(No Model.) 2 Sheets—Sheet 1.

S. D. TUCKER.

MACHINE FOR BENDING METAL PLATES.

No. 477,390. Patented June 21, 1892.

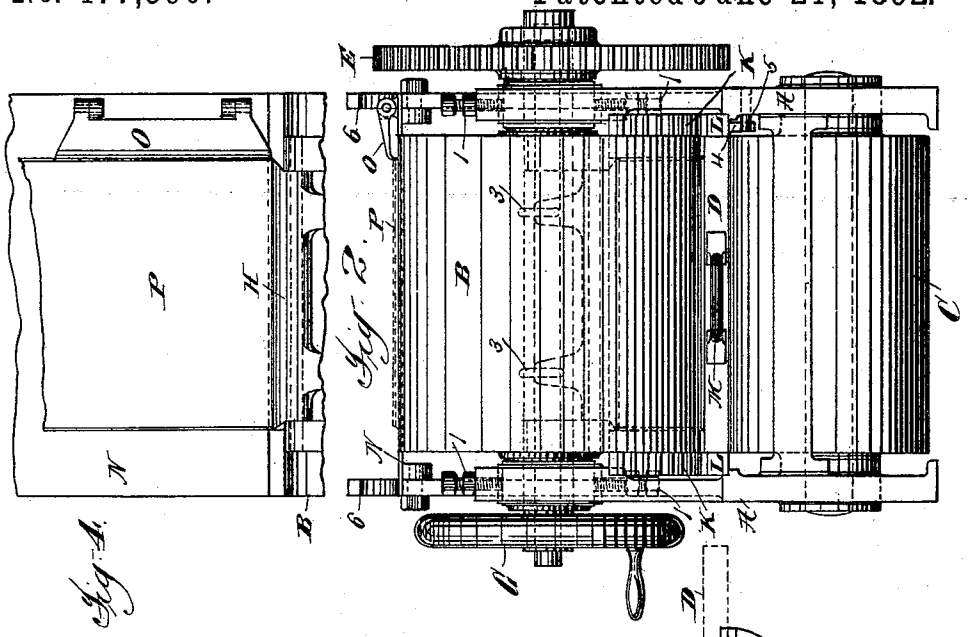


Fig. 1.

Fig. 2.

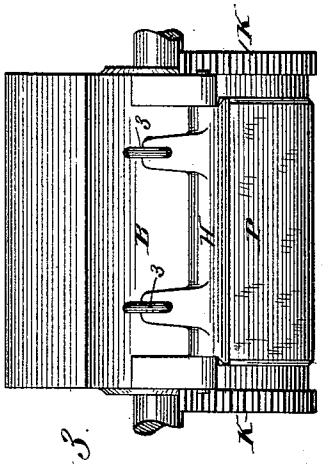


Fig. 3.

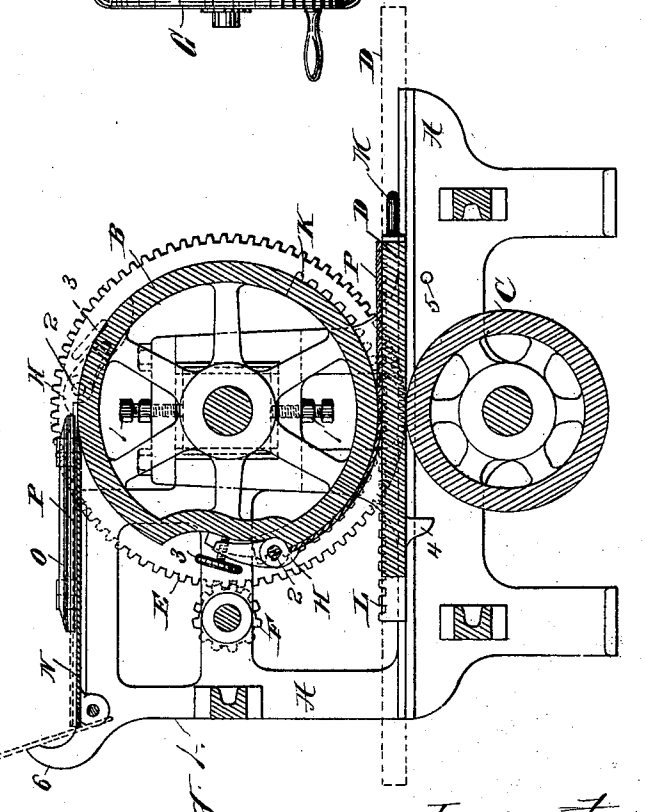


Fig. 4.

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(No Model.) 2 Sheets—Sheet 2.

S. D. TUCKER.

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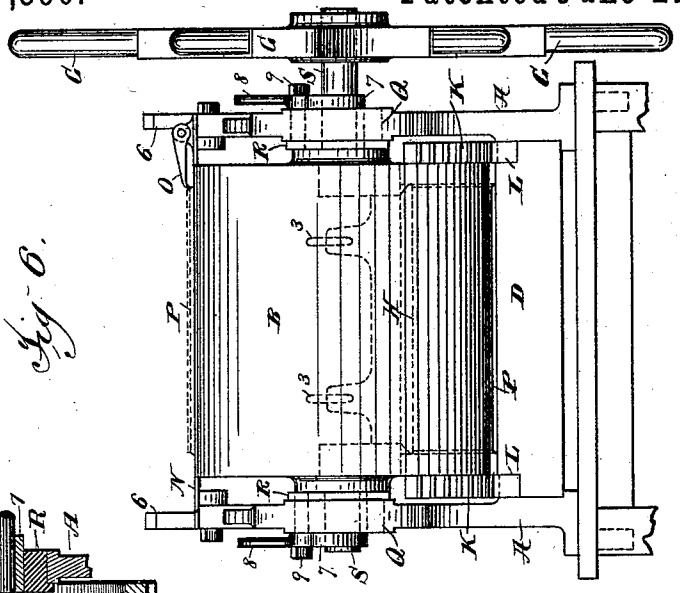


Fig. 6.

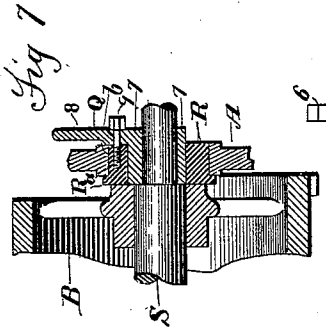


Fig 7

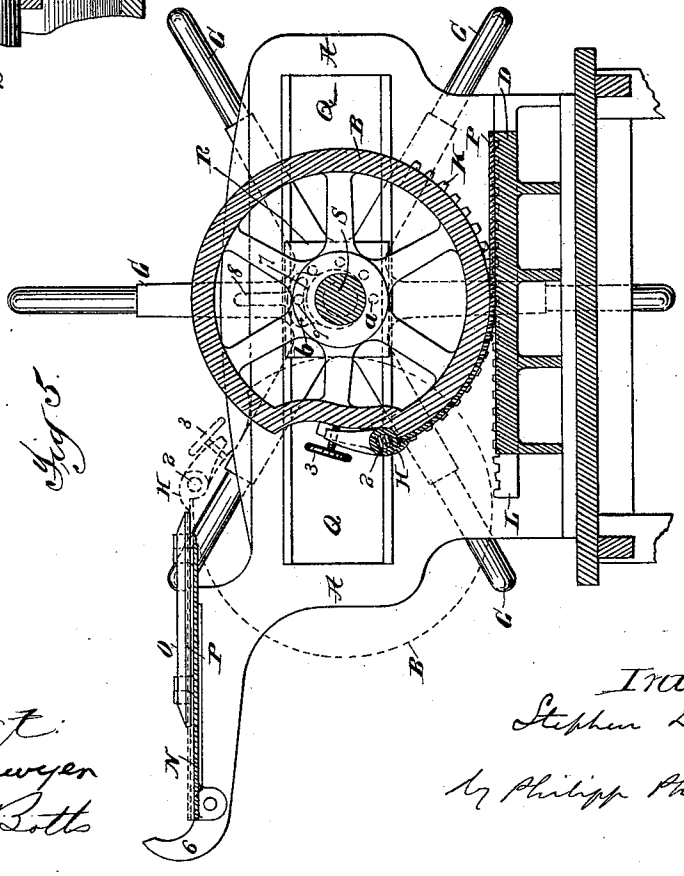


Fig 5.

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UNITED STATES PATENT OFFICE.

STEPHEN D. TUCKER, OF NEW YORK, N. Y.

MACHINE FOR BENDING METAL PLATES.

SPECIFICATION forming part of Letters Patent No. 477,390, dated June 21, 1892.

Application filed December 19, 1890. Serial No. 375,247. (No model.)

To all whom it may concern:

Be it known that I, STEPHEN D. TUCKER, a citizen of the United States, residing at New York, county of New York, and State of New York, have invented certain new and useful Improvements in Machines for Bending Metal Plates, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

The special class of plate-bending machines to which the invention relates are those in which the plate is secured at one end to a rotating cylinder and bent between said cylinder and an abutment, the object of the invention being to provide a simple, cheap, and convenient machine of this class.

While the machine embodying the present invention is applicable to bending metal plates of all kinds, it has been designed and is especially adapted for use as a stereotype or electrotype plate-bending machine, and will be described as thus applied.

In the accompanying drawings, forming a part of this specification, Figure 1 is a vertical longitudinal section of a machine embodying my invention. Fig. 2 is a front view of the machine. Fig. 3 is a rear view of the bending-cylinder. Fig. 4 is a plan view of the plate-receiving table and guide. Fig. 5 is a vertical longitudinal section of a modified form of machine, and Fig. 6 is a front view of the same. Fig. 7 is a detail section of the adjusting devices shown in Figs. 5 and 6.

Referring now particularly to Figs. 1 to 4, A is the frame of the machine, in the upper part of which is mounted the bending-cylinder B and in the lower part a cylinder C, which supports against the pressure of bending cylinder B the table D, forming an abutment between which and the bending-cylinder the plate is bent.

The shaft of the bending-cylinder B is mounted in bearings made adjustable by set-screws 1, so as to regulate the pressure between the cylinder and table and to compensate for differences in thickness of the plates and for wear of parts, and carries at one end a gear E, which meshes with a driving-pinion F, the shaft of which is provided with an operating wheel or handle G. For the purpose of securing the plate to the cylinder B, the latter is provided with a grip H, extending, preferably, nearly the length of the cylinder, so as to grip the entire edge of the plate, the grip being pivoted on shaft 2, extending longitudinally of the cylinder and operated to clamp or unclamp the plates by means of set-screws 3. The cylinder B is provided, also, at each end with segmental gears K, which extend rearward from the grip H through a little less than one-half the circumference of the cylinder.

The table D is mounted to slide upon the base of the frame A, but is supported directly opposite the bending-cylinder B by the cylinder C, before referred to. The table is provided at each side with racks L, which are engaged by the gears K on the revolution of cylinder B, the teeth of the gears and racks being so cut as to insure the movement of the table at a uniform surface-speed with the cylinder. The table is provided, also, with a handle M, by which it is returned to position by hand after the gears K have been rotated out of mesh with the racks L, and the return of the table to the proper position is insured by stops 4 5 on the table and frame, respectively. The table may be returned automatically by a weight, spring, or other suitable means, if preferred.

At the top of the frame above the cylinder B is pivoted a table N, upon which the plate is laid for clamping to the cylinder, and a side guide O is pivoted upon the frame and serves when placed upon the table to insure the accurate alignment of the plate. The forward edge of the table is supported close to the top of the cylinder B, so that the plate may be clamped while resting thereon, and in order to permit the cylinder to carry the plate past the table the latter is tipped backward, as shown in dotted lines in Fig. 1, in which position it is supported by stops 6 upon the frame.

The operation of this machine is as follows: The bending-cylinder having been rotated to carry the grip H into the position shown in dotted lines in Fig. 1, the table N is brought down from the position shown in dotted lines to that shown in full lines in that figure, and the stereotype or electrotype plate P is placed upon the table and pushed up against the side guide O, so as to insure an accurate registry of the side line of the plate with the line of

curve when the plate is bent. The grip H being in its raised position, the edge of the plate is brought under the grip and the latter then forced down by the set-screws, locking the edge of the plate firmly to the cylinder. The table D being in its forward position, as determined by the stops 4 5, the bending-cylinder B, with the plate attached, is rotated, and as the segmental gears K engage the first tooth of the racks L the table D is moved rearward at the same surface-speed as the bending-cylinder and the plate is bent around the cylinder by pressure between the cylinder and table, as shown in full lines in Figs. 1 and 3, the plate being shown as about half bent. The table N being tilted back, the rotation of the bending-cylinder is continued until the grip H and the front edge of the plate are carried into convenient position at the front of the machine, when the grip is released and the bent plate removed from the cylinder. The latter is then returned to bring the grip into position for another plate and the operation is repeated.

In Figs. 5 and 6 I have shown a modification, in which the table is stationary and the bending-cylinder is mounted in sliding bearings, so as to move over the surface of the table as the plate is bent.

In the modified construction the frame A is enlarged to provide for the sliding movement of the bending-cylinder therein and is provided on each side with openings Q, forming ways in which slide blocks R, forming bearings for the shaft S of the bending-cylinder B. The bending-cylinder is preferably rotated directly, as by a handle G, secured to the shaft S at one end. The adjustment of the cylinder relatively to the table is secured by mounting within each of the blocks R an eccentric sleeve 7, these sleeves forming eccentric bearings for the shaft S and being each provided with a handle 8, by which they may may be adjusted to raise or lower the cylinder. The sleeves are locked in position after adjustment by means of bolts 9, passing into one of a series of holes *a* in the blocks R through slots *b* in the sleeves. Approximate adjustment is thus obtained by shifting the sleeves and bolts from one hole to another, and accurate adjustment by the movement of the sleeve on the bolt by means of the slot.

The construction of the modified machine otherwise is the same as already described, and its operation will be understood from the following brief description: The cylinder B, having received a plate from the table N, while in the position shown in dotted lines in Fig. 5 is rotated toward the right of that figure by the handle G, and as the segmental gears K engage the racks L on the stationary table D the plate is bent between the cylinder and table, and at the same time the racks and gears move the cylinder over the surface of the table, the blocks R sliding in the ways Q, as shown in Fig. 5, in which the plate is shown as partially bent. The rotation of the cylinder is continued until the gears K pass out of mesh with the racks L, when the plate is fully bent. The cylinder may now be returned to its original position for receiving another plate, the bent plate being removed either before or after the return of the cylinder, as preferred.

It will be seen that my invention provides a very simple and efficient machine in which the movement of the sliding table or cylinder is controlled by the rotation of the bending-cylinder, so that an absolute uniformity in the two movements is secured. By the use of the segmental gears on the bending-cylinder a most simple arrangement for the automatic engagement and release of the sliding table or cylinder is obtained, the sliding member moving freely independently of the other member after the gears have been rotated out of engagement with the racks. By the use of the supporting-cylinder under the sliding table the pressure upon the table is supported wholly upon the line on which it is applied by the bending-cylinder, a more uniform action is obtained, and the friction of the table is largely reduced. The arrangement above the cylinder of the table for holding the plate in position for clamping is applicable in other classes of bending-machines than that shown, and this construction, as well as the combination therewith of an abutment below the cylinder against which the plate is bent, is claimed, broadly.

What I claim is—

1. The combination, with rotating bending-cylinder B, having segmental gears K at each end, of table D, against which the plate is bent, one of the members being mounted to move bodily in a plane parallel with the plane tangential to the cylinder at the line of bending pressure between the cylinder and table, and racks L on the table meshing with segmental gears K, whereby the moving member is driven directly from the cylinder during the bending operation and is free to return independently of the other member when the plate is bent, substantially as described.

2. The combination, with rotating bending-cylinder B, having gripper H and segmental gears K, of table D below the cylinder against which the plate is bent, one of the members moving bodily in a plane parallel with the plane tangential to the cylinder at the line of bending pressure between the cylinder and table, racks L on said table meshing with segmental gears K, whereby the moving member is driven directly from the cylinder and is free to return independently of the other member when the plate is bent, and table N above the cylinder for holding the plate in position to be gripped, substantially as described.

3. The combination, with rotating bending-cylinder B, having grip H, of table N above the cylinder for holding the plate in position to be gripped and adjustable away from the

surface of the cylinder, so as to permit the bent plate to pass it, substantially as described.

4. The combination, with rotating bending-cylinder B, having grip H, of table N above the cylinder for holding the plate in position to be gripped, said table being pivotally mounted to swing away from the surface of the cylinder to allow the bent plate to pass it, substantially as described.

5. The combination, with rotating bending-cylinder B, having grip H and segmental gears K, of table N above the cylinder for holding the plate in position to be gripped and pivotally mounted to swing away from the surface of the cylinder to enable the bent plate to pass it, sliding table D below the cylinder, against which the plate is bent, racks L on said table meshing with segmental gears K, whereby the table is driven directly from the cylinder during the bending operation and is free to move independently of the cylinder when the plate is bent, and supporting-cylinder C below said table, substantially as described.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

STEPHEN D. TUCKER.

Witnesses:
F. W. H. CRANE,
OTTO L. RAABE.