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May 23, 1939. J. S. EDISON 2,159,589

ROOFING-TRUSS STRUCTURE

Filed Feb. 23, 1937

Fig. 2.

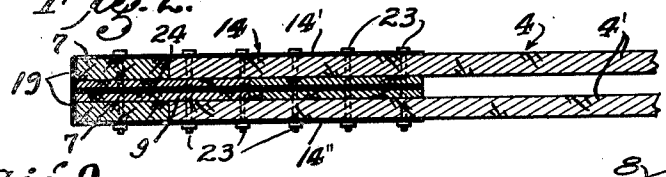


Fig. 9.

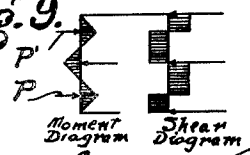


Fig. 1.

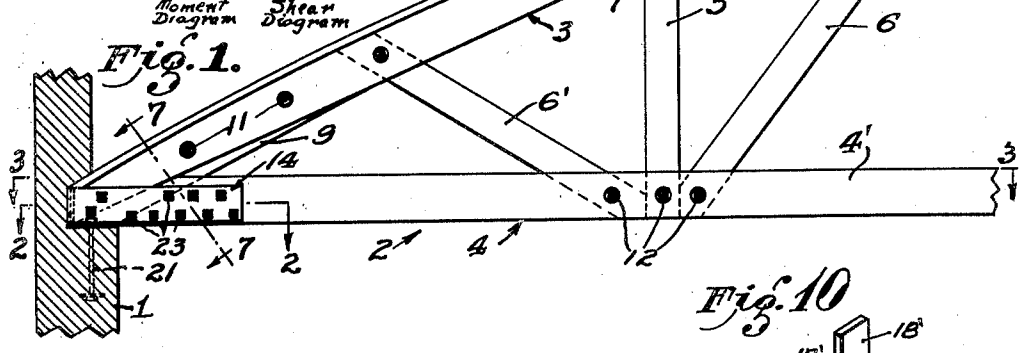


Fig. 10

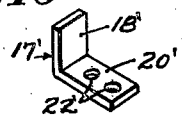


Fig. 3.

Fig. 4.

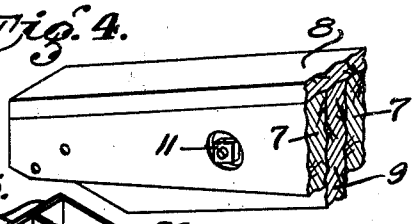


Fig. 7.

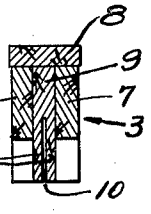


Fig. 5.

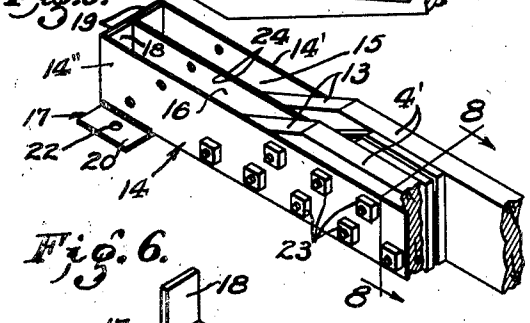


Fig. 8.

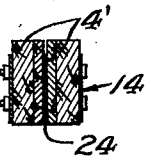
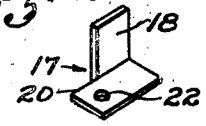


Fig. 6.



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his ATTORNEY.

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Patented May 23, 1939

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UNITED STATES PATENT OFFICE

2,159,589

ROOFING-TRUSS STRUCTURE

John S. Edison, Los Angeles, Calif., assignor to Wm. P. Neil Company, Ltd., Los Angeles, Calif., a corporation of California

Application February 23, 1937, Serial No. 127,061

8 Claims. (Cl. 108—23)

This invention relates to a new and novel truss-end construction for trusses supported from the wall of a building or like structure, such as a truss that is designed to support from the side walls of a building the roof thereof.

The invention particularly relates to timber trusses commonly known as the bow-string type, although certain features thereof may be applicable to other types of roof trusses.

An object of my invention is to provide a new and novel shoe for effectively and economically securing together the coincident ends of the upper arched and lower chords of a truss, and to provide a shoe of the above character which is simple, inexpensive to fabricate and economical to install.

An object of my invention is to provide a truss-end construction in which the top chord is so arranged with respect to the bottom chord that the connection between said chords are such that the forces at the end of the truss are concentric or in equilibrium.

Another object of my invention is to provide a novel truss-end construction in which a maximum load may be carried with a simple and inexpensive construction.

A further object of my invention is to provide a novel truss-end construction whereby an improved support between the truss end and the wall is provided whereby such support may be anchored in the wall to maintain relative rigidity between the wall and the truss construction.

A still further object of my invention is to provide a novel construction for framing the end of a bow-string truss into a steel or wood column, as occurs in roofs of the saw tooth type.

A still further object is the provision of a novel, strong and economical truss-end retaining member which will permit the truss to be delivered to the place of installation in a few units which may be easily and quickly assembled and erected.

My invention consists in the parts and combination of parts more particularly hereinafter described in detail and pointed out in the claims.

Other objects, advantages, and features of invention may appear from the accompanying drawing, the subjoined detail description, and the appended claims.

The accompanying drawing illustrates the invention in the form I at present deem preferable.

Figure 1 is a fragmentary side elevation of an end of a roofing truss structure embodying my invention, showing the manner of its support from the wall of the building or like structure.

Fig. 2 is a transverse sectional view on enlarged scale taken on line 2—2, Fig. 1.

Fig. 3 is a sectional view taken on line 3—3 of Fig. 1, and omitting the top chord.

Fig. 4 is a fragmentary isometric view of one end of the top chord structure.

Fig. 5 is a fragmentary isometric view of one end of the bottom chord and my novel shoe for securing together the coincident ends of the upper and lower chords of a truss.

Fig. 6 is a perspective view of a base plate adapted to be associated with the shoe member.

Fig. 7 is a sectional view taken on line 7—7, Fig. 1, but omitting the bottom chord.

Fig. 8 is a transverse sectional view taken on a plane indicated by line 8—8, Fig. 5.

Fig. 9 is a more or less diagrammatic view of the shear and bending moment of my novel shoe and the associated ends of the upper and lower chords of the roofing structure.

Fig. 10 is a perspective view of a modified form of base plate adapted to be associated with the shoe member when the end of the truss member is framed into a supporting column.

In the drawing, 1 designates one of the vertical enclosing walls of a building or a supporting column and 2 designates as a whole a roofing-truss structure of which there may be a number arranged in spaced relation to each other to support the entire roof structure. Each truss 2 comprises a top chord 3 and a bottom chord 4, said chords being connected by any suitable bracing means such as the vertical braces 5 and the diagonal braces 6, 6'.

The top chord 3 preferably includes a plurality of spaced apart side members or timbers 7 and one or two cap pieces 8 which extend over the side members 7 as shown in Fig. 7.

An end filler 9 is secured between the side members 7 at each end of the top chord 3 and is slotted as at 10 (see Fig. 7), the purpose of which will be more fully hereinafter explained. The side members 7 and the filler 9 are secured together in any suitable manner, as by the bolts 11, so as to act as a unitary structure.

The bottom chord 4 comprises a plurality of spaced elements 4' between which the vertical braces 5, 6 and 6' are interposed and secured thereto in any suitable manner, as by the bolts 12.

The members 4' of the bottom chord terminate at their outer ends in a diagonal plane indicated at 13 to receive the lower surfaces of the side members 7.

My invention comprises essentially the provi-

sion of a double U-shaped shoe 14, as more particularly shown in Fig. 5, which secures together the upper and lower chord members of the truss 2. Said shoe is preferably in the form of U-shaped members 14' and 14'' having receiving chambers 15 and 16 that are adapted to receive the side members 7 of the top chord 3.

The U-shaped members 14', 14'' are preferably constructed of sheet metal strips bent into a U-shaped form, the inner legs of which are secured together in any suitable manner, as by spot welding, and the end filler 9 is slotted as at 10 to receive the inner ends or legs of the U-shaped shoes 14', 14''.

A reinforcing and anchor plate 17 which has an upstanding member 18 that is secured to, or otherwise positioned adjacent the web 19 of the U-shaped metal shoes 14', 14'', as by welding or spot welding, and said plate 17 has an outwardly extending flange 20 that provides means for anchoring the shoe to the building wall or column through means of the anchor bolt 21 secured in the wall or column 1, and which anchor bolt extends through an opening 22 in the flange 20.

The top and bottom chords of the truss 2 are secured together by means of the shoe 14 and the bolts and nuts 23.

The slot 10 in the filler member 9 receives the inner legs 24 of the U-shaped shoes 14.

The shoes 14 and the filler and anchor plate 17 may be constructed of sheet metal, usually 10 or 12 gauge, and form a construction of maximum strength and rigidity for securing together the outer ends of the top and bottom chord of the roofing truss construction disclosed in my invention.

The ends of the top chord members 7 bear against the upstanding member 18 of the filler and anchor plate 17 and the web 19 of the shoes 14, 14' in end grain thrust relationship, thereby providing a structure in which a shoe of simple means is provided for connecting the upper and lower chords of a roofing truss construction in such relation to each other that the end of the truss is concentric or in equilibrium, and further whereby such connecting shoe may be made of lighter gauge metal than has heretofore been possible, and the securing bolts and nuts 23 may be of smaller size than have heretofore been used in a construction of this character. This construction provides a very strong connection between the top and bottom chords of the truss through said metal shoe that is divided into two receiving compartments whereby said shoe may be made of lighter material and smaller securing bolts and nuts may be used to insure a maximum efficiency between the top and bottom chords of the truss construction.

By constructing the retaining shoe for the top and bottom chords of a roofing truss as the shoe herein described, I have provided a construction wherein the securing bolts 23 act as continuous beams over two equal spans, with one concentrated load P, P' on each span applied at the third point as shown in Fig. 9. This loading produces bending stresses directly under the applied load substantially equal to the bending stresses over the central support, and the sum of the two end reactions or shear is equal to the reaction or shear at the central support. This evenly balanced condition permits me to use a shoe of lighter gauge metal than has heretofore been possible, and the reduction of the bending stresses in the bolts due to the central support permits me to use bolts of smaller diameter to carry the same load that heretofore has required much larger bolts.

By constructing the shoe 14 of double U-shaped members as above described, the center web thereof acts as a pilot when drilling the holes through the ends of the chords for the bolts 23, thereby permitting said holes to be drilled from one side of the truss and insuring registry of such holes with the opposed openings in the shoe, and thereby providing a structure in which the bolts are tight-fitting through the openings in which they are inserted.

When it is desired to frame the end of a bowstring truss into a steel or wood column, the usual seat angle, not shown, is provided, and the shoe will be provided with an anchor plate 17' as shown in Fig. 10 instead of the anchor plate 17 shown in Fig. 6. This anchor plate 17' has an upstanding member 18' analogous to the member 18 and has a flange 20' extending therefrom within the arms of the U-shaped members 14', 14'', and is provided with a plurality of holes 22' for securing the truss end to the seat angle in any suitable manner.

I claim:

1. In a roofing-truss construction; the combination of top and bottom chords; and a U-shaped shoe embracing and connecting the ends of said chords together, said shoe having a dividing wall extending from the closed end of said U-shaped shoe and providing two receiving compartments therein for said chords.

2. A shoe for connecting together the ends of the top and bottom chords of a roofing truss, said shoe comprising a double U-shaped member providing two receiving compartments for the ends of the top and bottom chords of said roofing truss, and the arms of said U-shaped member extending substantially parallel with the bottom chord of said truss.

3. A shoe for connecting together the ends of the top and bottom chords of a roofing truss, said shoe comprising a double U-shaped member providing two receiving compartments for the ends of the top and bottom chords of said roofing truss; and an anchor plate having a member upstanding in said compartment and adjacent the closed end thereof, and a flange extending outwardly beyond the outer side of said U-shaped members.

4. In a roofing-truss construction, the combination with top and bottom chords, a shoe member for connecting the ends of said chords together, and comprising a plurality of U-shaped members; a filler member in said top chord and being slotted at its end to receive the adjacent legs of said U-shaped members, said top chord and filler member being in end grain abutting contact with the closed end of said U-shaped members.

5. In a roofing-truss construction, the combination with top and bottom chords, a shoe member for connecting the ends of said chords together, and comprising a plurality of U-shaped members; a filler member in said top chord and being slotted at its end to receive the adjacent legs of said U-shaped members, said top chord and filler member being in end grain abutting contact with the closed end of said U-shaped members; and an anchor plate having an upstanding member positioned adjacent the closed ends of said U-shaped shoes and having a flange extending outwardly beyond each side of said shoe.

6. A shoe for securing the ends of the top and

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bottom chords of a roofing-truss construction together, said shoe member comprising two U-shaped members arranged with one arm of each U-shaped member adjacent the other; and an anchor plate having an upstanding member positioned adjacent the closed end of each U-shaped member and a flange extending outwardly from the other arms of said U-shaped members.

7. A shoe for securing the ends of the top and bottom chords of a roofing-truss construction together, said shoe member comprising two U-shaped members arranged with one arm of each member adjacent the other; and an anchor plate having an upstanding member positioned adjacent the closed end of each member and a flange extending from said upstanding member.

8. A shoe for securing the ends of the top and bottom chords of a roofing-truss construction together, said shoe member comprising two U-shaped members arranged with one arm of each U-shaped member adjacent the other; and an anchor plate having an upstanding member positioned adjacent the closed end of each U-shaped member and an anchoring flange extending from said upstanding member.

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