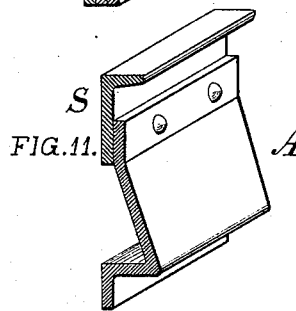
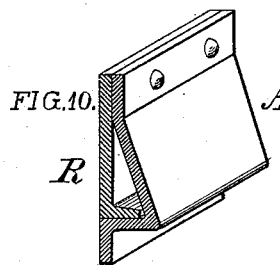
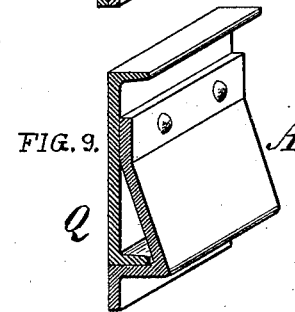
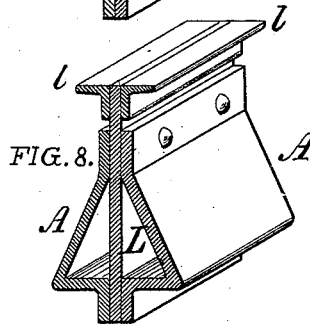
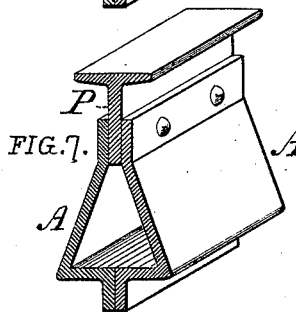
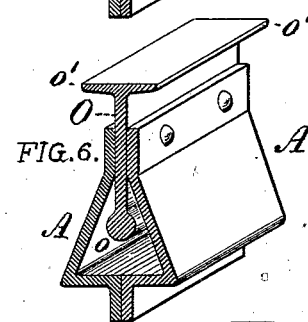
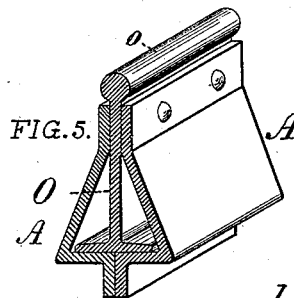
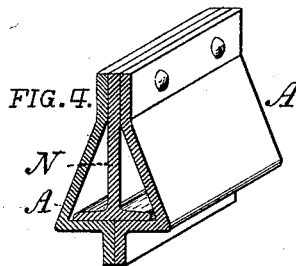
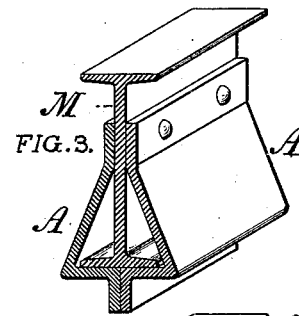
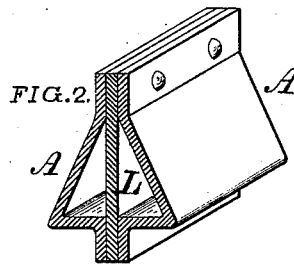
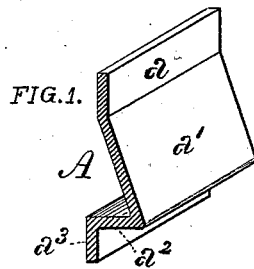


(No Model.)

E. M. BUTZ.  
METAL BEAM OR GIRDER.

No. 304,797.

Patented Sept. 9, 1884.



WITNESSES:

*J. Thomson Bell.*  
*R. A. Whittlesay.*

INVENTOR

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ATTORNEY

# UNITED STATES PATENT OFFICE.

EDWARD M. BUTZ, OF ALLEGHENY, PENNSYLVANIA.

## METAL BEAM OR GIRDER.

SPECIFICATION forming part of Letters Patent No. 304,797, dated September 9, 1884.

Application filed April 4, 1884. (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, in the county of Allegheny and State of Pennsylvania, have invented or discovered a certain new and useful Improvement in Metal Beams or Girders, of which improvement the following is a specification.

In the accompanying drawings, which make part of this specification, Figure 1 is a section in perspective of a metal shape plate or bar adapted for use in beams or girders embodying my invention; Figs. 2 to 11, inclusive, similar sections of beams, illustrating, respectively, different structural applications thereof.

My invention relates to beams or girders for buildings and other structures; and its object is to provide a light and strong beam having inclined sides or faces on its web, and suitable strengthening members above and below said inclined sides.

The improvements claimed are hereinafter fully set forth.

To carry out my invention, I form of rolled metal a plate, A, of the shape in section shown in the several figures. Said plate, which is fully set forth in another application for Letters Patent by me filed December 13, 1883, Serial No. 114,430, (Case C,) and is therefore not claimed *per se* as of my present invention, is shaped as follows—to wit, having a continuous body bent into four different planes arranged relatively as follows: The two outer portions,  $a$  and  $a^3$ , of the plate A, which are designed to stand vertically when in use in a beam, and hence may be termed “its vertical portions,” are in or substantially in line with each other, or in parallel planes; and of the two intermediate portions, one,  $a'$ , is bent or inclined at an obtuse angle to the upper vertical portion,  $a$ , and the other,  $a^2$ , bent so as to connect the lower side of the inclined portion,  $a'$ , with the upper side of the vertical portion  $a^3$ , thus providing in the plate an upper and a lower vertical web, an inclined web, and a transverse web. Under my present invention I employ a plate so shaped as a lateral member in a built or composite beam or girder, instances of different forms of which are illustrated in Figs. 3 to 11, inclusive.

Fig. 2 shows a beam formed of two plates A having their webs oppositely inclined and connected to a plate interposed plate or web, L; Fig. 3, a beam having an I-beam, M, interposed between and connected to two plates, A, with their inclined webs bent in opposite directions; Fig. 4, a beam having a web, N, of inverted-T section interposed between and connected to two plates, A; Fig. 5, a beam having an intermediate deck-beam web, O, and lateral plates A connected thereto, the rib  $o$  of said deck-beam standing at top, and its flanges  $o'$  at bottom; Fig. 6, a beam having an intermediate deck-beam, O, and lateral plates A connected thereto, the deck-beam having a shallow web fitting between the upper vertical webs of the plates A, and having its flanges  $o'$  at top; Fig. 7, a beam having a T-iron, P, interposed between and connected to the upper vertical portions,  $a$ , of two plates A; Fig. 8, a beam having a plain rib or web, L, having angle-iron flanges  $l$  at top interposed between and connected to two plates A; Fig. 9, a beam composed of a channel-iron web or plate, Q, and a plate, A, connected to the flanged side thereof; Fig. 10, a beam composed of a web of T-section, R, and a plate, A, connected to the flanged side thereof; and Fig. 11, a beam composed of an angle-iron, S, connected to the upper vertical portion  $a$  of a plate, A.

It will be obvious that the form and section of the member or members combined with one or more of the plates described in the construction of a composite beam may be varied in the judgment of the constructor, and I do not therefore limit myself to any specific form of connected web in said combinations.

I claim herein as my invention—

The combination, in a composite beam or girder, of a metal plate of the shape or section described, and a rib or web abutting against a vertical web of said plate, substantially as set forth.

In testimony whereof I have hereunto set my hand.

EDWARD M. BUTZ.

Witnesses:

J. SNOWDEN BELL,  
R. H. WHITTLESEY.