Nov. 17, 1936. J. D. ROBERTS 2,061,103

TRUSS

Filed April 29, 1935

Fig. 1

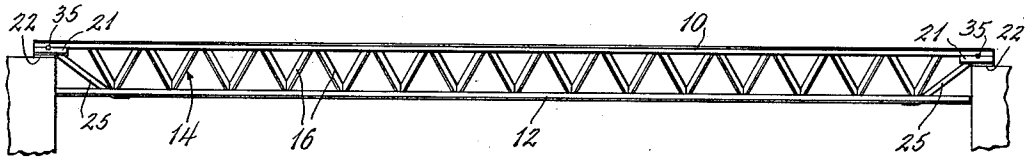


Fig. 2

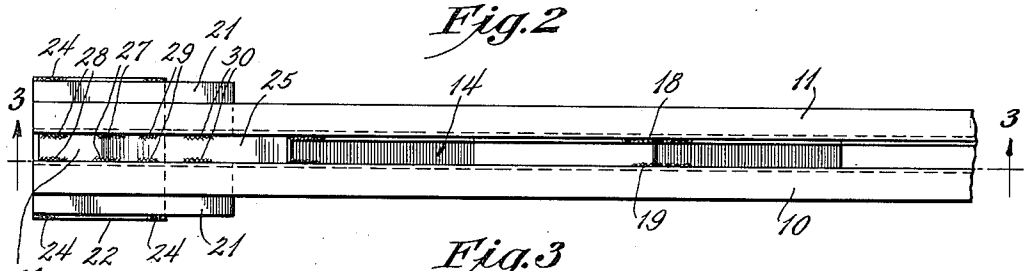


Fig. 3

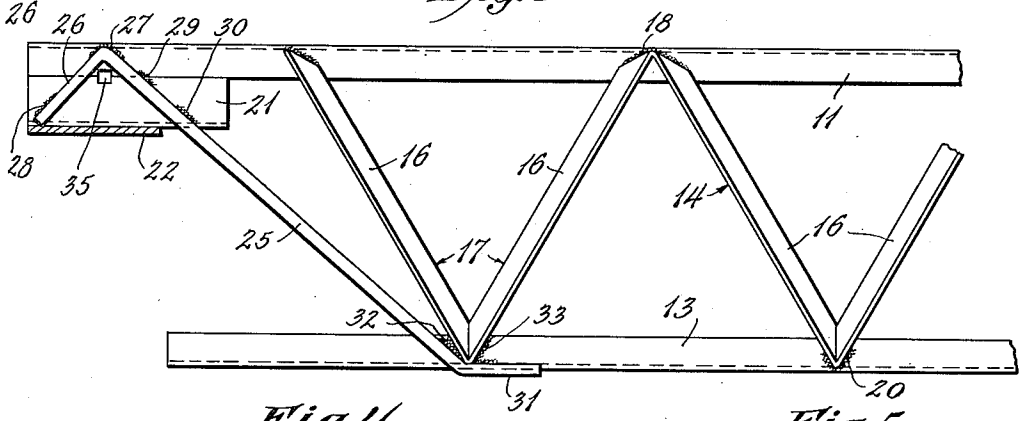


Fig. 4

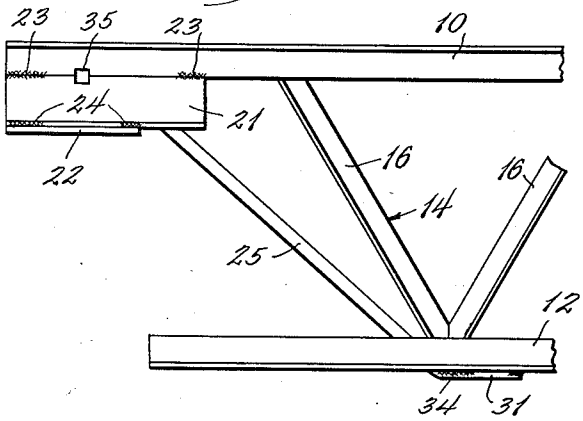


Fig. 5

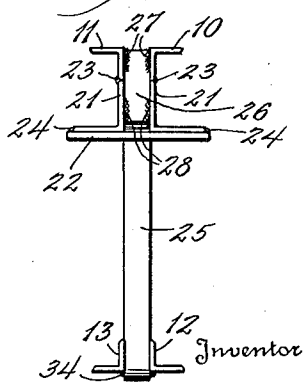
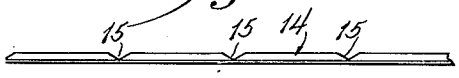


Fig. 6



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Patented Nov. 17, 1936

2,061,103

UNITED STATES PATENT OFFICE

2,061,103

TRUSS

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Application April 29, 1935, Serial No. 18,949

4 Claims. (Cl. 189—37)

This invention relates to trusses and particularly to light trusses of the class employed as floor joists, rafters and the like. A general object of the invention is to provide a truss of this class which may be manufactured very economically from strictly standard and readily obtainable shapes, and whose design facilitates welding all of the joints. A further object of the invention is the provision of improved bearing members at the ends of the truss, and an improved auxiliary tension member to strengthen either end of the truss.

In the accompanying drawing, illustrating a preferred embodiment of the invention:

Fig. 1 is a side elevation showing the truss resting on supports at either end;

Fig. 2 is an enlarged plan of an end portion of the truss;

Fig. 3 is a sectional view taken on line 3—3 of Fig. 2;

Fig. 4 is an elevation of the end of the truss shown in Figs. 2 and 3;

Fig. 5 is an end elevation on the same scale as Fig. 4; and

Fig. 6 is an elevation on a reduced scale illustrating a method of forming the web or bracing members of the truss.

Referring particularly to the drawing, the top chord of the truss is shown as comprising two similar spaced angle irons 10 and 11, and the bottom chord two similar spaced angle irons 12 and 13. Instead of angles, channels or Z-bars might be used, but angles are preferred. The upper and lower chords are tied together by a zig-zag web structure which is preferably formed of a single angle iron 14 shown in Fig. 6. The vertical flange of this angle is notched at regular intervals as at 15, and adjacent segments are then bent at an angle of preferably 60° to each other, providing a plurality of struts and ties 16. It will be observed that the member 14 is bent alternately in opposite directions so that the notches 15 are alternately closed together and opened to substantially 240°. See Fig. 3. The closed notches are welded to the bottom chord and the open notches to the top chord. While the above construction is preferred, the struts and ties 16 may be made of separate pieces. In this way, short lengths of angle iron can be utilized, but the time of assembly will be longer than is required with the construction shown.

All joints are herein shown as fillet welded, which is preferably accomplished by an electric arc process. However, the welding may be done by the resistance spot-welding method, or by any standard method.

In Figs. 2 and 3 there is illustrated the preferred method of joining the members 16 to the top chord. Here the vertical flange of the web member is welded along the vertical flange of the top chord angle 11, as at 18, and the fillet is also formed partially on the horizontal flange of the member 11 at the top portion of the weld. The outstanding flange of the angle 14 is united by heavy fillet weld 19 to the vertical flange of the top chord angle 10. At the lower chord, a continuous fillet 20 unites the exterior corner of the angle iron 14 to the vertical flange of the chord angle 13, while a similar fillet unites the opposite edge of the outstanding flange to the vertical flange of the chord angle 12.

At either end of the truss there is shown a bearing support comprising a pair of similar angle sections 21 and a plate 22. The angles 21 are welded at 23 to the vertical flanges of the top chord members, and the plate 22 is welded at 24 to the horizontal legs of the angles 21.

Since trusses of this class are usually supported at their ends from the upper chord, means must be provided to minimize bending strains in the upper chord between the point of support and the first leg of the bracing member or web. This has formerly been accomplished in several different ways. One method consisted in bending up the ends of the lower chord and fastening them to the top chord. This method is open to several objections, one being the difficulty of properly bending or shaping the heavy members composing the bottom chord. Also the projecting ends of the lower chord as shown in Fig. 1 have a certain utility which is lost when the ends are bent up. When the truss is used as a joist as shown in Fig. 1, it may often be advantageous to support a light load (e. g., a ceiling) from the ends of the bottom chord. Also these ends may conveniently be fastened in such a way as to prevent the beam from overturning. Another method sometimes used consists simply in extending the web members entirely to the end of the truss, but this method is wasteful in that it necessitates stronger than necessary stock in the major portion of the truss. In other cases, independent struts have been used at the ends of the truss, but where these have been welded, the design has departed from the principle of triangular bracing.

In the truss herein shown, an independent tension member 25 is used to carry the stress from a point directly over the point of support, to a point in the lower chord at the intersection of the first

two members of the web, this point being generally termed the first panel point of the bottom chord. Since this member **25** is subject only to tension, but carries a large load, it is preferably made of rectangular bar stock having a relatively large cross section. The width of the bar is equal to the overall width of the angle iron **14** so that it fits accurately in the space between the angles comprising the chords. The upper end of the bar **25** is bent approximately at right angles as at **26**, and the curved portion is welded to the vertical flanges of the top chord members **10** and **11** as at **27**. This is substantially the horizontal center of gravity of the top chord angles **10**, **11**. The bent end is then welded to the supporting angles **21** as at **28**. To further reinforce the supporting angles **21**, additional fillet welds are added at **29** and **30**, (Fig. 3). The opposite end **31** of the bar is bent parallel with the bottom chord member, as shown, and the top side of the bar is united to both of the first two legs of the web and also to the two chord angles **12** and **13** by two heavy fillet welds **32** and **33**. Additional fillet welds are then provided as at **34** uniting the underside of the bent end **31** to the two chord angles.

In order to provide means for anchoring the ends of the truss, the alined vertical flanges of the top chords **10**, **11** and the supporting angles **21** are provided with complementary notches which together form transverse openings **35** through which anchor rods or bars (not shown) may extend.

The truss herein shown and described is especially adapted for manufacture by small concerns since it may be easily fabricated out of strictly standard parts which are always had in stock. It will be clear that the simple bending operations necessary may be accomplished with great ease, and the simplicity of the structural shapes used is such as to greatly simplify the process of welding. While it is believed that the design described represents the most efficient utilization of the steel, it should be clear that in some cases other structural shapes might be employed without departing from the scope of the invention.

Obviously, the invention is not limited to the particular embodiment herein shown and described.

What I claim is:

1. A truss comprising, in combination, top and bottom chords each made of two spaced angle irons; and a web between and attached to the angle irons of each chord; said web being made of a single piece of angle iron notched at regular intervals and bent at the notches into a series of members each extending at angles of 60° and/or 120° to either chord; the notches each being angular and sufficiently wide to permit each pair of adjacent web members to lie at a 60° angle to each other, with the edges of the notch either substantially in contact or lying at 240° angles to each other; and welds joining each end of the web members to both angle irons composing the chord, said welds being outside of the 60° angles between the web members.

2. A truss comprising, in combination, top and bottom chords each consisting of two spaced angle irons; a zig-zag web member welded to the chords and comprising a plurality of members each intersecting the two chords at the same angle; and a tension member which is rectangular in cross-section at each end of the truss; the lower end of the tension member being welded to the bottom chord at the first panel point of the bottom chord; the tension member extending upwardly at an angle to the lower chord which is more acute than the angle between any part of the web member and the lower chord; the upper end of the tension member being welded to the top chord substantially at the horizontal center of gravity of the top chord angles.

3. The invention claimed in claim 2, wherein a pair of short sections of angle irons are secured to both ends of the top chord angles; the top edges of the short angle sections being butt welded to the bottom edges of the chord angles; the tension member being welded to both of the short angle sections, between which it passes, and having a down-turned upper end, likewise welded.

4. A truss comprising an upper and a lower chord, each consisting of a pair of spaced angle irons; a web comprising a single angle iron bent into a zig-zag pattern providing a plurality of diagonal web members; said diagonal members extending between said chords and being welded between the spaced angle irons which make up said chords to provide a rigid structure; and a tension bar at each end of the truss beyond the end of the web and having one end extending between and welded to the angles of the top chord, and the other end extending between and welded to the angles of the bottom chord and also welded to the juncture of the first two of said diagonal brace members.

JNO. D. ROBERTS.