

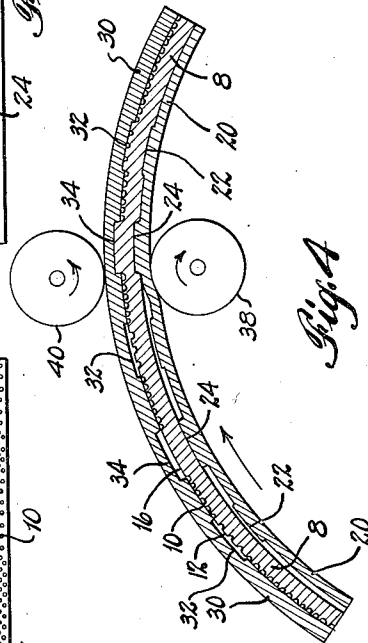
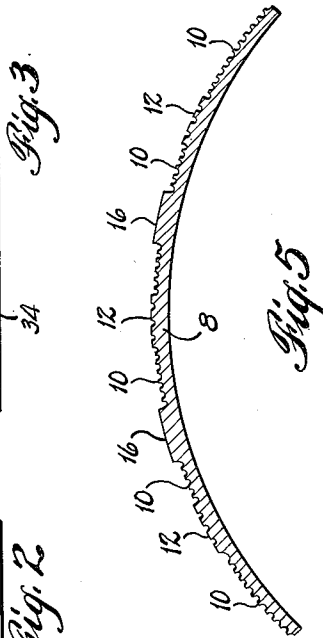
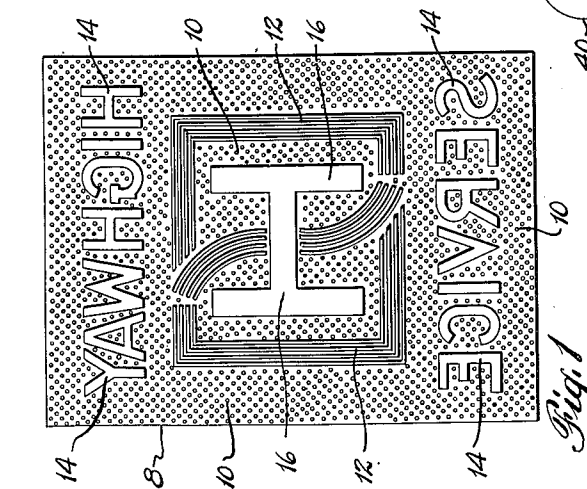
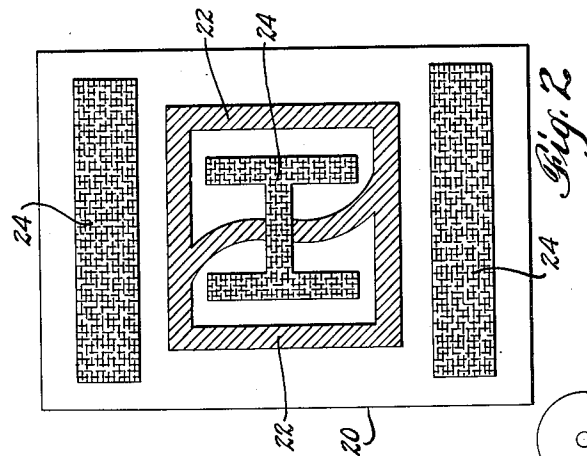
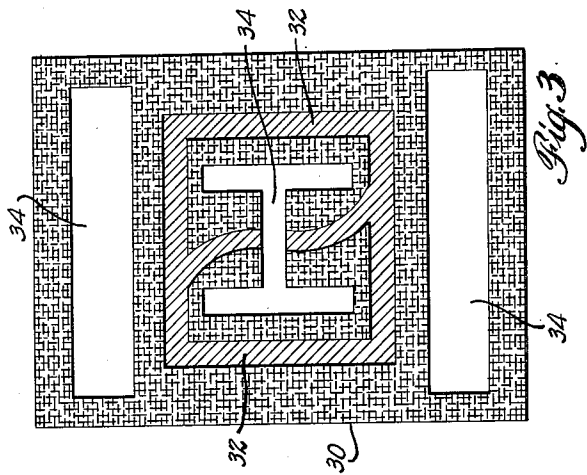
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2,587,439

MAKING READY CYLINDRICAL PRINTING PLATE

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MAKING READY CYLINDRICAL PRINTING
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The present invention relates to a novel and improved process for making-ready letterpress printing plates for rotary printing.

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 processes, steps and combinations pointed out in the appended claims.

The invention consists of the novel steps, construction, processes, compositions and improvements herein shown and described.

Of the drawings:

Figure 1 is a schematic developed plan view of a typical and illustrative, arcuate letterpress or relief printing plate to be treated by the process of the present invention.

Figure 2 is a schematic developed plan view of an overlay for use in making-ready the plate of Figure 1.

Figure 3 is a similar view of the underlay which may be used in connection with the overlay of Figure 2.

Figure 4 is a schematic elevational view showing the bumping operation as carried out in accordance with the present invention; and

Figure 5 is a schematic side elevation of a printing plate treated in accordance with the present invention.

The present invention has for its object the provision of a novel and improved process for the accurate making-ready of curved or part-cylindrical letterpress printing plates for use in rotary printing, particularly in the printing of high grade magazines and other periodicals. A further object is the provision of an improved process by which a curved plate may be accurately made ready with the portions for printing the solids or heavy tones substantially raised above the remainder of the surface of the plate. Still another object is the provision of a novel and improved process by which curved printing plates may be rapidly and accurately prepared for printing with a minimum of hand work on the plate.

Heretofore in the preparation of curved printing plates for rotary, letterpress printing, the making ready of the plates has been a relatively tedious and expensive operation, or else the making-ready has been carried out in a somewhat crude and inaccurate manner. Usually, the plate is made-ready after it has been clamped in position on the printing cylinder of the rotary printing press, and has been accomplished by

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positioning an overlay on the tympan, against which the inked surface of the plate is to print the web of paper passing through the press. At other times, the plate has been made-ready by roughly cutting out sheets of paper in accordance with the design on the face of the plate and positioning these sheets on the concave side of the plate so that they have their thicker portions underlying the heavier tone of the plate. Such a process has been unsatisfactory by reason of the great amount of time consumed for the production of a satisfactory underlay, or by reason of the lack of register between the underlay and the face of the printing plate in case the underlay is formed from a proof of the plate, as has usually been done.

In accordance with the present invention, the printing plate is preliminarily curved or is formed as an arcuate plate of the correct curvature. Such plates are usually electrotypes having a thickness of about one-quarter of an inch and about one-quarter circumference extent. Typically, such a plate would be about 11½ by 15½ inches, to print a page about 11 by 15 inches, and would be curved to fit on a cylinder about 15 or 16 inches in diameter. Such plates may be halftone or line plates or a combination of halftone and line subjects to which is often added textual material. A plate of this general kind is trimmed to the desired size and the edges of the plate are bevelled or otherwise finished so that the plate may be secured on the printing cylinder in the usual manner. The plate is then positioned on a conventional proof press and a proof is taken on suitable paper which is preferably a multi-ply laminated paper stock from which various layers may be individually removed in the desired areas so as to form an overlay.

Such a sheet of laminated stock generally comprises a heavy sheet of paper, often about 0.010" thick, in which are secured a plurality of thinner layers of paper, each about 0.002" thick, which layers may be differently colored for convenience in separating the layers and for determining by inspection the depth of the removed portions of the paper. The proof impression is made on the uppermost thin sheet of paper and the several layers of paper are then removed as desired in accordance with the intensity of the tone of the impression. Thus, at those areas corresponding to the full tones or solids, two or three thicknesses of the thin paper would be removed, at the halftones of the plate only one thickness of the paper would be removed, while at the highlights none of the thin

layers of paper would be removed. The removal of the layers of thin paper is easily accomplished by scribing around the various areas with a sharp knife so that one or more of the thin layers is cut through after which the one or two layers of thin paper are removed as desired.

I have found that this overlay may conveniently be made in accordance with the disclosure of the patent to Bishop No. 2,038,398 or 2,256,921, utilizing the make-ready stock there disclosed.

An underlay is also prepared which is to have thin layers of paper selectively removed from it, those areas corresponding to the highlight areas and a few number of layers in those areas corresponding to the halftone areas of the plate, while none of the thin layers of paper would be removed from the shadow or full-tone areas of the plate.

Such an underlay is not prepared by printing the plate in the conventional manner on the underlay sheet, but is prepared by rolling the paper over the inked plate while the plate is simultaneously and proportionately advanced with respect to the underlay sheet, thereby producing an impression on the underlay sheet which is progressively shortened throughout its length with respect to the surface of the printing plate from which the impression was made. Thus for a quarter-cylindrical plate about 0.250" thick having an outer dimension of 11.5" by 15.5" and curved about its shorter dimension to fit a cylinder 15.5" in diameter, the overlay should be 11.5" by 15.5" while the underlay should be shortened by about 0.3" thereby giving an underlay about 11.2" by 15.5", or with a shortening of about 0.027" per inch of arcuate length.

The underlay and overlay so formed are substantial complements of each other, one having its high areas corresponding to the low areas of the other, and adapted to register radically with each other when the two are positioned on the face and back respectively of the plate for which they were made.

The overlay is then secured in register to the face of the plate and the underlay is secured to the back or concave side of the plate in radial register with the printing face of the plate. This securing of the overlay and underlay may be made by means of any suitable temporary adhesive.

With the underlay and overlay in position on opposite sides of the printing plate, the printing plate is subjected to heavy radial pressure sufficient to deform the plate and to push the solids or heavier tone portions of the plate outwardly, thereby raising them above the general surface of the printing face of the plate, this deformation being in accordance with the difference in thickness of the underlay and overlay at the different parts of the plate. The radial pressure may be as strong as desired so long as no substantial crushing effect is produced on the finer halftone portions or small type areas of the plate, and is preferably accomplished by means of a pair of smooth surfaced cylindrical pressure rollers capable of exerting several hundred pounds per lineal inch, one roller being driven while the other roller is an idler roller.

After this bumping operation has been completed, the underlay is preferably removed from the concave surface of the plate, and the plate protected on its face by the overlay is returned to the arcuate shaving machines where the back of the plate is again shaved to render the rear or concave face of the plate truly cylindrical and to reduce the plate to its final or finished thick-

ness. After the overlay is removed, the plate is ready to be put on the press and printed.

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 in detail to the present preferred and illustrative manner of carrying out the process of the present invention, as shown schematically in the accompanying drawings, Figure 1 shows the developed surface of a typical letterpress printing plate to be treated by the process of the present invention. As there shown, the plate 8 comprises nonprinting or highlight areas 10, halftone areas 12 and shadow or full tone areas 14, as well as heavy type matter 16. The full tone areas 14 and the heavy type matter 16 require heavier pressure in printing than the other areas of the plate and this heavier pressure is best obtained by raising these areas of the plate slightly above the general surface of the plate, while the halftone areas of the plate require to be raised only a lesser amount above the general surface of the plate, leaving the highlight areas at their original height.

Figure 2 shows the underlay 20 for use with the plate of Figure 1 and this underlay is of the same height as the plate 8 but is narrower than the plate, the difference in width being determined by the diameter of curvature of the plate, the arcuate extent of the plate and the thickness of the plate. As shown in Figure 2, the underlay is formed of a plurality of thickness of paper, the bottommost sheet being relatively heavy while the two or more upper layers are thin and are preferably secured together by means of a temporary adhesive over their entire area. For a plate of the typical dimensions given, the plate 8 or the corresponding original from which the electrotype duplicate was prepared, is printed on the underlay sheet so that the underlay impression is progressively shortened throughout its width, and this shortening may be 0.027" per inch for the example given. The proofed underlay is then cut around the halftone and highlight or non-printing areas 22, and one or more of the thin paper layers are removed from the underlay so as to leave the full tone areas 24 about 0.004" and the halftone areas 22 about 0.002" inch above the general level of the underlay. The underlay is then positioned on the concave side of the curved plate 8 and secured thereto in radial register with the design on the face of the printing plate.

The curved printing plate or the original plate from which the duplicate electrotype plate was prepared is then proofed on a sheet of paper suitable for making overlays and an overlay 30 is prepared. In his overlay, as is shown in Figure 3, the areas 34 corresponding to the full tone areas 14 have two layers of thin paper removed, while those areas 32 corresponding to the halftone areas 12 of the plate have one layer of the thin paper removed, and no paper is removed from the areas 32 corresponding to the highlight or non-printing areas 10 of the plate. Thus the underlay and overlay sheets are substantial complements of each other, except that the underlay is narrower than the overlay sheet.

Figure 4 diagrammatically illustrates the bumping operation with the underlay and overlay sheets temporarily secured to the under and outer surfaces of the plate respectively. The plate, with the underlay and overlay attached to it is passed between the two smooth surfaced cylindrical pressure rollers 38, 40, one of which is a driven roller, while the other is preferably a non-driven

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or idler roller. These rollers are pressed together either, by yielding pressure or not, and exert a powerful pressure on the plate, underlay and overlay so as to deform the plate 3 in accordance with the varying heights of the underlay and overlay, the pressure being insufficient to cause any damage to the printing face of the plate.

After passage of the plate through the rollers 38, 40, the plate preferably has the underlay removed from its back surface and the back surface may be shaved so as to reduce the plate to the desired finished thickness. After the plate has the overlay removed from it, it is ready to be clamped on the press and printed.

The invention in its broader aspects is not limited to the specific process and steps 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.

What is claimed is:

1. The process of making-ready an arcuate printing plate which comprises forming an overlay of the same size as the original for said plate, printing on an underlay sheet the design of said plate while progressively shortening the impression with respect to the direction of curvature of the plate in the amount necessary to compensate for the shortening in the arcuate length of the back of the plate as compared to the printing face, preparing an underlay from said sheet in accordance with the shortened impression, positioning the overlay in register on the face of the curved plate, positioning the underlay on the concave face of the plate and in radial register with the overlay, and subjecting the overlaid and underlaid plate to deforming pressure, finishing the concave back of the plate to render it cylindrical.

2. The process of making-ready an arcuate printing plate which comprises forming an overlay of the same size as the original for said plate, printing on an underlay sheet the design of said plate while progressively shortening the impression with respect to the direction of curvature of

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the plate in the amount necessary to compensate for the shortening in the arcuate length of the back of the plate as compared to the printing face, preparing an underlay from said sheet in accordance with the shortened impression, positioning the overlay in register on the face of the curved plate, positioning the underlay on the concave face of the plate and in radial register with the overlay, subjecting the overlaid and underlaid plate to deforming pressure.

3. The process of making ready an arcuate printing plate which comprises forming an overlay of the same size as the original for the face of the arcuate plate, forming an underlay shortened in the amount necessary to compensate for the shortening in the arcuate length back of the plate as compared to the printing face for the concave back of the plate, positioning the overlay and underlay in radial register on the face and back of the arcuate plate respectively, subjecting the overlaid and underlaid plate to deforming radial pressure and removing the overlay to prepare the plate for printing.

4. A process as claimed in claim 3 in which the underlay is removed and the concave face of the plate is cylindrically finished.

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