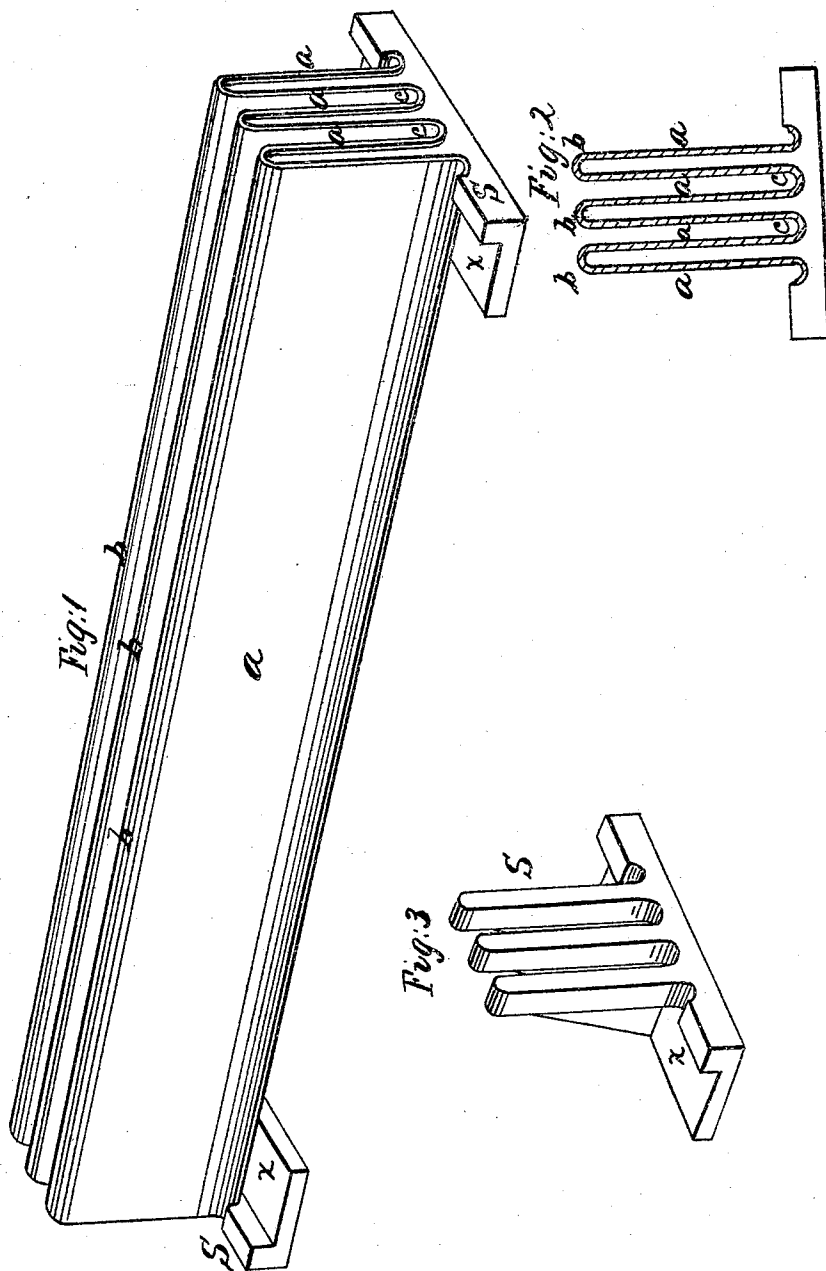


R. Montgomery
Sheet Metal Beam.

No. 9,842.

Patented Jul. 12, 1853.



UNITED STATES PATENT OFFICE.

RD. MONTGOMERY, OF NEW YORK, N. Y., ASSIGNOR TO ELISABETH MONTGOMERY.

SHEET-METAL BEAM.

Specification forming part of Letters Patent No. 9,842, dated July 12, 1853; Reissued July 2, 1867, No. 2,668.

To all whom it may concern:

Be it known that I, RICHARD MONTGOMERY, of the city, county, and State of New York, have invented or discovered a new and useful improvement in the manufacture of sheet-metal beams for supporting weights and resisting strains in bridges, houses, ships, and other structures, of which the following is a full and exact description, reference being had to the accompanying drawing, which makes part of this specification, and in which—

Figure 1 represents a view in perspective of one of my improved beams made of a single plate; Fig. 2 a transverse section of the same; and Fig. 3 a view in perspective of a saddle for the support of the ends of the beam.

The object of my invention is to produce a metallic beam of greater lightness and strength and at less cost than has heretofore been done, and I effect this object by bending sheet metal which possesses great textile strength into such a form as will give it the proper proportions, rigidity, and transverse strength, to admit of its use as a beam for resisting great weights or strains.

It is well known that if beams be properly secured against twisting or buckling, all other things being equal, those will possess the greatest amount of transverse strength, or support the greatest weight without liability to fracture, which present the greatest depth of material in the line of pressure. By applying this test to my beam it will be seen that it possesses greater transverse strength and stiffness than any other beam of equal weight formed of sheet metal by bending the same into folds.

My beam is constructed by bending a sheet of metal into a series of longitudinal strips, which are alternately arched and flat, the arches being alternately inverted, the flat strips being arranged, vertical, parallel, and equidistant, as nearly as practicable, and each connected to the adjacent flat strip by an inverted arch at the bottom, on the one hand; and by an uninverted arch at the top, on the other hand; the arches terminating in the parallel strips, and acting as flanges to give them lateral stiffness, and the arches and flat strips together constituting a series

of folds of the sheet metal, which run lengthwise of the beam.

In a beam thus constructed, the great depth of the parallel plates, which form the side of the folds is rendered available to support a weight, or resist strains, and as each plate is a rectangular beam of great depth compared to its thickness, and as rectangular beams resist fracture by a force proportionate to the square of their depth, I produce a beam of immense strength with but little weight of material.

In the accompanying drawing of one of my beams made of a single sheet of metal, bent into four vertical flat strips (*a*), three uninverted arches (*b*) and four inverted arches (*c*), the flat strips and arches all run lengthwise of the beam.

The span and height of the arches and the depth and number of the folds in the series, and the manufacture of the beam by swaging, rolling, or otherwise, are matters which must be left to the judgment of the engineer who superintends the construction.

The ends of the beam thus constructed require a firm and stable support at both ends, and in order more effectually to insure such a support, I have contrived a saddle (*S*) which fits the under side of the beam, and having a broad flat base (*x*), is adapted to being built into, or stand firmly on the wall.

When this beam is employed in ship building, it may be riveted or otherwise secured to the knees or ribs so that advantage may be taken of its tensile strength as well as its stiffness.

I am aware that plates of metal for roofing and steam boilers have been bent into a wavy form by a process commonly termed corrugation, for the purpose of stiffening them; but in every such case, the series of folds are comparatively shallow and instead of the strips between the arches being parallel and in the plane of pressure, they are inclined to each other, and stand obliquely across the plane of pressure, in which position they would break down with a load that they could easily support if placed vertical and parallel as in my beam. And to a plate with such inclined strips I therefore make no claim as it is not suitable for a beam. But

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

1. A beam formed of sheet metal bent into a series of longitudinal folds the sides of which are flat and parallel, and the tops and bottoms uninverted and inverted arches respectively.

2. I also claim the combination with such

a beam of a pair of saddles to support its ends, substantially as herein set forth.

In testimony whereof, I have hereunto subscribed my name.

R. MONTGOMERY.

Witnesses:

P. A. WATSON,

I. L. SMITH.

[FIRST PRINTED 1913.]