(No Model.)

J. B. MILLER & J. DALE.

BENDING ELECTROTYPE PLATES.

No. 378,707. Patented Feb. 28, 1888.

Fig. 1.

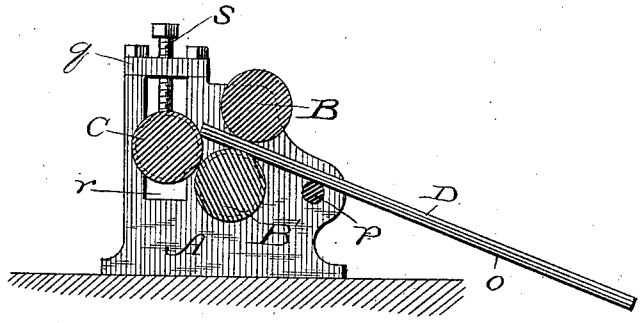


Fig. 2.

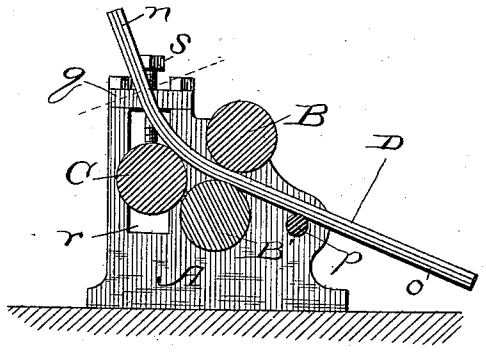
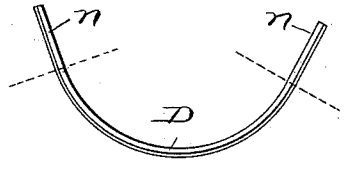


Fig. 3.



Witnesses.
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UNITED STATES PATENT OFFICE.

JOHN B. MILLER AND JAMES DALE, OF CHICAGO, ILLINOIS; SAID MILLER ASSIGNOR OF ONE-HALF HIS RIGHT TO SAID DALE.

BENDING ELECTROTYPE-PLATES.

SPECIFICATION forming part of Letters Patent No. 378,707, dated February 28, 1888.

Application filed June 10, 1887. Serial No. 240,867. (No model.)

To all whom it may concern:

Be it known that we, JOHN B. MILLER and JAMES DALE, citizens of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in the Manufacture of Electrotype and Stereotype Plates for the Form-Cylinders of Printing-Presses; and we hereby declare the following to be a full, clear, and exact description of the same.

The application to the form-cylinders of printing-presses of electrotype and stereotype plates has hitherto been impracticable, owing to the difficulty encountered in bending the plates throughout into true circular form corresponding with the curved surfaces of the cylinders upon which they require to be adjusted, thereby to produce the necessary snug and accurate fit of the plates to the curved surfaces of the cylinders, and owing to the difficulty encountered in bending the plates without mashing the type. We have discovered a method of bending these plates without injury to the face, to cause the plates to conform accurately to the curved surfaces upon which they are to be applied; and our invention consists in the method we practice.

To practice our improvement for the purpose named the usual method of producing the plates constitutes the preliminary step from which our invention proceeds—that is to say, generally stated, with relation to electrotype-plates, to the manufacture of which the following description and the accompanying illustrations are, for the sake of convenience, confined, the flat form of type, set up, preferably, with high spaces and quadrats and with type-high bearers all around it, is pressed upon a smooth surface of soft material, usually bees-wax, carefully and thoroughly rubbed over with black-lead. After the wax mold has been "built" and again properly blackleaded it is placed in the precipitating-cell and subjected to the action of the battery. The copper shell, when separated from the wax, is backed with lead poured upon it in a molten state and allowed to harden.

The difficulties hitherto encountered in bending the electrotype-plates after their production have, as aforesaid, been twofold: first, that of avoiding injury by mashing in the bending operation to the face of the electrotype, and, second and particularly, the bending—by machinery, of course—while it produces the desired curve across the intermediate portion of the plate, leaves straight or tangential edges which it is practically impossible to bend to form true continuations of the curve at the intermediate part.

The first-named difficulty we overcome by interposing between the face of the electrotype-plate to be bent and the rollers against which it moves a suitable material—such as pasteboard—which is softer or more yielding than the plate, or by covering the rollers with which the face of the plate is in contact while bending it with such material, which is the equivalent of covering the plate with such material.

The second difficulty we overcome by making the electrotype-plate as much longer or wider, depending upon whether the bend is longitudinally or transversely of the form afforded by the electrotype-plate, on opposite sides of the type portion than the form is required to be, as is necessary to make the straighter or tangential edges hereinbefore referred to equal, or substantially equal, in width to the excess of the width or length of the plate over that required for the form, and then cutting off such straight edges after the bending operation.

The machine we employ for our purpose is shown, with other matter illustrative of our improvement, in the accompanying drawings, in which—

Figure 1 represents the machine in sectional side elevation, and shows an electrotype-plate inserted for the purpose of bending it. Fig. 2 is a similar view of the same, showing the plate undergoing the bending operation; and Fig. 3, an end view of the plate after it has been bent and before the straight or tangential edges have been cut off, the lines at which they are cut being indicated by dotted lines.

A is the frame of the machine, which is of ordinary construction, being of the kind commonly employed to bend sheet metal. The frame affords bearings for rollers B and B', one above the other and geared together to cause the rotation of one simultaneously to rotate the other. The rollers are turned by means of a crank, which is not shown in the

drawings owing to the nature of the views selected for illustration; nor is the gear connection between the rollers shown, for the same reason. The operation will, however, be readily understood, notwithstanding the omission from the drawings of the features named, as the machine itself is of old and common construction.

Behind the rollers B and B′ is a roller, C, supported at its ends in journal-boxes (not shown) working in slots *r* in the frame and raised and lowered for adjustment by means of set-screws *s*, connected to the journal-boxes and working in bearings *q*.

In front of the rollers B and B′ is a rest, *p*, for the article while being operated upon by the machine.

D is an electrotype-plate, produced in the manner already described, as much longer or wider on opposite sides than the form upon it as will equal, or substantially equal, the distance between the line of impingement against it on opposite sides of the rollers B and B′, when inserted between them, as hereinafter described, and the roller C at a point where the forward end of the plate strikes it. The plate to be bent is inserted face downward and preferably slanting, as shown, with a sheet, *o*, of soft material—such as pasteboard—covering its face to protect it against the mashing effect of the rollers B and B′, between the said rollers, which are turned to feed it toward the roller C, and the mashing effect of the roller C.

If desired, instead of covering the face of the plate, as aforesaid, the same protection may be afforded by covering the rollers B′ and C with a suitable material. This is illustrated by means of dotted circles in Fig. 1 of the drawings, which represent the rollers proper, while the circles in full lines surrounding the dotted ones represent the covering. When the forward end of the plate comes into contact with the roller C, continued operation of the rollers B and B′ causes it to rotate the roller C and produce bending or curving of the plate, as shown in Fig. 2.

As will be seen, the plate, after being passed through the machine, will be curved between straight or tangential edges *n*, which correspond in width each to the distance between the rollers B B′ and C, as aforesaid, and they are subsequently removed by cutting them off, leaving—owing to the precaution taken to have the curve in the plate begin and end at the extremities of the form proper, as aforesaid—an electrotype plate curved to conform accurately to the surface of the form-cylinder upon which it is to be applied. Of course the radius of the curve depends upon the radius of the cylinder upon which the form is to be applied, and the machine employed may either be adjustable to produce curves of different radii, or separate machines may be used for the purpose.

Our method may, without change in the mode of procedure, also be practiced for manufacturing stereotype-plates, and our invention includes the manufacture of both electrotype and stereotype plates.

We are aware of metal-bending machines of the general nature of the machine illustrated in the present drawings as a means for practicing our improved method. The former would not, however, be satisfactorily practicable for our purpose, since, besides being comparatively complicated and expensive, they are non-adjustable as to the parts for producing the curves, and each could only, therefore, at best, be used to produce a curve of a certain degree; and as plates are required to be bent to produce different curves to fit them to cylinders of different diameters a separate machine would be required for each degree of curve. Although, therefore, even if the machines referred to would bend the plates without producing tangential ends, and thus complete in the one operation of bending for what we require two operations—bending and cutting—to produce, our method would still possess advantages over the method as it could be practiced on the machines referred to, since, being capable of practice on a machine having adjustable parts, it enables the use of one such machine for any required degree of curve.

What we claim as new, and desire to secure by Letters Patent, is—

The method of bending an electrotype or stereotype plate to fit it to the form-cylinder of a printing-press, which consists in making it greater in length or width at opposite sides of the form upon it than the form itself, passing it between bending-rollers, and then removing the tangential edges produced by the bending, substantially as described.

JOHN B. MILLER.
JAMES DALE.

In presence of—
J. W. DYRENFORTH,
WM. A. BRACKETT.