2 Sheets—Sheet 1.

W. COOKE & L. D. YORK.

MANUFACTURE OF SECTIONS OF IRON COLUMNS.

No. 180,005. Patented July 18, 1876.

Fig: 1.

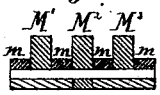


Fig: 2.

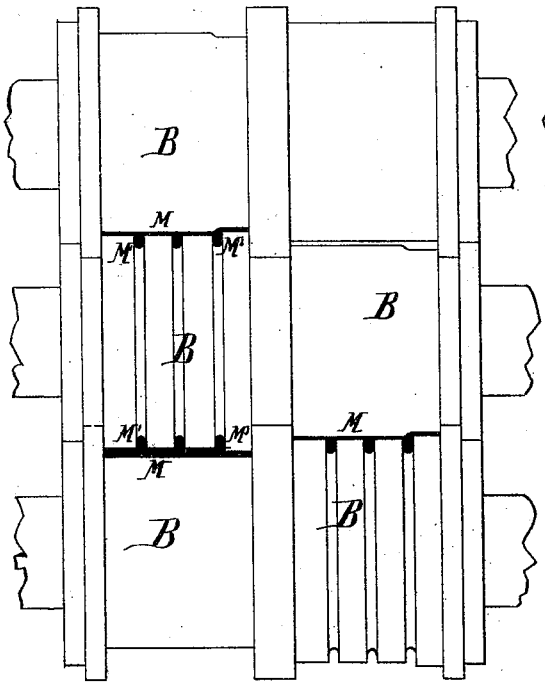
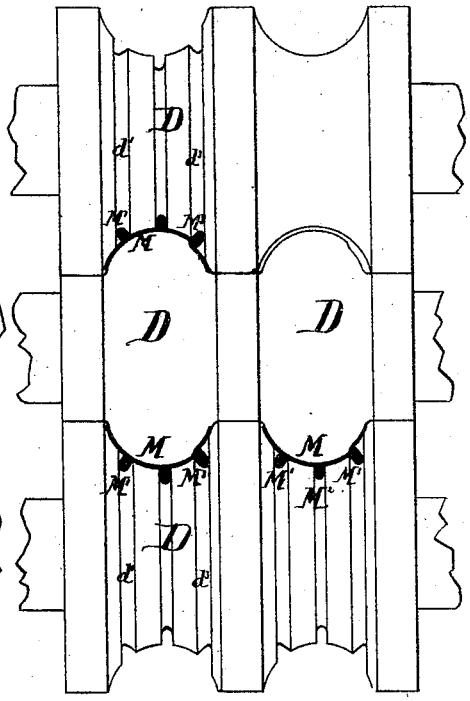


Fig: 3.



Witnesses:

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M. A. Claxton

Inventors:

Watts Cooke and Levi D. York by their attorney

Thomas D. Stetson

2 Sheets—Sheet 2.

W. COOKE & L. D. YORK.

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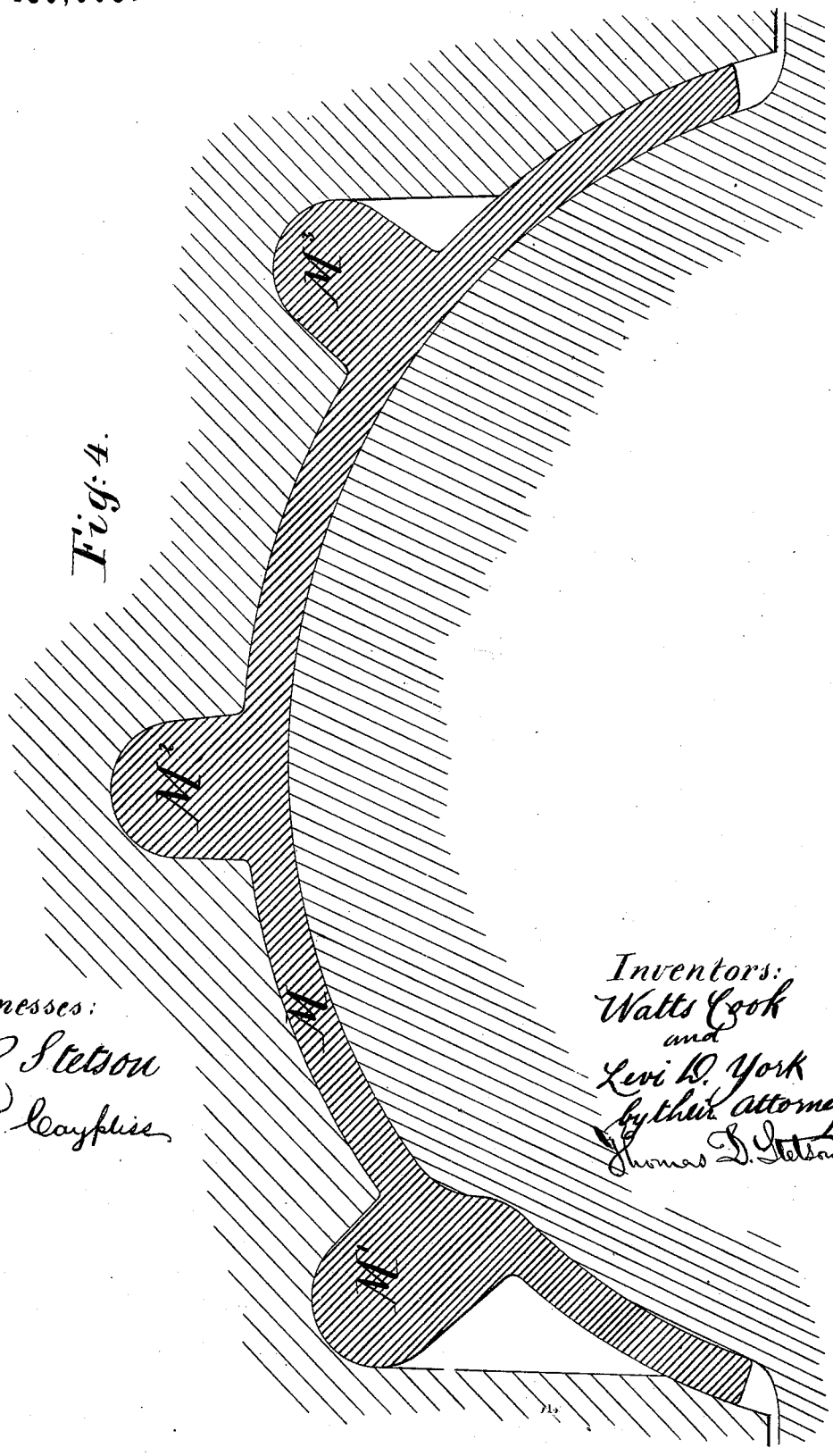

Fig: 4.

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Levi D. York
by their Attorney
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UNITED STATES PATENT OFFICE.

WATTS COOKE AND LEVI D. YORK, OF PATERSON, NEW JERSEY.

IMPROVEMENT IN THE MANUFACTURE OF SECTIONS OF IRON COLUMNS.

Specification forming part of Letters Patent No. **180,005**, dated July 18, 1876; application filed June 9, 1876.

To all whom it may concern:

Be it known that we, WATTS COOKE and LEVI D. YORK, of Paterson, Passaic county, in the State of New Jersey, have invented certain new and useful Improvements relating to the Method of Producing Sections of Iron Columns, of which the following is a specification:

We have applied the invention to the production of iron bars for sections of wrought-iron columns. The forms of the bars are like those described in the patent to G. Halstead, [Cornell,] June 8, 1869, No. 91,125, except that there are three (3) iron ribs on each section, instead of one, (1,) as set forth in that patent.

To produce the shape we first pile the iron in a peculiar manner. We next roll the bar to exactly the required shape, except that the body of the shape is flat, instead of being, as is finally required, curved in its transverse section, like the body of an ordinary metallic pen. We then impart the final curvature to it by rolls, which are so grooved that they do not disturb or in anywise modify the shape of the ridges, but only bend the body into the required curved condition—that is to say, we produce in the final rolls grooves which receive the outer ridges or ribs without constraining them, and allow them to change their inclination relatively to the central ridge in the act of passing through the rolls.

The accompanying drawings form a part of this specification, and represent what we consider the best means of carrying out the invention.

Figure 1 is a cross-section of the pile prepared for heating and rolling. Fig. 2 is a view of the rolls in the act of producing from such pile the shape in a flat, or nearly flat, condition.

The shape is shown in cross-section with strong black ink. It is complete in every point except in the curvature, which curvature is to be afterward impressed.

Fig. 3 is a view of the rolls in the act of curving the shape; and Fig. 4 is a view of the shape and of the adjacent portion of the rolls as it passes through in the act of being curved, (shown on a larger scale.)

Similar letters of reference indicate like parts in all the figures.

The iron being treated will be designated by the marks M^1 M^2, &c., to indicate the different parts. B B B represent a set of the first rolls, of which there may be several sets, inducing the desired shape in a flat bar by a succession of rollings. D D D are a set of the bending-rollers, of which there may be a succession of sets, inducing the desired curvature by degrees. The outermost grooves, d^1 and d^3, in the concave rolls are much wider than the thickness of the corresponding ridge in the bar, and allow the ridge to change its inclination as the body is bent.

In case there are several sets of these rolls corresponding to B and D, the last set or sets may have the grooves so formed as to touch the inner side of each outer ridge on the iron; but none of the rolls of this bending set touch the outer side of the outer ridges.

The rolls D D effect their end by practically working on the body M, and not on either of the ribs or ridges. The ridges M^1 and M^3, near the edges of the section, are left free to be governed in their inclination entirely by the bending of the body M. The rolls D, which effect the transverse bending, act on the body and leave the ridges free. Each ridge completed stands in a position which is radial to the finished column, and it assumes this position by being left free during the bending process.

In commencing to make one of the shapes or sections M M^1 M^2 M^3, we prepare the iron in accordance with the ordinary practice, by previously rolling it into bars of substantially rectangular section, and cutting off those bars in short lengths and piling a number of them together for reheating. In so piling, we introduce the iron for each of the ridges M^1 M^2 M^3 by putting wide and relatively thin bars (correspondingly marked in Fig. 1) edgewise in the pile, and allow the upper edge to extend above the upper surface of the intermediate bars *m*, and allowing the lower edge to extend down below the upper surface, and into the body of the pile. In other words, we place the bars M^1 M^2 M^3 on edge, and pile other bars, *m*, of less height between them, fill-

ing the spaces between their lower parts, and leave only half, or about half, of each of the bars M^1 M^2 M^3 to project above the main body of the pile.

This mode of piling conveniently and effectively holds the material for the ridges in position, and we find that it insures a very perfect connection between the several ridges and the main body. The cinder can escape freely through the radial joint, and the weld is practically perfect. Our subsequent treatment in the bending is intended to avoid throwing any strain on any of the ridges; but when, in consequence of imperfect workmanship, or any irregular wear of the rolls, even a severe strain shall be thrown on a ridge, this mode of piling does much to insure against any injurious effect therefrom.

Modifications may be made in some of the details without defeating the object of the invention. Thus, instead of three-high rolls, either for the flat rolling parts B B B, or for the curving parts D D D, single pairs of rolls may be used. We believe it possible to attain the result, if necessary, in any case by a succession of hammers or swages variously operated; but in all cases we esteem it important to first pile the iron with the ridges M^1 M^2 M^3, with the lower bars *m* between them and alongside thereof, and to finally curve the iron by acting upon the body, and leave the outer ridges M^1 M^3 practically untouched or free.

We claim as our invention—

The method herein described of forming sections of iron columns—namely, forming a pile, in the manner substantially as shown, welding said pile by rolling to thus produce a plate with two or more longitudinal ribs, and then passing said plate between the bending-rolls, as described, to impart to it the proper transverse curvature.

In testimony whereof we have hereunto set our hands this 1st day of June, 1876, in the presence of two subscribing witnesses.

WATTS COOKE.
LEVI D. YORK.

Witnesses:
THEO. SCHOONMAKER,
J. WESLEY BUCKLEY.