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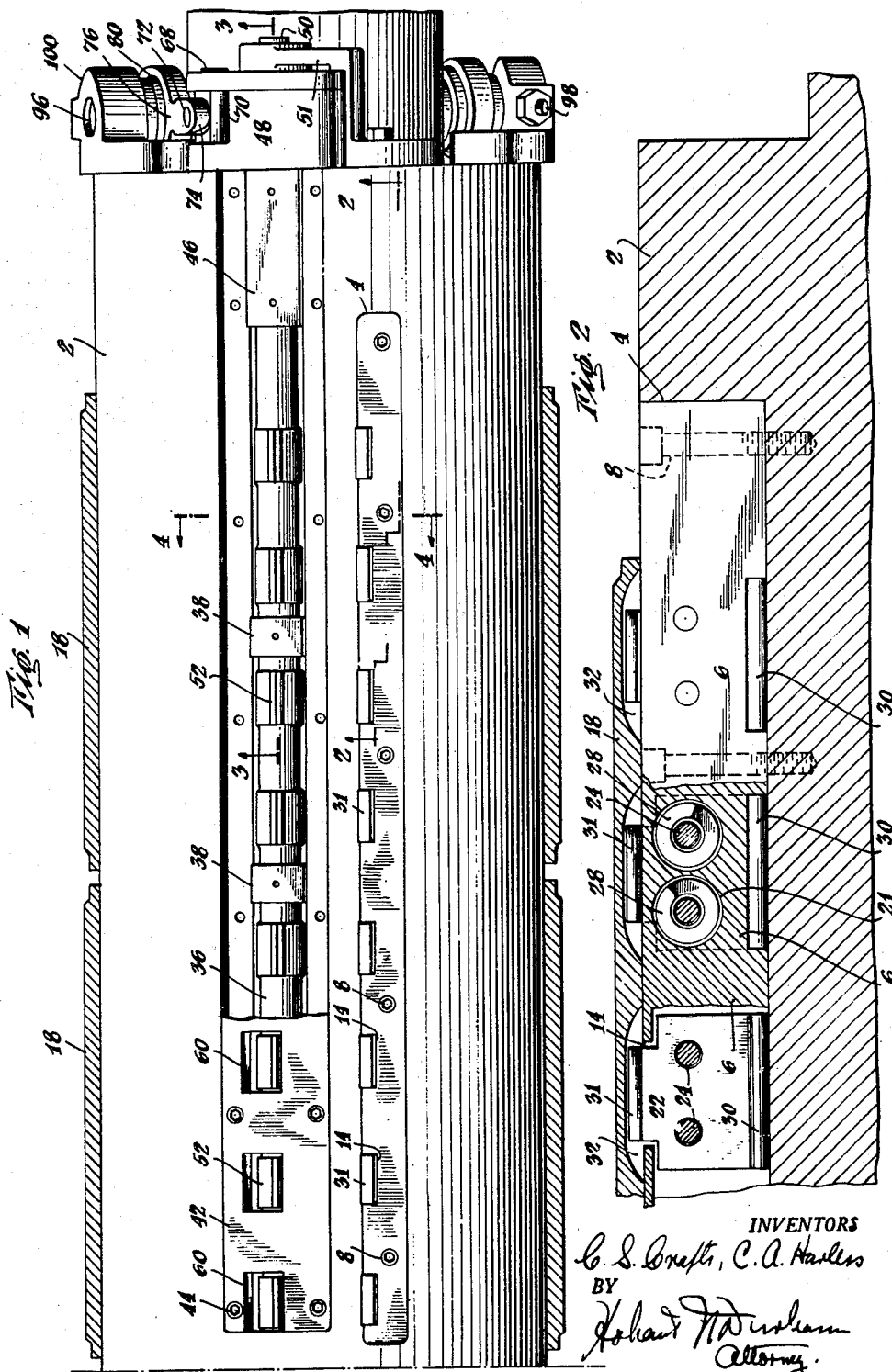
C. S. CRAFTS ET AL

2,413,174

ROTARY PRINTING PRESS

Filed Dec. 2, 1943

3 Sheets-Sheet 1



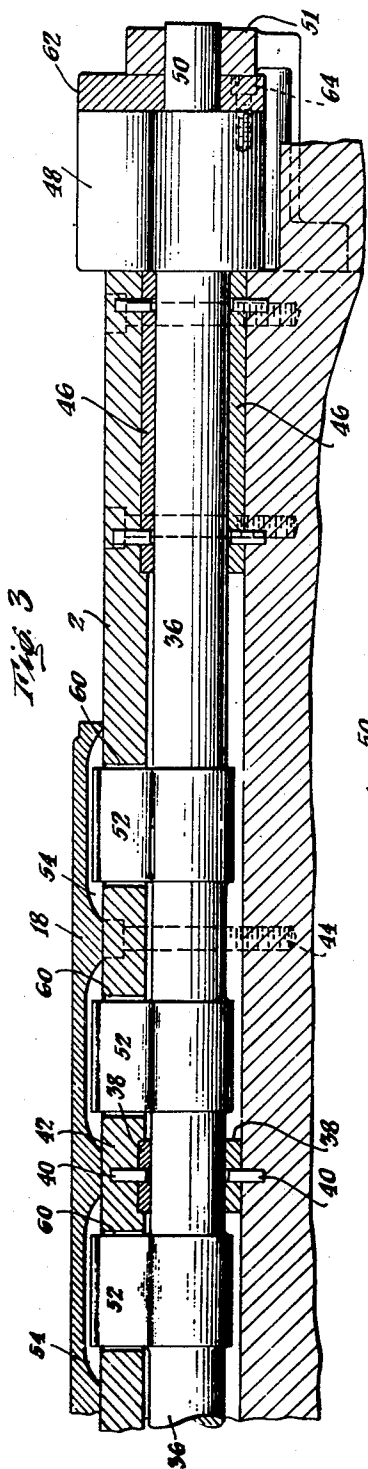
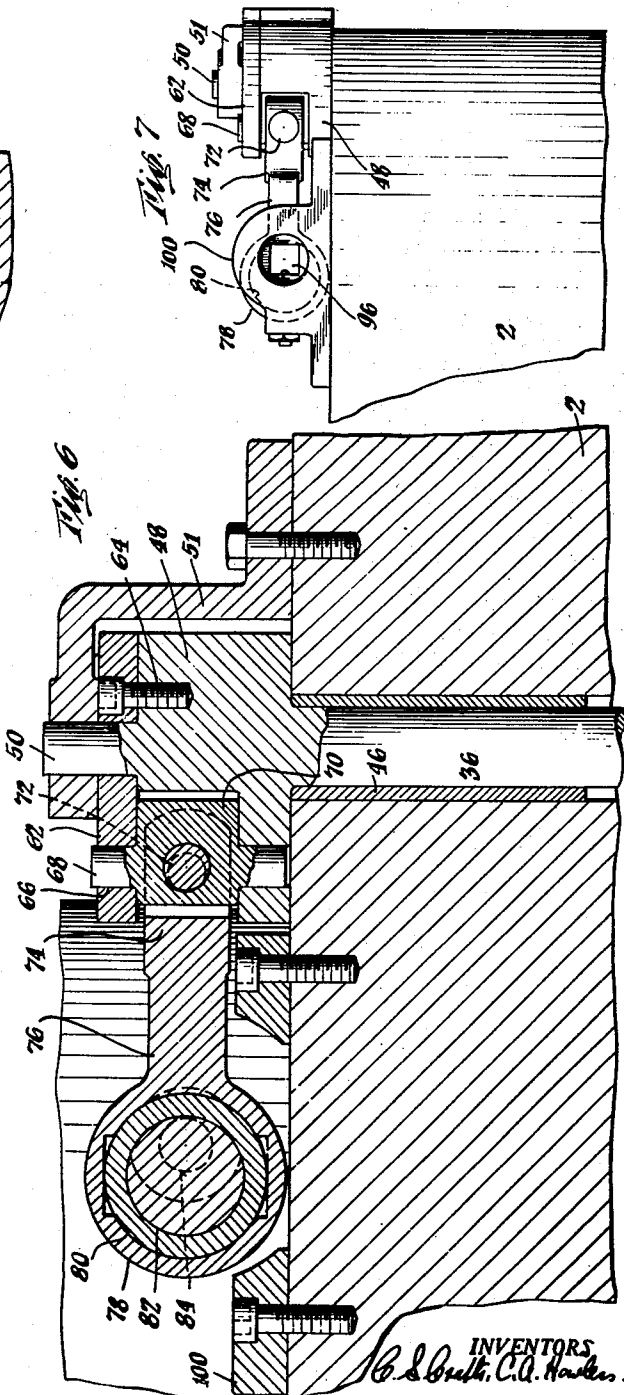
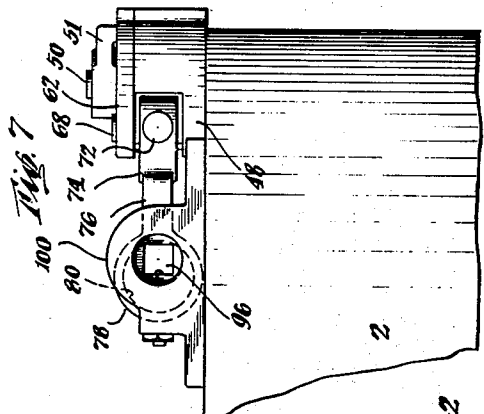
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3 Sheets-Sheet 2



INVENTORS  
*B. S. Crafts, C. L. Hawley*  
BY *Robert H. Dushane*  
ATTORNEY

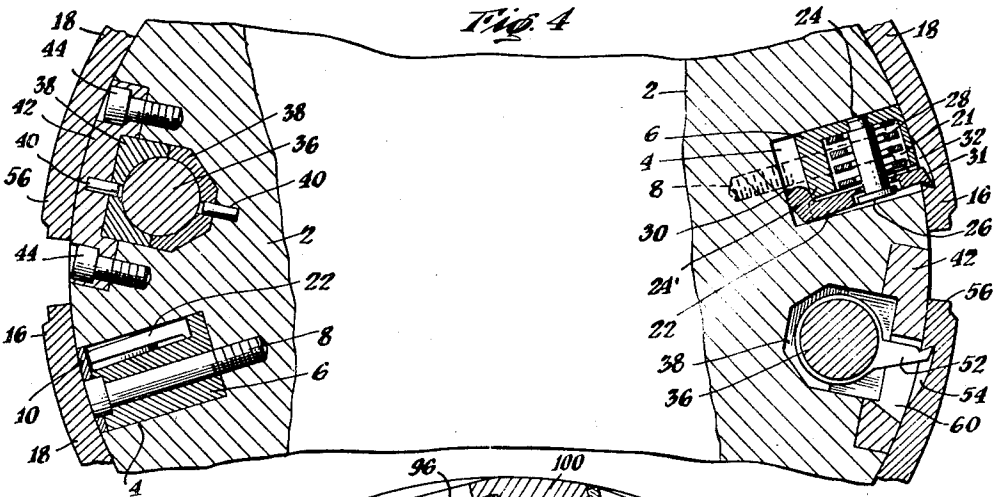
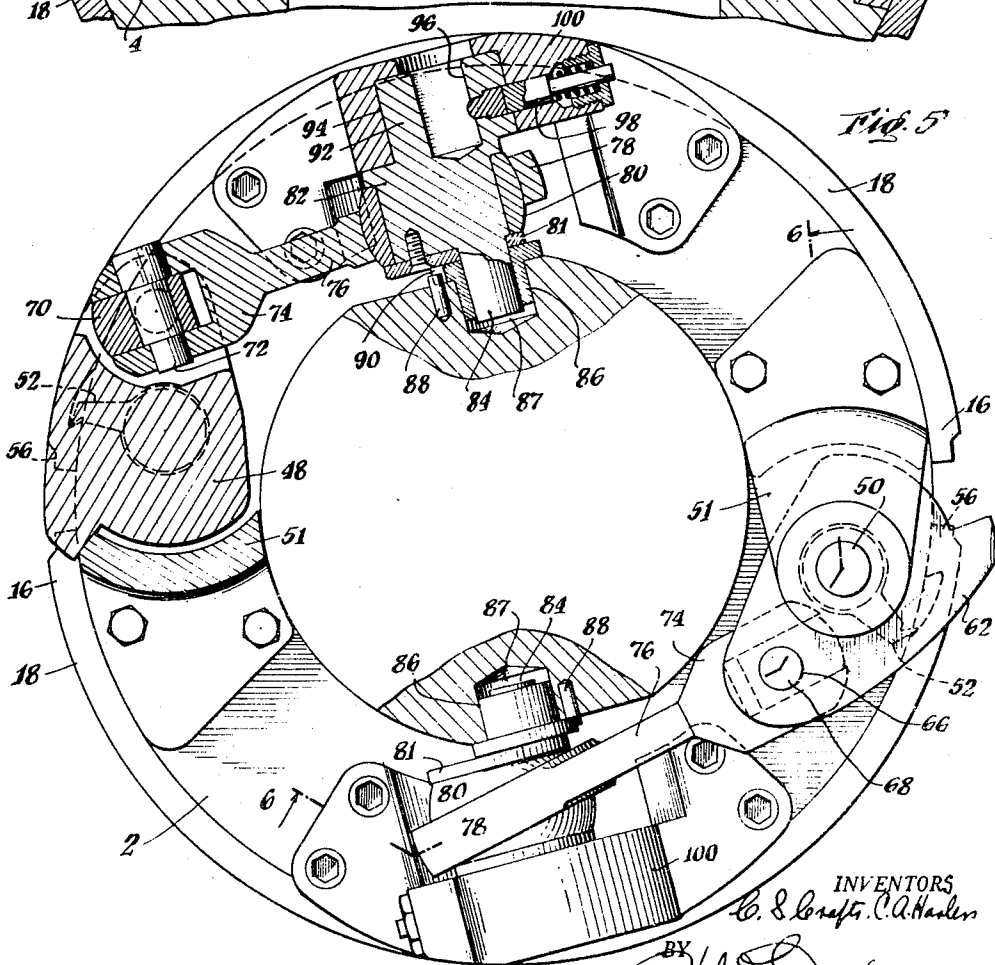
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3 Sheets-Sheet 3



INVENTORS  
C. S. Crafts, C. A. Hansen  
BY *Arthur N. Durbin*  
ATTORNEY

## UNITED STATES PATENT OFFICE

2,413,174

## ROTARY PRINTING PRESS

Curtis S. Crafts and Charles Alonzo Harless, Oak Park, Ill., assignors to The Goss Printing Press Company, Chicago, Ill., a corporation of Illinois

Application December 2, 1943, Serial No. 512,530

19 Claims. (Cl. 101—378)

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This invention is an improvement in rotary printing presses, and relates to the plate cylinder in such a press, being concerned particularly with means for exerting circumferential tension on a stereotype plate carried by the plate cylinder.

Objects and advantages of the invention will be set forth in part hereinafter and in part will be obvious herefrom, or may be learned by practice with the invention, the same being realized and attained by means of the instrumentalities and combinations pointed out in the appended claims.

The invention consists in the novel parts, constructions, arrangements, combinations, and improvements herein shown and described.

The accompanying drawings, referred to herein and constituting a part hereof, illustrate one embodiment of the invention, and together with the description, serve to explain the principles of the invention.

Of the drawings:

Fig. 1 is a side view of a plate cylinder of a rotary printing press of this invention;

Fig. 2 is an enlarged fragmentary sectional view taken on the line 2—2 of Fig. 1;

Fig. 3 is an enlarged fragmentary sectional view taken on the line 3—3 of Fig. 1;

Fig. 4 is an enlarged fragmentary cross section of the plate cylinder, taken on the line 4—4 of Fig. 1;

Fig. 5 is an end view partly broken away of the plate cylinder of this invention;

Fig. 6 is a sectional view of certain parts of Fig. 5 taken on the line 6—6 of Fig. 5; and

Fig. 7 is a view on a smaller scale of the portion of Fig. 1, looking from the right of that figure.

With high speed printing presses, it has been found desirable to hold a stereotype plate in position on the plate cylinders by means exerting circumferential tension on the plate. With these high speed presses, there is a tendency for the plate to deform, and eventually crack, due to the continuous and successive pressure waves exerted on it in the printing operation; there is some tendency for the plate to become displaced, and there is also the effect of centrifugal force. All of these factors are eliminated or counteracted to a substantial degree by securing the leading edge of the printing plate to the plate cylinder and by exerting a circumferential resilient tension on the trailing edge of the plate.

The principal object of the present invention is to provide a plate cylinder for a rotary printing press where a resilient circumferential ten-

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sion is exerted on the trailing edge of the plate while a torsion shaft exerts a force on the plate against the pull of said resilient means.

Another object of the invention is to provide a plate cylinder where the respective longitudinal edges of the plate are engaged with hooks, one set of hooks exerting resilient tension on the trailing edge, and a second set of hooks controlled by a torsion shaft exert a force on the leading edge against the pull of the resilient hooks.

Another object of the invention is to provide controlling means for the described torsion shaft which can be turned and locked in position, to put the resilient means at the trailing edge of the plate under tension, and to hold the leading edge of the plate in place against the pull of such resilient means.

Another object of the invention is to provide a controlling means for described torsion shaft, which means is turnable on an axis substantially perpendicular to the axis of the plate cylinder, whereby the torsion shaft can be turned and caused to put the tension exerting means at the trailing edge under tension.

It will be understood that the foregoing general description and the following detailed description as well are exemplary and explanatory of the invention but are not restrictive thereof.

Referring now to the drawings, the plate cylinder 2 is provided with a longitudinally extending recess 4. The recess 4 is partially filled by a plate 6 which is formed with spaced recesses and is secured by bolts 8. A cover portion 10 formed integrally therewith has openings 14, opening into the respective recesses in the plate 6.

In each of the described compartments there is mounted a unitary assembly for exerting spring tension on the trailing edge 16 of the stereotype plate 18. This assembly comprises the plate 6 having pairs of recesses 21. This housing is connected with a hook plate 22 by means of two pins 24, passing through the recesses 21. One end of each pin 24 is secured in the housing, while the lower end passes through and loosely engages the hook plate 22, pins 24 having heads 26 somewhat larger than the hole through which the pins pass. Mounted in each recess 21 and encircling each pin 24 is a strong compression spring 28 bearing against the inside of the recesses 21 and against the hook plate 22. The inner end of the hook plate projects beyond the inner wall 24' of the housing, and is rounded, as shown at 30. With the described construction, hook 22 has a limited pivotal movement by reason of its rounded

end 30 and is pressed strongly outwardly by the two springs 28. The hooks 31 of the hook member extend through openings 14 in cover portion 10 and engage in recesses 32 in the trailing edge of the stereotype plate. This assembly of tension exerting means may readily be put in place or removed from the plate cylinder as a unit.

The torsion shaft and cooperating mechanism for holding the leading edge of the plate and for putting the tension exerting means at the trailing edge under tension will now be described. This mechanism comprises a torsion shaft 36 extending longitudinally of the plate cylinder mounted in bearings 38 in their suitable recesses in the plate cylinder, the bearings being held in place by pins 40 while the outer bearings are held in place by a cover plate 42 held in place in a suitable recess in the cylinder by screw bolts 44.

In making the torsion shaft 36, it is machined under torsion, so that when in use and again put under torsion the resulting deflection will result in accurate positioning of the plate engaging hooks carried by the shaft. In other words, the hooks 52 on the finished unstressed shaft are positioned along a helix, instead of being strictly in line. However, when the shaft is put under torsion in actual use, the slight successive displacements of the hooks bring the hooks into accurate axial alignment.

Further bearings for the shaft 36 are provided at 46, while the end of the shaft terminates in a head 48 and a projecting stud 50, stud 50 being journaled in a bracket 51 secured to the end of the plate cylinder.

The shaft 36 is provided with a plurality of outwardly projecting hooks 52 rigidly secured thereto preferably being forged to the shaft, and adapted to engage in recesses 54 in the leading edge 56 of the stereotype plate, these hooks extending through openings 60 in the cover plate 42.

The mechanism for turning and locking the torsion shaft 36 for holding the leading edge of the stereotype plate will now be described. This mechanism comprises an actuating lever or plate 62 secured to head 48 of shaft 36 by stud 64. Apertures 66 in actuating plate 62 and the head 48 provide journal bearings for the stub shafts 68 projecting from a block 70. Block 70 is provided with a transversely extending, eccentrically mounted stub shaft 72. Shafts 68 and 72 are at right angles providing universal movement. The ends of shaft 72 are journaled in a stirrup 74 integral with arm 76, the other end of which arm is formed into an eccentric strap 78. This eccentric strap 78 engages over a spherically curved bushing 80 being held in place by plate 81. Bushing 80 is free on the eccentric head 82, one end 84 of which is fixed to bushing 86 journaled in recess 87, bushing 86 having a limited rotary movement by reason of the fixed pin 88 working in slot 90 of the bushing. The outer end 92 of the eccentric head 82 is journaled in a recess 94 in the plate cylinder and is provided with the key slot 96 for receiving a wrench for turning it. In order to lock the described parts in fixed position a spring pressed plunger 98 adapted to snap into a recess in head 92 is used.

The operation is as follows: A stereotype plate is put in position on the cylinder, the hooks 22 for the trailing edge being engaged in their recesses 32, while the hooks 52 for the leading edge are engaged in recesses 54, hooks 52 being retracted far enough to allow them to slip into their recesses. In order to tighten the plate in position, it is necessary to rotate torsion shaft 36 to

cause the hooks 52 to pull the plate against the tension exerted by the resilient hooks at the trailing edge. This is accomplished by putting a wrench in recess 96 and turning the eccentric 82 which, referring to the lower part of Fig. 5, pushes stirrup 74 to the right, the movement of the eccentric away from the end of the cylinder being compensated for by the movement about the stub shaft 72. The movement of 74 to the right moves the actuating plate 62 in a counterclockwise direction and, since the plate 62 is fixed to shaft 36, the shaft is moved in a counterclockwise direction to cause hooks 52 to exert a circumferential tension on the plate, which pulls against the tension exerted on the plate by the described resilient means engaging with the trailing edge thereof, and so the plate is put under tension. The shaft 36 is locked in this position by the plunger 98 snapping into the appropriate recess in head 92 of the operating eccentric, the eccentric being at about dead center in this position.

In removing the plate, the plunger 98 is released and the eccentric turned in the opposite direction, to swing hooks 52 to the position shown at the right of Fig. 5, in which position the leading edge of the plate can be lifted away from the cylinder about its trailing edge as a pivot, to clear the hooks 52, after which hooks 22 are readily released.

Where two stereotype plates are used the described mechanism is in duplicate, as shown. The same mechanism may be used for a cylindrical stereotype plate.

The invention in its broader aspects is not limited to the specific mechanisms shown and described but departures may be made therefrom within the scope of the accompanying claims without departing from the principles of the invention and without sacrificing its chief advantages.

We claim as our invention:

1. In a rotary printing press, a plate cylinder for exerting circumferential tension on a stereotype plate, comprising resilient means for exerting tension on the trailing edge of the plate and means, including a torsion shaft extending longitudinally of the plate cylinder, for exerting tension on the leading edge of the plate, against the tension of said resilient means.

2. In a rotary printing press, a plate cylinder for exerting circumferential tension on a stereotype plate, comprising resilient means for exerting tension on the trailing edge of the plate, means, including a torsion shaft extending longitudinally of the plate cylinder, for exerting tension on the leading edge of the plate, against the tension of said resilient means and means for locking said torsion shaft in tension exerting position.

3. In a rotary printing press, a plate cylinder for exerting circumferential tension on a stereotype plate, comprising resilient means for exerting tension on the trailing edge of the plate, means, including a torsion shaft extending longitudinally of the plate for exerting tension on the leading edge of the plate against the tension of said resilient means, an actuating member fixed to one end of said torsion shaft, and means for oscillating said member in a plane substantially perpendicular to the axis of the torsion shaft.

4. In a rotary printing press, a plate cylinder for exerting circumferential tension on a stereotype plate, comprising resilient means for exerting tension on the trailing edge of the plate, means including a torsion shaft extending longi-

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turning on an axis substantially perpendicular to the axis of the plate cylinder, an eccentric strap, operatively connecting said actuating member and said eccentric, whereby the torsion shaft is moved back and forth about its axis and means for locking said turnable means in fixed position.

5. In a rotary printing press, a plate cylinder for exerting circumferential tension on a stereotype plate, comprising resilient means for exerting tension on the trailing edge of the plate, means, including a torsion shaft extending longitudinally of the plate for exerting tension on the leading edge of the plate against the tension of said resilient means, an actuating member fixed to one end of said torsion shaft, and turnable means, turning on an axis substantially perpendicular to the axis of the plate cylinder, for oscillating said actuating member for turning said torsion shaft back and forth about its axis.

6. In a rotary printing press, a plate cylinder for exerting circumferential tension on a stereotype plate, comprising resilient means for exerting tension on the trailing edge of the plate, means, including a torsion shaft extending longitudinally of the plate for exerting tension on the leading edge of the plate against the tension of said resilient means, an actuating member fixed to one end of said torsion shaft, means for oscillating said member in a plane substantially perpendicular to the axis of the torsion shaft and means for locking said oscillating means in fixed position.

7. In a rotary printing press, a plate cylinder for exerting circumferential tension on a stereotype plate, comprising resilient means for exerting tension on the trailing edge of the plate, means, including a torsion shaft extending longitudinally of the plate for exerting tension on the leading edge of the plate against the tension of said resilient means, an actuating member fixed to one end of said torsion shaft, turnable means, turning on an axis substantially perpendicular to the axis of the plate cylinder, for oscillating said actuating member for turning said torsion shaft back and forth about its axis and means for locking said turnable means in a fixed position.

8. In a rotary printing press, a plate cylinder for exerting circumferential tension on a stereotype plate, comprising resilient means for exerting tension on the trailing edge of the plate, means, including a torsion shaft extending longitudinally of the plate for exerting tension on the leading edge of the plate against the tension of said resilient means, an actuating member fixed to one end of said torsion shaft, turnable means, including a spherically curved eccentric, turning on an axis substantially perpendicular to the axis of the plate cylinder, and an eccentric strap, operatively connecting said actuating member and said eccentric, whereby the torsion shaft is moved back and forth about its axis.

9. In a rotary printing press, a plate cylinder for exerting circumferential tension on a stereotype plate, comprising resilient means for exerting tension on the trailing edge of the plate, means, including a torsion shaft extending longitudinally of the plate for exerting tension on the leading edge of the plate against the tension of said resilient means, an actuating member fixed to one end of said torsion shaft, turnable means, including a spherically curved eccentric,

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turning on an axis substantially perpendicular to the axis of the plate cylinder, an eccentric strap, operatively connecting said actuating member and said eccentric, whereby the torsion shaft is moved back and forth about its axis and means for locking said turnable means in fixed position.

10. In a rotary printing press, a plate cylinder for exerting circumferential tension on a stereotype plate, comprising resilient means for exerting tension on the trailing edge of the plate, a torsion shaft extending longitudinally of the cylinder, projections carried by the torsion shaft and engageable with the stereotype plate, and means for turning the torsion shaft about its axis.

11. In a rotary printing press, a plate cylinder for exerting circumferential tension on a stereotype plate, comprising resilient means for exerting tension on the trailing edge of the plate, a torsion shaft extending longitudinally of the cylinder, outwardly extending hooks carried by the torsion shaft and engageable with the back of the stereotype plate and means for turning and locking the torsion shaft.

12. In a rotary printing press, a plate cylinder for exerting circumferential tension on a stereotype plate, comprising resilient means for exerting tension on the trailing edge of the plate, and means, including a torsion shaft provided with outwardly extending hooks for engaging the leading edge of the plate, said hooks, when the shaft is not under torsion, being progressively displaced from axial alignment to such an extent that torsional deflection of the shaft with the hooks engaging the plate brings the hooks into substantial axial alignment.

13. A torsion shaft for exerting a force on the edge of a stereotype plate, having outwardly extending hooks thereon for engagement with said plate, said hooks, when the shaft is not under torsion, being progressively displaced from axial alignment to such an extent that torsional deflection of the shaft with the hooks engaging the plate brings the hooks into substantial axial alignment.

14. A torsion shaft for exerting a force on the edge of a stereotype plate, having outwardly extending hooks thereon for engagement with said plate, said hooks, when the shaft is not under torsion, being arranged along a helix, the deflection of the shaft by torsion serving to bring the hooks into substantial axial alignment.

15. In a rotary printing press, a plate cylinder for exerting circumferential tension on a curved stereotype plate, said cylinder having a recess in its surface to receive a removable plate hook assembly in substantial alignment axially of the cylinder surface, said hook assembly comprising a plate having spaced recesses extending normal to the length of the plate, a plurality of hooks pivotally mounted with respect to the recessed plate, compression springs in the recesses urging the hooks away from the recessed plate, and means for retaining the assembly in cylinder recess.

16. In a rotary printing press, a plate cylinder for exerting circumferential tension on a curved stereotype plate, said cylinder having a recess in its surface to receive a removable plate hook assembly in substantial alignment axially of the cylinder surface, said hook assembly comprising a plate having spaced recesses extending normal to the length of the plate, a plurality of hooks pivotally mounted with respect to the recessed plate, compression springs in the recesses urging

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the hooks away from the recessed plate, pins mounted in the plate recesses and encircled by said springs, said pins extending through said hooks and serving to retain them assembled to the plate, and means for retaining the assembly in cylinder recess.

17. In a rotary printing press, the combination of a plate cylinder for supporting a printing plate, resilient means carried by said cylinder for exerting tension on one edge of the plate, and movable means carried by said cylinder torsionally operated to exert a predetermined torsional load on the other edge of the plate against the resiliency of said resilient means.

18. In a rotary printing press, the combination of a plate cylinder for supporting a printing plate, resilient means acting on one straight edge of the plate to exert resilient tension thereon, movable means including a torsional shaft extending longitudinally of the cylinder for exert-

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ing a pull on the other straight edge of the plate against the resiliency of said resilient means, and operating means for stressing said shaft with a predetermined torsional force as said movable means engage with the said other edge of the plate.

19. In a rotary printing press the combination of a plate cylinder for supporting a printing plate, means for securing a parti-cylindrical printing plate thereto including a shaft carrying plate engaging hooks which project through the surface of the cylinder to engage in recesses in the concave side of the plate near an edge thereof and means for angularly moving said shaft and hooks including an arm connected thereto, an eccentric and a link connecting the eccentric and arm.

CURTIS S. CRAFTS.

CHARLES ALONZO HARLESS.