E. FLOWER.

METHOD OF PREPARING PRINTING PLATES FOR BENDING.

APPLICATION FILED AUG. 12, 1910.

992,121. **Patented May 9, 1911.**

Fig. 1.

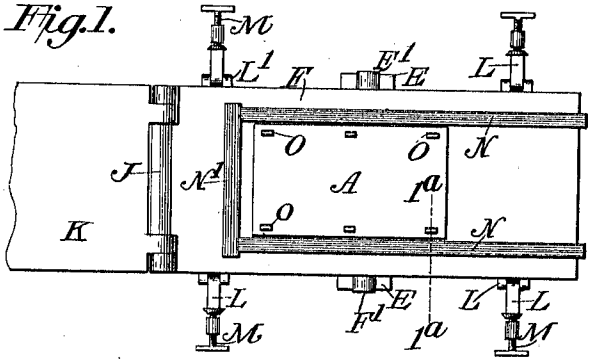


Fig. 2.

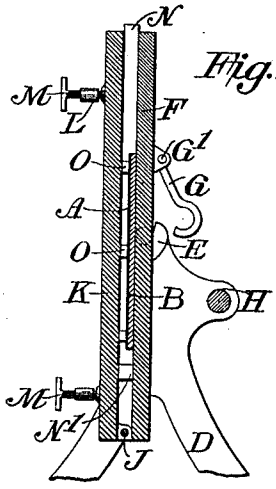
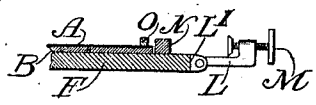


Fig. 1a



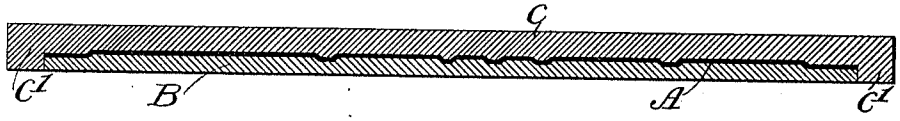
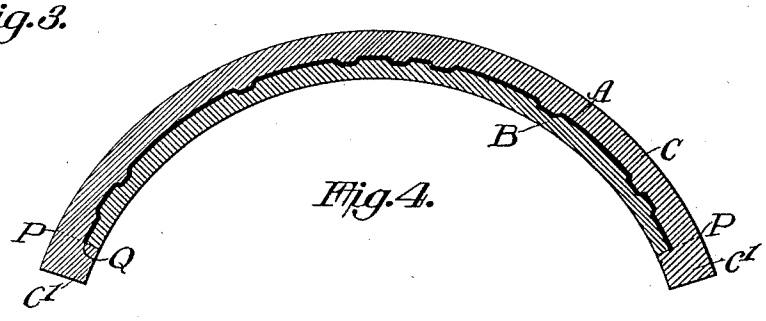


Fig. 3.

Fig. 4.



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METHOD OF PREPARING PRINTING-PLATES FOR BENDING.

992,121. Specification of Letters Patent. Patented May 9, 1911.

Original application filed November 30, 1909, Serial No. 530,552. Divided and this application filed August 12, 1910. Serial No. 576,919.

To all whom it may concern:

Be it known that I, EDWIN FLOWER, of Passaic, in the county of Passaic and State of New Jersey, have invented certain new and useful Improvements in Methods of Preparing Printing-Plates for Bending; and I hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, which form part of this specification.

This invention is an improved method of and apparatus for bending printing plates and is a division of my application Serial Number 530,552 filed November 30, 1909 for process of bending electrotypes.

In the production of curved electrotypes for use on cylinder presses, a flat electrotype is first made and this is then bent to the desired shape. Such procedure naturally distorts the type, and various methods have been proposed hitherto for effecting a compensation for the distortion, as by successive bending in opposite directions.

My invention as set forth in my aforesaid application has for its object to practically avoid such distortion entirely, and this I accomplish by forming a composite plate of the electrotype and a backing, and then bending such composite plate, the type face being situated at what may be termed the neutral zone of the composite plate, or in other words that portion which suffers neither elongation nor compression of the type face or printing surface during the bending operation.

The present invention has more particular reference to the method of producing the backing on the printing plate prior to the bending operation and will now be described in detail with reference to the accompanying drawings, in which—

Figure 1 is a partial plan view of an apparatus suitable for carrying out the invention. Fig. 1^a is a detail section on line 1^a—1^a of Fig. 1. Fig. 2 is a vertical section showing the apparatus in a different position. Fig. 3 is a longitudinal section of the composite plate made with the apparatus shown in Figs. 1, 1^a and 2; and Fig. 4 shows this composite plate after the bending operation.

The invention can be carried out with any suitable plate having a printing surface; for instance I have shown an electrotype plate having the customary copper printing surfaced shell A and a body B of softer metal, such as so-called electrotype metal (lead alloy). On the shell or printing surface A, I apply a suitable backing, preferably provided with projections engaging the ends of the plate A, B, so that the plate is embraced and held between said projections. Preferably the backing C and the projections C^1 are formed of cast metal, which may be the same metal as the body B, or (and this may be the better way) of a metal or alloy having a somewhat lower melting point. To produce this casting I employ the following method and an apparatus such as shown in Figs. 1, 1^a and 2.

The standards D carry bearings E in which the bottom plate F is mounted to swing by means of trunnions F^1, so that the plate can assume a horizontal position as in Fig. 1, or a vertical position as shown in Fig. 2. A hook G, pivoted to the plate F at G^1, is adapted to engage a stationary cross-bar H for the purpose of holding the plate firmly in a horizontal position, when desired. A hinge J, parallel to the trunnion axis, connects the plate F with a top plate K. Suitable means are provided for clamping the plates F, K, together, such as brackets L pivoted to the bottom plate F at L^1 about axes at right angles to the trunnions F^1, and clamping screws M mounted to turn in threaded bearings at the ends of said brackets.

In carrying out my invention this apparatus is used as follows: While the bottom plate F is horizontal and the plate K swung away from it, as in Fig. 1, I place the printing surfaced plate A, B, on the bottom plate F, with the type face or printing face A up. Against the longitudinal side edges of the plate A, B, I then place two bars N, of wood, metal, or other suitable material, and at the inner portions of said bars (that is, the ends nearest the hinge J) I place a cross-bar N^1. The thickness of these bars N, N^1 is greater than that of the printing plate A, B, and corresponds to the thickness of the composite plate A, B, C, that is to be produced. On the face of the shell A I then put distance blocks or pieces O at suitable points. These distance pieces are preferably elastic or compressible, being made, for instance, of pine wood, and are of such thick-

ness as to originally project somewhat beyond the upper faces of the bars N, N¹, as clearly shown in Fig. 1ª.

When the various parts have been arranged, as described above, the top plate K is swung over so as to engage the distance pieces O and hold the plate A, B, in position, then the brackets L are swung upward and inward and the clamping screws M are tightened until the distance pieces O have been compressed and the plate K brought in contact with the upper faces of the bars N, N¹. The hook G is thereupon disengaged from the cross-bar H, and the plates F, K, with the parts clamped between them, are swung on the trunnions F¹ to a vertical position, as shown in Fig. 2; or to such position that the ends of the plates F, K, opposite the hinge J will be higher than said hinge. The plates F, K, together with the longitudinal bars N and the cross-bar N¹ then form a box open only at the top and in this box is located the electrotype or printing plate A, B, the distance pieces O holding the printing plate firmly, yet leaving spaces through which the metal poured in through the open top may pass down as far as the cross-bar N¹. For casting, I may use the same metal of which the body B is made, although it may be preferable to use a metal or alloy having a lower melting point, to prevent the body B being melted or the printing surface A injured by the inflowing metal. I have found however, that the same metal may be used provided it is poured in as cool as it can be kept without destroying its fluidity. After allowing the casting to set, upon opening the casting apparatus the flat composite plate shown in Fig. 3 is obtained having transverse projections C¹ at the ends. This composite plate I bend to the desired curved shape, for instance the one shown in Fig. 4, by means of any suitable apparatus. Presses comprising a concave mold and a convex die or shaper are well known in the art, and such presses are available for carrying out the bending operation above referred to.

In bending the composite plate the inner concave surface is compressed while the outer convex surface is stretched or expanded. Obviously, there must be between said surfaces an intermediate plane (known as the neutral zone) which will preserve its original length, that is, it will be neither compressed nor stretched. Now according to my invention I so select the dimensions of the several parts that the printing surface of the shell A, or other printing plate, will be so approximately or exactly in the neutral zone of the composite plate (A, B, C) that the printing or type surface of the printing plate can be bent to the desired shape without stretch or compression thereof. The location of the neutral zone depends on the physical characteristics and on the relative thicknesses of the materials used for the layers A, B, C; with ordinary electrotypes, and when the backing C is made of the same metal as the body B, I find that the backing should be about twice as thick as said body. The transverse projections C¹ assist in keeping the printing plate A, B in proper relation to the backing C. After the bending operation, the projections C¹ (or at least one of them) are cut off or sawed off at the points indicated by the dotted lines P, so as to expose one or both ends of the printing plate A, B. The connection or adhesion between the backing C and the plate A, B is so slight that the backing can easily be pried off by introducing a chisel or other suitable tool between the adjacent surfaces at Q. The resulting product is therefore the bent printing plate A, B, of the shape shown in Fig. 4. If desired, sheets of millboard or the like may be applied against the inner surfaces of the plates F, K, to prevent chilling.

What I claim is:

1. The method of preparing flat printing plates for bending, consisting in placing a printing-plate face outward against the wall of a suitable mold; placing compressible wooden blocks upon the face of the plate; closing the mold upon said blocks and clamping the mold so as to cause the blocks to hold the plate securely in the mold, and then filling the mold with molten metal to form a backing on the face of the printing-plate and projections beyond the ends thereof.

2. The method of treating flat printing-plates preparatory to bending same, consisting in placing a printing-plate face outward against a flat surfaced support, placing bars of greater thickness than the plate around three sides of said plate, placing compressible distance pieces upon the face of the plate; placing a flat plate over the printing plate and said distance pieces, clamping the mold-plate to the support so as to bring the mold-plate into close contact with the bars, and compress the distance pieces and cause them to hold the plate; and finally filling the mold space between the bars support and plate with molten metal to form a backing on the face of the printing-plate.

3. The method of treating flat printing plates to enable same to be bent, consisting in placing a flat printing plate face uppermost upon a flat support, placing bars of greater thickness than the plate beside the plate; placing compressible wooden blocks upon the face of the plate; placing a flat mold-plate upon said blocks, clamping the mold-plate and support together so as to compress the blocks until the mold-plate is in close contact with the bars; turning the support and attached parts to an approxi-

mately vertical position; then pouring molten metal into the space between said mold-plate and surface to form a backing on the face of the printing plate and extensions beyond the ends thereof, and finally removing the composite plate thus formed.

In testimony that I claim the foregoing as my own, I affix my signature in presence of two witnesses.

EDWIN FLOWER.

Witnesses:
GEORGE BOTT,
FRANK PINCKNEY.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."