(No Model.) 2 Sheets—Sheet 1.

T. R. MORGAN, Sr.

MACHINE FOR BENDING SHEET METAL FENCE POSTS.

No. 283,269. Patented Aug. 14, 1883.

Fig. 2.

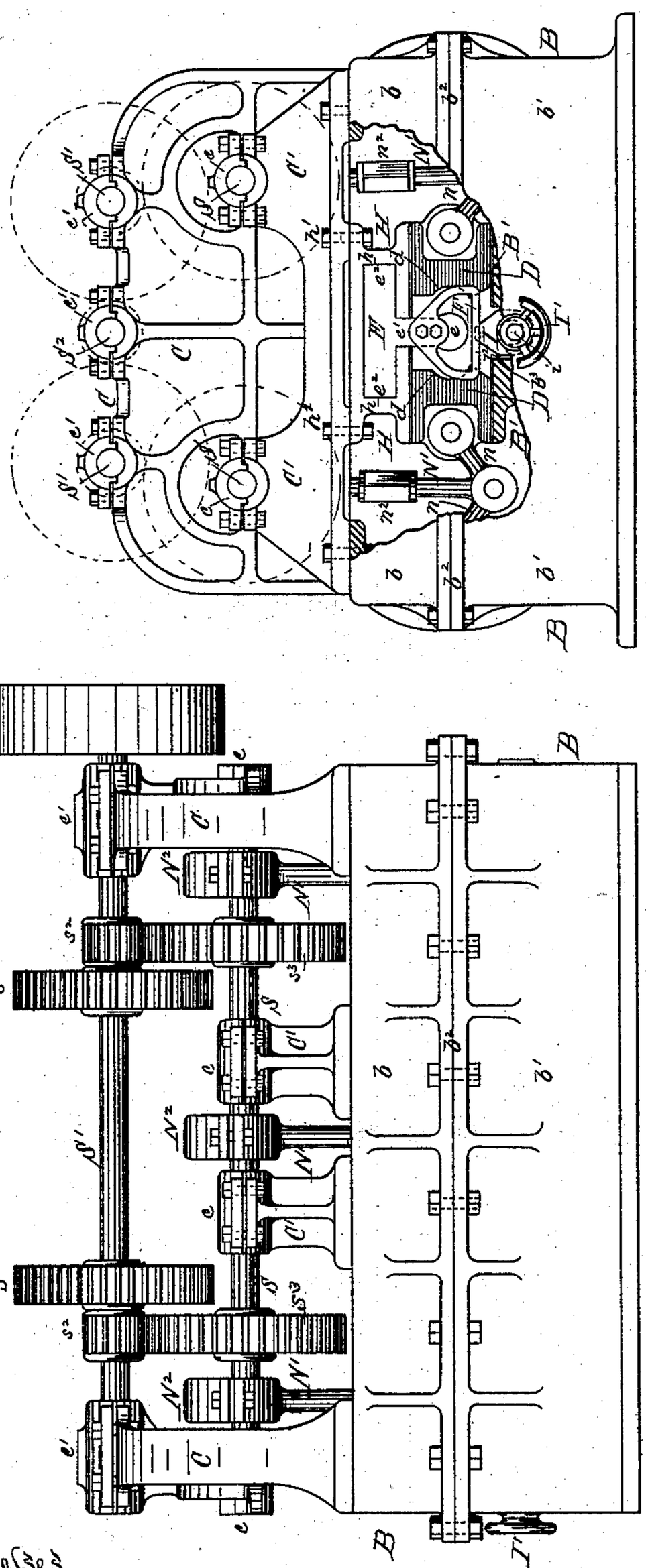

Fig. 1.

Fig. 6.

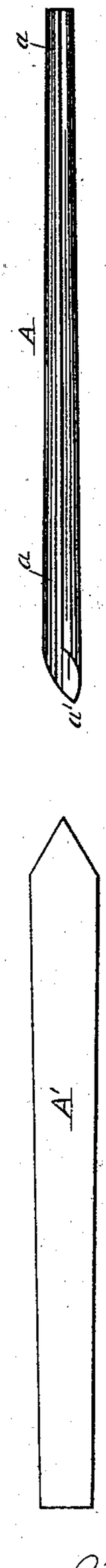

Fig. 5

Witnesses.
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(No Model.) 2 Sheets—Sheet 2.

T. R. MORGAN, Sr.

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Fig. 3.

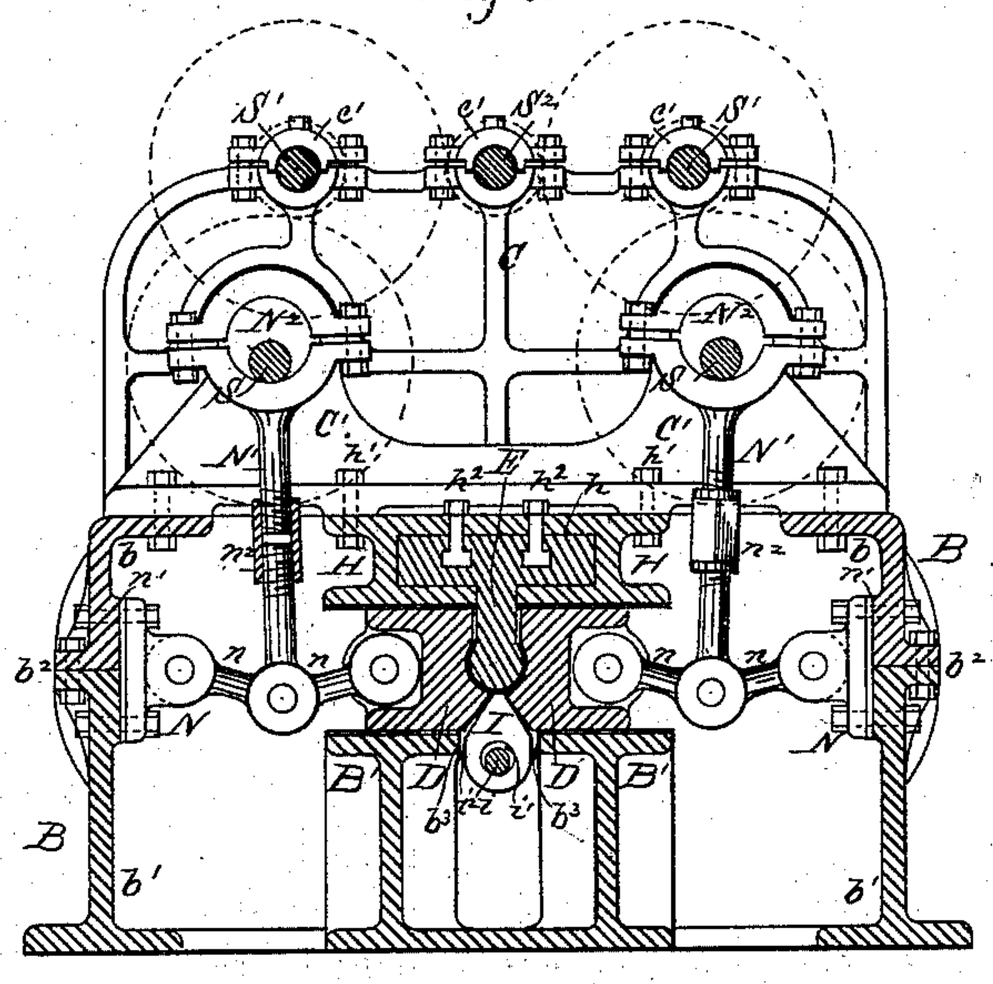
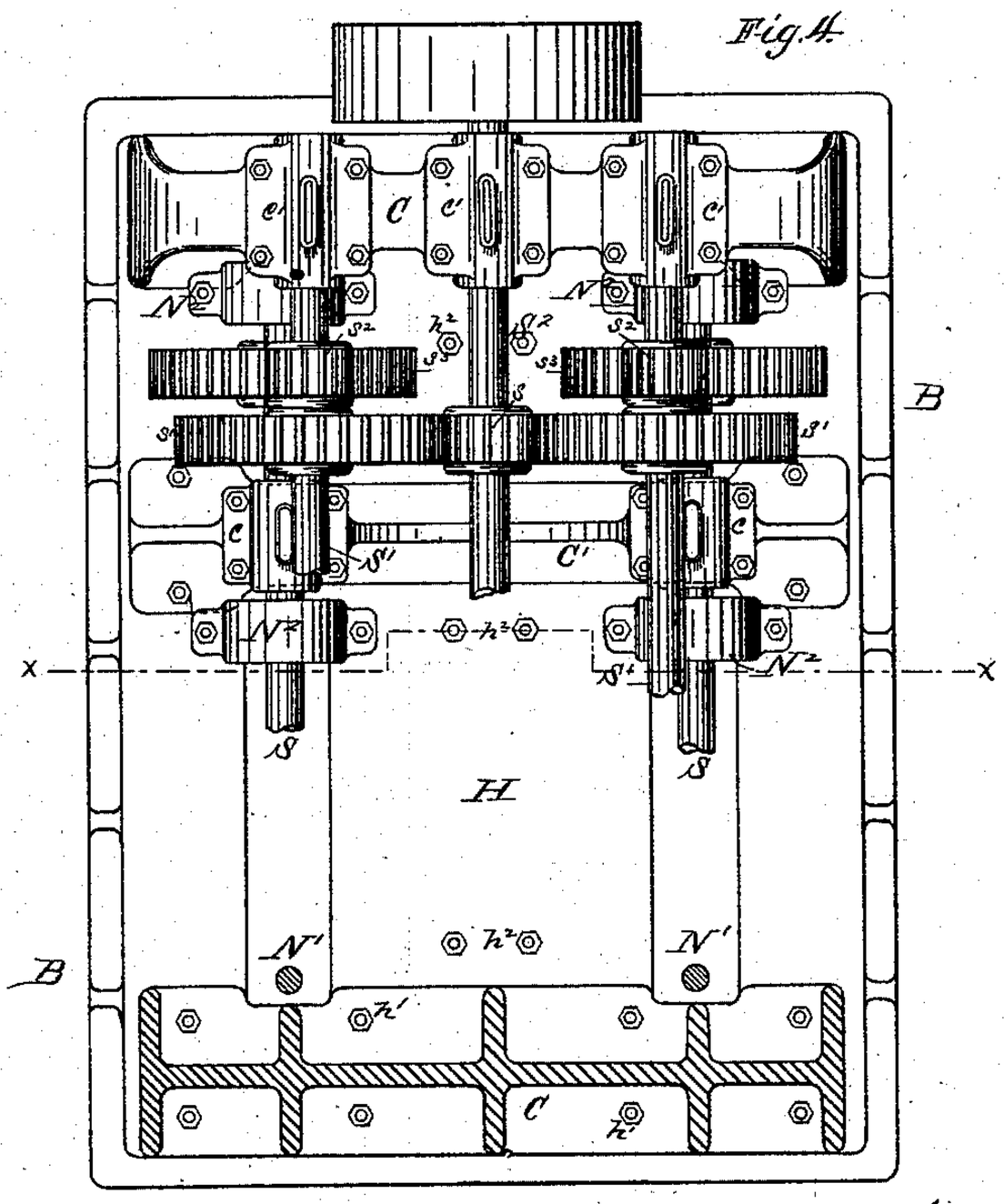


Fig. 4.



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UNITED STATES PATENT OFFICE.

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MACHINE FOR BENDING SHEET-METAL FENCE-POSTS.

SPECIFICATION forming part of Letters Patent No. 283,269, dated August 14, 1883.

Application filed March 26, 1883. (No model.)

To all whom it may concern:

Be it known that I, THOMAS R. MORGAN, Sr., a citizen of the United States, residing at Alliance, county of Stark, and State of Ohio, have invented or discovered a new and useful Improvement in Machines for Bending Sheet-Metal Fence-Posts; and I do hereby declare the following to be a full, clear, concise, and exact description thereof, reference being had to the accompanying drawings, making a part of this specification, in which—like letters indicating like parts—

Figures 1 and 2, Sheet 1, are side and end elevations, respectively, of my improved machine. Fig. 3, Sheet 2, is a transverse sectional view taken in the plane of the line *x x*, Fig. 4. Fig. 4 is a top plan view, partially broken away; and Figs. 5 and 6, Sheet 1, are views of one form of blank and the product made therefrom by my improved machine.

My invention relates to a machine for bending sheet-metal fence-posts and other articles of cylindrical and similar form; and it consists of certain combinations of a former or mandrel, reciprocating dies for bending the blank upon the mandrel, a clamp for binding the blank to the mandrel preliminary to bending, guiding-supports for directing the blank into proper position, and mechanism for imparting reciprocating motion to the bending-dies, as hereinafter more fully described and claimed.

My invention is designed more especially for bending sheet-metal blanks into curved or rounded form, (represented in one form of product by the tapering-fence post A, Fig. 6.) These posts are open along one side, as at *a*, and describe something over a half-circle in cross-section.

In order to obtain good finish, freedom from scale, salable appearance, and also ecomony in manufacture, it is desirable that the metal be bent cold. The purpose of my invention is to provide for compliance with these and other like conditions in manufacture. This is done by means of a machine constructed as follows: A rectangular metallic bed or supporting-frame, B, is employed, which for convenience in casting and fitting is formed of upper and lower parts, *b b'*, which are bolted together, as at b^2, thereby securing flanged side plates extending above the upper level of the die-supporting bed-beams B' B'. Pillow-blocks or housings C C' are bolted across the upper flanged side edges of the frame, which serve to carry the driving-gear, strengthen the frame, and support the former or bending-mandrel E. This support is secured by means of a block or box, H, extending, by preference, the full length of the mandrel and bolted, as at *h'*, to the under face of the pillow-blocks in the longitudinal central line of the machine. A T-groove, *h*, is made in this block, opening downward, adapted to receive the head e^2 and a portion of the connecting-web *e'* of the mandrel, the latter forming, by preference, a close fit in the groove. Ordinary T-headed bolts, h^2, or other suitable form of bolts, may be employed to secure the mandrel against movement in the groove. Instead of a T-groove and corresponding tongue, an ordinary dove-tail tongue and groove may be employed; or the head e^2 may be bolted to its support without tongue-and-groove connections. I prefer the construction shown, however, on account of convenience in construction and stability in use. The shaping or forming portion *e* of the mandrel corresponds in form to the post to be made, both in taper and in form of cross-section, (circular being preferred,) though other forms may be used, as oval, elliptical, polygonal, &c.

The blank, A', to be bent is directed into proper position beneath the mandrel (see Fig. 2) by means of guide-bars F, bent upward to form side guides, and secured by screws or in other suitable way to the ends of mandrel-web *e'*. Similar or equivalent guides may, however, be secured to other fixed portion of the machine, though I prefer to attach them to the mandrel in order to insure uniformity of relationship between the two.

In order to prevent lateral displacement of the blank during bending, and also to prevent bulging downward, I provide a clamp, I, beneath and in the longitudinal central plane of the mandrel mounted on a through-shaft, *i*, with eccentric *i'* interposed, which gives the clamp vertical thrust on rotation of the shaft by hand-wheel I'. The clamping-pressure thus imposed upon the blank will hold it against the under face of the mandrel and in-

sure a tight bend and true form. The clamp is held upright in working position by means of its flat side faces, i^2, bearing against the edges b^3 of bed-beams B′. Any suitable or known form of guides may be employed, however, to hold the clamp upright and permit of its requisite vertical or clamping motion. Two dies, D D, are employed, one on either side of the mandrel, having concave working-faces *d*, corresponding in form to the sides of the former *e*. These dies have side support between the parallel faces of bed-beams B′ and mandrel-block H, and reciprocating motion is given to them to and from the former by knee-joint levers *n n*, having strong pivot-connection with the dies, also with fulcrum-block N, and with eccentric-rods N′. Three of these knee-joint levers are shown for each die. This number may be increased or diminished, however, if desired. Movement is communicated to them through eccentric-rods by eccentrics N^2, carried on rotary shafts S S. These shafts are mounted in suitable journal-bearings *c* on the outer and intermediate plumber-blocks, C C′, and they are driven from power-shaft S^2 by intermediate counter-shafts S′, a pinion, *s*, on the drive-shaft gearing into larger wheels, *s′*, on the counter-shafts, and other pinions, s^2, on the latter shafts gearing into larger wheels, s^3, on the eccentric-shafts. By these trains of gearing a rapid motion in the drive-shaft is reduced to a slow but powerful motion in the eccentrics.

The shafts S′, S′, and S^2 are journaled in suitable bearings, *c′*, on the end pillow-blocks, C, and in order to secure uniformity and steadiness of movement two trains of gearing are employed, one near either end of the shafts. By these means a powerful movement is imparted to the dies, especially at the close of their compressing action, whereby the blank is firmly set upon the former and caused to retain the bent form given it. In bending tapered articles the plate-blank may be given the same taper as the mandrel, and in such case the die-faces *d* may be parallel with and be moved the same distance from the mandrel at both ends; but the slit-opening *a* in the article thus made will be wider at one end than at the other. This difference will be small, however, and will not detract from the value of the article as a fence-post. Also, in bending cylindrical or non-tapered articles, the dies and mandrel may be parallel, the dies being moved uniformly at both ends. If, however, it is desired to form a taper with uniform slit-opening *a*, it may be done by cutting the blank to proper taper and giving the dies more travel or movement at the wide than at the narrow end, sufficient to make up the requisite difference in taper between the plate-blank and mandrel. Such die movement may be secured by increasing the throw of the eccentrics N^2 in regular succession toward the end to be moved the most; or the desired extent of movement may be secured by lengthening the rods N′ through screw-couplings n^2, thereby decreasing the inclination between the lever-arms *n n*, and imparting to them greater spread or thrust for a given upward movement of the central pivot. Substantially the same result may also be secured by placing liners *n′* between the pivot-blocks N and the side plates of the main frame to which they are bolted. By these provisions for making adjustments movement of the dies may be regulated either for uniform movement at both ends, or for greater extent of movement at one end than at the other, as the nature of the work may require.

The blanks A′ are fed to the machine by the workman at the larger end of the former, and are delivered at the smaller end, being guided to proper central position, as before described, by the end guides and supports, F.

In feeding and discharging, the movement of the dies is by preference arrested at their point of greatest separation. This may be effected by any of the usual appliances—foot-treadles, &c.—ordinarily employed for throwing driving mechanism into and out of gear at the pleasure of the operator. Such devices being in common use, I do not deem it necessary to describe the same.

I do not wish to limit the application of my invention to bending any specified form of sheet-metal post or other article, as it may be employed for various forms and products—cylindrical, elliptical, oval, or polygonal; also, different sizes may be made by proper interchange of former and dies.

In order to secure the best results, I prefer to use dies and mandrel or former equal to or exceeding a little the length of the article. This is not essential, however, especially when the blank A′ is sheared before bending to form the sharpened end *a′* of a fence-post for driving, and in this case good results may be secured by making the dies about equal in length to the body portion of the post.

I claim herein as my invention—

1. The combination of a rounded former for shaping sheet-metal blanks, a clamp for pressing and holding the blank against the mandrel, and reciprocating bending-dies mounted one on either side of the former, and movable to and from the same, substantially as set forth.

2. The combination of former *e*, end guides, F, clamp I, and reciprocating side dies, D, substantially as set forth.

3. The combination of mandrel E, mandrel-support H, bed-beams B′, and reciprocating side dies, D, the latter being supported and guided by and between the adjacent faces of the beams B′ and mandrel-support H, substantially as set forth.

4. The rounded tapering former *e*, in combination with two reciprocating side dies, D, having working-faces *d*, conforming to the adjacent sides of the former, substantially as set forth.

5. The mandrel E, constituted of former *e*, web *e′*, and head e^2, in combination with support H, having a T-groove therein for receiving and securing the head and a portion of

the web of the mandrel, substantially as set forth.

6. The combination of mandrel E, clamp I, two bending-dies, D, one on either side of the mandrel, knee-joint levers *n*, eccentric-rods N′, shafts S, and power mechanism for giving to the shafts rotary motion in unison, substantially as set forth.

7. The combination of mandrel E, clamp I, parallel with and beneath the mandrel in its central plane, eccentric *i′*, and rotary shaft *i*, substantially as set forth.

In testimony whereof I have hereunto set my hand.

THOMAS R. MORGAN, SR.

Witnesses:

S. HARVEY THOMPSON,

C. L. PARKER.