A. C. GILBERT.

TOY BUILDING CONSTRUCTION.

APPLICATION FILED JAN. 6, 1916.

1,302,652. Patented May 6, 1919.

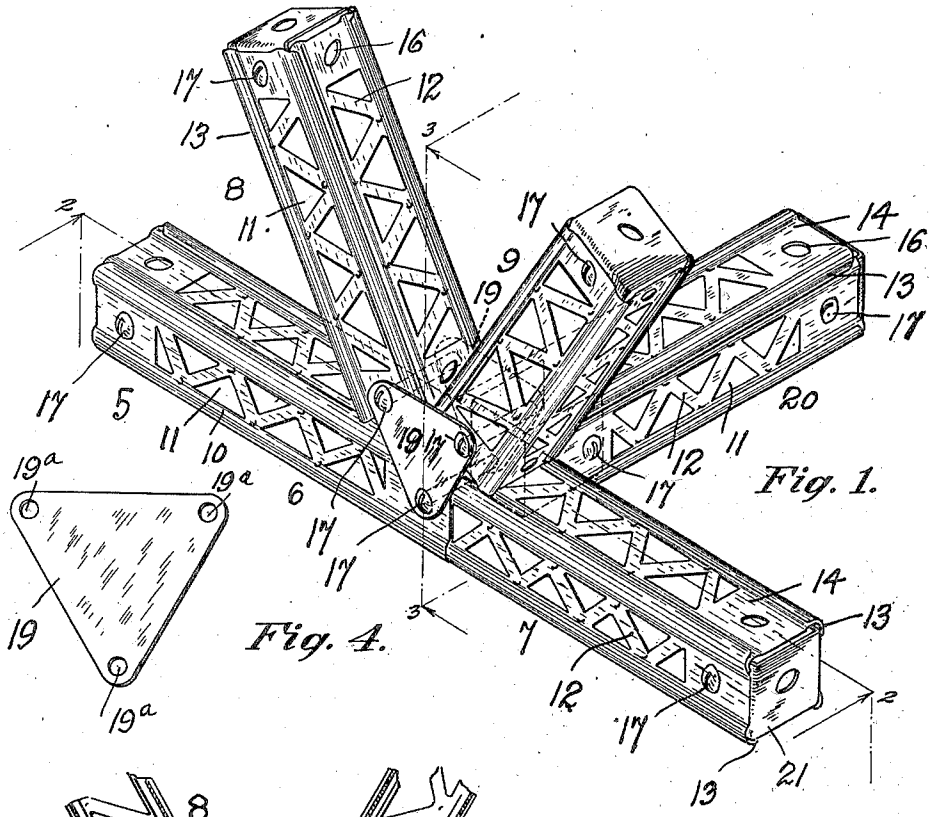


Fig. 1.

Fig. 4.

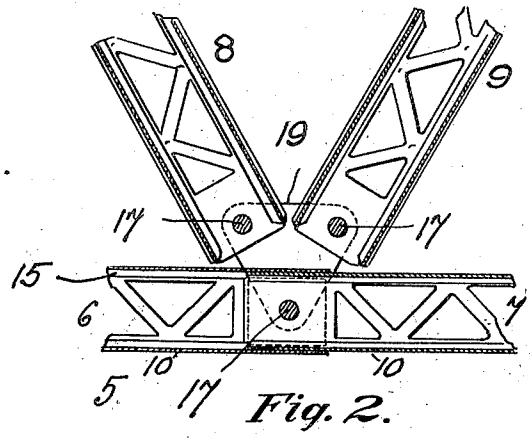


Fig. 2.

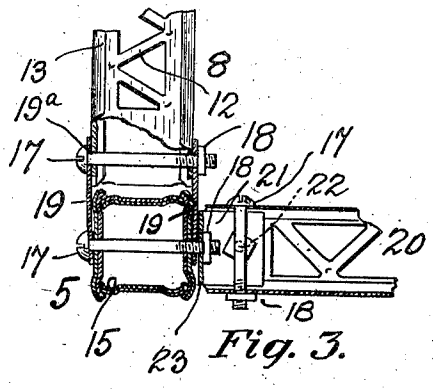


Fig. 3.

WITNESSES:

L. J. Bernard.

INVENTOR

Alfred C. Gilbert

BY

ATTORNEY

UNITED STATES PATENT OFFICE.

ALFRED C. GILBERT, OF NEW HAVEN, CONNECTICUT, ASSIGNOR TO THE A. C. GILBERT COMPANY, OF NEW HAVEN, CONNECTICUT, A CORPORATION OF CONNECTICUT.

TOY BUILDING CONSTRUCTION.

1,302,652. Specification of Letters Patent. Patented May 6, 1919.

Application filed January 6, 1916. Serial No. 70,696.

To all whom it may concern:

Be it known that I, ALFRED C. GILBERT, a citizen of the United States, residing in the city and county of New Haven and State of Connecticut, have invented certain new and useful Improvements in Toy Building Construction, of which the following is a full, clear, and exact description.

This invention relates to toy building construction intended to simulate the modern structural steel used in erecting bridges, fireproof buildings and similar structures. The invention relates more particularly to a joint for connecting a box girder with a second box girder arranged obliquely with respect thereto, as in the case where the second box girder constitutes, for example, a truss member in a bridge. In this case, the first-named box girder serves as one of the horizontal longitudinal girders of the bridge, but obviously the invention is not limited to this particular application.

The primary object of the invention is to provide a very simple form of joint between two girders, one arranged obliquely with respect to the other.

Another object of the invention is to provide a simple, efficient joint for connecting two oblique girder sections disposed at an angle to each other to a third girder section. It is also proposed to furnish a construction which, while particularly advantageous as a toy, nevertheless possesses considerable strength, and in which the various parts may be conveniently taken down and assembled with the use of a minimum number of bolts or similar fastenings.

To these and other ends, the invention consists in the novel features and combinations of parts to be hereinafter described and claimed.

In the accompanying drawing,

Figure 1 is a perspective view of a portion of a bridge framework embodying my improvements;

Fig. 2 is a fragmentary section on line 2—2 of Fig. 1;

Fig. 3 is a fragmentary section on line 3—3 of Fig. 1; and

Fig. 4 is a detail perspective view of one of the triangular connecting plates.

Referring to the particular embodiment selected for illustration, a horizontal box girder 5 is composed of two sections 6, 7 respectively, connected end to end, and inclined or oblique girder sections 8 and 9 extending at an angle to each other are connected with the girder 5 at or adjacent the junction of the sections 6, 7. For purposes of description, it may be assumed that the box girder 5 is one of the lower horizontal girders of a bridge, and that the sections 8 and 9 form complete truss members or parts of truss members adapted to be connected to an upper longitudinal girder (not shown) similar to girder 5. It will be apparent that the invention is not limited to this particular application.

Before describing the parts in detail, it may be well to state that the girder sections are each preferably built up from a plurality of sheet metal strips, as described in my application Serial No. 814,533, filed January 26, 1914, and that the sections 6 and 7 are preferably connected end to end, in the manner described in my application Serial No. 24,974, filed April 30 1915.

Each sheet metal strip 10 is preferably stamped out at 11 to present truss members 12, integrally connecting the side edge portions of the strip, which are provided with flanges 13. The median portion of the strip, including the truss members 12 and the solid end portions 14, is bent inward out of the plane of the side edge portions so as to present, in connection with the flanges 13, parallel grooves or channels 15 extending along the side margins of the strip. The portions 14 at the ends of each strip are provided with perforations 16. When each of the box girder sections 6, 7, 8, 9 is to be built up, four of the strips 10 are assembled in box-like form, two of the strips being placed opposite to each other with the channels 15 of one strip facing those of the other strip. Between the two oppositely located strips just mentioned, two other strips are set in to complete the box-like structure, the flanges 13 of said last-named strips being engaged in the channels 15 of the first-named strips. The first-named strips are then interconnected at the ends by bolts 17 having nuts 18, and these bolts, by pressing the outer strips against the inner spacing strips, detachably hold the parts in assembled relation. The connection between the sections 6, 7 of the girder 5 is effected by overlapping each strip of section 6 on the corresponding strip of section 7. Although the method of assemblage may be

greatly varied, it will be assumed for purposes of description that the left-hand section 6 is complete except for the bolt at the right-hand end, and that the right-hand section 7 is complete except for the bolt at the left-hand end. The sections are then nested together at their contiguous ends by the overlapping of corresponding strips, after which a single bolt 17 may be passed through certain of the registering perforations 16 for the purpose of holding all of the several parts in assembled relation. In the particular form shown in the drawing, the right-hand ends of the outer strips of section 6 are outside of the left-hand ends of the outer strips of section 7, and the connecting bolt in being set in place passes through an opening 16 in an outer left-hand strip, then through a registering opening in an outer right-hand strip, and then traverses the box-like structure through registering perforations in the corresponding strips at the other side, as shown in Fig. 3. It will be understood, therefore, that the bolt 17 just mentioned not only holds the several strips of section 6 in assembled relation at one end of the section, and holds the several strips of section 7 in assembled relation at one end of said section, but also detachably interconnects the two sections. Further than this, the bolt 17 not only has the several functions above mentioned, but it also serves in securing the oblique sections 8, 9 to the girder 5. To this end, connecting plates 19, preferably of triangular form, are used for connecting the lower bolts 17 of sections 8 and 9 with the bolt 17 interconnecting the two sections 6, 7. In the form shown, the last-named bolt 17 passes through a perforation 19^a at one apex of a triangular plate 19 arranged on the outside of the girder 5, and said bolt also passes through a similar perforation in another plate 19 arranged at the inside of the girder 5, as shown in Fig. 3. The lower connecting bolt 17 of section 8 passes in a similar manner through registering perforations 19^a located at other corners of the two plates 19, and in a similar fashion the lower bolt 17 of section 9, passes through registering perforations 19^a located at the third corners of the respective plates 19. The nuts 18 on the lower bolts of sections 8 and 9 press against the inside plate 19 and firmly connect each section 8, 9 with the two plates, and in turn with the horizontal girder 5, so that when the upper ends of the sections 8, 9 are suitably connected to the upper member (not shown) of the bridge or like structure, they will be rigidly held against displacement.

The construction just described enables each of the sections 8, 9 to be swung on its lower bolt 17 as an axis so that the angle between it and the girder 5 may be varied as desired although the sections 8, 9 remain in the same plane as the girder 5. This is of particular advantage in a toy construction, as it permits a considerable amount of adjustment. In Fig. 2, the sections 8, 9 are arranged at such an angle as to be supported solely by their lower bolts, but it will be apparent that as section 8 is swung slightly to the left, and section 9 is swung slightly to the right, their lower corners will abut the upper surface of girder 5, so that each section will then be supported at two points.

The bolt 17 interconnecting the sections 6, 7 not only secures sections 8 and 9 to girder 5, but in the form shown also secures to said girder 5 a horizontal transverse girder section 20 arranged at right angles to the girder 5. For this purpose, the end of section 20 which is contiguous to girder 5 has a U-shaped clip 21 set therein, as shown in Fig. 3, said clip 21 lying in a plane at right angles to the bolt 17 at the same end of section 20. The leg portions of the U-shaped clip 20 are provided with perforations so that they may be secured to the side members of section 20 by means of bolts 22, and the intermediate connecting portion 23 of the U-shaped clip is provided with a perforation engaged by the end of the bolt 17 interconnecting the sections 6, 7, as shown in Fig. 3. A nut 18 placed on said last-named bolt 17, and bearing against the inner face of the intermediate portion 23 of the clip 21, secures the parts in assembled relation.

I do not claim herein the connection which exists between the girder 5 and section 20, independently of one or both of the sections 8, 9, as this is a feature claimed in my companion application Serial No. 70,695, filed on even date herewith. Furthermore, I do not claim herein the specific form of box girder section, as claimed in my application Serial No. 814,533, nor the manner of interconnecting two sections by the overlapping of corresponding strips, as claimed in my application Serial No. 24,974.

What I claim is:—

1. In toy building construction, a girder formed of two interconnected sections each composed of a plurality of sheet metal strips, said sections placed endwise relatively to each other with the strips of one section overlapping the corresponding strips of the other section, a box girder section arranged obliquely with respect to said girder and having one end contiguous to said girder at the point where said sections are interconnected, and means for detachably securing said oblique girder section to said girder comprising plates and bolts passing through said plates and through the adjacent end portions of said girders, said bolts serving also as means for retaining said strips in place to form said girders; substantially as described.

2. In toy building construction, two box girder sections each composed of a plurality of strips, said sections placed endwise relatively to each other, a bolt interconnecting certain strips of one section retaining the strips assembled in the form of a girder section, and interconnecting said sections, a third box girder section composed of a plurality of strips and arranged obliquely with respect to the first two sections, and means secured to said first-mentioned sections by said bolt for securing said oblique section to said two first sections; substantially as described.

3. In toy building construction, two separable box girder sections placed endwise relatively to each other, a bolt for interconnecting said sections, two similar separable sections arranged obliquely with respect to said first sections and disposed at an angle to each other, and means for connecting said oblique sections with said bolt comprising plates overlying the adjacent end portions of said sections and secured thereto; substantially as described.

4. In toy building construction, a box girder member having a bolt traversing the same, plates clamped in place by said bolt at opposite faces of said box girder member, a second box girder member in the same plane as the first and similarly constructed, and a bolt passing through said second box girder member and engaging said plates; substantially as described.

5. In toy building construction, a box girder member comprising four light flexible sheet metal strips arranged in box-like form, two of said strips being set in between the other two to space them apart, a bolt passing through the outer strips, plates secured to said bolt at opposite sides of said member, and a second box girder member similar to the first and arranged in the same plane as the first having an end bolt passing through said plates; substantially as described.

6. In toy building construction, a box girder member comprising two pairs of metal strips arranged in box-like form, two additional box girder members arranged obliquely with respect to said first girder member in the plane thereof and having end portions contiguous thereto and to each other, a clamping plate overlying all three of said box girder members, and means for securing each of said members detachably to said plate and thereby to the other members, one of said means serving also to retain said metal strips in place to form said first mentioned girder member; substantially as described.

7. In toy building construction, two box girder sections, each comprising four flexible sheet metal strips arranged in box-like form, two of said strips being set in between the other two to space them apart, said sections placed endwise relatively to each other with the strips of one section overlapping those of the other section, a bolt passing through the outer strips of both sections and interconnecting said sections, plates held in place by said bolt at opposite sides of the girder member, and another box girder section located in the same plane as the first two and having an end bolt passing through said plates.

8. In toy building construction, two box girder sections placed end to end, each of said sections composed of a plurality of separate sheet metal strips arranged in box-like form, each strip adapted to engage the adjacent strips, the contiguous ends of said sections overlapping each other, a bolt for detachably interconnecting said sections where they overlap, two additional but similar sections arranged obliquely with respect to said first sections and disposed at an angle to each other, and means for connecting said oblique sections with said bolt.

In witness whereof, I have hereunto set my hand on the 5th day of January, 1916.

ALFRED C. GILBERT.