United States Patent [19]

Moyer

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[54] **POSITIVE BACKING SHEET PLATE LOCK-UP**

[75] Inventor: **Richard Leroy Moyer,** Newark, Del.

[73] Assignee: **Hercules Incorporated,** Wilmington, Del.

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[21] Appl. No.: **446,455**

[52] **U.S. Cl.** **101/415.1;** 101/383

[51] **Int. Cl.**[2] **B41F 27/00;** B41F 27/06

[58] **Field of Search** ..... 101/415.1, 383; 57/368, 57/358, 370, 380, 382, 384, 386; 267/158, 159, 41.36 R; 251/297; 92/26, 30

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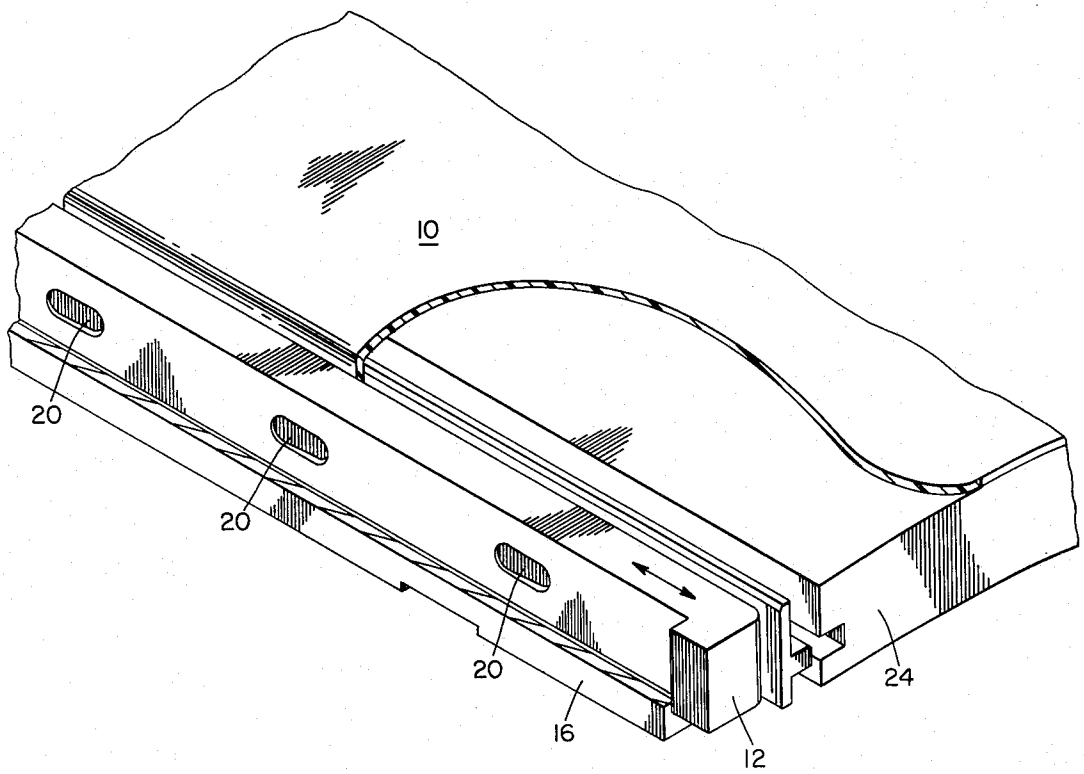
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Primary Examiner—Edgar S. Burr
Assistant Examiner—Paul J. Hirsch
Attorney, Agent, or Firm—James W. Peterson

[57] **ABSTRACT**

The invention is a slide bar saddle lock-up for securing flexible printing plates on a rotary printing press. The flexible printing plate is positively clamped in essentially identical leading and trailing edge clamping members by slide bars having camming surfaces thereon which cooperate with cam adjustment members. The trailing edge of said saddle is resiliently biased to tension the flexible printing plate upon the saddle and includes retaining means to restrain said resilient biasing when installing or removing a plate.

3 Claims, 7 Drawing Figures



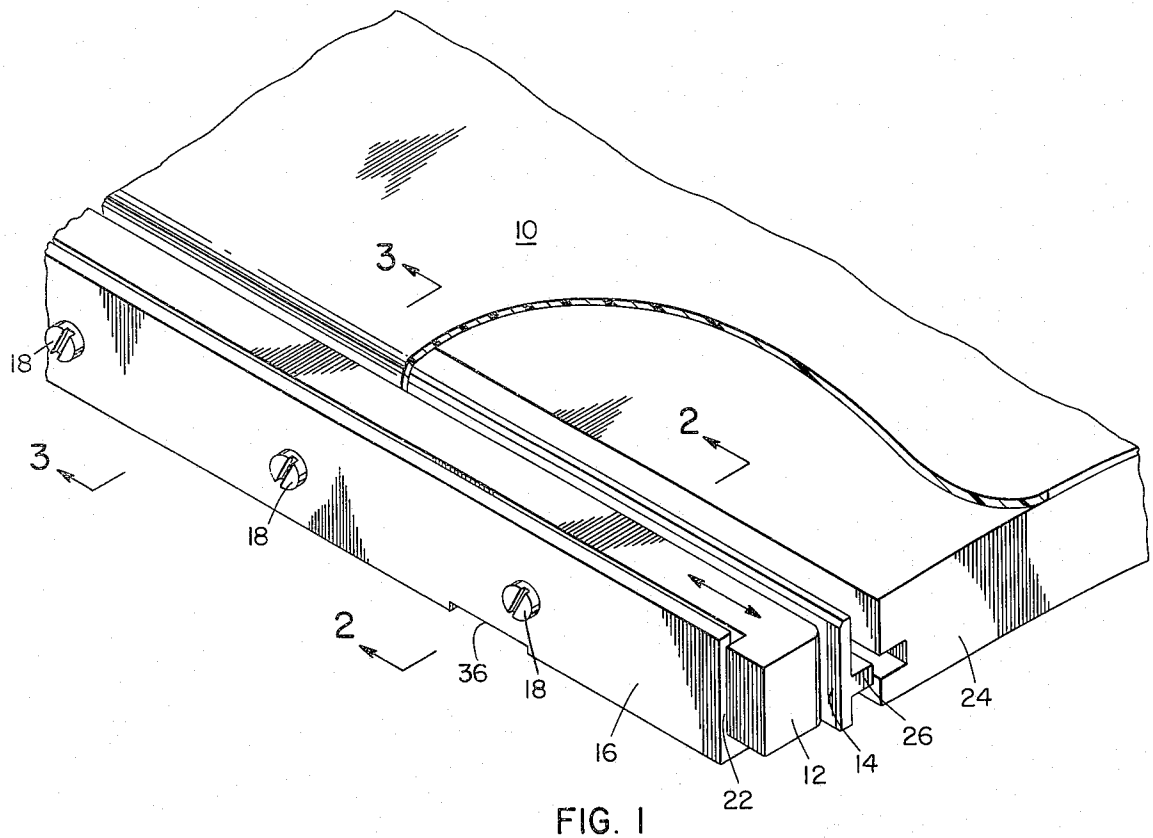


FIG. 1

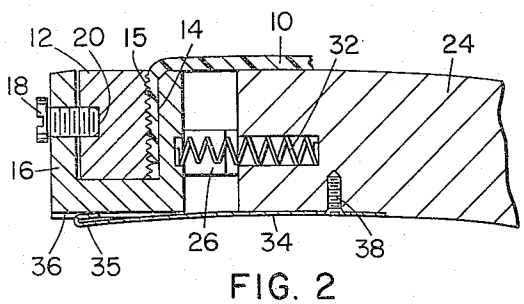


FIG. 2

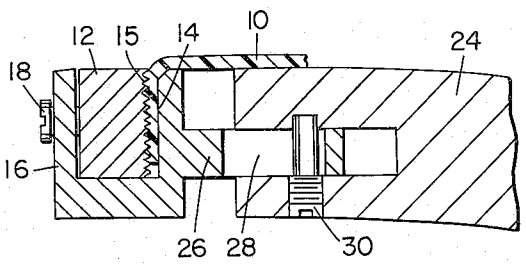


FIG. 3

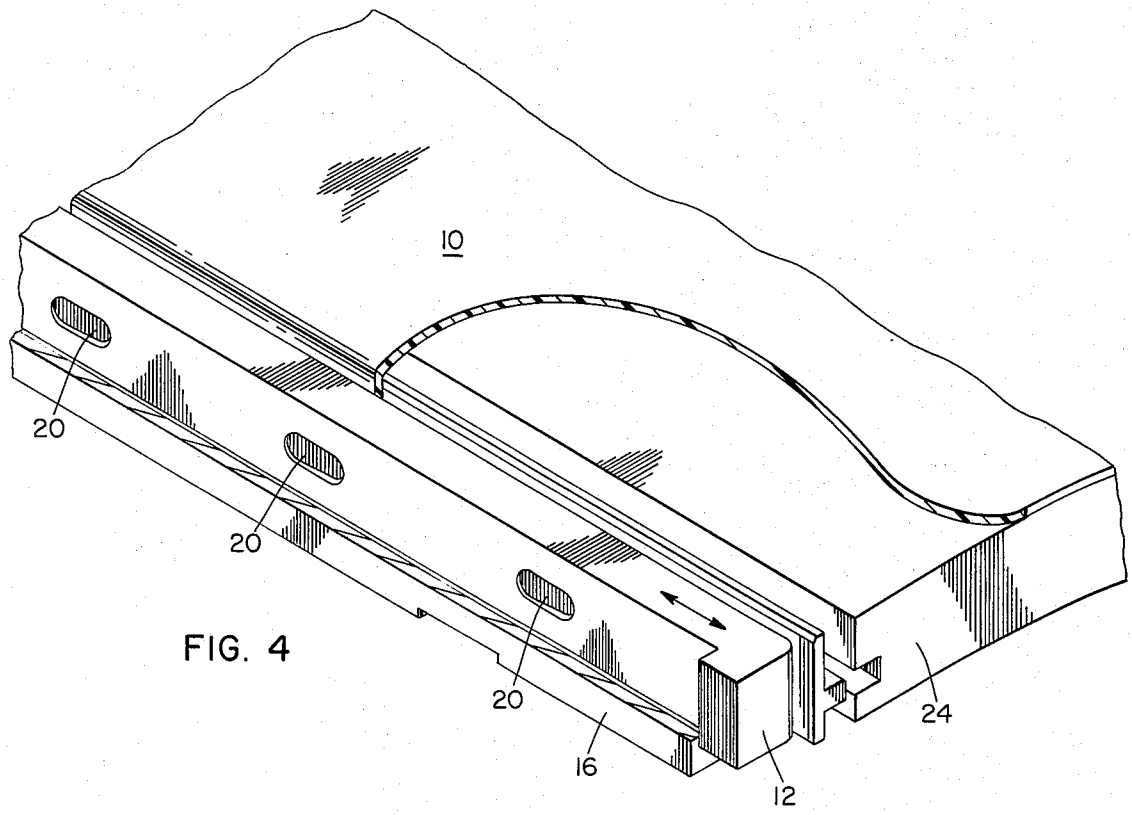


FIG. 4

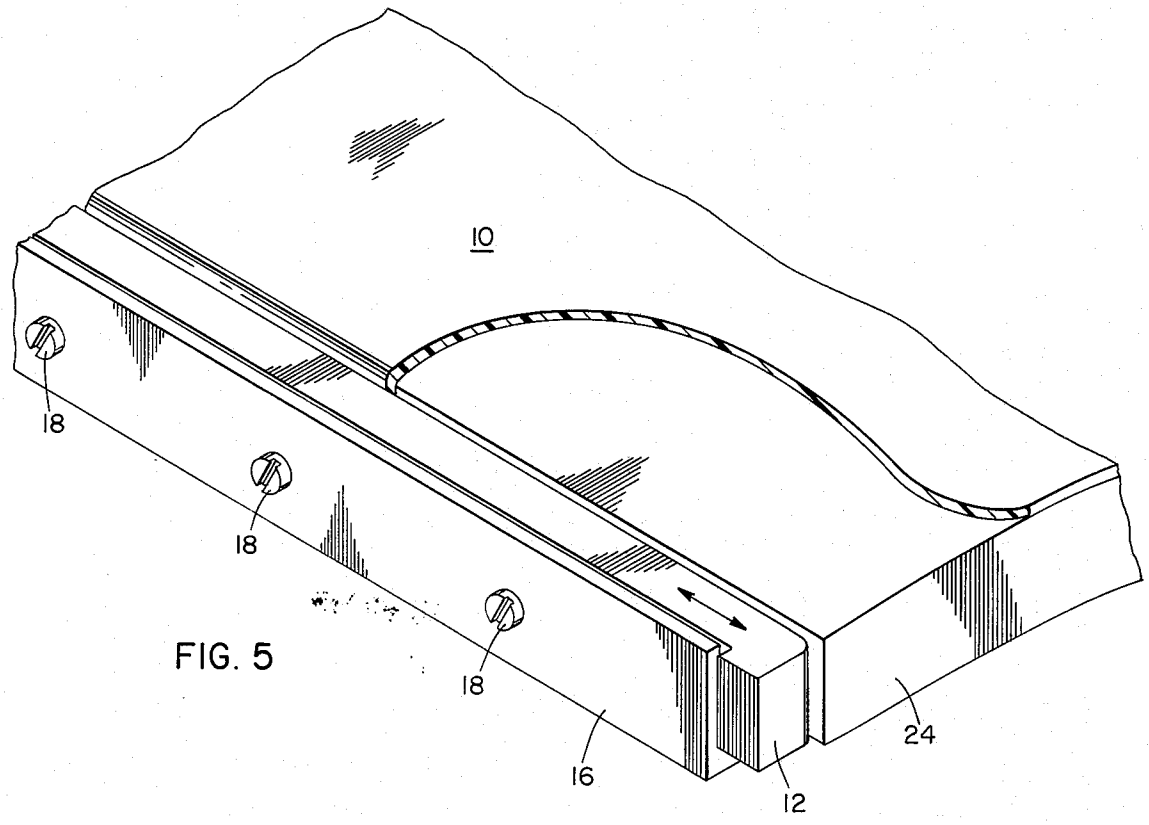


FIG. 5

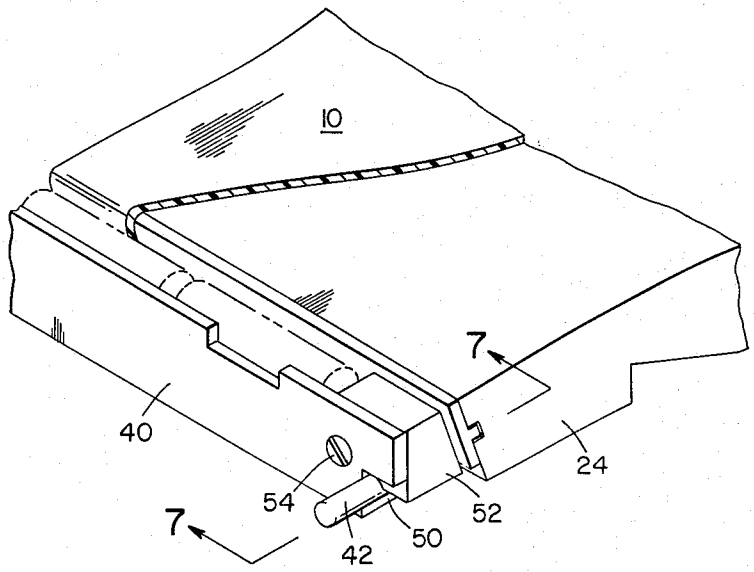


FIG. 6

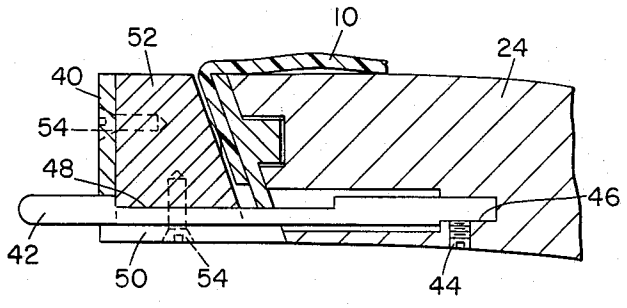


FIG. 7

POSITIVE BACKING SHEET PLATE LOCK-UP

BACKGROUND OF THE INVENTION

The present invention is directed to a clamping device for securing a flexible printing plate on a rotary printing press and more particularly to an arrangement for securing the flexible plate to a curved saddle member that is attached to the printing cylinder. In the past, several devices have been developed for securing flexible members to rotary printing presses by the use of complicated lock-up devices within the cylinder. These prior art devices utilize large bulky clamping devices internally within the printing cylinder to provide the mechanical advantage needed to positively clamp a flexible member. These flexible members were generally in the nature of press blanket rolls or printing members having reinforced edges. Only within the past few years has modern technology made possible the use of photopolymer flexible plate systems which produce a high quality flexible plastic plate of photopolymer bonded to flexible plastic backing sheets. A major problem with these plates has been their retention on a press. Conventional gripping or clamping means have not been satisfactory for polymer plates and many systems have gone to the use of photopolymers bonded to a metal backing sheet so that more conventional clamping means could be employed. Attempts at clamping built-up photopolymer edges on the plastic backing sheets have been unsuccessful in that the tremendous forces created in press operation cause separation of the photopolymer from the plastic backing sheet. It is most desirable, therefore, to provide a flexible printing plate saddle capable of securely gripping and tensioning the flexible plastic backing sheet directly, said saddle being attachable to an ordinary printing cylinder. The saddle-flexible printing plate combination may be used as a direct replacement for the well-known semicylindrical lead stereos without printing press modification. The technical problem has been to provide an adequate clamping mechanism within the narrow thickness of the saddle dimension. The instant invention provides a slide bar clamping arrangement having great mechanical advantage for positive gripping, said clamping structure being resiliently biased against the body of the saddle on one edge thereof to tension the flexible printing plate after the plate is clamped at both ends thereof. The resilient biasing of the clamping edge is easily and conveniently restrained by the use of an integral retaining means during the plate changing operation.

SUMMARY OF THE INVENTION

It is the purpose of the instant invention to provide a saddle lock-up capable of positive clamping and tensioning a flexible printing plate. To accomplish this purpose the instant invention provides a cam slide bar, adjustable for wear and clamping force, said slide bar cooperating with a clamping surface, said slide bar and clamping surface being moveable with respect to the body of the saddle at one edge thereof, and said saddle having retaining means to hold the slide bar and clamping surface combination in an unbiased position for loading and unloading the flexible printing plate.

OBJECTS OF THE INVENTION

It is the primary object of the instant invention to provide a saddle lock-up that will positively clamp and tension flexible printing plates.

It is another object of the instant invention to provide a saddle lock-up that will positively clamp with a minimum number of components a flexible printing plate.

It is yet still another object of the instant invention to provide a flexible printing plate saddle lock-up having gripping means that are adjustable for wear.

A further object of the instant invention is to provide a flexible printing plate saddle lock-up that will tension a flexible printing plate, said tension being restrained during the plate changing operation.

Even a further object of the instant invention is to provide a flexible printing plate saddle lock-up that will directly grip the flexible printing plate backing sheet without the use of a built-up photopolymer edge.

BRIEF DESCRIPTION OF THE DRAWING

FIG. **1** is a partial perspective view of the trailing edge of the flexible printing plate saddle lock-up.

FIG. **2** is a partial section view taken along section lines **2—2** in FIG. **1.**

FIG. **3** is a partial section view taken along section lines **3—3** in FIG. **1.**

FIG. **4** is a partial section view of the flexible plate saddle lock-up with the front edge of the U-channel cut away to show the camming surfaces of the slide bar.

FIG. **5** is a partial section view of the leading edge of the flexible plate saddle lock-up.

FIG. **6** is a partial perspective view of the trailing edge of another saddle lock-up utilizing an alternate embodiment of the retaining means shown in FIG. **2.**

FIG. **7** is a partial section view taken along section lines **7—7** in FIG. **6.**

DESCRIPTION OF THE PREFERRED EMBODIMENT

With continued reference to the drawing, FIG. **1** shows the trailing edge of the slide bar saddle lock-up having a flexible printing plate **10** secured in printing position. Flexible printing plate **10** is positively clamped between slide bar **12** and clamping surface **14** of the U-channel **16.** As can be clearly seen in FIGS. **2** and **4,** this clamping action is produced by the cooperation of cam adjustment members **18** and camming surfaces **20.** Cam adjustment members **18** bear against the gradual taper of camming surfaces **20** so that slide bar **12** is forced toward clamping surface **14** as the slide bar is moved in one direction and is allowed to move away from clamping surface **14** as the slide bar is moved in the opposite direction. Slide bar **12** is provided with printing plate gripping means shown typically as serrations **15.** Slide bar **12** is longer in length than U-channel **16** to provide a gap typically shown at **22** at each end of the U-channel **16** so that a tool (not shown) such as the blade of a screwdriver may be inserted in the gap **22** to slide the slide bar **12** in one direction or the other to either increase or decrease the slide bar-clamping surface interaction. It can be seen that cam adjustment members **18,** shown typically as threaded bolts, are adjustable with respect to camming surfaces **20** to provide positive clamping of flexible printing plate **10.** As either the cam adjustment members **18** or the camming surfaces **20** wear, the cam adjustment members may be adjusted to compensate. It would be within the scope of the invention to use set screws or other equivalent adjustable members as cam adjustment members **18.**

With further reference to FIGS. 1–3, it can be seen that the U-channel 16 and slide bar 12 combination are moveably mounted with respect to the saddle body 24. The side of the U-channel 16 facing the saddle body 24 is provided with an integral web member 26 having slots 28 therein (only one shown) to allow movement of the U-channel 16 toward and away from saddle body 24. A set screw 30, or the equivalent, inserted through the back side of saddle body 24 through slot 28 prevents U-channel 16 from completely disengaging saddle body 24. Resilient means 32 urge U-channel 16 away from saddle body 24 to tension the flexible printing plate 10. It is extremely desirable to provide means to hold U-channel 16 in close proximity to saddle body 24 when moving slide bar 12 to load and unload flexible printing plates 10. The instant invention provides clip retaining means 34 in the form of a flat leaf spring of steel or like material secured in cantilever fashion at 38 to saddle body 24, said clip retaining means 34 cooperating with slot 36 in U-channel 16 to hold U-channel 16 in close proximity to saddle body 24 when U-channel 16 is manually urged toward saddle body 24 overcoming the biasing of resilient means 32. Clip retaining means 34 having a bent portion 35 riding in slot 36 will snap upwardly on the front surface of U-channel 16 when U-channel 16 is pushed toward saddle body 24 to hold U-channel 16 while slide bar 12 is being manipulated. Clip retaining means 34 may then be depressed manually allowing U-channel 16 to be urged by resilient means 32 away from saddle body 24 thereby tensioning flexible printing plate 10. Resilient means 32 is shown to be a coil spring. However, it would be within the scope of the instant invention to use other resilient means such as elastomeric materials, etc. It is evident from the drawing that only a portion of the saddle lock-up is illustrated and that more than one clip retaining means 34 and resilient means 32 may be employed to urge U-channel 16 away from saddle body 24. The entire saddle lock-up may be secured to a printing cylinder by cut-away clamping portions (not shown) in the back of saddle body 24 as is well-known in the art.

FIG. 5 shows the leading edge of the instant invention which is basically identical to the trailing edge with the exception that it is not moveable and resiliently biased away from saddle body 24. The leading edge utilizes the same slide bar 12 and U-channel 16 mechanism to positively clamp the flexible printing plate 10. In operation the flexible printing plate 10 would first be secured to the leading edge and then to the trailing edge and finally tensioned by release of clip retaining means 34.

FIGS. 6 and 7 illustrate another saddle lock-up having a clamping mechanism (not the subject of this disclosure) which utilizes a similar but thinner U-channel that is moveable with respect to saddle body 24 to tension the flexible printing plate, said U-channel 40 being restrained by an alternate embodiment of the retaining means shown in FIG. 2. In this embodiment a spring rod 42 of heat treated spring wire is secured in cantilever fashion as in FIG. 2 to the saddle body 24. The spring rod 42 is shown to be secured by a set screw 44 which engages a flat 46 ground into spring rod 42. It would also be possible to secure spring rod 42 by threading (not shown). Another flat 48 has been ground into spring rod 42 to restrain U-channel 40. A slot 50 has been cut in U-channel 40 to provide for spring rod 42. The clamping mechanism shown in phantom line utilizes steel end blocks 52 in the U-channel 40 which are secured to the U-channel, preferably made from aluminum alloy by flat head screws 54. Spring rod 42 is shown to engage steel end block 52 for wear purposes. It would be within the scope of the invention to have the spring rod 42 engage the front surface of U-channel 40. Spring rod 42 may be depressed manually allowing U-channel 40 to be urged away from saddle body 42 by resilient means (not shown) similar to that in FIG. 2.

What I claim and desire to protect by Letters Patent is:

1. A saddle lock-up for flexible printing plates comprising:

a semi-cylindrical saddle body having a leading edge and a trailing edge;

leading edge clamping means connected to said leading edge to positively secure one end of a flexible printing plate;

trailing edge clamping means moveably connected to said trailing edge to move toward and away from said trailing edge to positively secure the other end of a printing plate, said trailing edge comprising a transverse U-channel parallel and adjacent to said trailing edge of said saddle, a slide bar transversely slideably mounted within said U-channel, said slide bar and said U-channel defining a gap therebetween for one end of a printing plate, said slide bar having camming surfaces thereon on the side opposite said gap and having printing plate gripping means on the side within said gap, and cam adjustment members connected to said U-channel through the side of said U-channel, said cam adjustment members engaging said camming surfaces to move said gripping means within said U-channel to close said gap and positively clamp a flexible printing plate; and

resilient means biasing said trailing edge clamping means away from said trailing edge to tension a flexible printing plate when clamped.

2. A device as in claim 1 wherein said saddle lockup further includes a clip retaining means connected at one end thereof in cantilever fashion to the trailing edge of said saddle body and engaging at the other end thereof said trailing edge clamping means when said trailing clamping means is urged toward said trailing edge overcoming said resilient biasing to hold said trailing edge clamping means next to said trailing edge for ease of printing plate change.

3. A device as in claim 2 wherein said clip retaining means comprising a generally flat leaf spring secured at one end thereof to the trailing edge of said saddle body on the concave side thereof, said spring having a bent portion at the other end thereof which engages the outside of said U-channel to hold said U-channel next to said trailing edge.

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