E. FLOWER.

PROCESS OF BENDING ELECTROTYPES.

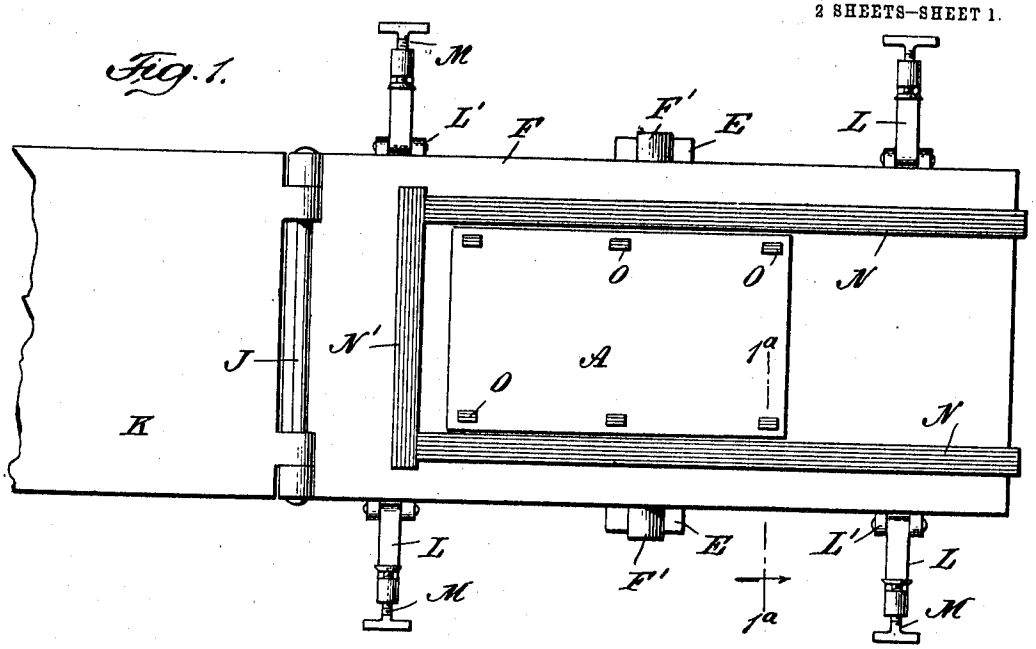
APPLICATION FILED NOV. 30, 1909.

988,763.

Patented Apr. 4, 1911.

2 SHEETS—SHEET 1.

Fig. 1.



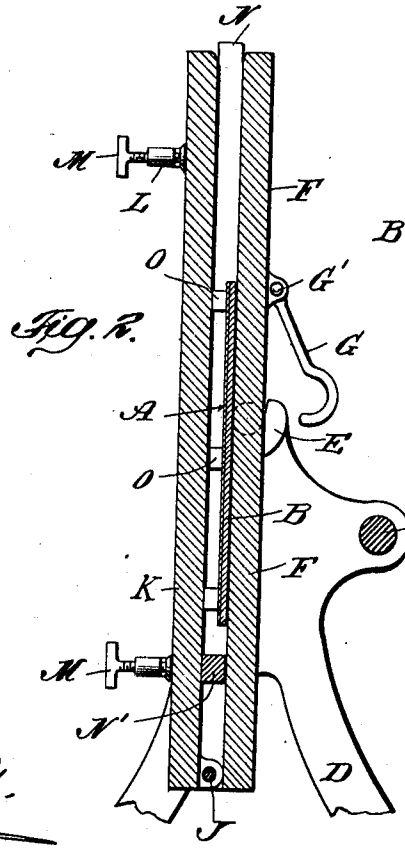


Fig. 2.

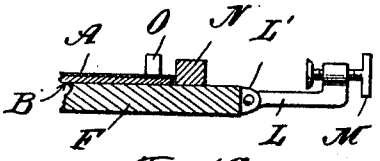


Fig. 1a.

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2 SHEETS—SHEET 2.

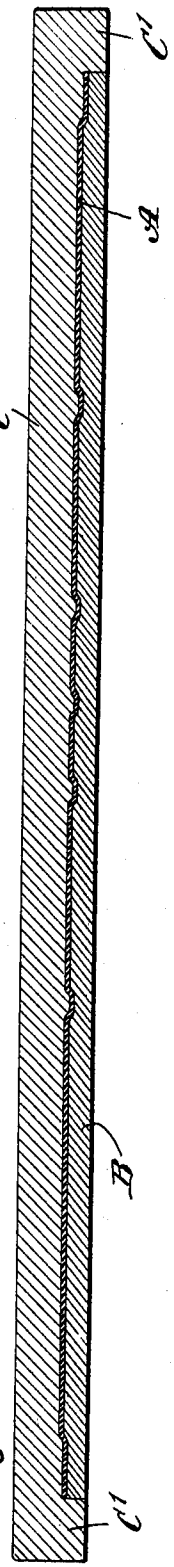


Fig. 3.

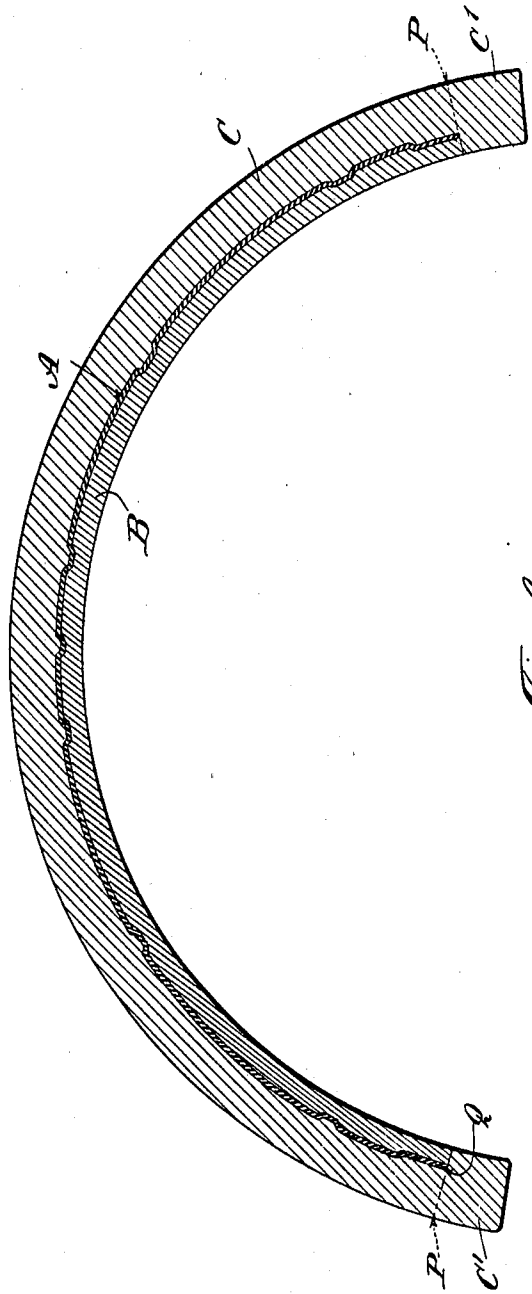


Fig. 4.

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PROCESS OF BENDING ELECTROTYPES.

988,763. Specification of Letters Patent. Patented Apr. 4, 1911.

Application filed November 30, 1909. Serial No. 530,552.

To all whom it may concern:

Be it known that I, EDWIN FLOWER, a citizen of the United States, and resident of Passaic, in the county of Passaic and State of New Jersey, have invented certain new and useful Improvements in Processes of Bending Electrotypes, of which the following is a specification.

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 present invention 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 invention 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 preferred form of my process; Fig. 1ª is a detail section on line 1ª—1ª 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, 1ª and 2; and Fig. 4 shows this composite plate after the bending operation.

The invention is carried out with any suitable plate having a printing surface, for instance an electrotype plate having the customary copper type shell A and a body B of softer metal, so-called electrotype metal (lead alloy). On the shell 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. In the preferred embodiment of my invention, the backing C and the projections C′ form a casting which may consist of 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 may employ an apparatus such as shown in Figs. 1, 1ª and 2, it being understood that a casting apparatus of this character is readily obtainable in the market: The standards D carry bearings E in which the bottom plate F is mounted to swing by means of trunnions F′, so that the plate can assume a horizontal position as in Fig. 1, or a vertical position as in Fig. 2. A hook G, pivoted to the plate F at G′, is adapted to engage a stationary cross-bar H for the purpose of holding the plate firm 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, as brackets L pivoted to the bottom plate F at L′ about axes at right angles to the trunnions F′, and clamping screws M mounted to turn in threaded bearings at the ends of said brackets. This apparatus is used as follows in producing a composite plate suitable for carrying out my invention: While the bottom plate F is horizontal and the plate K swung away from it, as in Fig. 1, I place the plate A, B, on the bottom plate F, with the type face or printing face A up. Against the longitudinal sides 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′. The thickness of these bars N, N′ is considerably greater than that of the printing plate A, B, and corresponds to the thickness of the composite plate A, B, C to be produced. On the face of the shell A, I then put distance pieces O at suitable points. These distance pieces are preferably elastic, being made, for instance, of pine wood, and are of such thickness as to originally project somewhat beyond the upper faces of the bars N, N′, as clearly shown in Fig. 1ª. The various parts having 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, N′. The hook G is thereupon

thrown clear of the cross-bar H, and the plates F, K with the parts clamped between them, are swung on the trunnions F′ to a vertical position as shown in Fig. 2, or at any rate to a position where the ends of the plates F, K opposite the hinge J will be higher than said hinge. It will be seen that the plates F, K, together with the longitudinal bars N and the cross-bar N′ 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 N′. 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 opening the casting apparatus upon cooling, and removing the projecting end of the casting, the flat composite plate shown in Fig. 3 is obtained. The casting C has transverse projections C′ 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. Pressses 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 layer (known as the neutral zone) which will preserve its original length, that is, it will be neither compressed nor stretched, and will suffer no distortion. 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 approximately or exactly in the neutral zone of the composite plate (A, B, C) so that the printing or type surface of the printing plate can be bent to the desired shape without distortion. 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 C′ assist in keeping the printing plate A, B in proper relation to the backing C. After the bending operation, the projections C′ (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.

I claim as my invention:

1. The herein described method of bending printing plates consisting in first applying to the printing surface of such plate a metallic backing of such thickness that the printing surface of such printing plate will be substantially in the neutral zone of the composite plate formed by the printing plate and applied backing; second, bending such composite plate and thereby curving the printing plate without distorting its printing surface; and third, removing the backing from the curved printing plate.

2. The herein described method of bending printing plates, consisting in casting a metallic backing onto the printing surface of such printing plate so as to bond such surface and produce therewith a composite plate, the backing being of greater thickness than the printing plate, and the printing surface of the printing plate being so located in the composite plate thus formed as not to be distorted when such composite plate is bent; then bending such composite plate by suitable means so as to curve the printing plate without distorting its printing surface; and finally removing the backing from the surface of the curved printing plate.

3. The herein described method of bending printing plates, which consists in applying a backing to the printing surface of such plate and transverse projections, connected with said backing, to the ends of the printing plate, the backing being of such thickness over the printing surface of the printing plate that such surface will be in the neutral zone of the composite plate thus formed; then bending such composite plate; and finally removing the backing and projections from the printing plate.

4. The herein described method of bending printing plates, consisting in casting a backing of suitable metal onto the printing surface of such printing plate, such backing being of greater thickness than the printing plate and projecting beyond the ends of the printing plate so as to bond the same longitudinally and form therewith a composite plate with the printing surface of the printing plate lying substantially in the neutral zone of such composite plate;

then bending such composite plate by suitable means; then cutting away the portions of the backing projecting beyond the ends of the printing plate; and finally removing the remaining part of the backing from the printing surface of the curved printing plate.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

EDWIN FLOWER.

Witnesses:
FRANK PINCKNEY,
GILBERT E. MILES.

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