The present invention relates to printing and more particularly to an apparatus for curving zinc printing plates.

It is conventional in newspaper printing, or the like, to form stereotype plates from matrices formed from the half-tone or line engravings and type locked in a chase. These stereotype plates are each accurately curved to fit the press cylinder and rotate therewith in printing a continuous sheet. It is well understood that a certain amount of accuracy of reproduction of the engravings and type locked in the chase is lost by the mat and stereotype process, and that a much clearer impression may be obtained by direct printing from an engraving made from a sliek proof of the type and wherein screen negatives are stripped into the negatives from which the engraving is made. Heretofore no satisfactory means has been developed for accurately curving a zinc engraving and attaching the same to the rotary press cylinder.

These engraving plates, which are conventional, are formed from flat sensitized zinc plates which are substantially 60 thousandths of an inch in thickness. After printing the desired impression on the sensitized zinc the latter is etched to a depth of approximately 40 thousandths, from the sensitized or type surface, thus leaving a thickness of the zinc plate, between the type area and around half-tone impressions, of approximately 20 thousandths of an inch. Since the half-tone areas cannot be etched to such a depth, and still retain the half-tone screen, this results in a plate which is easily bent or deformed in the deep etched area but which is not easily formed or curved in those areas occupied by the half-tone screen. Furthermore, since this zinc plate is relatively thin when compared with the thickness of a stereotype casting the plate cannot directly replace the stereotype casting on a printing cylinder and still use the press in connection with such stereotype castings.

It is, therefore, the principal object of the instant invention to provide a novel portable apparatus for curving engraved printing plates for mounting and bonding the curved plates upon a composite printing member in which the combined thickness of the printing plate and dummy plate is equal to the thickness of the usual stereotype cast printing plate.

Another object is to provide an apparatus of this class in which the composite printing member, comprising the printing plate and dummy plate, may be used interchangeably with cast stereotype plates now conventionally used with rotary printing presses.

Another important object is to provide a device of this class which will permit a rotary press to carry engraved plates and print directly upon a continuous sheet thereby producing a clearer and more accurate printing impression or reproduction of the engraving on the sheet stock.

Another object is to provide an apparatus of this class which is relatively simple in construction and economical in operation and which will accurately curve a zinc printing plate to a predetermined are in one operation.

The present invention accomplishes these and other objects by providing a horizontally disposed, substantially rectangular frame which transversely journals a pair of drums in fixed spaced relation adjacent its respective opposing ends. A third drum is journaled in spaced-apart parallel relation above the pair of drums. An endless belt is tautly entrained over the three drums. A presser roller is freely journaled by one end of the frame in adjusatably closely spaced relation with respect to one of said pair of drums. Handle means, connected with one of said pair of drums, permits rotating the drums and the belt for impinging a zinc plate between the belt and one of the drums.

Other objects will be apparent from the following description when taken in conjunction with the accompanying single sheet of drawings, wherein:

FIGURE 1 is a perspective view of the device;
FIGURE 2 is a fragmentary side elevational view of the zinc curving end portion of the apparatus with the bar elements removed for clarity;
FIGURE 3 is a perspective view of the curved zinc plate; and,
FIGURE 4 is a perspective view of a stereotype dummy plate and illustrating, by dotted lines, the exploded position of the curved zinc plate before attachment with the dummy plate.

Like characters of reference designate like parts in those figures of the drawings in which they occur.

In the drawings:

The reference numeral 10 indicates the device, as a whole, which is substantially rectangular in general configuration. The numeral 12 indicates a frame formed from angle-iron stock, as shown, but which may be formed of any suitable material. The frame 12 includes a substantially rectangular horizontally disposed portion 14, supported by two pairs of legs 16 and 18 suitably interconnected by cross members 20 and 22 and connected with the portion 14 by braces 24. A pair of cylindrical-like hollow drums 26 and 28, each having closed ends, are journaled transversely of the frame, adjacent its respective opposing ends by suitable bearing supports 30 and 32 connected with the respective sides of the horizontal portion 14 of the frame.

The radius of the drum 26 is preferably substantially equal with respect to the radius of the arc or curve desired for the finished zinc plate 34 for the reasons which will readily be apparent. The diameter of the drum 28 is not critical but is preferably equal to or greater than the diameter of the drum 26, for providing ample working room or space between the drums for the purposes described hereinafter.

The drums 26 and 28 are of substantially equal length and are preferably of greater length than the width of the zinc plate 34 to be curved. A third roller-like drum 36, of any selected diameter and substantially of equal length with respect to the drums 26 and 28, is journaled in spaced parallel relation above the drum 26 by a pair of braces 38 connected at one end to the respective ends of the drum shaft 40 and pivotally connected at their opposite ends with the horizontal portion 14 of the frame by bolts 42.

An endless belt 44, having a width slightly less than the length of the drums but greater than the width of the zinc plate 34, is tautly entrained around the three drums 26, 28 and 36, thus providing a substantially horizontally disposed extent 46 of the belt, between the pair of drums 26 and 28 for the purposes more fully disclosed hereinafter.

A cylindrical-like presser roller 48, diametrically smaller than the drum 26 is freely journaled in parallel closely spaced relation with respect to the drum 26 adjacent the outer surface of the belt 44 by a pair of upwardly inclined supports 50, each connected at one end with the shaft 52 of the roller 48 and pivotally connected at their opposing ends to the respective sides of the frame portion 14 by bolts 54.

A pair of struts 56 are each connected at one end to the
roller shaft 52 and are adjustably connected adjacent their respective opposing ends to the braces 38, intermediate their ends, by bolts 59. The ends of the struts 56, connected with the braces 38, are each provided with a longitudinal slot 60 which permits adjustably positioning the roller 48 adjacent the belt 44 for the purposes which will presently be apparent.

Handle means 62 is connected with the shaft 64 of the roller 26 for manually rotating the latter and the belt 44.

Operation

In operation, suitable flat padding 66 is positioned on the horizontal portion or extent 46 of the belt between the drums 26 and 28. The rectangular flat zinc engraving 34 is placed, type face or impression side down, upon the upper surface of the padding 66. The leading edge 68 of the zinc plate is manually positioned in contiguous contact with the periphery of the drum 26 as at 69 (FIG. 2). Placing the edge 68 of the plate 34 in contact with the drum 26 prior to the start of the bonding or curving action, insures that the axis of the curve imparted to the zinc plate will be coaxial with respect to a press printing roller, not shown. The drum 26 is then manually rotated by the handle means 62, in the direction of the arrow 70, thus moving the zinc plate 34 and padding 66 around the circumference of the drum 26 which accurately curves the zinc plate 34. The combined thickness of the plate 34 and padding 66 forces the belt 44 outwardly of the periphery of the drum 26 and contacts the periphery of the fixed presser roller 48. Thus, the presser roller 48 maintains the zinc plate in contiguous rolling contact with the periphery of the drum 26 and insures imparting a curvature to the plate 34 substantially equal with respect to the radius of the drum 26. The purpose of the padding 66 is to prevent damage to raised type face or half-tone impressions on the printing face of the zinc plate by the pressure of the roller 48. After the zinc plate 34 has been rolled around the circumferential portion of the drum 26, the plate 34 is removed from the drum and has a configuration substantially like that shown in FIG. 3. A stereotype blank dummy plate or saddle 72, adapted to be connected in a conventional manner to the printing roller of a press, not shown, is provided for each of the curved zinc plates 34. The curved zinc plate is positioned upon the outer surface of the dummy plate 72, as shown by the dotted line action in FIG. 4, and is securely fastened thereto by a bonding agent applied to the meeting surfaces of the plate 34 and dummy plate 72 thus forming a composite printing member having the identical thickness of a conventional stereotype cast printing plate which may then be removably connected to printing rollers of presses, not shown.

Obviously the curved zinc plate 34 is tested by placing the latter in position upon the dummy plate 72 before applying the bonding agent to insure a perfect fit between the mating surfaces. If the zinc plate 34 has not been perfectly curved it is again placed upon the device and rolled, back and forth, around the drum 26 and retested on the dummy plate 72 until the desired fit is obtained. Obviously the invention is susceptible to some change or alteration without defeating its practicability, and I therefore do not wish to be confined to the preferred embodiment shown in the drawings and described herein, further than I am limited by the scope of the appended claims.

I claim:

1. An apparatus for accurately curving a zinc plate, comprising: a horizontally disposed rectangular frame; a pair of drums journaled by horizontal axes connected transversely to said frame adjacent the respective ends of the latter; a pair of braces connected at one end to opposing sides of said frame intermediate its ends; a third drum journaled by a horizontal axle extending between and connected to the other ends of said braces above said frame in adjustable spaced parallel relation with respect to the axis of said pair of drums; an endless belt tautly entrained over said pair of drums and said third drum and forming a substantially horizontal extent extending between said pair of drums adapted to position and support a zinc plate to be curved; a pair of supports connected to said frame adjacent one of said pair of drums; a presser roll freely journaled by a horizontal axle extending between and connected to said supports positioning a peripheral portion of said presser roll in adjustable closely spaced relation with respect to a peripheral portion of one of said pair of drums; and handle means for rotating one of said pair of drums and said endless belt for impinging a zinc plate positioned on the horizontal extent of said belt between the latter and the periphery of one of said pair of drums as the belt and drums are rotated.

2. An apparatus for imparting a predetermined curve to a zinc plate, comprising: a horizontally disposed rectangular frame; a pair of drums transversely journaled above said frame adjacent the respective ends of the latter, at least one of said drums having a radius substantially equal to the radius of the curve desired for said zinc plate; a pair of elongated upstanding braces pivotally connected at one end to the respective sides of said frame intermediate its ends, a third drum journaled between the upper end portions of said braces above said frame in adjustable spaced parallel relation with respect to said pair of drums; an endless belt tautly entrained over said pair of drums and said third drum and forming a substantially horizontal extent extending between said pair of drums adapted to position and support a zinc plate to be curved; a pair of supports connected to the respective sides of said frame adjacent said drum having a radius substantially equal to the radius of the curve desired for said zinc plate; a presser roll having an axle connected to said supports positioning a peripheral portion of said presser roll in closely spaced relation with respect to a peripheral portion of said one of said pair of drums having a radius substantially equal to the radius of the curve desired for said zinc plate; a pair of elongated strut members connected at one end to the respective opposing end portions of the axle of said third drum and adjustably connected at their other end portions to said outstanding braces intermediate the ends of the latter for preventing movement of said third drum toward said presser roll; and handle means for rotating the last mentioned said drum and impinging a zinc plate between the belt and the drum for curving the zinc plate around the drum, whereby said presser roll bearing against the outer surface of said belt maintains a rolling contact between the zinc plate and the periphery of the drum.

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