H. F. BECHMAN.

BENDING MATRICES.

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1,318,044.

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Fig. 1.

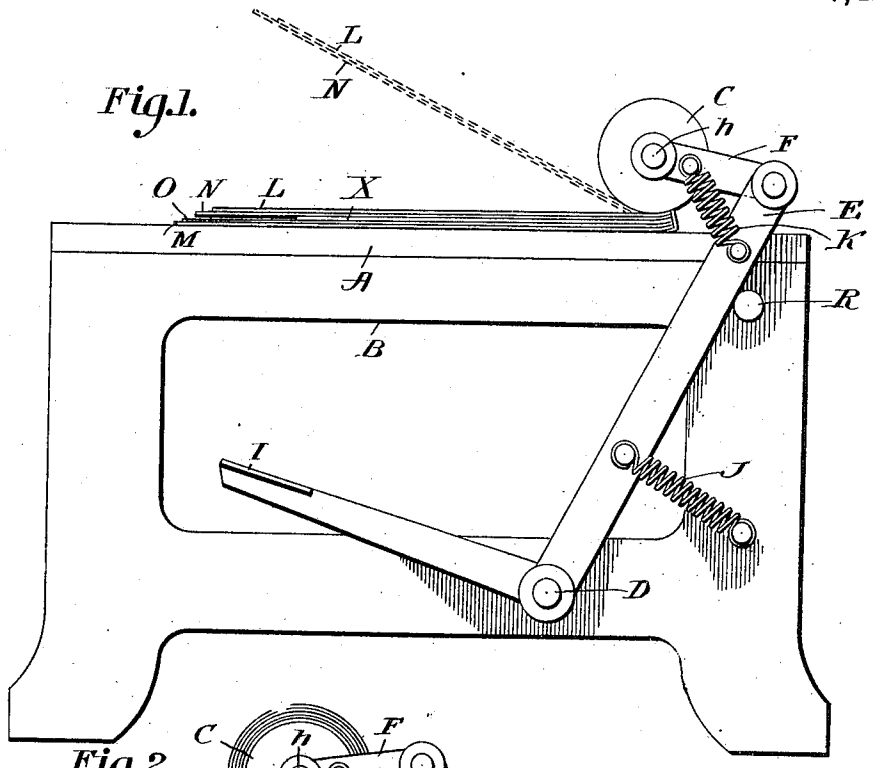
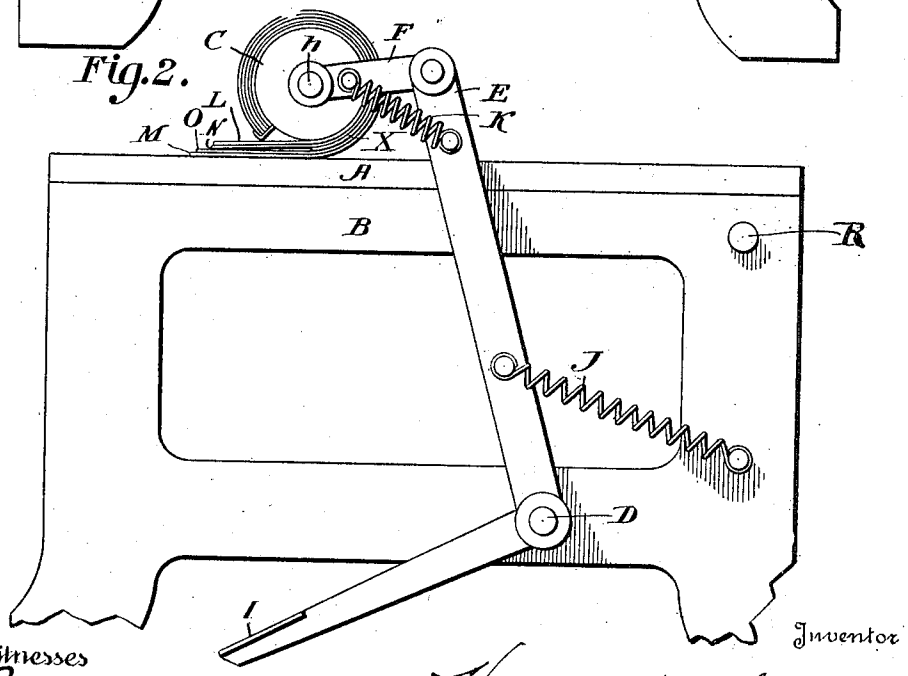


Fig. 2.



Witnesses

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BENDING MATRICES.

1,318,044. Specification of Letters Patent. Patented Oct. 7, 1919.

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To all whom it may concern:

Be it known that I, HENRY F. BECHMAN, a citizen of the United States, residing at Battle Creek, in the county of Calhoun and State of Michigan, have invented certain new and useful Improvements in Bending Matrices; 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 relates to the art of stereotyping and its object is to preliminarily bend or curve the matrices before they are placed in the casting boxes preparatory to casting a plate so that when such matrices are placed in the casting boxes they will readily conform to the curvature of the boxes and properly position themselves therein without buckling, cracking or creasing, thus insuring perfect plates. The invention includes a novel process of bending such matrices and also novel apparatus for bending same.

The novel process of bending the matrices consists essentially in placing the matrix between two flexible sheets or surfaces which are then rolled up, preferably by wrapping same around a core or cylinder, so that the matrix is bent or curved by and between such surfaces to approximately the shape of the plate to be cast therefrom without the matrix being broken, crumpled or injured; and when such bent matrix is afterward placed in a casting box it will readily conform to the curvature of the casting box without buckling or cracking.

In carrying out such process I preferably use two or more flexible metallic sheets between which the matrix to be bent is placed, such sheets then lying flat upon a surface or table; and after the matrix is placed therebetween the sheets and matrix are wrapped around a cylinder, thereby bending the matrix and imparting approximately the desired curvature thereto. The sheets and matrix may then be unrolled and the matrix removed therefrom ready for insertion in the casting box.

The invention will be further explained with reference to the accompanying drawings, and I have epitomized in the claims the essentials of the invention for which protection is desired.

In said drawings:—

Figure 1 is a side elevation of a machine for bending matrices in accordance with my process, showing in full lines the parts in position preparatory to rolling and bending the matrix.

Fig. 2 is a similar view showing the parts in position with the matrix bent.

As shown in the drawings the machine comprises a table A which is preferably flat and is supported upon a suitable frame or standard B. Mounted to roll upon the table A is a cylinder C which is provided with trunnions *h* at its ends pivotally connected by links F to the upper ends of levers E which are mounted upon a rock shaft D journaled in the frame B below the table, and which rock shaft carries a treadle I which can be depressed by the foot of the operator so as to rock shaft D and cause levers E to roll cylinder C across the table from the position shown in Fig. 1 to the position shown in Fig. 2. The levers E and cylinder C may be returned to normal position by means of suitable springs J connected with levers E and frame B, the levers B being arrested by stops R when the cylinder is returned to normal position. The cylinder C may be held down with any desired pressure upon the table A by means of springs K connected to links F and levers E.

Upon the table A are two plates O and N preferably of thin sheet steel, or other suitable flexible and preferably hard surfaced material; I preferably place a rubber blanket M below the sheet O, and a rubber blanket L above the sheet N; these sheets are superposed as shown in Fig. 1 and preferably may be connected at their rear edges to the periphery of cylinder C by any suitable means, so that as cylinder C is rolled forward over these sheets they will be wrapped around the periphery of such cylinder as indicated in Fig. 2.

The flat matrix X constructed in the usual manner, is placed between the sheets N and O, while the cylinder is in the retracted position shown in Fig. 1. By lifting sheet N and blanket L to the position indicated in dotted lines in Fig. 1 the matrix can be readily positioned upon sheet O, then sheet N and blanket L are lowered thereupon. Then the operator depresses

the treadle I and by so doing causes cylinder C to roll forward over the table and in so doing the sheets N and O with the inclosed matrix therebetween are rolled around and wrapped upon the cylinder, as indicated in Fig. 2, thus bending the matrix X to conform to the curvature of the cylinder, which is approximately of the desired curvature of the plate to be cast from the matrix.

This bending of the matrix to approximately the curvature of the plate to be cast therefrom prior to placing the matrix in the casting box imparts to it a degree of flexibility which enables it to readily conform to the curvature of the casting box when placed therein, and prevents the matrix buckling or cracking when inserted in such casting box, and insures perfect and uniform plates being produced when cast from such matrix, and avoids many troubles and annoyances which arise in casting plates from matrices as ordinarily used, such matrices not being previously bent or flexed are apt to bulge or crack or not conform properly to the casting box, resulting in producing unequal imperfect plates which cause great annoyance and delay in getting out the publication.

The inside sheet of smooth hard surfaced metal flexing with the matrix and outer sheet is the only means that has been found to avoid the matrix kinking or breaking especially where "rules" have made indentations crosswise of the matrix forming possible breaking points. A fine line of type will create the same kind of a line across the matrix, and also often cause the matrix to break or kink when placed in the box, unless the matrix is preliminarily bent by my method.

Experience has shown that a matrix curved around the cylinder under outside pressure will not naturally uniformly bend, but will have a tendency to break sharply at points where rules or thin lines have crossed it. When placed between two sheets of flexible hard material which hold the matrix firmly between them and curve smoothly and uniformly, as they do, there is no chance for the matrix to break, and it is bent around on the proper curve perfectly.

The metal sheets tend to flatten out when unwrapped, but owing to their thinness do not have any injurious effect upon the bent matrix therebetween, and such matrix is removed from between the sheets after bending. A matrix having been treated by my process, in the manner described, even if subsequently somewhat flattened will tend to assume its curved condition; and when placed in a casting box will readily conform smoothly and uniformly to the curvature of the box without breaking, cracking or angularly bending.

The invention is equally well adapted for use in bending matrices for either semi-cylindric plates or for tubular plates, and is particularly useful in connection with matrices made from very open forms. It will be obvious that the novel process could be performed entirely by hand, by manually wrapping or rolling the matrix, as by placing the matrix between two sheets and then rolling up the sheets and matrix upon each other, or upon a roller or core. The novel machine shown enables the process to be performed quickly and efficiently, but when the invention is once known it will be easy to devise other machines for carrying out the process, and I therefore do not consider the invention mechanically restricted to the particular mechanism herein illustrated, although such mechanism is a practical and efficient apparatus for bending matrices.

What I claim is:

1. A machine for bending plates comprising a table, a pair of flexible metallic sheets mounted thereon, blankets above and below the metallic sheets, said metallic sheets being adapted to receive a matrix between them; a cylinder, and means for rolling up the sheets with the matrix between them upon the cylinder.

2. A machine for bending matrices comprising a movable member, a pair of flexible metallic sheets connected with the member and adapted to receive a matrix between them, resilient sheets above and below the metallic sheets, and means for operating said member to roll up the sheets with the matrix between them.

3. The herein described process of bending matrices consisting in first placing the flat matrix between separate sheets of suitable flexible hard surfaced material, and then bending the sheets and interposed matrix together around a form approximately conforming to the curvature of the box in which the matrix is to be used.

4. Apparatus for bending matrices comprising a pair of parallel separate flexible hard surfaced sheets between which the matrix is placed, and a movable cylinder to which one end of each sheet is attached and around which said sheet and the interposed matrix is wrapped.

5. A machine for bending matrices comprising a support, a cylinder thereon, a pair of separate smooth flexible hard sheets connected at one end to said cylinder and between which sheets the matrix is placed; and means for rolling said cylinder over the support to simultaneously wrap the sheets and interposed matrix around the cylinder.

6. A machine for bending matrices comprising a movable member, a pair of separate smooth flexible metallic sheets connected with the member and adapted to receive a matrix between them, resilient sheets

above and below the metallic sheets, and means for operating said member to roll up the sheets with the interposed matrix between them.

7. A machine for bending matrices comprising a table, a pair of flexible metallic sheets adapted to receive a matrix between them, resilient sheets above and below the metallic sheets, and reciprocatory means connected with the table for rolling up the sheets with the matrix between them.

8. A machine for bending matrices comprising a table, a reciprocatory cylinder, a pair of flexible hard surfaced sheets connected with said cylinder between which the matrix to be bent is placed, and means for moving said cylinder on the table to wrap the sheets and the inclosed matrix around the cylinder and bend the matrix, substantially as described.

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

HENRY F. BECHMAN.

Witnesses:
CHARLES A. GRAMES,
IRVING K. STONE.

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