PRINTING PLATE HOLDER FOR ROTARY CYLINDER PRINTING PRESSES

George Mangus, Miami, and Vernon R. Spitaleri, South Miami, Fla., assignors to Knight Newspapers Inc., Miami, Fla., a corporation of Ohio


1 Claim. (Cl. 101—378)

This is a division of our patent application Serial No. 646,846, filed March 18, 1957 for "Printing Plate Bending and Mounting Machine" which was issued as United States Patent No. 2,990,000 on June 27, 1961.

This invention relates to printing and, in particular, to printing plate holders for mounting curved printing plates on rotary cylinder printing presses. One object of this invention is to provide a printing plate holder consisting of a curved dummy or adapter body to which an original engraved printing plate is attached and which in turn is capable of being mounted directly upon a cylinder press so that this assembly can be used immediately for rotary printing. As, for example, in high speed newspaper printing presses.

Another object is to provide a printing plate holder of the foregoing character wherein the ends of the printing plate are bent around the opposite ends of the dummy or adapter body and attached thereto by clamping bars in order to secure these to one another and lock them solidly together.

Other objects and advantages of the invention will become apparent during the course of the following description and the accompanying drawings, wherein:

FIGURE 1 is a side elevation of a printing unit resulting from the bending and securing of an original printing plate to an improved printing plate holder according to the present invention;

FIGURE 2 is a perspective view of the printing plate and plate clamping angle bar assembly ready for bending around and securing to the curved adapter body of the printing plate holder of the present invention;

FIGURE 3 is an enlarged end elevation of the assembly shown in FIGURE 2;

FIGURE 4 is a fragmentary longitudinal section taken along the line 4—4 in FIGURE 3;

FIGURE 5 is a fragmentary longitudinal section taken along the line 5—5 in FIGURE 3;

FIGURE 6 is an enlarged fragmentary vertical section through the right-hand end of the assembly shown in FIGURE 1, showing one of the plate-clamping angle bars and the adjacent end of the printing plate immediately prior to its being bent around the adjacent end of the adapter body; and

FIGURE 7 is a fragmentary vertical section, similar to FIGURE 6, showing the positions of the parts after a threaded fastener has been inserted through the end-bending device and the plate-clamping angle bar and bent printing plate and into the starting end of the dummy or adapter body.

Hitherto, high speed printing of newspapers and other similar printed matter has been accomplished on high speed rotary presses carrying stereotype plates for producing the printed impressions. These stereotype plates have been cast by bringing molten metal into contact with matrices of specially prepared paper which have previously been pressed into contact with printing materials, such as type, engraving plastic, etc., in order to receive an impression from which stereotype plates could be cast. Such stereotype plates resulted in high volume production of newspapers, but the quality of reproduction was considerably inferior to that produced by direct printing from original printing plates produced by photo-engraving processes. Such original printing plates, however, previously consumed so much time in preparation that it was impractical to attempt to produce them in the quantities necessary for use in a newspaper printing plant.

Recently, however, improvements in high speed etching processes and color separation techniques have enabled the production of process color engravings with great rapidity, such as the production of a plate every two or three minutes. This procedure for the first time makes it feasible, from a time point of view, to print newspapers directly from engraved plates rather than by stereotype plates cast from paper matrices produced from engraved plates. Ordinary engraved plates, however, are not directly adaptable to high speed rotary printing presses, such as are used for the printing of newspapers, because stereotype plates (inbular and semi-cylindrical) are flat and curved like a section of a hollow cylinder, whereas the engraved plates produced by conventional photo-engraving processes are thin and flat.

In general, the present invention provides a printing plate holder wherein an engraved printing plate is bent into accurate form against a curved thick dummy or adapter body which is adapted to fit into the printing press cylinder, so that the combined thicknesses of the curved plate and dummy are substantially the same as the thickness of a standard stereotype press. The present invention also provides means of firmly securing the printing plate to the opposite ends of the dummy or adapter body, so that, in effect, the printing plate and dummy form a substantially inseparable printing unit. As a result, this unit can be handled in the press room in a manner similar to that of handling stereotype plates, with the same facility for accurate alignment and positioning (registration) if required, and with greater superior quality of reproduction of the printed matter, such as newspapers produced on the press.

In the printing plate bending and mounting disclosed and claimed in our above-identified parent patent, the engraved plate is placed flat upon a heated flat bed, and the dummy is secured in an improved manner, according to the present invention, to the end of a hollow cylindrical sector dummy or adapter body which has been clamped to a heated cylinder overlying the secured end of the printing plate; the cylinder is then rolled forward over the printing plate, bending the printing plate into contact with the curved dummy until the opposite end of the dummy reaches the corresponding opposite end of the printing plate. That end of the printing plate is then similarly secured to the adjacent end of the dummy in an improved manner, whereinupon the printing unit consisting of the dummy and the now-curved printing plate mounted thereon is ready for application to the cylinder of the rotary printing press in place of the thick curved stereotype plates previously used.

Referring to the drawings in detail, FIGURES 6 and 7 show the lower left-hand end portion of a printing plate bending and mounting machine, generally designated 30, according to our above-identified parent patent as mounted upon a supporting frame having legs which support an open rectangular top portion 36 upon which is bolted an approximately U-shaped bed plate 52 (FIGURE 6). The bed plate 52, as its name suggests, has a substantially flat top surface 54 with parallel upstanding ridges 56 at its opposite ends adapted to enter corresponding grooves 58 at the opposite ends of the printing plate, generally designated 60 (FIGURE 2).

The printing plate 60 (FIGURE 2) is conventional and is produced by conventional processes which are beyond the scope of the present invention. Such printing plates
are customarily made from metal, such as magnesium alloys which are easily attacked by the etching acid used in the preparation of engraved plates. Each plate 60 is of rectangular outline with parallel side edges 59 and 61 and has an outer or printing surface 62 and an inner or backing surface 66 on its front or print side. Secured to each printing plate 60 at its opposite ends are fastening clips or plate-clamping angle bars 66 of approximately L-shaped cross-section. These angle bars or clips 66 have horizontal and vertical portions 68 and 70 respectively, the former having a groove 72 near its junction with the latter portion 68. Secured to the end 61 of the printing plate 60 by the groove 58 therein and providing an easily bendable thin wall 76 above the groove 58. The groove 72 in the horizontal angle bar portion 68 also provides a rib 78 which projects upwardly into the groove 58 in the printing plate 60 and interlocks with the rib 74 thereby to provide a printing plate unit, generally designated 80, including the plate-clamping angle bars 66, which are secured to the printing plate 60 by fasteners 82, such as rivets (FIGURES 3 and 5), engaging the ribs 68. The ribs 68 are also drilled at intervals with holes 84 aligned with holes in the thin portion 76 of the plate 60 (FIGURES 3, 4 and 6) through which screws or other fasteners 87 (FIGURE 7) are subsequently inserted, as described in our above-identified patent No. 2,990,000, June 27, 1961.

The bed plate 52 has depending edge flanges 88 (FIGURE 6) which form a heater chamber 90 closed by a closure plate 92 secured to the bottom thereof.

The printing plate 60 is bent and secured in the manner set forth below to a curved dummy or adapter body, generally designated 114, (FIGURES 1, 6 and 7) having bevelled edges 116. In order to bend the thin end portions 76 of the printing plate 60 around the rounded edges 110 of the opposite ends 112 of the hollow cylindrical section dummy or adapter body 114, to which the printing plate unit 80 is to be secured (FIGURES 10 and 15) and secure the thin portion 76 thereto by suitable fasteners mounted in the threaded screw holes 116 in the dummy ends 112, the bending machine 30 is provided with bending units, generally designated 120, FIGURES 6 and 7, pivotally mounted on the machine at the opposite ends of the printing plate 60 and including a swinging bending bar 142.

The bending bar 142 in its inoperative position at the commencement of bending operations is in the vertical position shown in FIGURE 6 resting against the adjacent end surface 143 of the bed plate 52, from which it is swung upwardly into the horizontal position of FIGURE 7 during the bending operation, as described below in connection with the operation of the invention. The bending bar 142 is provided with a thickened offset edge portion 145 containing a groove 144 (FIGURE 6) shaped and dimensioned to receive the horizontal portion 68 of the plate clamping angle bar 66 and having bores 146 aligned with the bores 84 and 86 in the angle bars 66 and printing plate thin portion 76 and of a sufficiently large diameter to pass the heads of screws subsequently inserted in the holes 84 and 86 (FIGURE 6). Thus, the groove 144 in the bending bar 142 provides parallel upstanding ribs 148 and 149 on the bending bar 142, the rib 148 entering the space between the end of the bed plate 52 and the overhanging clip 66, and the somewhat higher rib 149 serving as an abutment against which the vertical portion 70 of the bar clip 66 rests during bending.

The hollow cylindrical section dummy or adapter body 114 is designated because it is in the form of a sector of a hollow cylinder of considerably greater radial thickness than the thickness of the printing plate 60. With the printing plate unit 80 it forms an adapter-and-plate assembly, generally designated 150 (FIGURE 1). The outer cylindrical surface 152 of the dummy 114 is adapted to be engaged by the back surface 64 of the printing plate 60 and their combined radial thicknesses when bent in the manner shown in FIGURE 1 by the machine 30 into the assembly 150 substantially equal the thickness of the conventional cast metal stereotype plate which the assembly 150 is intended to replace in the rotary cylindrical printing press, according to the invention. The dummy 114 is thus an adapter body or filter of partially hollow cylindrical form intended to fill in the space between the bent printing plate 60 and the outer surface of the cylinder of the plate-clamping angle bar 66 of the dummy or adapter body 114 accurately fits the outer cylindrical surface of the rotary press cylinder (not shown). The dummy or adapter body 114 adjacent its opposite ends 112 is provided with rabbets 156 adapted to receive the plate-clamping angle bar portions 70 after the bending operation has been completed (FIGURES 1 and 6), the edges of the rabbets 156 and bar clip portion 70 being correspondingly inclined or beveled.

Summarizing the operation of mounting the printing plate 60 upon the adapter body 114, as more fully disclosed in our above-mentioned patent No. 2,990,000, when the dummy or adapter 114, bed plate 52 and printing plate 60 have become sufficiently heated, the operator swings the left-hand bending unit 120 and consequently its bending bar 142 in a clockwise direction, bending the left-hand end portion of thin portion 112 of the dummy upward from the position shown in FIGURE 6 to that shown in FIGURE 7, against the adjacent dummy or adapter body end 112 around the rounded corner edge 110, bringing the holes 84 and 86 into alignment with the threaded holes 116 (FIGURE 7). This action moves the bores 146 in the bending bar 142 from the vertical position of FIGURE 6 to the horizontal position of FIGURE 7. The operator then inserts a screw 87 in each bore 146 and by means of a screw driver (not shown) pushes the shank of each screw 87 through the holes 84 and 86 into the mouth of the threaded hole 116 and rotates the screw driver to thread the threaded portion of each screw 87 into its respective screw hole 116, thereby securing the angle bar clip 66 and the adjacent thin end portion 76 of the printing plate 60 to the end 112 of the dummy or adapter 114 (FIGURE 7).

The operator then rolls the bending cylinder 208 from its left-hand position of FIGURE 7 along and above the bed plate 52, causing the printing plate 60 to be simultaneously bent and rolled into contact with the curved surface 152 of the dummy or adapter 114 until the bending cylinder unit 208 arrives at the opposite limit of its travel, whereupon the opposite end of the dummy or adapter body 114 is now presented above the opposite plate-clamping angle bar 66 of the printing plate unit 80. The operator then swings the bending bar 142 of the opposite bending unit 120 in a counterclockwise direction upward to the left to bend the adjacent thin portion 76 of the opposite end of the printing plate 60 around the opposite corner edge 110 into contact with the adjacent opposite end 112 of the dummy or adapter body 114, and consequently bring the screw holes 84 and 86 at said opposite end into alignment with the threaded holes 116, whereupon screws 87 are inserted through the horizontal bores 146 in the manner described above and thus securing the now accurately-bent printing plate unit 80 completely to the dummy or adapter 114. The bending unit 120 are now swung backward to their starting positions, one of which is shown in FIGURE 6, and the printing plate and adapter assembly 150 removed from the bending cylinder 208. The assembly 150 is allowed to cool sufficiently for handling, the differential shrinkage causing a tight fit between them. The assembly 150 is then ready to be transferred to the press room for mounting upon the rotary press cylinders and the stereotype plates which the assemblies 150 are intended to replace. Printing is then carried out in the
3,228,329

usual manner, but by the use of the original printing plate and adapter assemblies 150, instead of by stereotype plates.

What we claim is:

An original printing plate holder for substitution of an original printing plate for a stereotype in a rotary cylinder printing press wherein the printing plate has grooved opposite end portions with substantially perpendicular shoulders thereof bent radially inward against the opposite ends of the holder, said holder comprising

an adapter body having the general shape of a sector of a hollow cylinder with a cylindrical inner surface configured to fit the press cylinder and a cylindrical outer printing-plate-receiving surface substantially coaxial therewith,

said body having approximately radial opposite ends and parallel opposite sides,

each of said body ends having a rounded outer fulcrum edge adjacent its junction with said outer surface of said body and having a rabbeted inner edge recess adjacent its junction with said inner surface of said body, the combined radial thicknesses of said body and the original printing plate carried thereby being substantially equal to the thickness of the stereotype for which they are substituted,

a pair of plate-clamping angle bars each having mutually perpendicular flanges and each being disposed at respective ends of said adapter body,

said angle bars each having one of its flanges radially-directed with a shoulder thereon disposed in interlocking gripping engagement with the shoulder of the adjacent radially-bent end portion of the printing plate and overlying and urging the same against the adjacent radial end of the adapter body,

said angle bars each having the other of its flanges tangentially-directed and seated in the rabbeled recess of the adjacent inner edge of the respective adapter body end,

and means engaging each angle bar and disposed substantially perpendicular to its respective adapter body end for securing each angle bar to its respective body end.

References Cited by the Examiner

UNITED STATES PATENTS

415,132 11/1889 Wendte 101—145.1
896,527 8/1908 Fraser 101—145.1
960,005 5/1910 Droitcour 101—378
960,219 5/1910 Droitcour 101—415.1
1,976,640 10/1934 Upshaw 101—415.1
2,121,309 6/1938 Wale 101—378
2,261,305 11/1941 Stephenson 101—378
2,276,012 3/1942 Blackley 153—46
2,663,349 12/1953 Albrecht 153—46

FOREIGN PATENTS


ROBERT E. PULFREY, Primary Examiner.