2 of the cylinder carrying with it, by means of the yieldably mounted studs 9 the clip slide collar 2. As collar 2 moves toward the end B' of the plate, the angular slots 2c in the collar 2, already engaged with angular tongues 6a in the clips 6 and 7, force the clips 6 and 7 to move radially of cylinder A until the projecting flange 7e will clear the flange 1a of clip collar 1. The outer end of base 7c will then engage the under surface of the flange 1a of collar 1, and further rotation of cam shaft 5a will force the collars 2 and 3 and the clips 6 and 7 axially until the flanges 7e of clips 7 contact the beveled end B' of the plate. The springs 10 of studs 9 equalize the pressures between the clips 6—7 and the plate B. In previous devices for this purpose, the plate gripping portions of the clips 7 were limited to the width of slots formed in the cylinder A. Our device however permits use of a wide gripping edge, not limited to the width of slots in the cylinder A; also said slots in the cylinder in previous devices are entirely eliminated.

For small differences in the lengths of plates B, the studs 9 may be rotated in the collar 2 to shorten or lengthen the travel of flanges 7e of the clips 7, said studs 9 being locked in position by the lock nuts 9e after the adjustment is made. Also to equalize the spring pressure the springs 10 may be compressed or expanded by adjusting the nuts 9b—9c. Adjustments of about ¼" or less are sufficient for these small variations. However, sometimes a pressman makes replacements of plates which are considerably shorter than the maximum length as provided. In this case a collar marked A4 (Figs. 1 and 2) may be provided between the clip collar 1 and the shoulder A2 of the cylinder. This applies to a change from a plate say 16" long to a plate 14" long or in other words, a make-up of 8 column 12 ems to a 7 column make-up.

We claim:

1. In combination, a plate cylinder having a cylindrical plate supporting surface and having an axially disposed reduced portion; a member within the reduced portion forming a continuation of the supporting surface and adapted to underlie one end of a printing plate disposed thereon, said member having an annular recess in its outer end; a collar of diameter smaller than the supporting surface slidably mounted on said reduced portion, and having portions of its outer face inclined outwardly away from the said member; substantially U-shaped plate clips disposed between the collar and member and normally below the plate supporting surface and having portions engaging said inclined portions of the collar, said clips normally seating upon the reduced portion with their legs directed towards the member, and means for shifting the collar towards the member whereby the clips will be moved outwardly and axially to permit the legs of the clips to telescope the said member with one leg of each clip overlying the outer face of the member to engage the end of the printing plate.

2. In a combination as set forth in claim 1, a removable collar in said reduced portion interposed between the member and the end of the reduced portion, and forming a continuation of the plate supporting surface to permit adjustment of the member to suit plates of various widths.

3. In a combination as set forth in claim 1, said collar shifting means comprising a slidable shift collar on the reduced portion; cam means for shifting the shift collar; and yieldable means connecting the shift collar with the first mentioned collar.

4. In a combination as set forth in claim 1, said collar shifting means comprising a slidable shift collar on the reduced portion having diametrically opposed cam shoes slidably mounted therein; a cam shaft extending through said shift collar, cam shoes, and through a diametrically disposed bore in said reduced portion and having eccentrically disposed heads thereon engaging recesses in the cam shoes; means for rotating the shaft; and yieldable means connecting the shift collar with the first mentioned collar.

5. In combination, a plate cylinder having a cylindrical plate supporting surface and having an axially disposed reduced portion; a member within the reduced portion forming a continuation of the supporting surface and adapted to underlie one end of a printing plate disposed thereon; said member having an annular recess in its outer end; a collar of diameter smaller than the plate supporting surface slidably mounted on said reduced portion, and having a series of slots in its outer face extending from its end adjacent the member, the bottoms of said slots being inclined outwardly away from the said member; slides engaging said slots; plate clips carried by said slides disposed between the collar and member, and having base flanges normally seating upon the reduced portion, and having outer flanges normally disposed below the plate supporting surface; and means for shifting the collar towards the member whereby the clips will be moved outwardly and axially to permit the base flanges thereof to enter the annular recess in the member whereby the outer flanges of the clips will overlie the outer face of the member to engage the end of the printing plate.

6. In a combination as set forth in claim 5, means for maintaining the clips in alignment with their respective slots.

7. In a combination as set forth in claim 5, a removable collar in said reduced portion interposed between the member and end of the reduced portion, and forming a continuation of the plate supporting surface to permit adjustment of the member to suit plates of various widths.

8. In a combination as set forth in claim 5, said collar shifting means comprising a slidable shift collar on the reduced portion; cam means for shifting the shift collar; and yieldable means connecting the shift collar with the first mentioned collar.

9. In a combination as set forth in claim 5, said collar shifting means comprising a sildable shift collar on the reduced portion having diametrically opposed cam shoes slidably mounted

therein; a cam shaft extending through said shift collar, cam shoes, and through a diametrically disposed bore in said reduced portion and having eccentrically disposed heads thereon engaging recesses in the cam shoes; means for rotating the shaft; and yieldable means connecting the shift collar with the first mentioned collar.

10. In combination, a plate cylinder having a cylindrical plate supporting surface and having an axially disposed reduced end portion forming a shoulder; a member within the reduced portion secured to said shoulder and having an outer annular flange forming a continuation of the plate supporting surface adapted to underlie the end of a printing plate disposed thereon; said member having an inner annular flange seated upon the reduced end portion; a collar of diameter smaller than the plate supporting surface slidably mounted on said reduced end portion, and having a series of slots in its outer face extending from its end adjacent the member, the bottoms of said slots being inclined outwardly away from said member; slides engaging said slots adapted to be shifted radially outwardly as the collar is shifted axially towards the member; plate clips carried by said slides disposed between the collar and member and having base flanges normally seating upon the reduced end portion and contacting the ends of the inner flange of the member, said plate clips having outer flanges normally disposed opposite the outer flange of the member; and means for shifting the collar towards the member whereby the plate clips will be moved outwardly to permit the base flanges of the clips to enter between the inner and outer flanges of the member, and the outer flanges of the plate clips to overlie the outer flange of the member to engage the end of the printing plate.

11. In a combination as set forth in claim 10, means for maintaining the plate clips in alignment with their respective slots.

12. In a combination as set forth in claim 10, studs on the outer end of the outer flange of the member entering slots in the base flanges of the plate clips for maintaining the plate clips in alignment with their respective slots.

13. In a combination as set forth in claim 10, a removable collar in said reduced portion interposed between the member and shoulder and forming a continuation of the plate supporting surface to permit adjustment of the member to suit plates of various widths.

14. In a combination as set forth in claim 10, said collar shifting means comprising a slidable shift collar on the reduced end portion; cam means for shifting the shift collar; and yieldable means connecting the shift collar with the first mentioned collar.

15. In a combination as set forth in claim 10, said collar shifting means comprising a slidable shift collar on the reduced portion having diametrically opposed cam shoes slidably mounted therein; a cam shaft extending through said shift collar, cam shoes, and through a diametrically disposed bore in said reduced end portion and having eccentrically disposed disk-heads thereon engaging circular recesses in the cam shoes; means for rotating the shaft; and yieldable means connecting the shift collar with the first mentioned collar.

16. In combination, a plate cylinder having a cylindrical plate supporting surface and having an axially disposed reduced portion; said supporting surface having an annular recess in its outer end underlying one end of a printing plate disposed thereon; a collar of smaller external diameter than the plate supporting surface slidably mounted on said reduced portion; plate clips disposed between the collar and plate supporting surface and having base flanges normally seating upon the reduced portion and having outer flanges normally disposed below the plate supporting surface; means operated by the collar when same is moved axially towards the plate supporting surface whereby the clips will be moved outwardly and axially to permit the base flanges thereof to enter the annular recess in the end of the plate supporting surface and the outer flanges of the clips to overlie the plate supporting surface and engage the end of the printing plate; and means for moving the collar.

17. In a combination as set forth in claim 16, said collar moving means comprising a slidable shift collar on the reduced portion; cam means for shifting the shift collar; and yieldable means connecting the shift collar with the first mentioned collar.

18. In a combination as set forth in claim 16, said collar moving means comprising a slidable shift collar on the reduced portion having diametrically opposed cam shoes slidably mounted therein; a cam shaft extending through said shift collar, cam shoes, and through a diametrically disposed bore in said reduced portion and having eccentrically disposed heads thereon engaging recesses in the cam shoes; means for rotating the shaft; and yieldable means connecting the shift collar with the first mentioned collar.

19. In a combination as set forth in claim 16, said collar moving means comprising a slidable shift collar on the reduced portion having diametrically opposed cam shoes slidably mounted therein; a cam shaft extending through said shift collar, cam shoes, and through a diametrically disposed bore in said reduced portion and having eccentrically disposed disk-heads thereon engaging circular recesses in the cam shoes; means for rotating the shaft; and spring pressed bolts adjustably connecting the shift collar with the first mentioned collar.

EARL P. LACURE.
ALBERT J. CARPENTER, JR.