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3,387,559

HOLDING MEANS FOR LAMINATED RELIEF PRINTING PLATE

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FIG. 1

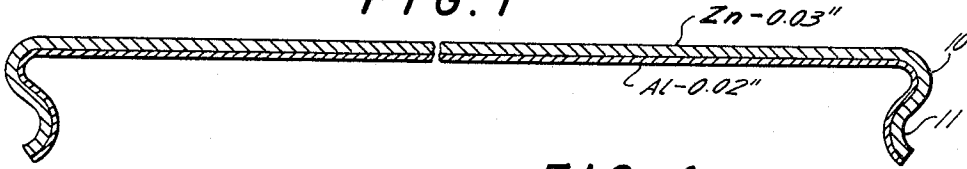


FIG. 4

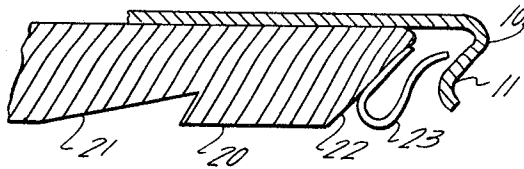
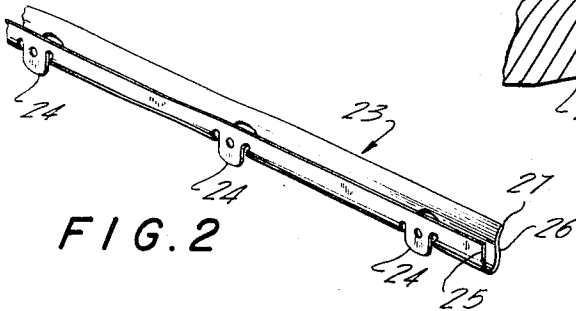


FIG. 2

FIG. 5

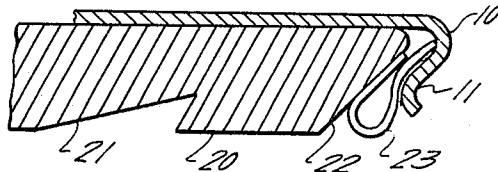


FIG. 3

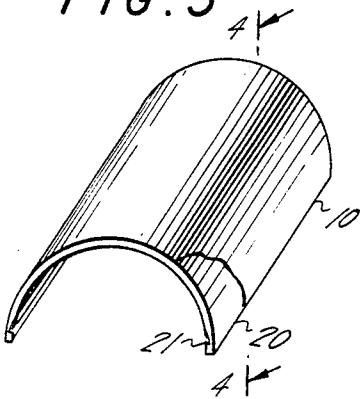


FIG. 6

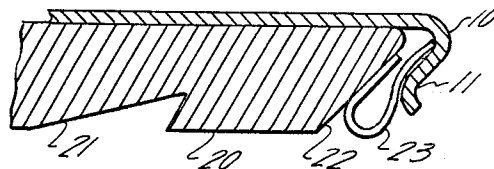
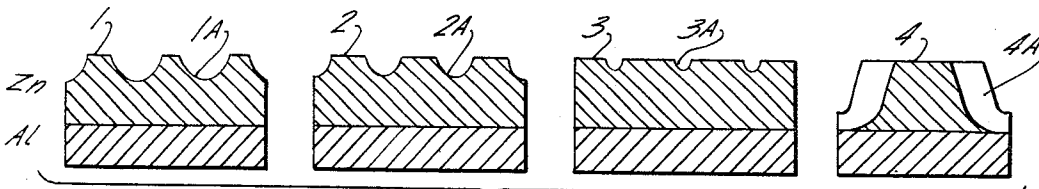


FIG. 7

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HOLDING MEANS FOR LAMINATED RELIEF PRINTING PLATE

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Continuation-in-part of application Ser. No. 545,770, Apr. 27, 1966. This application Aug. 4, 1967, Ser. No. 658,515

3 Claims. (Cl. 101—383)

ABSTRACT OF THE DISCLOSURE

An elongated spring having a straight leg and a curved leg so as to fit complementally between a laminated relief printing plate and an edge of a saddle for holding the plate securely to the saddle. The plate is composed of a zinc printing layer to be etched and a supporting layer of aluminum and is curved so as to fit on the saddle by which the plate is mounted on a printing cylinder.

This application is a continuation-in-part of Horner application Ser. No. 545,770 filed Apr. 27, 1966, for Laminated Relief Printing Plate and Means for Holding Same, now abandoned in favor of application Ser. No. 672,929 filed Oct. 4, 1967.

Background of the invention

This invention relates to relief printing plates for rotary printing machines and more particularly to a means for securely holding such a plate on a saddle.

In rotary relief printing as heretofore practiced the plate has typically been formed as a casting, as for example, the familiar newspaper stereotype plate. Such plates are heavy and formed of metal (typically a lead-tin-antimony alloy) which has a low tensile strength. Also the production of the flog requires mechanical composition of the entire subject-matter to be carried by the plate.

To some extent, electrotypes have been used, but the expense is high and this type of printing surface has been available only for high quality printing.

In an effort to simplify the production of the plate, etched plates, typically of zinc, have been used, the plate being either etched in its curved form or produced flat and then bent to the required curve to fit the printing cylinder. Even where the plate is comparatively thick, it inevitably distorts due to its variations in thickness when etched and the difficulty of holding it properly in place due to the plasticity or creep of the metal.

Relief printing using rubber or synthetic resin printing surfaces has been practiced with some success, but such surfaces hold no promise whatever of producing plates of comparable durability and sharpness of printing to what can be had with metal plates, or at comparable cost.

In Horner application, Ser. No. 454,139 filed Oct. 12, 1965 and now abandoned for Laminated Relief Printing Plate, there is disclosed a zinc-aluminum plate which is substantially free of the deficiencies of prior proposals.

The object of the present invention is to provide a means for securely holding such a plate having a composite plate structure to a saddle for adapting the zinc-aluminum laminated plate to use with printing machines using softer surfaced form rollers and impression blankets, and in greater thickness as to the laminated plate itself.

Brief description of the drawings

In the drawings:

FIG. 1 is an enlarged fragmentary section of a composite plate in the flat and prior to etching which is to be secured to a saddle by the present invention.

FIG. 2 is an isometric view of the present invention.

FIG. 3 is an isometric view of the plate in position on a saddle by which it is mounted on a printing cylinder.

FIGS. 4, 5 and 6 are enlarged sections along the line 4—4 of FIG. 3, showing different positions of an end of the plate with reference to the saddle and showing the present invention in position for securing the plate to the saddle.

FIG. 7 is an enlarged schematic sectional view showing segments of the plate of FIG. 1 after etching.

Description of the preferred embodiment of the invention

As explained in the above mentioned application, the various areas of the relief halftone printing plate are reproduced by etching as indicated in FIG. 7. The small highlight dots 1 are formed by etching the metal around these dots away as indicated at 1A. The depth of etch of such areas is comparatively great and may be five or six thousandths of an inch. In the middle tones the printing dots 2 and spaces 2A between them are comparable in area and the depth of etch is less than in the highlights, being three to four thousandths of an inch. In the shade areas the etched away portions 3A are small and isolated and the unetched area 3 occupies the remainder of the surface. The etching depth here is slight, being from one to three thousandths of an inch. Where typographic or other line material is printed, or where there is a non-printing area of the plate, the etching 4A around the line printing elements 4 proceeds to a comparatively great depth, where the etching is done in a single step. A nitric acid etchant with suitable addition agents is used, so that the walls of the etched out depressions of the plate will be at a substantial constant angle, making the depth of etch proportional to the width of the etched area. Under these circumstances, if a solid zinc plate were used the etching in the line and non-printing areas would go far below the .030" depth specified. However, in the composite plate the aluminum backing layer is not affected by the etchant so that its surface defines a limit to the depth of etch. In the plate shown the zinc layer is about .030", while the aluminum supporting layer is about .020" in thickness.

The increased depth of etch in the non-printing areas, as compared to the disclosure of the above mentioned application, permits the use of the plate with wide, soft-surfaced impression cylinders. The increased thickness of the aluminum layer stiffens up the plate so that it can be clipped over a saddle for attachment to printing cylinders with underneath tensioning hooks for the plate.

As shown in FIG. 2 with reference to one end of the plate, the plate ends are bent first in a 45 degree bend 10 and then back in a 90 degree bend 11 so as to hook over the ends of a supporting saddle.

The plate may be used with any of various saddles which are adapted to holding it in place on a cylinder, as for example, the expandable saddle shown in Faerber Patent 2,966,848. It is preferred, however, to support the plate on a rigid saddle which is fitted with spring holding means at one end, such as provided by the present invention.

As shown generally in FIG. 3 the saddle 20 is semi-cylindrical in form. At each straight end it has a groove 21, for receiving the clamping hooks which hold it to the printing cylinder. The straight ends 22 are bevelled or slanted back under the saddle outer surface at an angle of about 45 degrees to the cylinder surface. The plate clips over the saddle as shown in FIG. 4, the bends 10 fitting around the ends 22 of the saddle. At one end there is provided the present invention comprising a spring holding means 23 running the length of the end 22. The spring is of a novel construction as shown in FIG. 2, comprising an elongated leaf spring having a U shaped cross section with one leg 25 thereof straight and the

other leg 26 being curved in an S shaped configuration. When the spring is in position between the saddle and plate as shown in FIG. 6 the upper part of the S 27 conforms to and will be urged against the inner side of the bend 10 of the plate so as to tension the plate on the saddle. The upper convex part of the S curve is designed to fit complementary with the bend 11 of the plate and the lower concave part of the S curve continues around into the straight leg forming the heel of the spring. This heel portion does not exert a forced against the bend 11 of the plate, if it did the plate would be urged off the saddle. Only the upper portion 27 exerts a force against the plate in such a way as to keep the plate held securely on the saddle.

Preferably the spring is attached to the straight end 22 of the saddle. For this reason the spring is provided with cutouts 24 forming a lip having holes for receiving screws or bolts which are to be fastened to the straight end 22 of the saddle, thereby attaching the spring to the straight end 22.

In attaching the plate, one end 10 is hooked over the spring 23 as shown in FIG. 4. At this time the other, or register, end will not be in place. The spring-held end is now forced against the saddle as shown in FIG. 5, using for this purpose any convenient clamping arrangement fitting in the groove 21. The bend 11 at the opposite end of the plate will now clear the edge 22 so that this end may be snapped into place. The spring-held end is now released, permitting the spring 23 to expand slightly (FIG. 6) thus holding the plate down snugly on the saddle.

The weight of the plate may be only about two pounds, for a plate measuring about 15" along the straight edges 22 or 22 inches circumferentially. The spring 23 exerting a holding force of about 150 lbs. (about 10 lbs. per axial inch of plate) will hold the plate on the saddle satisfactorily at speeds of 25 thousand cylinder revolutions per hour or higher. Higher spring force may also be used where needed, and it is therefore preferable to make the spring 23 with a potential of exerting approximately 8-20 lbs. of force per lineal inch.

The plate itself is bent into cylindrical form (preferably prior to etching) and to a greater curvature than that of the saddle. In the usual size of plate the radius of curvature of the plate may be between a half inch and one inch less than that of the saddle. Under these conditions, the plate is made to hug the saddle snugly and the interface between zinc and aluminum layers retains substantially the same length as it had in the plate prior to bending.

While it is preferred to bend the plate to its cylindrical form prior to etching, it may also be etched in the flat, the recessed or depressed areas which are thus formed being suitably packed during bending.

It is essential that the zinc and aluminum layers be of

controlled and uniform thickness and that they be molecularly bonded together. Laminations produced according to Boessenkool Patents 2,691,815 and 2,753,623 are, as pointed out in the above mentioned application, satisfactory.

Because of the uniqueness of the composite plate and saddle arrangements it is essential that the means for holding the plate on the saddle be of proper design and configuration. It can be seen from the forgoing description that the present invention adequately performs the required function of securely holding the plate to the saddle.

What is claimed is:

1. Printing plate holding means for printing cylinders comprising an etched bi-metallic printing plate for relief half-tone printing, a supporting saddle adapted to be releasably held on a said cylinder for supporting said plate, said saddle having its ends slanted back under its outer surface, said plate comprising a printing layer of zinc and a backing layer of aluminum molecularly bonded together, the printing layer of zinc having a uniform thickness of approximately .03 inch being parallel to the aluminum backing layer having a uniform thickness of about .02 inch, the plate being curved to a smaller radius of curvature than the saddle surface and being bent under at its straight ends into an S curve, the said bent ends fitting over said saddle ends and under the edges thereof, and an elongated leaf spring fitted on one end of said saddle engaging a said bent end for tensioning the plate onto said saddle and holding the other bent end of the plate against the saddle, said spring having a substantially U shaped cross section with one leg thereof straight and secured to the saddle end and the other leg curved in an S configuration conforming to said plate bent end so that the spring fits between the straight end of the saddle and the bent end of the plate.

2. The printing plate holding means according to claim 1 wherein said spring straight leg has cutouts therefrom along its length forming a plurality of lips provided with holes for attaching the spring to the straight end of the saddle.

3. The printing plate holding means according to claim 2 wherein the spring has a potential of exerting approximately between 8 and 20 lbs. per lineal inch.

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