Oct. 22, 1963 F. W. STRAHORN 3,107,610

DEVICE FOR PRINTING PLATES

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FIG. 1

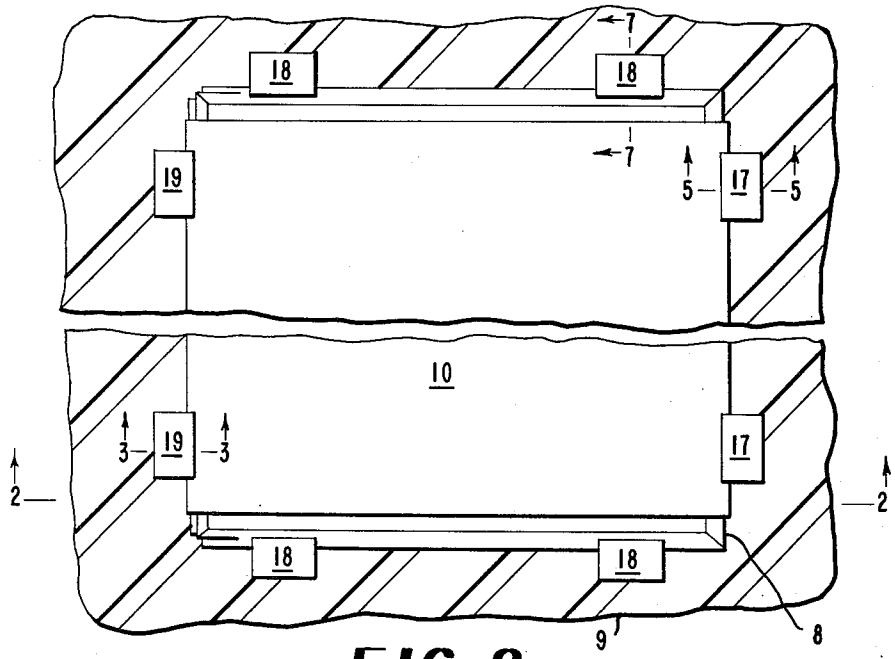

FIG. 2

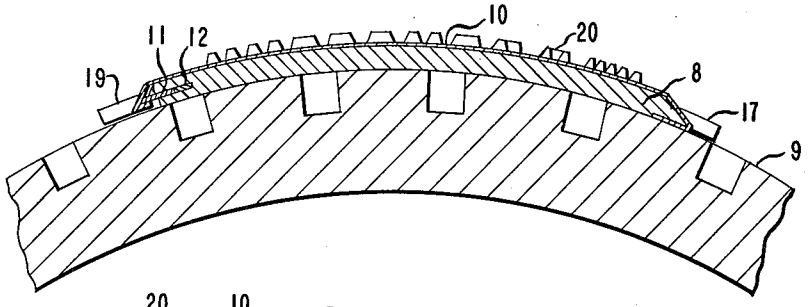

FIG. 3

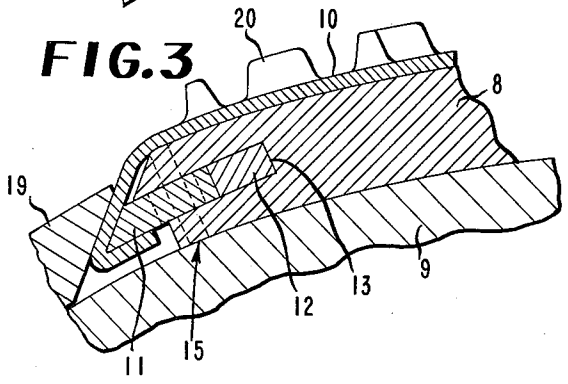

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FIG. 4

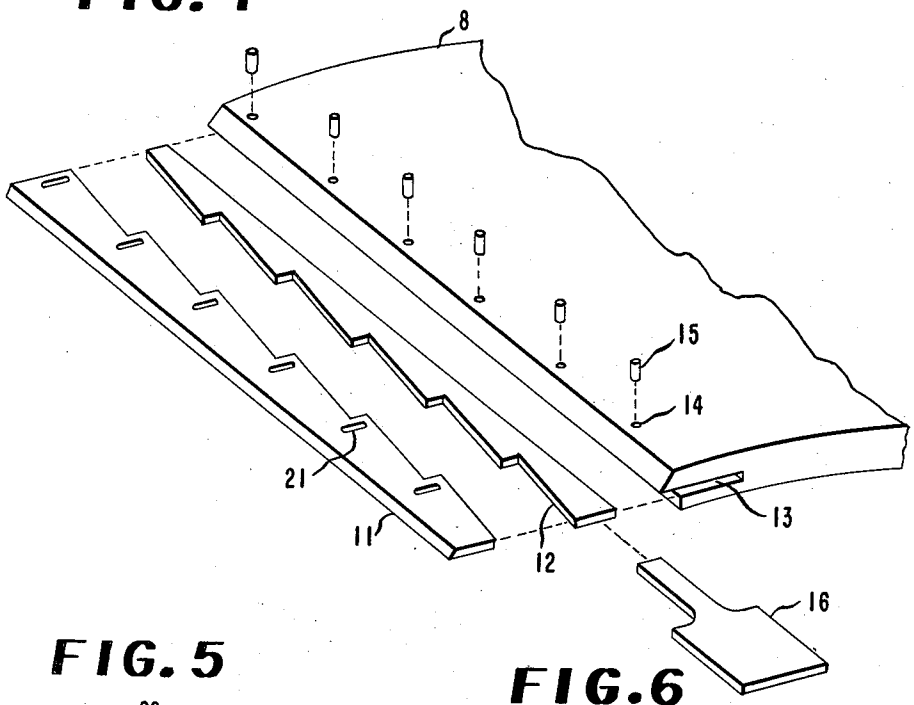


FIG. 5

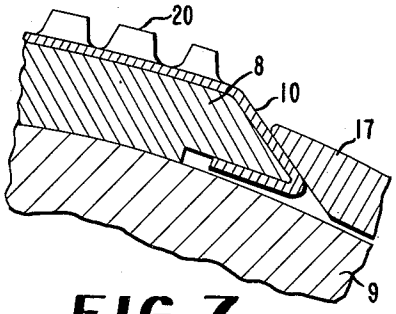


FIG. 6

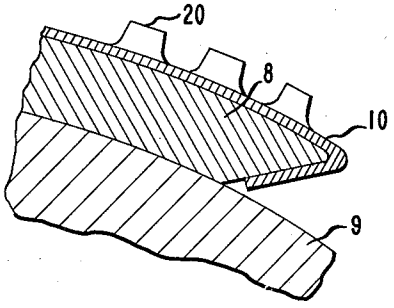
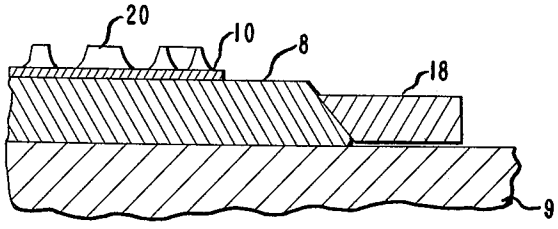


FIG. 7



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3,107,610
DEVICE FOR PRINTING PLATES

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5 Claims. (Cl. 101—415.1)

This invention relates to a backing plate or saddle for a flexible printing plate. More particularly it relates to a single piece backing plate provided with an adjustable wedge means for bringing flexible printing plates under tension.

In positioning flexible printing plates on printing press beds or cylinders, it is necessary that the plate be held taut in order to avoid distortion of the printing surface. Another reason why the flexible printing plate should be held taut is to prevent "breathing" or flexing which can result in fatigue of the printing areas or the flexible metal plate or base. Excessive wear of the printing surface occurs when the plate continuously breathes or flexes by an up-and-down movement in a direction perpendicular to the surface of the support or along a radius of a printing cylinder.

An object of this invention is to provide a simple and effective means for quickly tensioning flexible printing plates. Another object is to provide such a means whereby breathing of the assembled tensioned plate can be prevented. Yet another object is to provide a simple and inexpensive backing plate or saddle for a flexible printing plate. A further object is to provide such a saddle which can be used rapidly and accurately and assembled by the ordinary printer to position and tension a printing plate. Still other objects will be apparent from the following description of the invention.

The novel backing plate or saddle of this invention comprises a stiff rectangular metal backing plate, two opposite ends of which are shaped to suit standard printing press clamps, and one end is provided with a slot, at the base of which is fitted a first wedge member having an outer surface with at least one wedging surface, and in abutting relationship, a second wedge member having an inner surface with at least one wedging surface which interlocks with the wedging surface of said first wedge member and an outer surface which slants from the perpendicular and which can be adjusted to extend beyond the end of said backing plate and engage a flexible printing plate. The printing saddle is either flat for a bed press or is curved to fit upon a printing cylinder. The wedge members preferably have a plurality of wedging surfaces. When the saddle is curved to fit upon a printing cylinder, the two opposite ends referred to above are those ends parallel to the axis of the printing cylinder.

The metal backing plate preferably is provided with a plurality of parallel circular holes along the slot end, and the second wedge member is provided with a plurality of parallel slots, each hole and slot being engaged by a single pin so that when an axial or lateral motion is applied to the first wedge member the second wedge member moves circumferentially or longitudinally and applies tension to the edges of a printing plate. The maximum distance between the wedge faces of the second wedge member and the base of the slot is limited by the slot length, said slot length being adjusted so that the base member cannot escape from the slot.

The edge of the metal backing plate opposite the slot is preferably undercut or has a lengthwise offset on its outer bottom surface. The undercut portion or offset portion is adapted to receive the end of a flexible printing plate support which is bent around the edge and under the bottom surface to interfit with the undercut portion

of the metal backing plate. The opposite end or slot end of the flexible printing plate is similarly bent around the outer wedge member of the metal backing plate. The printing plate is then brought under tension by adjusting the wedge members as will be more fully described below. The metal backing plate supporting the printing plate can then be fastened to the printing bed or cylinder by conventional locking means.

The invention will now be more fully explained with reference to the accompanying drawings which constitute a part of this application. While the specific description which follows refers to arcuate saddles for printing cylinders, it is obvious that the saddle can be made as a flat member to be locked on the bed of a flat bed press. Referring now to the drawings wherein similar reference numerals refer to similar parts throughout the several views:

FIG. 1 is a fragmentary plan view of the saddle and flexible printing plate in assembled relationship on a printing cylinder;

FIG. 2 is a cross sectional view taken along the line 2—2 of FIG. 1;

FIG. 3 is a cross sectional view taken along the line 3—3 of FIG. 1;

FIG. 4 is an exploded view of the wedge locking mechanism;

FIG. 5 is a cross sectional view taken along the line 5—5 of FIG. 1;

FIG. 6 is a cross sectional view of an alternate construction taken along line 5—5 of FIG. 1;

FIG. 7 is a cross sectional view taken along the line 7—7 of FIG. 1.

With reference to the drawings, a flexible printing plate **10** is mounted on a metal saddle **8** as shown in FIGS. 1 and 2. The metal saddle **8** consists of a rigid material of uniform thickness and of generally arcuate shape. One end of the saddle **8** is tapered and has an offset portion on the bottom as shown in FIGURE 5, and the corresponding end of the printing plate **10** is formed to fit against and in close proximity to this tapered end of the metal saddle **8**. The opposite end of plate **10** is similarly formed around the end of metal saddle **8**; however, this end of the metal saddle contains a means for subjecting the printing plate to tension, described below. FIG. 6 shows an alternate construction for the end of the saddle opposite the slot end.

The metal saddle **8** is provided with a slot **13**, as shown in FIGURES 3 and 4. A first wedge member **12** having a plurality of wedging surfaces is located at the base of the slot **13** and a second wedge member **11**, also having a plurality of wedging surfaces, is located in the outer portion of the slot **13** such that the wedge faces of wedge member **12** and second wedge member **11** are in abutting relationship. One edge of second wedge member **11** can protrude from the slot **13** beyond the end of the metal saddle **8**. Pins **15** extend through the holes **14** in saddle **8**. The pins **15** also engage the slots **21** in second wedge member **11**, thus, an axial motion of wedge member **12** can produce only a general circumferential motion in second wedge member **11**. To simplify handling and prevent loss of wedge member **12**, the maximum distance between the wedge faces of second wedge member **11** and the base of the slot **13** is limited by the extent of the slots **21** such that the wedge member **12** cannot escape from the slot **13**.

In use, the wedge member **12** in the saddle **8** is moved in an appropriate axial direction by use of tool **16** which is designed for insertion into the ends of the slot **13**. A retracted position of wedge member **12** will permit the second wedge member **11** to be manually pushed back into the slot **13**, thus temporarily reducing the overall circumferential length of the saddle assembly to a mini-

mum. The printing plate **10**, with its ends formed as shown in FIGURES 3 and 5, is then slipped over the saddle **8** in an axial direction to reach a desired position. The wedge member **12** is then manually driven in an appropriate sense to urge second wedge member **11** to extend from the slot **13** and engage the bent edge of the printing plate **10**, thus developing a positive tension in the printing plate **10**. The formed ends of the printing plate **10** hold it in intimate contact with the ends of the metal saddle **8** and the tension developed in the relatively flexible printing plate **10** will cause it to lie snugly against the outer arcuate surface of metal saddle **8**. The printing plate **10** and the metal saddle **8** are now an integral assembly and can be locked to a printing press cylinder **9** in a conventional manner. Circumferential motion of the metal saddle **8** and printing plate **10** is resisted by the catches **19** and **17**; axial motion of the assembly is resisted by the catches **18** as shown in FIGURE 7.

Obviously, the thickness of the metal saddle is chosen to complement the overall thickness of the printing plate such that the printing face **20** is at a desired diametral height above the outer cylindrical surface of the printing cylinder **9**.

Since the taper on the wedge members **11** and **12** is what is commonly known as a self-locking taper, and the wedge member **12** is driven sufficiently far to tension the printing plate **10**, the wedge mechanism will not become loose until the wedge member **12** is intentionally driven in a direction opposite to the lock-up direction.

The flexible base of the printing plate is preferably composed of metal, e.g., aluminum, steel, copper, brass, a magnesium alloy, etc., and has its ends bent over the edges of the axial ends of the saddle as illustrated in the drawings. The printing or relief surface of the printing plate bears reference numeral **20**. This printing surface is preferably composed of a polymeric or plastic material, e.g., a synthetic organic resin or polymer, but it can be composed of rubber, molded plastic, metal, etc. For example, in its preferred form, it may be composed of an addition polymer and made after the manner described in Plambeck U.S. Patents 2,760,863 and 2,791,504, the application of Martin and Barney, Serial No. 596,766, filed July 9, 1956, now U.S. Patent 2,927,022, issued March 1, 1960, and the application of Munger, Serial No. 736,661, filed May 21, 1958, now U.S. Patent 2,923,673, issued February 2, 1960.

The assembled printing plate and saddle are fastened onto the printing cylinder or flat bed by means of conventional clamping blocks or hooks known to the art. Suitable slots can be made on the inner arcuate surface and at each end of the metal saddle to permit the use of tension lockup catches to assist in holding the saddle and the printing plate on the cylinder or flat bed. The saddle can also be used on printing presses equipped with margin bars in place of one or more of the standard catches illustrated in FIGS. 1 and 2. For use in printing presses employing compression lockup on only 3 sides of a printing plate, the end of the metal saddle can slant from the perpendicular as shown in FIG. 6. Since there are no catches in contact with this end, the corresponding flexible base of the printing plate is formed as illustrated in FIG. 6. Either of the constructions as shown in FIGS. 5 or 6 serve to anchor and to hold the base of the printing plate snugly against the metal saddle.

In place of the multi-step wedge, a single wedge can be utilized, the former type wedge, however, provides a maximum degree of adjustment in a minimum amount of space. It is also possible to have one portion of the wedge surface formed in the end of the saddle and to use only one loose wedge member.

The wedge tensioning member can be adapted to be inserted in a hole in a printing cylinder. The wedge member can also be utilized in a circular saddle which can be slipped on or fitted around a printing cylinder.

The tool which is used to move the base wedge member in an axial direction can be of any design but is limited in thickness by the size of the slot in the saddle. The design shown in FIG. 4 illustrates the preferred embodiment but in no way limits the tool design.

The metal saddle should be of sufficient thickness that it is stiff and does not flex to any appreciable degree during the tensioning thereon of a flexible printing plate. A thickness of about $\frac{3}{16}$ inch usually is sufficient for flexible plates having a total thickness in the range of 15 to 70 mils. The saddle can be made of metals and alloys described above for the printing plate as well as hard, semi-rigid plastics, e.g., phenol formaldehyde, acrylic, phenolic, nylon, etc. and other light weight materials. When light weight materials are used, the wedge members are made of the tougher, more wear resistant materials described above for the printing plate base.

This invention is advantageous because it permits the mounting of flexible printing plates onto printing presses using completely conventional printing cylinders, techniques, and catches. The metal saddle is reusable and the photopolymerizable printing plate can be used for a production run, removed from the metal saddle, stored for any length of time and then be remounted to the same or a different metal saddle to be run again at a later date. This permits the printer to maintain a minimum inventory of saddles and insures his ability to reuse any of the photopolymer printing plates in the future. Since the wedge mechanism has the ability to operate over a range, the circumferential length of the photopolymer printing plate between the end crimps need not be accurate, thus reducing the mounting preparation cost of the printing plate.

The saddle is also advantageous because no loose pieces or expendable pieces are required to fasten the photopolymer printing plate to the metal saddle. Since the photopolymer printing plate does not initially have to fit snugly on the metal saddle before locking, the plate can easily and quickly be assembled to the saddle manually without the use of tools. The action of tightening the photopolymer printing plate on the metal saddle is also a quick and simple operation using a tool as shown in FIGURE 4. All moving parts can be made of wear resistant materials, thus insuring a long life of the saddle. Since many printers would prefer the saddle to be fabricated of light materials, which could be more susceptible to damage, the wedge members can be made of hard materials and be removed from a worn or damaged saddle and reinstalled in a replacement saddle, thus minimizing costs. Finally, the printing plate is supported on a continuous, one piece uninterrupted surface assuring maximum printing quality.

The saddles are useful with flexible printing elements or plates of various types including those made from magnesium, rubber and molded plastic as well as those described in Plambeck Patents 2,760,863 and 2,791,504, the application of Martin and Barney, Serial No. 596,766, filed July 9, 1956, now U.S. Patent 2,927,022, the application of Munger, Serial No. 736,661, filed May 21, 1958, now U.S. Patent 2,923,673, and the application of McGraw, Serial No. 664,459, filed June 10, 1957, now abandoned, and continuation-in-part application Serial No. 833,928, filed August 17, 1959, now U.S. Patent No. 3,024,180.

What is claimed is:

1. In a saddle for a flexible printing plate comprising a stiff rectangular metal backing plate, the improvement which consists in said backing plate having a slot within one end and beneath the surface of said backing plate, at the base of which slot is fitted a first wedge member having an outer surface with at least one wedging surface, and a second wedge member having an inner surface with at least one wedging surface which interlocks within said slot in abutting relationship with said first wedge member, and an outer surface extending beyond said slot

which slants from the perpendicular and which can be adjusted to extend beyond the end of said backing plate and engage a flexible printing plate, said second wedge member having means for restricting lateral movement.

2. Saddle as in claim 1 wherein the saddle is curved to fit upon a printing cylinder.

3. Saddle as in claim 1 wherein said first and second wedge members have a plurality of wedging surfaces having a self-locking taper.

4. Saddle as in claim 2 wherein said means for restricting lateral movement comprises said backing plate having a plurality of parallel circular holes along the slot end and said second wedge member having a plurality of parallel slots, each hole and slot being engaged by a single pin so that when axial motion is applied to said first wedge member the second wedge member moves circumferentially and applies tension to the edges of said printing plate.

5. Saddle as in claim 1 wherein said means for restricting lateral movement comprises said backing plate having a plurality of parallel circular holes along the slot end and said second wedge member having a plurality of parallel slots, each hole and slot being engaged by a single pin so that when lateral motion is applied to said first wedge member the second wedge member moves longitudinally and applies tension to the edges of said printing plate.

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