

(No Model.)

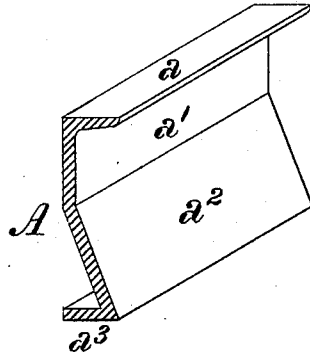
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STRUCTURAL SHAPE FOR BEAMS, GIRDERS, &c.

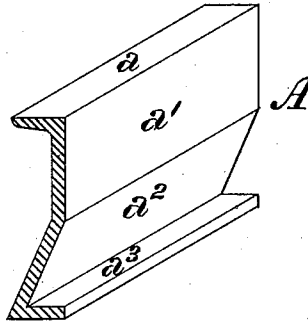
No. 304,782.

Patented Sept. 9, 1884.

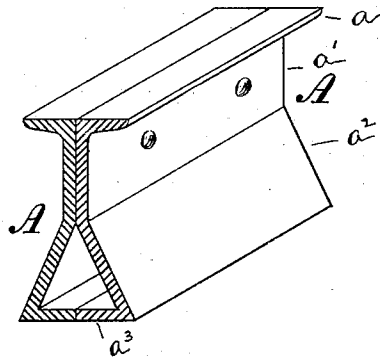
*Fig. 1.*



*Fig. 2.*



*Fig. 3.*



WITNESSES:

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# UNITED STATES PATENT OFFICE.

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## STRUCTURAL SHAPE FOR BEAMS, GIRDERS, &c.

SPECIFICATION forming part of Letters Patent No. 304,782, dated September 9, 1884.

Application filed December 13, 1883. (No model.)

*To all whom it may concern:*

Be it known that I, EDWARD M. BUTZ, a citizen of the United States, residing at Allegheny, county of Allegheny, State of Pennsylvania, have invented or discovered a new and useful Improvement in Structural Shapes for Beams, Girders, &c.; 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—

Figure 1 is a section in perspective of a metal shape plate or bar adapted for use in beams or girders embodying my invention; Fig. 2, a similar section of a plate having its inclined portion bent in opposite direction to that of the plate shown in Fig. 1, and Fig. 3 a similar section of a beam formed by uniting two shapes of the section shown in Figs. 1 and 2.

My invention relates to shapes for metal plates or bars designed and adapted for use, either singly or in combination, in beams or girders for buildings and other structures, its object being to provide a beam or girder having inclined sides or faces on its web, as is under certain conditions desirable, in which the metal shall be so disposed that proper strength and lightness may be attained without undue expense or complication in construction.

The improvements claimed are hereinafter fully set forth.

In an application for Letters Patent of even date herewith, Serial No. 114,429, (marked Case A,) I have set forth a plate having an inclined portion bent at an obtuse angle to a vertical portion. Under my present invention I supplement the structural advantages of a plate of such shape by the additional strength afforded by the employment of an upper and a lower flange continuous therewith.

To carry out my invention I form of rolled metal a plate, A, of the shape in section shown in the several figures—to wit, having a continuous body bent into four different planes, the outer portions,  $a$  and  $a^2$ , of the plate A adjacent to its opposite longitudinal edges being substantially parallel, and one or both being about at a right angle to one of the in-

termediate portions, and the intermediate portions,  $a'$  and  $a^2$ , being bent relatively at an obtuse angle, or in the form of a flattened V, having sides of unequal length, that which is perpendicular, or nearly so, to its adjoining outer portion being the narrower of the two. The plate A is designed to stand vertically, with the portion  $a^2$  as its lower side when in use, and the portion  $a$  may descriptively be termed the "upper flange," the portion  $a'$  the "vertical web," the portion  $a^2$  the "inclined web," and the portion  $a^3$  the "lower flange." The inclined web  $a^2$  may be bent either to the right, as in Fig. 1, or to the left, as in Fig. 2, the direction of the upper and lower flanges,  $a$  and  $a^3$ , being correspondingly changed. A plate so shaped may be used singly as the web of a beam or girder, but is preferably employed as a lateral member in a built or composite beam or girder formed by the connection of two plates, of the shape above described, with their inclined portions in reverse directions, respectively, and abutting by their vertical webs, as shown in Fig. 3, and I have illustrated the capacity of a beam of such construction to provide an abutment for an arch and an internal air-chamber in an application, Serial No. 114,427, for Letters Patent for improvements in fire-proof buildings filed by me of even date herewith.

I claim herein as my invention—

1. A structural metal plate of shape or section as described, adapted to use in a beam or girder, the same having a continuous body bent into four different planes, and presenting in succession an upper flange, a vertical web, an inclined web, and a lower flange, substantially at a right angle to its vertical web, as and for the purpose set forth.

2. The combination, in a composite beam or girder, of two metal plates of the shape or section described, having their inclined webs bent in opposite directions, respectively, and having their vertical webs abutting one against the other, substantially as set forth.

In testimony whereof I have hereunto set my hand.

EDWARD M. BUTZ.

Witnesses:

J. SNOWDEN BELL,  
R. H. WHITTLESEY.