

CHARLES BENDER.

Improvement in Metallic Columns.

No. 121,318.

Patented Nov. 28, 1871.

Fig. 1.

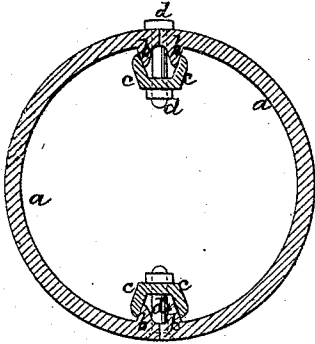


Fig. 3.

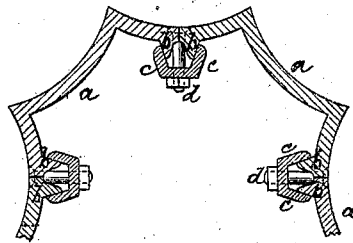


Fig. 2.

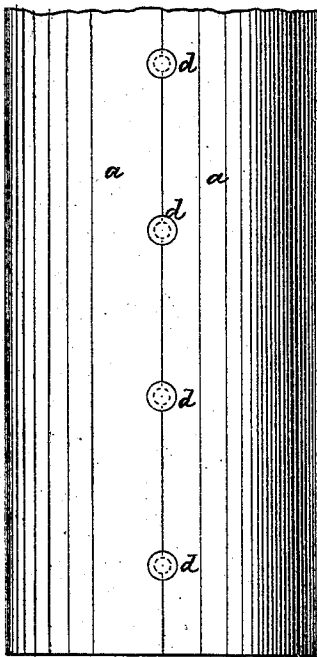
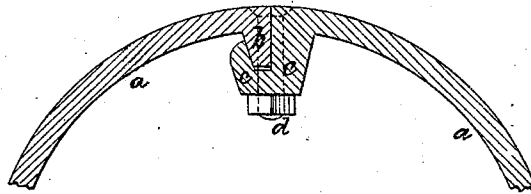


Fig. 4.



Witnesses.

Chas. B. Nottingham
J. B. Nottingham

Inventor.

Charles Bender
by atty. Folger

UNITED STATES PATENT OFFICE.

CHARLES BENDER, OF PHOENIXVILLE, PENNSYLVANIA.

IMPROVEMENT IN METALLIC COLUMNS.

Specification forming part of Letters Patent No. 121,318, dated November 28, 1871.

To all whom it may concern:

Be it known that I, CHARLES BENDER, of Phoenixville, in the county of Chester and State of Pennsylvania, have invented certain new and useful Improvements in Metallic Columns for engineering, architectural, and other purposes, of which the following is a specification:

My invention relates to metallic columns composed of longitudinal segments united together by bolts or rivets; and it principally consists in a novel and useful clamp connection for said segments, consisting of ribs or bulbs, clamp or channel pieces, and rivets or bolts combined, and operating to draw together the segments of the column, substantially in the manner hereinafter described. It further consists in the employment in a metallic column, composed of segments, as stated, of dowels or pins placed in the seams between the segments, and extending from the exterior to the interior of the column, as hereinafter described; the object of this arrangement being to cause the pins to receive and transmit the shearing strain—*i.e.*, the strain which arises when from any cause any one of the segments is subjected to a greater compressive strain than the other. It further consists in a novel mode of putting up a metallic sectional column by binding the segments temporarily in the shape of the finished column, then drilling and riveting or bolting together the segments while temporarily supported and held in place, and then, after the completion, removing the temporary connections therefrom; this mode of putting up the column being more expeditious, cheaper, and productive of a better column than by the ordinary method now in use.

To enable those skilled in the art to understand and use my invention, I will now proceed to describe more particularly, by reference to the accompanying drawing, the manner in which the same is or may be carried into effect.

In the drawing, Figure 1 represents a transverse section of a column made in accordance with my invention. Fig. 2 is an elevation of a portion of a column, such as shown in Fig. 1. Fig. 3 is a transverse section, designed to illustrate a column of different external form. Fig. 4 is a transverse section representing a modification of the clamp connection shown in the other figures.

The column is composed of two or more seg-

ments, *a*, of iron, steel, or other metal, and may have any suitable or desired shape and size in section. The column shown in Fig. 1 is composed of two semi-cylindrical segments, but it is manifest that it may be formed of three, four, or more segments. I prefer to make the segments of rolled iron, which are formed with a bulb or rib, *b*, running the length of the segment and near each of its edges. The surface of each rib furthest removed from the edge of the segment is made slanting, as shown, so that when the segments are placed together each set of ribs on the contiguous edges of the segments may have a wedge-like formation, the base of the wedge being toward the exterior of the column. In lieu of rolling these ribs on the segments they may be formed separately and afterward attached to the segments by rivets or other suitable means; but I much prefer the construction shown in the drawing.

Each of the ribs may be continuous throughout the length of the segment, or there may be several short ribs with spaces intervening between them in lieu of one continuous long rib. With these ribs I combine a clamp or channel-piece, *c*, with the inner side surfaces of the channel slanting to correspond with the inclination of the exterior side surfaces of the ribs, the arrangement of the two being such that when the clamp or channel pieces are fitted over and pressed down on the ribs they will draw them and their segments closely and tightly together. Each clamp may consist either of a channel-piece extending the whole length of the column, or of two or more channel-pieces of any suitable length, and they may be placed close together or at a distance from each other, as may seem to be best suited to the requirements of the column. The clamps are drawn down upon the ribs by means of bolts *d* passing through from the outside to the inside of the column, and also through the clamp, as shown; and they may be placed at any suitable distance apart. In lieu of bolts rivets may be used, either hot or cold; but I prefer the bolts. The holes for the bolts are formed in the seam, as shown in Fig. 2, preferably by drilling, and they extend through the column and clamp, so that the bolts, when passed through column and clamp and then fitted with nuts on their inner ends, can, by screwing up the nuts, be caused to draw the clamp tightly down upon the ribs, which it straddles,

in order to compress the edges of the segments closely together. The heads of the bolts may project from the column, or may be countersunk therein, as shown.

It may be found advisable to slant the edges of the segments so that a lap-joint may be formed at each seam, and the segments can also be rolled, so that their edges will be in contact at the exterior of the column first, if, for any reason, this should become necessary.

The operation of putting in the nuts, fitting them on the bolts, and screwing them up can be readily effected by means of proper tools for the purpose. I have devised tools for this use, which, however, I shall not here describe, as I contemplate making application for Letters Patent for the same.

It will be manifest that this clamp connection, in lieu of being upon the interior, may be upon the exterior of the column, the ribs or bulbs being rolled or otherwise formed, and located upon the outside instead of the inside of the segments. It will also be manifest that the segments may be rolled or formed in any suitable shape in cross-section, so as to form, for instance, a fluted column of the section shown in Fig. 3, the clamp connection being of such a nature as to allow columns to be produced of any external configuration and design, thus fitting the column to be used not only for compression-members in bridges and for other engineering purposes, but also for architectural and other purposes where ornamental columns are required.

In Fig. 4 I have shown a modification of the clamp connection. The arrangement of the bolt is the same as before, but in lieu of rolling a rib on each of the contiguous edges of the segments I roll on one a rib, *b*, and on the other a clamp or channel-piece, *c*, the two being fitted together and combined with the bolt, as shown. The principle of operation, however, is the same in both cases, there being in each a column composed of segments drawn together by means of ribs or bulbs, channel or clamp pieces fitting over the ribs, and rivets or bolts, drawing down the clamps upon the ribs.

I propose filling the small space between the clamps and ribs with any suitable material to prevent oxidation or deterioration of the metal, and also to place in the seams paper strips coated with linseed drying-oil and red lead; or other substances may be used for this purpose.

It will be noticed that the bolts or rivets act as dowels to receive, take up, and distribute what is known as the shearing strain, due to the compressive force exercised on one segment in excess of that to which the other members of the column are subjected. This action of the bolts or rivets is due to their arrangement in the seams between the segments. It will be noticed they extend from the inside to the outside of the column, and that the seam, as it were, divides the bolt into two longitudinal sections, the one section being contained in the one segment, the other in the other.

This arrangement of the dowels or pins is ex-

tremely beneficial to obviate or prevent any injurious effect from shearing strain, and is applicable not only to the sectional column herein shown, but to other sectional columns composed of segments whose longitudinal edges are united by riveting or other means.

In putting up the column the segments *a* and clamp-pieces *b* are laid around a core or form composed of, say, three or four center or mandrel pieces, preferably of cast-iron, and made adjustable, and suited to the inner section of the column. Rings or hoops are placed around the segments *a* and are tightened to hold them firmly together by means of screws, wedges, or other means. The whole column is then brought under a multiple or gang-drill, and the holes are at once drilled through both column and clamp-pieces, thus securing a perfect fit for the bolts or rivets.

This drilling operation is much better than the punching operation generally adopted, for punching compels to larger holes and rivets or bolts than necessary for columns. It is less accurate than drilling, frequently injures the iron, and causes delay, expense, and further deterioration of the metal during the process of riveting up the column. My mode of drilling the holes through the parts to be connected at once, the column being previously put together by temporary means, admitting any size of bolts or rivets, does not injure the metal, facilitates the process of riveting or bolting most materially, admits the use of the riveting-machine, is cheaper in the end, and produces a better column.

After drilling all the holes in the segments I remove them, still clamped and held together in the form required for the completed column, and roll them on a skid, where workmen put in the bolts, beginning from both ends of the column at the same time, if necessary, and also put in the nuts with a proper tool with a long handle, by means of which the nuts are fitted on the bolts, and then by means of another tool of wrench-like formation screw up the nuts tightly on the bolts until the clamp or channel pieces are drawn closely down upon the ribs.

This mode of putting up columns is well adapted for any sectional column composed of segments requiring to be riveted or bolted throughout their length.

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

1. A metallic sectional column whose segments are united by means of ribs or bulbs, clamp or channel pieces, and rivets or bolts, combined, and operating to draw together the segments, substantially as herein shown and described.

2. In a column composed of metallic segments united together, the use of metallic dowels or pins placed in the seams between the segments and extending from the exterior to the interior of the column, substantially as shown and described.

3. The mode herein described of putting up a metallic sectional column—that is to say, binding the segments together in their proper positions to form a column, with or without the aid

of a core or form, then drilling and riveting together the segments while thus supported and held, and then removing the core or form, if one be used, substantially as set forth.

4. A metallic column composed of segments whose contiguous edges are drawn together and united by a clamp connection located inside the column, substantially as herein shown and set forth.

In testimony whereof I have signed my name to this specification before two subscribing witnesses.

CHARLES BENDER.

Witnesses:

P. F. BONNER,
WM. S. BAILEY.

(21)