Sept. 20, 1960 H. J. LUEHRS 2,953,091

PLATE CLAMPING MEANS FOR WRAP AROUND PRINTING PLATES

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Fig. 1

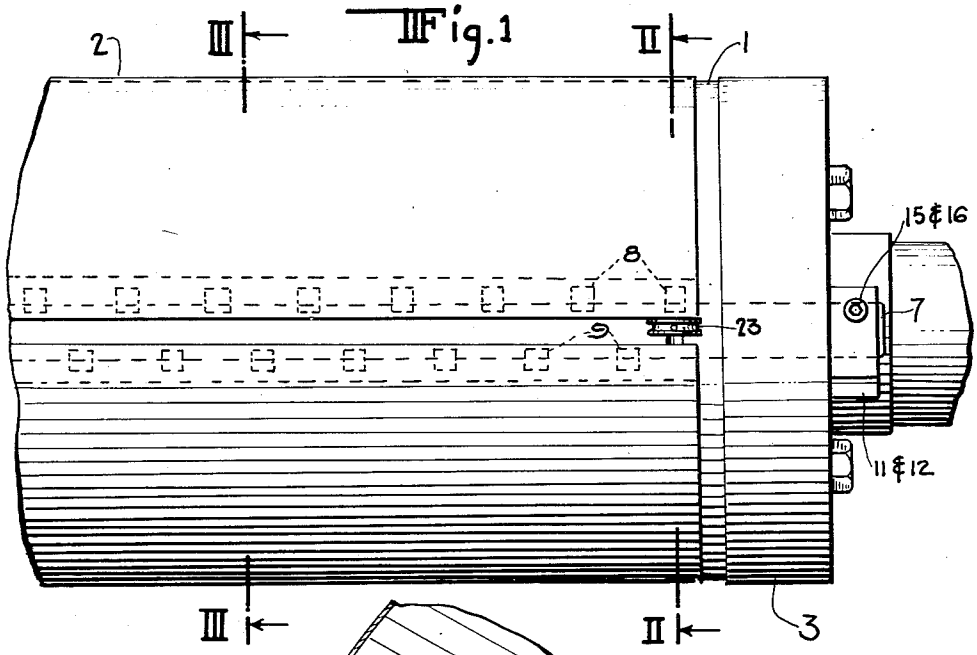
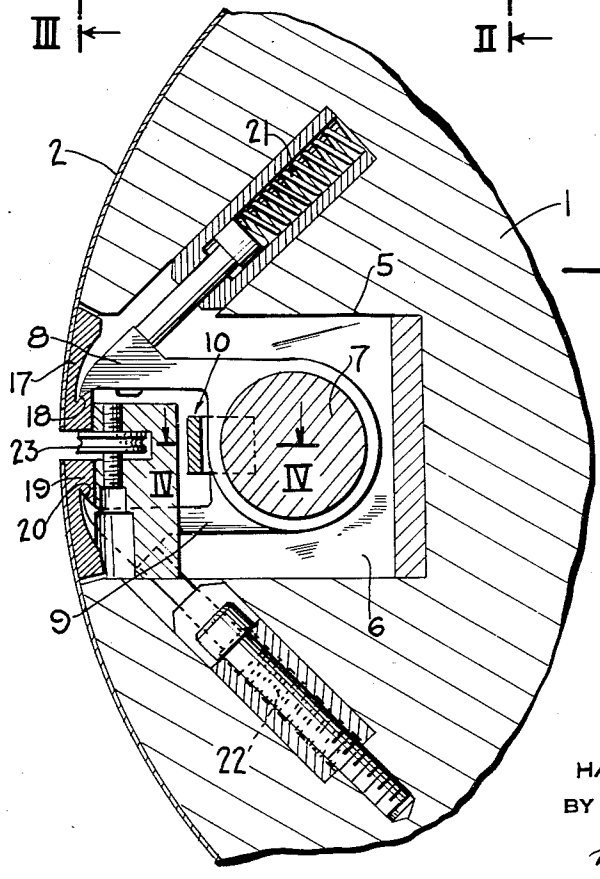


Fig. 2



INVENTOR
HANS J. LUEHRS
BY Brown & Seward
his ATTORNEYS

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PLATE CLAMPING MEANS FOR WRAP AROUND PRINTING PLATES

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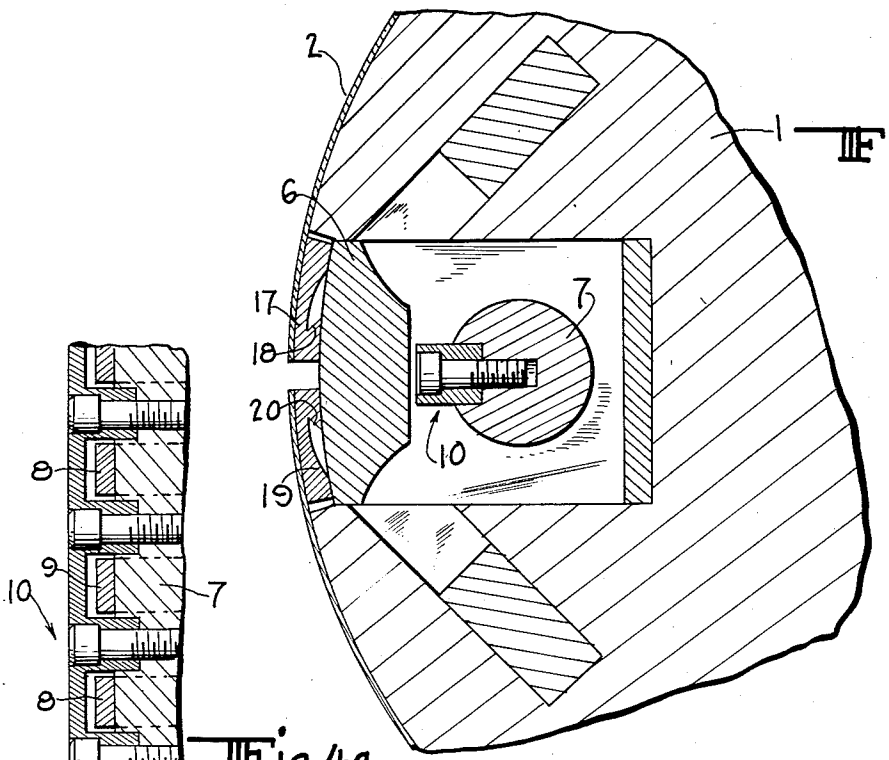

Fig. 3

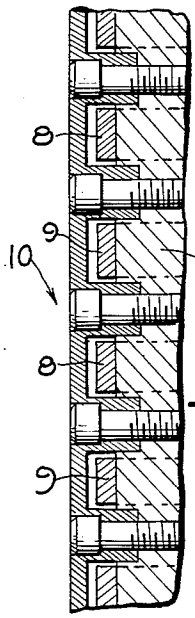

Fig. 4a

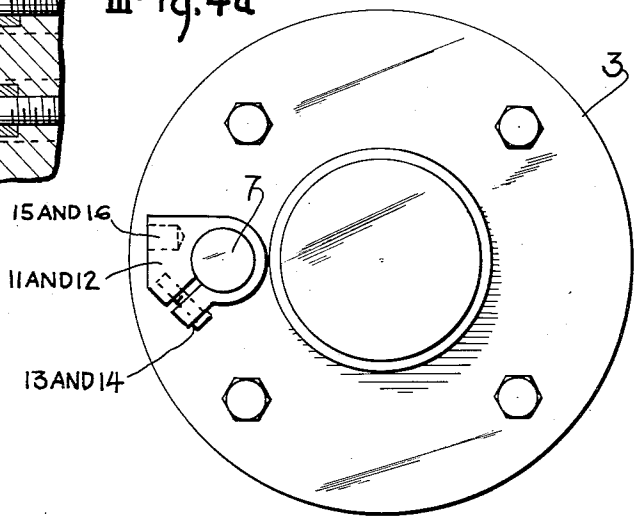

Fig. 4

INVENTOR
HANS J. LUEHRS
BY Brown & Seward
his ATTORNEYS

Sept. 20, 1960 H. J. LUEHRS 2,953,091

PLATE CLAMPING MEANS FOR WRAP AROUND PRINTING PLATES

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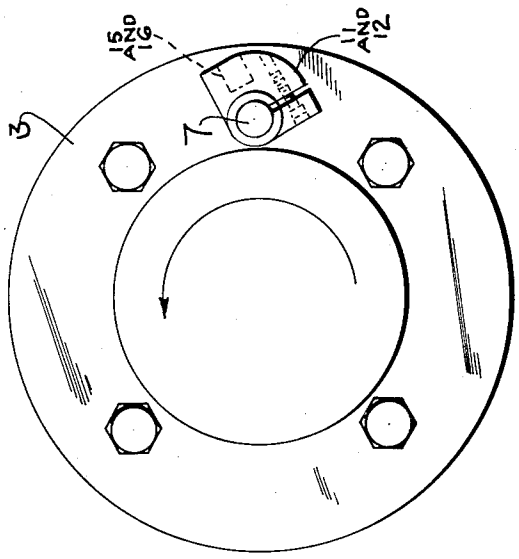

FIG. 6

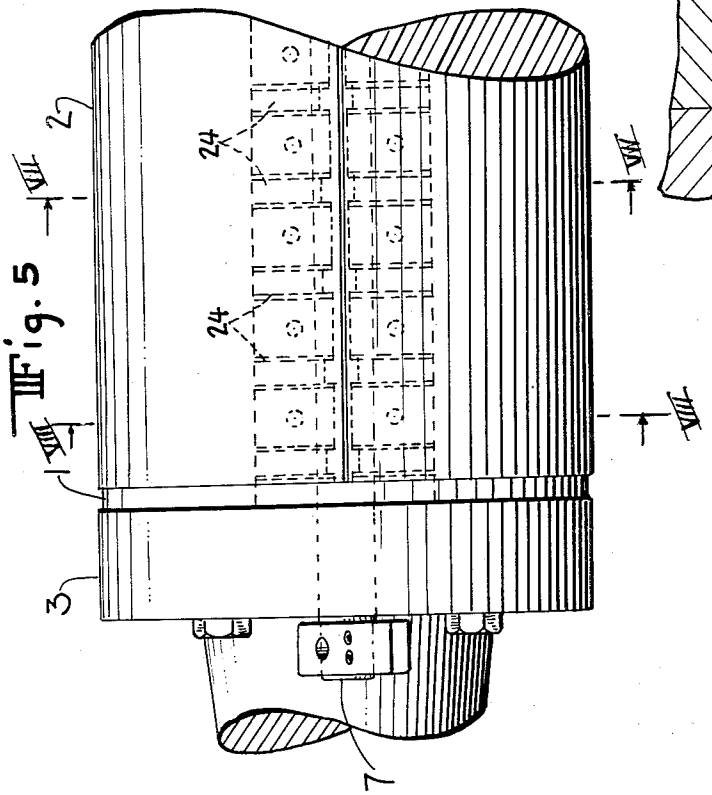

FIG. 5

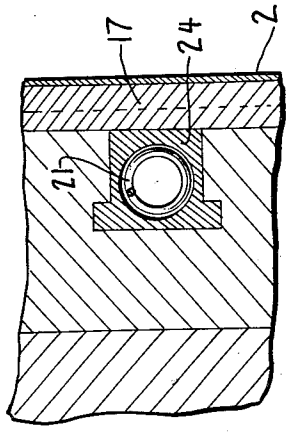

FIG. 10

INVENTOR
HANS J. LUEHRS
BY Brown & Seward
his ATTORNEYS

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PLATE CLAMPING MEANS FOR WRAP AROUND PRINTING PLATES

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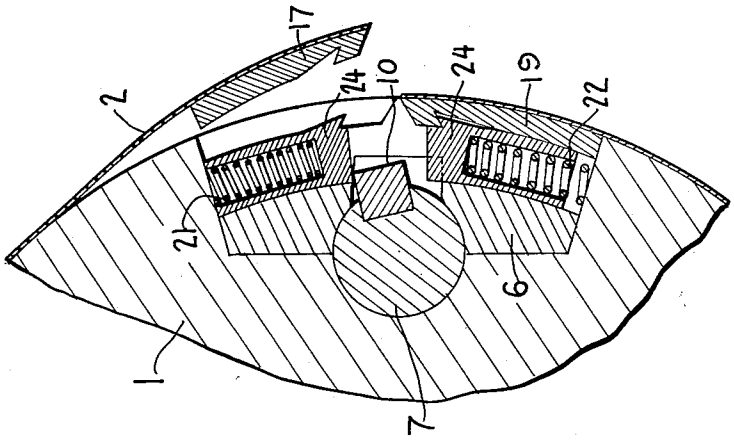

Fig. 7

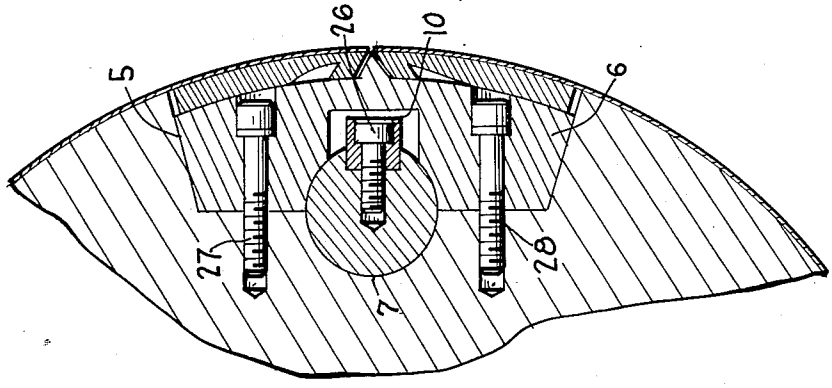

Fig. 8

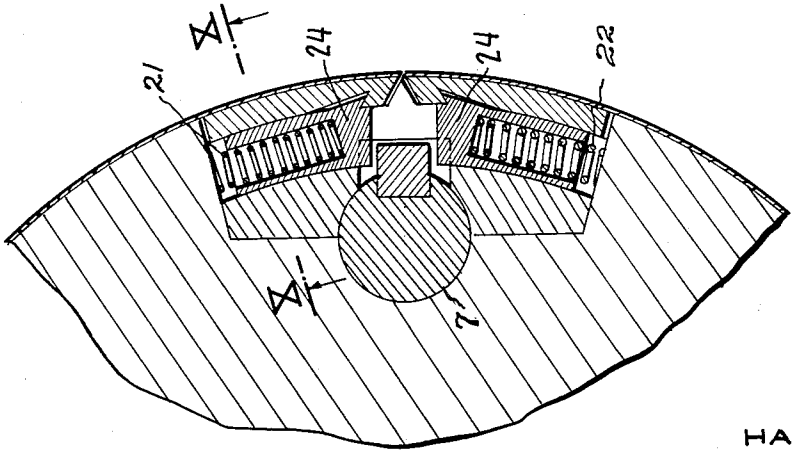

Fig. 9

INVENTOR
HANS J. LUEHRS

BY
Brown & Sewall
his ATTORNEYS

United States Patent Office 2,953,091 Patented Sept. 20, 1960

2,953,091

PLATE CLAMPING MEANS FOR WRAP AROUND PRINTING PLATES

Hans J. Luehrs, Westerly, R.I., assignor to The Cottrell Company, Westerly, R.I., a corporation of Delaware

Filed July 16, 1959, Ser. No. 827,547

12 Claims. (Cl. 101—415.1)

While wrap around plates per se are well known in the printing art, the increased speeds of modern presses have made desirable printing plates of less weight and of different characteristics. Due to the changes in plates it has been necessary to develop new means for clamping or tensioning same to the plate cylinder.

The object of my invention is to provide plate clamping means for wrap around printing plates suitable for plates normally not subjected to any pre-bending or beading operation to facilitate tensioning same to a printing plate cylinder. My invention is particularly suited to plates formed of brittle material, such as magnesium, but this example is given only for the purpose of illustration and is not to be considered a restriction.

Another object of my invention is to provide plate clamping means of a character such that the plate cylinder requires only a simple slot to accommodate said clamping means thereby eliminating the necessity for overhanging, bolted filling in pieces normally used to cover the clamping means and round out a portion of the cylinder surface.

Another object is to provide means whereby predetermined plate tension will be maintained under all printing conditions uniformly across the width of the plate, said means being combined with additional means to locate the plate in its desired location on the cylinder circumference.

Another object is to furnish means for quickly clamping to and locating the plate on the cylinder.

Another object is to provide wrap around plate clamping means which permit a small lateral printing margin, said means being of a design whereby the maximum rigidity and strength of the plate cylinder and its journals are effectively retained.

A further object is to provide wrap around plate clamping means wherein the above and other objects may effectively be attained as will hereinafter appear from the detailed specification.

Broadly, my invention comprises a plate clamping means for wrap around printing plates, including movable head and tail clamps having different clamping pressures with respect to the plate, and fixed on adjustable locating stops for the plate, plus individually spring-actuated levers independent from the common means to operate said levers to release the plate from the cylinder.

Practical embodiments of my invention are shown in the accompanying drawings in which:

Fig. 1 represents a plan view of a fragment of a cylinder carrying a wrap around plate tensioned thereon according to my invention.

Fig. 2 represents a detail section taken on the line II—II of Fig. 1 looking in the direction of the arrows.

Fig. 3 represents a detail section taken on the line III—III of Fig. 1 looking in the direction of the arrows.

Fig. 4 represents an end view of the form of my invention shown in Fig. 1.

Fig. 4*a* represents a section on line IV—IV of Fig. 1 looking in the direction of the arrows and showing the key carried by a shaft.

Fig. 5 represents a plan view of a fragment of a cylinder carrying a wrap around plate tensioned thereon according to a modified form of my invention.

Fig. 6 represents an end view of a plate cylinder constructed according to my invention, as shown, in Fig. 5, showing a clamped lever for rocking the key carrying shaft.

Fig. 7 represents a detail view of the opposed plate clamp levers of Fig. 5 monuted in the cylinder, taken on the line VII—VII of Fig. 5 looking in the direction of the arrows with the trailing plate edge and its engaging device prior to their engagement.

Fig. 8 represents in detail view the keys mounted on their actuating shaft, and the plate held to the cylinder as represented by a section on line VIII—VIII of Fig. 5 looking in the direction of the arrows.

Fig. 9 represents in detail side elevation the structure of Figs. 7 and 8 but with the plate locked to the cylinder; and

Fig. 10 represents a detail section taken on the line X—X of Fig. 9, looking in the direction of the arrows.

Referring to the accompanying drawings, the usual plate cylinder is denoted by **1**, its plate wrapped therearound by **2** and the customary cylinder bearers by **3**.

To accommodate the plate tensioning clamping levers and their actuating devices, the cylinder **1** is provided with a longitudinal slot **5** in which are positioned a bar **6** suitably milled and slotted to take a rockable shaft **7** on which are loosely mounted opposed plate clamping levers **8** and **9**. Also, but fixedly, mounted on said shaft **7**, are a plurality of keys denoted collectively by **10**, said keys being normally out of contact with but located to operatively and alternately contact said levers **8** and **9** depending upon the direction of rotation of said shaft **7** to push said levers back against the pressure of their respective springs so the plate end bars may be engaged by said levers.

Said shaft **7** is provided at each end with a means for actuating same comprising clamp levers **11**, **12** and their securing means **13**, **14**. Each clamp lever is holed (at **15** and **16**) as shown in Figs. 1 and 5 to receive a pin wrench (not shown) or other suitable tool for rocking shaft **7** in the desired direction, i.e., clockwise or counterclockwise with respect to the cylinder with the effects set forth below.

Plate **2** is provided at its leading edge with a bar **17** undercut at **18** and at its trailing edge with a bar **19** undercut at **20**, said undercuts being adapted to receive the outer ends of spring biased plate clamping levers **8** and **9**, respectively, for holding the plate to the cylinder under tension.

As stated above, levers **8** and **9**, are movably mounted to swing on shaft **7** as said levers are moved away from and then biased toward their plate bar engaging positions by the action of springs **21** and **22**. In the absence of plate locating stops **23**, spring **21** is usually heavier than spring **22**, and, as noted, biases lever **8** at the head or leading edge of plate **2**. When shaft **7** is turned in a clockwise direction (referring to Fig. 2) by means of the tool, or tools, inserted in holes **15** and/or **16**, the keys **10** engage the plate clamp levers **8** and push them back against the pressure of their respective springs **21** so that the plate **2** and its leading edge bar **17** may be properly placed with respect to the cylinder **1**. When the plate has been placed, shaft **7** is turned counter clockwise to disengage the keys **10** from the levers **8** and the latter are urged into plate bar engaging position by the action of their springs **21**. Likewise, at this stage the

leading edge of plate 2 will be brought against the plate locating stops 23 when same are employed.

Subsequent to wrapping plate 2 around cylinder 1, shaft 7 is rotated by means described above, in counter clockwise direction whereby keys 10 are brought into engagement with plate clamping levers 9, forcing same back against the pressure of their springs 22 in order that plate tail bar 19 may be inserted into the mouth of cylinder groove or slot 5. Shaft 7 is then released and the action of springs 22 will cause plate clamping levers 9 to enter into operative engagement with the undercuts 20 in plate trailing edge bar 19, thereby subjecting plate 2 to a uniform tension throughout its entire width of a magnitude equal to the difference in strength between springs 21 and 22.

It will also be noted that the plate leading and trailing edge bars 17 and 19 may be so located on the plate as to pre-tension the latter upon the insertion of the said bars into the cylinder slot. Under these conditions, and assuming a gap of substantial proportions between the leading and trailing edges of plate 2, the plate clamping levers and their springs will serve only to take up any stretch of the plate caused during the printing operation, thereby gradually diminishing any gap between the plate ends.

Also, as illustrated in Figs. 7, 8 and 9, any gap between the plate ends may be substantially eliminated by causing bars 17 and 19 on an initially tensioned plate to closely fit within the cylinder slot 5. In this instance, the capacities of springs 21 and 22 may be of equal magnitude and the plate clamping levers 8 and 9 merely serve as holddowns for bars 17, 19 and plate 2. This arrangement will provide the smallest possible printing margin.

In the modified form of my invention (Figs. 7, 8 and 9) the plate engaging elements 24 and 25 are slidably mounted in cylinder 1 rather than on shaft 7, and are biased into plate bar engaging position by their springs 21 and 22 as described above.

It will be noted that the means for actuating these elements 24 and 25 is otherwise similar to that described with respect to levers 8 and 9, the stops 10 being fixed on bar 7 by screws 26 (shown in Fig. 8).

Bar 6 is held in the slot by a series of screws denoted by 27 and 28.

The embodiments of my invention herein described and illustrated are normally applicable to cylinders of different sizes without requiring modification amounting to invention. The assembly which may be installed at the lesser radial depth in the cylinder permits its journals to be relatively large in diameter.

Since it is evident that various changes may be resorted to in the construction, form and arrangement of the several parts without departing from the spirit and scope of my invention, I do not intend to be limited except as set forth in the appended claims and have therefore illustrated several possible combinations.

What I claim is:

1. A plate clamping mechanism for flexible wrap-around printing plates comprising a cylinder, a longitudinal slot in said cylinder, a wrap-around plate adapted to be held to said cylinder and means located within said cylinder slot for tensioning said plate on the cylinder, said last named means comprising a longitudinal bar, a rockable shaft in said bar, plate engaging levers, lever engaging keys on said shaft and other means based in the cylinder for urging said levers into plate engaging position to clamp the plate to the cylinder.

2. A structure according to claim 1 in which the plate is flexible and provided at its ends with undercut bars adapted to receive said plate engaging levers.

3. A structure according to claim 1 in which the longitudinal bar is fixed in said cylinder slot and the shaft is rockably mounted thereon.

4. A structure according to claim 1 in which the rockable shaft in said bar is provided on at least one end with means for receiving an actuating tool whereby said shaft may be rocked with respect to said bar.

5. A structure according to claim 1 in which the plate engaging levers are alternately opposed and loosely mounted on said rockable shaft and the lever engaging keys are fixed on said shaft and located for engagement with alternate levers depending upon the direction of rotation of said rockable shaft.

6. A structure according to claim 1 in which the plate engaging levers are spring biased into plate engaging position, said biasing means for said plate comprising springs based at one end in said cylinder and in contact with said plate engaging levers at their other ends and in which said other means comprise springs based at one end in said cylinder and in contact with said plate engaging levers at their other ends.

7. A structure according to claim 1 in which said other means comprises two sets of springs, each set being unequal in strength.

8. A structure according to claim 1 in which adjustable plate stops are located in said cylinder slot for engagement with a plate end to locate the plate on the cylinder.

9. A structure according to claim 1 in which the plate is an initially tensioned snap-on plate and the plate engaging levers are automatically self adjusting hold downs for the plate.

10. A plate clamping mechanism for flexible wrap-around printing plates comprising a plate cylinder, a longitudinal circumferential slot in said cylinder, a wrap-around plate, undercut bars across each end of said plate, and means in said cylinder slot for tensioning and holding said plate on the cylinder, said last named means comprising a longitudinal bar fixed in said slot, a shaft rockably mounted in said bar, opposed plate engaging levers swingably mounted on said shaft, a plurality of lever engaging keys fixed on said shaft, means at each shaft end for rocking the shaft to cause said keys to engage their respective levers, and other means comprising springs based in said cylinder for urging said plate engaging levers into contact with said undercut bars whereby the plate is held under tension on the cylinder.

11. A plate clamping mechanism for flexible wrap-around printing plates comprising a plate cylinder, a longitudinal circumferential slot in said cylinder, a wrap-around plate, undercut bars across each end of said plate, and means in said cylinder slot for tensioning and holding said plate on the cylinder, said last named means comprising a longitudinal bar fixed in said slot, a shaft rockably mounted in said bar, opposed plate engaging elements slidably mounted in said cylinder, a plurality of element engaging keys fixed on said shaft, means at each shaft end for rocking the shaft to cause said keys to engage their respective plate engaging elements, and other means comprising springs based in said cylinder for urging said plate engaging elements into contact with said undercut bars whereby the plate is held under tension on the cylinder.

12. Plate clamping mechanism for flexible wrap-around printing plates comprising the combination of a cylinder, a longitudinal slot therein, a wrap-around plate adapted to be held to said cylinder and means operable from said slot for tensioning and holding said plate on the cylinder, said last named means comprising a longitudinal bar, a rockable shaft partially mounted in said bar, plate engaging elements, plate engaging element keys on said rockable shaft adapted to move said plate engaging elements when the shaft is rocked and other means based in the cylinder for urging the plate engaging elements into plate engaging position to clamp the plate to the cylinder.

No references cited.