F. H. SMITH.

ROLLED IRON OR STEEL COLUMN.

No. 103,380. Patented May 24, 1870.

Fig. 1

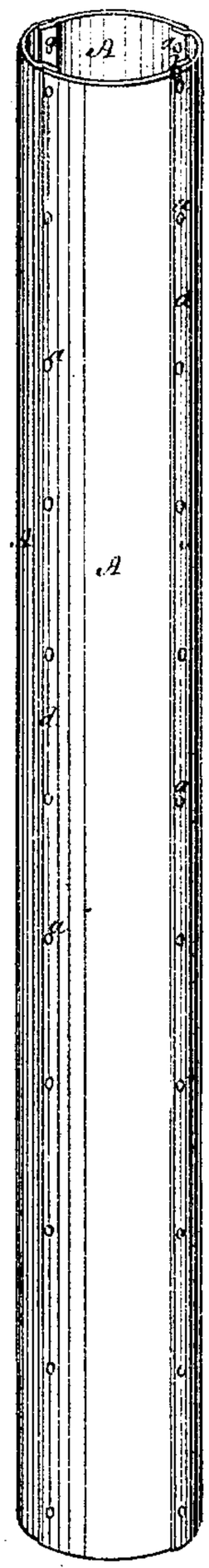


Fig. 2

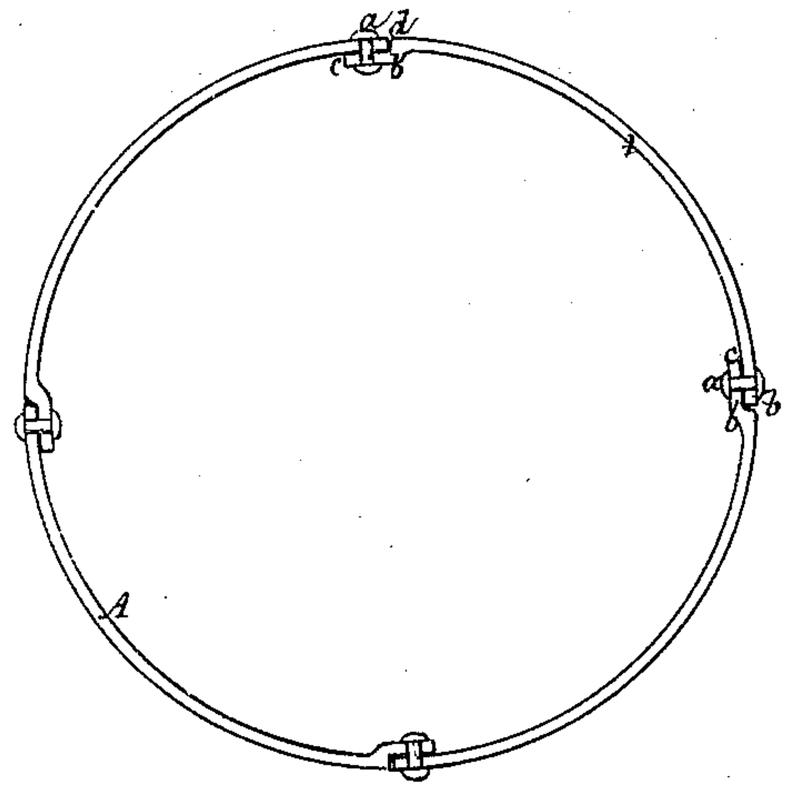


Fig 3

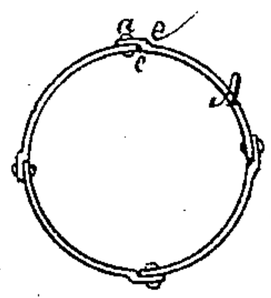
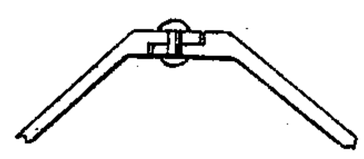


Fig. 4

Fig. 5.

Fig. 6.

Fig. 7.



Witnesses.

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Letters Patent No. 103,380, *dated May* 24, 1870.

IMPROVEMENT IN ROLLED IRON OR STEEL COLUMNS.

The Schedule referred to in these Letters Patent and making part of the same.

To whom it may concern:

Be it known that I, FREDERICK H. SMITH, of Baltimore, in the county of Baltimore and State of Maryland, have invented a new and useful Improvement in Rolled Iron or Steel Columns, for compression and tension members for piers, bridges, trestles, roofs, buildings, or other structures; and I hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings.

This invention relates to rolled iron or steel columns which are used in the construction of bridges, piers, or other like structures, as compression or tension members. These have heretofore usually been made in sections, provided with external flanges, whereby the several sections were united to form the columns.

The use of columns thus made is recommended by the comparative ease and facility of their manufacture; but, at the same time, disadvantages attend their construction, such, for instance, as the great waste of material, and the fact that, with a given amount of metal, the strength of a column decreases in proportion as it departs from a purely cylindrical form.

Take, for example, a four-segment phœnix column. Each segment must be provided at each edge with a flange about two inches deep, so that, in the four segments, there are taken from the width of the plates sixteen inches which do not go to form the cylinder.

In the column devised by me, however, the edges of the segments, instead of being bent out into flanges, form part of the cylinder, so that, supposing the column to be composed of four segments, and the lap at each joint to be two inches, I save at each joint two inches width of plate, or eight inches in all, over a phœnix column, composed of four segments or plates of like dimensions, these eight inches being thus utilized to produce a column of greater diameter and strength.

In practice I have found it impossible to construct my columns with overlapping edges by the means heretofore in use, because columns used for compression and tension members in bridges, piers, and other like structures are of such a diameter as to forbid an operator or "help" (usually a boy) entering the interior of the column for the purpose of passing the heated rivets through the holes from the inside to be upset on the outside, or of upsetting them on the inside when passed through the holes from the outside; and the machines heretofore in use are not designed for and do not answer the purpose of riveting columns of the diameter usual for the structures named.

To enable others, therefore, to make columns according to my invention, I shall now describe the manner in which the same is or may be carried into effect, by reference to the accompanying drawings, in which—

Figure 1 represents, in perspective, a cylindrical column, constructed of wrought iron or steel, in four segments, riveted together with rivets, having their inner heads formed over a flanged surface or offset, and their outer heads formed over a plane surface; by this mode of uniting the segments of the column the exterior surface is unbroken.

Figure 2 is a transverse section, on an enlarged scale, of the column represented in fig. 1.

Figures 3, 4, 5, 6, and 7 are cross-sections of columns, representing modified modes of uniting together the segments or parts of the column for piers or other structures.

A A represent the longitudinal segments made of rolled iron or steel, constructed in such forms as to admit of their union into one column by means of rivets.

The iron or steel, of which the columns are formed, is of the necessary thicknes to sustain, without flexure, the strains induced upon upon it in the direction of its length.

One edge of each of the segments used in the formation of the column is constructed with elbow *b*, or an offset flanged inwardly, continuous throughout the entire length of the column.

The depth of the elbow, from a continuation of the outer surface of the column to the lip *c*, is equal to the thickness of said segment.

The opposite edge *d* of each segment overlaps the lip *c* of the elbow *b* of the adjacent plate; a series of rivets, extending the entire length of the column, are either headed on the inside and outside of the column, as shown in figs. 1 and 2, or one or both ends of the rivets may be countersunk in the overlapping segments; the former mode of uniting the segments is clearly illustrated in fig. 5. In the latter case the exterior surface of the column presents an unbroken surface. Another improved mode of securing the segments together is by using rivets, the heads of which are countersunk in each segment.

Instead of constructing each segment of the column with interior elbows, as explained, with reference to figs. 1 and 2, the elbow *e* may be formed as an exterior elbow to overlap the plain edge *e'* of the adjoining segment, as represented in fig. 3. The segments are riveted together in the manner above stated.

Still another mode of eniting the segments of columns is to chamfer the abutting edges of the segments, and rivet them together, as shown in fig 4. In fig. 6 is exhibited another mode of uniting together opposite segments of the column by rivets, wherein the edges at both ends of the segments are halved into

each other. In fig. 7 is shown the mode of riveting the segments of an octagonal column.

In order to rivet these segments together, holes are properly punched or drilled along the edges of the segments, and the segments being temporarily attached or held together in shape by clamps, a former, having a cup or mold, is placed inside the clamped column, so that the cup or mold of the said former will be directly beneath the punched holes. Rivets (heated only at their points) are then inserted in the holes, and, by blows or pressure upon the cold heads outside, are driven in until the heated metal of the point upsets itself into the cup of the former inside of the column; or pieces of heated iron can be inserted in the holes and heads formed upon each end of them by two formers—one inside and the other outside of the column—caused to approach each other at a proper speed, under pressure or impact.

These methods of riveting render it practicable to construct columns with internal and external heads to the rivets, this difficulty of riveting having heretofore prevented the construction of rolled meta columns, except where much of the metal was wasted in making flanges to pass rivets through; and it is well known that the strength of a column increases in proportion as it approaches a true circle with all its metal.

Having described my invention,

What I claim, and desire to secure by Letters Patent, is—

As a new manufacture, a rolled iron or steel column for compression or tension members of bridges, piers, and other structures, made substantially in the manner herein shown and described.

FREDERICK H. SMITH.

Witnesses:

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