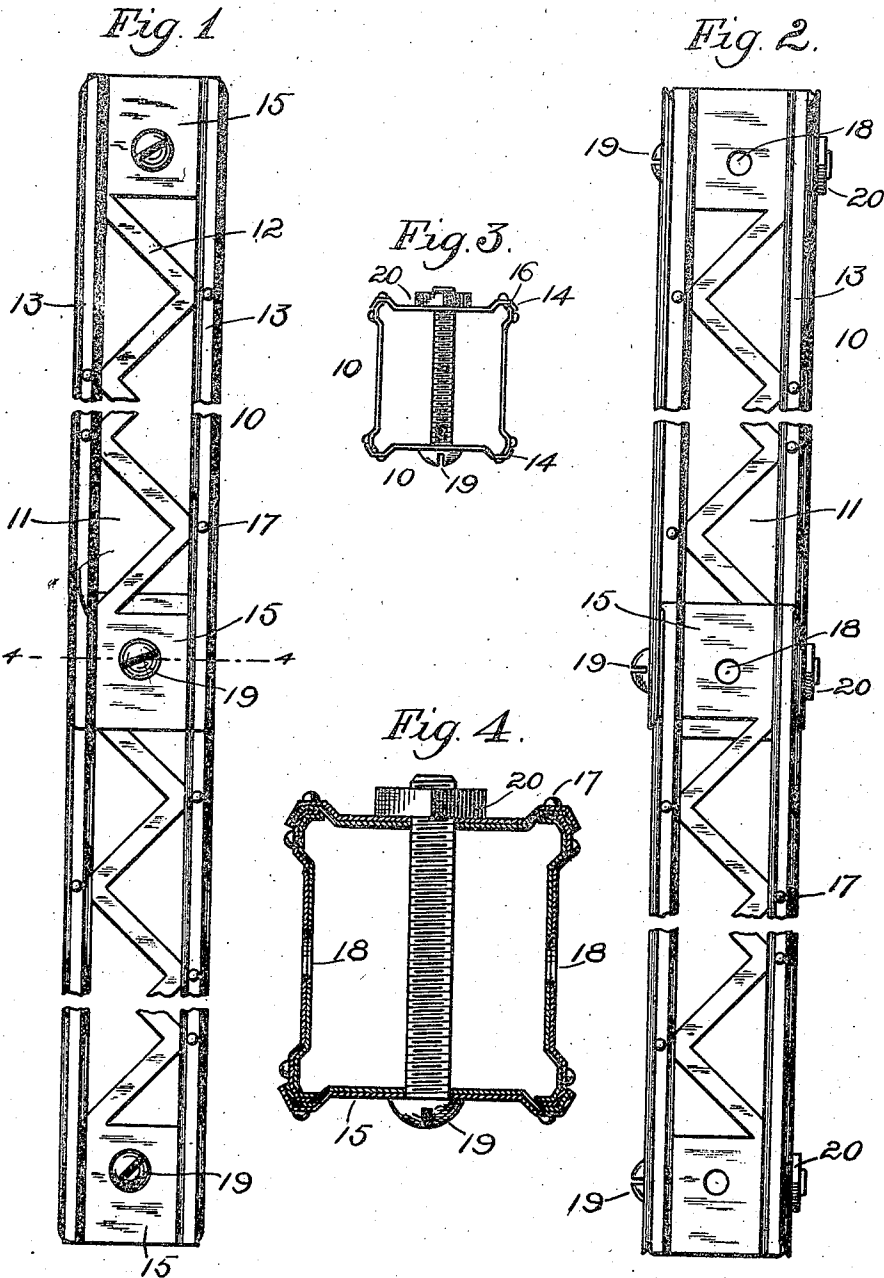


A. C. GILBERT.
TOY BUILDING CONSTRUCTION.

APPLICATION FILED APR. 30, 1915. RENEWED FEB. 8, 1922.

1,426,376.

Patented Aug. 22, 1922.



WITNESSES:
J. S. Coleman

INVENTOR:
Alfred C. Gilbert
BY
Alfred C. Gilbert
ATTORNEY.

UNITED STATES PATENT OFFICE.

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

TOY BUILDING CONSTRUCTION.

1,426,376.

Specification of Letters Patent. Patented Aug. 22, 1922.

Application filed April 30, 1915, Serial No. 24,974. Renewed February 8, 1922. Serial No. 535,093.

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 Constructions, 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 building sky scrapers, bridges and for similar purposes. The invention relates more particularly to a box girder construction in which the girder consists of two or more sections which are connected end to end.

The primary object of the invention is to provide improved means for interconnecting the adjacent ends of the girder sections so that a very simple joint will have the necessary strength. Another object of the invention is to interconnect the adjacent ends of the sections in such a manner that the structure may be conveniently and readily assembled and taken apart. More specifically, my object is to provide a box girder in which two sections, each consisting of four strips or elements, may be effectively interconnected by a single bolt, or similar fastening.

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,

Fig. 1 is an elevation of a box girder, consisting of two interconnected sections,

Fig. 2 is a similar view, taken at right angles to Fig. 1,

Fig. 3 is a top plan view of the girder, and

Fig. 4 is an enlarged section on line 4-4 of Fig. 1.

Referring to the drawing, 10 is a light, flexible strip or bar preferably formed of thin sheet metal, portions of which are stamped out, as shown at 11, to present truss members 12 integrally connecting side members 13 extending parallel to each other at the margins of the strip. The side members 13 are provided with flanges 14 at the side edges of the strip. The median portion of the strip, including the truss members 12 and the solid end portions 15, is bent inward out of the plane of the side mem-

bers 13, as shown in Fig. 3, so as to present, in connection with flanges 14, parallel grooves, seats or channels 16, extending along the margins of the strip. Small bosses 17 are preferably punched in the side members of the strip to present projections near the junctions of the truss members, which projections simulate the rivets used in structural steel work. It may be stated, however, that while I have described in detail one particular form of strip which may be used for making up a box girder, the character of strip employed may be varied considerably without departing from the scope of the invention.

For the purpose of connecting a plurality of strips together to form a box girder, and of connecting a plurality of girders together, the solid portions 15 at the ends of the strips are provided with perforations 18. When a box girder is to be built up, a plurality of strips 10 are assembled in the manner shown. First, a box girder section is built up of four of the strips. Referring particularly to Fig. 3, it will be noted that two strips are placed opposite each other, with the channels of one strip facing those of the other strip. At the respective ends of the section, these strips are interconnected by bolts 19 having nuts 20, said bolts passing through the perforations 18 of said strips. Between the outer oppositely located strips just mentioned, two inner strips are set in to complete the box-like structure. The side flanges 14 of the inner strips fit the grooves 16 of the outer strips and space apart the outer strips, while the inner strips are prevented from outward movement relatively to the box-like structure by the flanges 14 of the outer strips. The inner strips are also prevented from inward movement relatively to the box-like structure by the engagement of their side edges in the channels or seats of the outer strips, as shown in Fig. 3. Thus, it will be seen that when the nuts 20 of the bolts 19 are tightened, a strong, rigid box girder section is provided.

Assuming the box girder thus described to be the upper section shown in Figs. 1 and 2, this section may be interconnected with another section in order to lengthen the girder by proceeding substantially as follows: Although the method of assemblage may be greatly varied, it will be assumed for purposes of description that the upper section

60

65

70

75

80

85

90

95

100

105

110

is complete except for its lower bolt 19, and that the lower section which is to be joined to said upper section is also complete except for its upper bolt interconnecting the two outer strips. The sections are then nested together in any appropriate manner by the overlapping of their adjacent ends, after which a single bolt 19 may be passed through certain of the registering perforations 18 for the purpose of holding all of the several parts in assembled relation. In the particular form shown in the drawing, the upper ends of the outer strips of the lower section are slipped beneath the lower ends of the outer strips of the upper section, so as to bring their perforations 18 into registry with those of the upper strips. On the other hand, the upper ends of the inner strips of the lower section are slipped over the lower ends of the inner strips of the upper section. The fastening bolt is then passed through the perforation in the lower end of one of the outer strips of the upper section, then through the registering perforation in the underlapping outer strip of the lower section, across the box-like structure, and through the registering perforations at the other side of the structure. Then after the nut is placed on the bolt and tightened up, the whole structure will be firmly held in its assembled position. The inner strips of the respective sections are not positively locked against endwise sliding movement, but it has been found that when the nut on the fastening bolt has been tightened to a sufficient extent, these strips which are not directly interconnected by the bolt are clamped so tightly by the friction of the other strips on their flanges that said inner strips are quite securely and firmly clamped in place. It will thus be seen that by my improved construction, a girder section, consisting of four separable strips, may be securely fastened to another similar section by means of a single bolt, or similar fastening.

The arrangement of the eight strips forming the girder illustrated is symmetrical throughout the structure, but obviously this is not an essential feature of the invention. For example, one of the outer strips of the outer section might overlap the corresponding strip of the lower section at one side of the girder, while at the opposite side of the girder the outer strip of the lower section might overlap the corresponding strip of the upper section. This also applies to the inner strips, and it will be seen that two adjacent sections may readily be fitted together and interlocked without any great care in assembling, so long as the fastening bolt passes through what may be termed the outermost strips of the structure, at the overlapping joint portion thereof. It will be apparent that in the completed structure, the overlapping ends of the outer strips are

spaced apart by the overlapping ends of other strips set in between said first-named strips to space the latter apart, the inner overlapping strips being prevented from inward or outward displacement by engagement in the innermost channels of the outer strips, as shown in Fig. 4 of the drawing.

It will be apparent, of course, that the construction of a separable sectional girder of the type described is very much facilitated by the flexible or yielding character of the comparatively thin sheet metal strips. This permits two strips which are initially of identical cross-section to be connected end to end in such a manner that the overlapping end portions nest together and conform quite closely to each other under the pressure of the fastening bolt or bolts. This result is due primarily, of course, to the yielding nature of the side flanges which make each strip more or less self-adjusting, and enables it to conform to and fit similar strips and other parts in a manner which would be quite impossible if the strip were so rigid as to resist bending.

Various changes in the details of the construction may be adopted without departing from the scope of the invention, as defined in the claims.

I do not claim herein the construction of the girder section per se made up of four strips with channels or seats therein, as claimed in my application, Serial No. 814,533.

What I claim is:—

1. In toy building construction, two miniature box girder or column sections, each formed of a plurality of strips of light flexible sheet metal assembled separably into a box-like structure, the ends of the strips of one section overlapping those of the other section, and means for fastening the sections detachably together where they overlap; substantially as described.

2. In a building toy, the combination of a miniature box girder section comprising four light flexible strips separably assembled, a similar section formed of four light flexible strips separably assembled, the strips of the two sections being overlapped at their ends, and one or more bolts for fastening the sections detachably together.

3. In toy building construction, the combination of a miniature box girder or column section comprising four strips, two opposite strips having longitudinal parallel inwardly facing seats engaged by the side edge portions of the other two strips, a second section made up of similar strips, the corresponding strips of the respective sections being overlapped at the ends, and means passing through certain strips of both sections, where said strips overlap, for fastening the several parts detachably together in assembled relation.

4. In toy building construction, a box

girder section made up of four separable strips, a similar section made up of four separable strips, the corresponding strips of said sections being overlapped endwise, and
 5 a single bolt passing through the overlapping portions of certain strips for inter-connecting said sections; substantially as described.

5. In toy building construction, a miniature box girder or column composed of at
 10 least two endwise-connected sections, each of said sections comprising four strips of light flexible sheet metal separably assembled in
 15 box-like form, two of the strips of each section being provided with longitudinal inwardly facing seats engaged by the side portions of the other two strips, such other two
 20 strips being set in between the first or outer strips to space them apart, the corresponding strips of the respective sections being overlapped at the ends and snugly nested together, and a single means at the overlapping
 25 portions of the sections for holding the strips of both sections in assembled relation and for inter-connecting the respective sections.

6. In a toy box girder, the combination of a box girder section composed of a pair of opposing outer strips and a pair of inner
 30 strips set in between the outer strips to space them apart, said outer strips provided with means to prevent inward and outward displacement of the inner strips, a second box girder section similar to the first, the
 35 end portions of the strips of one section overlapping the end portions of the corresponding strips of the other section, and a single bolt passing through said sections at a point where they overlap for holding the
 40 parts in assembled relation; substantially as described.

7. In toy building construction, the combination of a box girder section formed of an
 45 outer pair of strips and an inner pair of strips, said sections having means for preventing inward and outward displacement of the inner strips, a similar section formed of outer and inner strips, the corresponding
 50 strips of the two sections being overlapped in an endwise direction, and a bolt passing

transversely through the overlapped strips at opposite sides of the structure, and inter-connecting the sections; substantially as described.

8. In toy building construction, a miniature box girder or column section comprising
 55 an outer pair of light flexible sheet metal strips and an inner pair of light flexible sheet metal strips set in between said first strips to space them apart, the outer strips
 60 having longitudinal inwardly facing seats in which the side edge portions of the inner strips are detachably engaged to prevent inward and outward displacement of said
 65 inner strips, a similar miniature box girder or column section formed of similar outer and inner strips, the corresponding strips of the two sections being overlapped in an
 70 endwise direction, and a bolt passing through the outer strips of both sections where they overlap and traversing the box-like structure for holding the strips of both
 75 sections in assembled relation at that portion of the structure and for inner-connecting the sections.

9. In a toy box girder, two miniature box girder sections each comprising four laterally separable strips, two of the strips of each section being set in between the other
 80 two to space them apart and such other two strips being provided with means for preventing outward and inward displacement of the inner spacing strips, one end portion of each
 85 of said strips overlapping the end portion of the corresponding adjacent strip of the other section, a single fastening bolt traversing the box-like structure at the juncture of the sections and passing through the outer
 90 strips of both sections where they overlap for holding the strips of both sections in assembled relation at the juncture of the sections and detachably inter-connecting
 95 said sections, and bolts passing through the outer strips of both sections at the remote ends of said sections for holding the strips in assembled relation at such remote ends.

In witness whereof, I have hereunto set my hand on the 28th day of April, 1915.

ALFRED C. GILBERT.