Dec. 21, 1948. S. MACOMBER 2,457,056

ROOF TRUSS

Filed Dec. 16, 1946 2 Sheets-Sheet 1

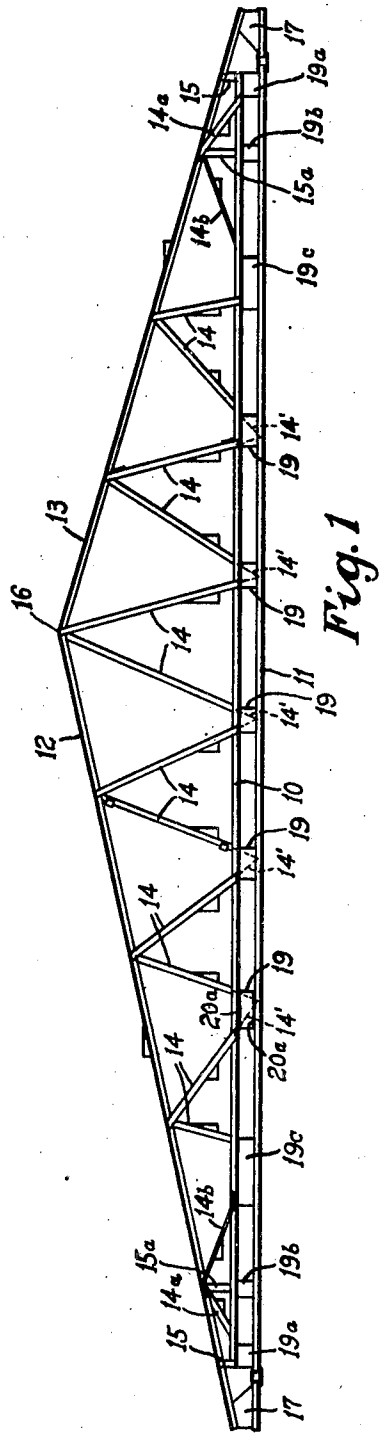


Fig. 1

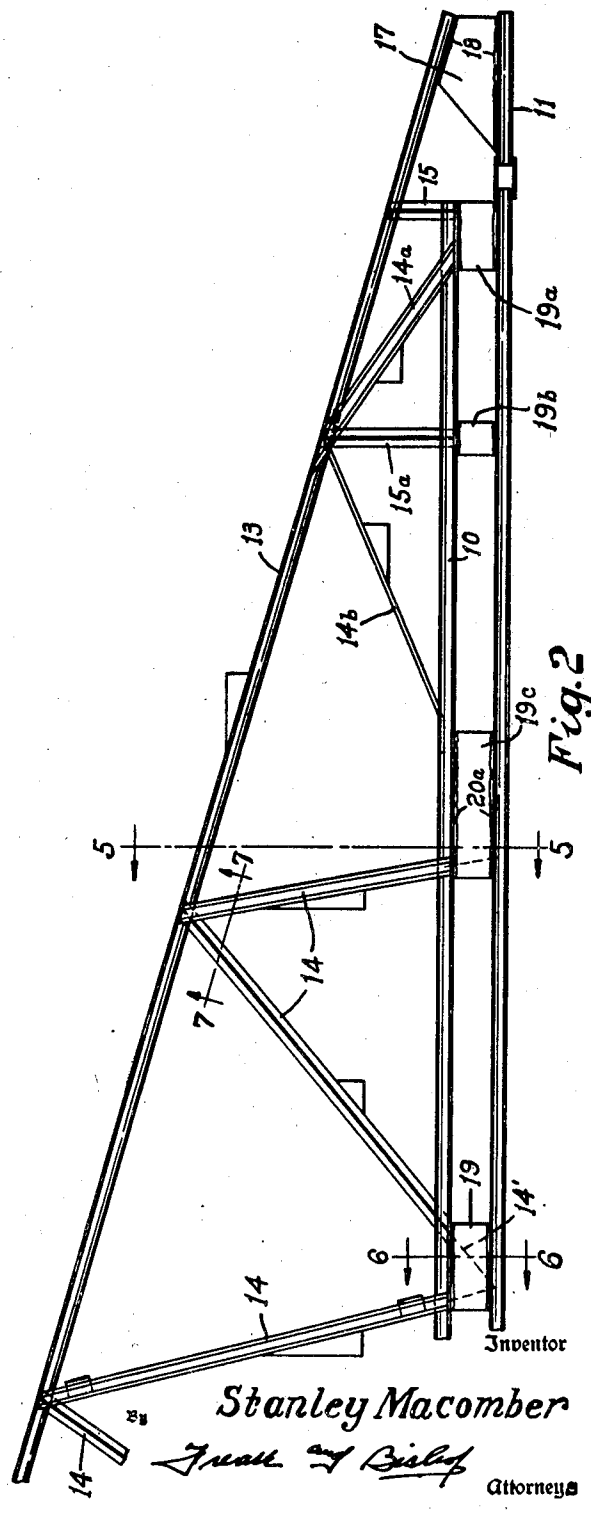


Fig. 2

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ROOF TRUSS

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Fig. 3

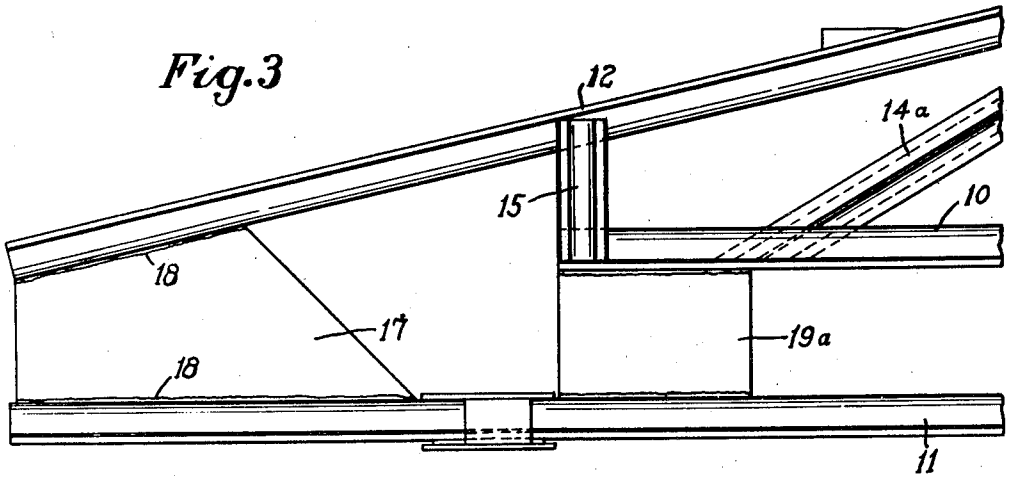
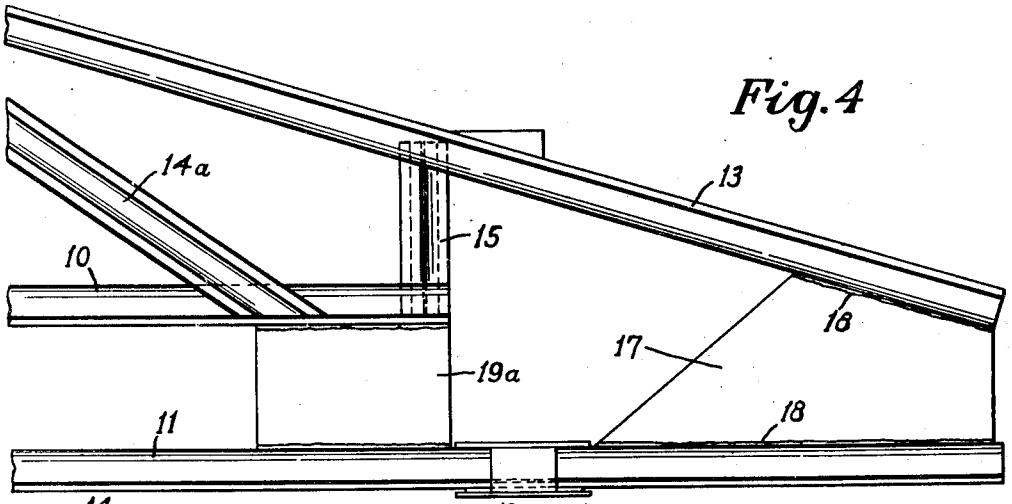


Fig. 4



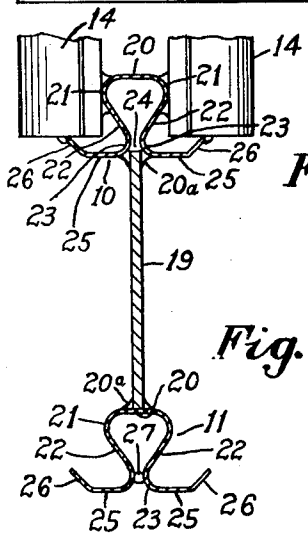
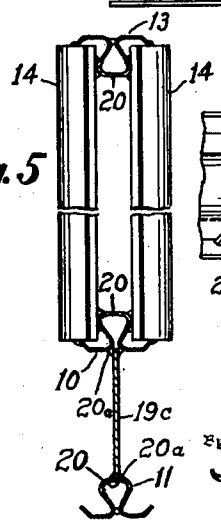


Fig. 5



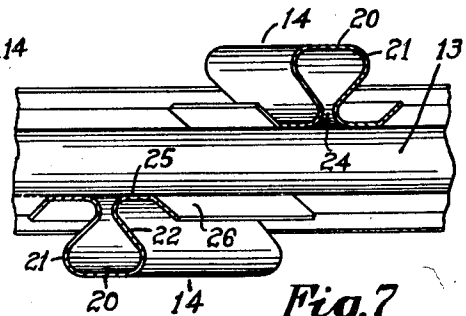


Fig. 7

Fig. 6

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UNITED STATES PATENT OFFICE

2,457,056

ROOF TRUSS

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Application December 16, 1946, Serial No. 716,636

13 Claims. (Cl. 108—23)

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The invention relates to trusses and more particularly to a novel type of roof truss and it is an object of the improvement to provide a roof truss having a maximum of strength with a minimum of weight.

Another object is to provide a truss in which the top and bottom chords and the struts are all formed of substantially V-shape structural members which provide a maximum compression value.

A further object is to provide a novel type of roof truss having vertically spaced dual lower chords or tie beams.

A still further object is to provide such a truss in which load bearing plates are connected to the vertically spaced bottom chords or tie beams, at the points where the struts are attached to the uppermost of the two bottom chords so as to transmit the load to the lowermost of the two bottom chords.

It is another object of the invention to provide a truss of the character referred to having a novel, simple and efficient end construction for attaching opposite ends of the lowermost of the bottom chords to the adjacent ends of the top chords.

The above objects together with others which will be apparent from the drawings and following description, or which may be later referred to, may be attained by constructing the improved roof truss in the manner hereinafter described in detail and illustrated in the accompanying drawings, in which;

Figure 1 is a side elevation of a roof truss embodying the invention;

Fig. 2 an enlarged side elevation of one end portion of the improved truss;

Fig. 3 a side elevation on a still larger scale of one end of the improved truss;

Fig. 4 a similar view of the other end thereof;

Fig. 5 an enlarged transverse sectional view through the truss taken as on the line 5—5, Fig. 2;

Fig. 6 a transverse sectional view on a larger scale through the vertically spaced lower chords, or tie beams of the truss and one of the load bearing plates connected thereto, taken on the line 6—6, Fig. 2; and,

Fig. 7 an enlarged detail sectional view taken as on the line 7—7, Fig. 2.

The improved roof truss is especially adapted for use in buildings where an air space is desired above the ceiling, or between the ceiling and a spaced upper wall such as an attic floor. For this purpose the improved truss is provided with a

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pair of vertically spaced bottom chords, or tie beams, whereby when a ceiling is connected to the lowermost of these bottom chords, or tie beams, and an attic floor or similar wall or covering to the uppermost thereof, a horizontal air space is provided therebetween through which a heating or cooling agent may be circulated.

To this end the improved roof truss comprises generally the two vertically spaced bottom chords, or tie beams, 10 and 11, the oppositely inclined top chords, or rafter beams, 12 and 13 and a multiplicity of angular struts 14 connected at opposite ends to the top chords 12 or 13 as the case may be and to the uppermost of the bottom chords as indicated at 10.

The uppermost bottom chord 10 terminates at each end of the truss at a point spaced from the adjacent ends of the lowermost bottom chord 11, and top chord 12 or 13 as the case may be, and may be attached to the adjacent top chord, at a point spaced from the end thereof, as by the vertical web member or strut 15.

The inner ends of the top chords 12 and 13 are connected together as indicated at 16, to form the comb or ridge of the roof, and the outer ends thereof are connected to the outer ends of the lowermost bottom chord 11 as by the end plates 17, which are welded or otherwise rigidly attached to the top and bottom members as indicated at 18.

Adjacent pairs of struts 14 are welded to the top chords 12 or 13 as the case may be at points transversely opposite to each other on opposite sides of the top chord. The lower ends of adjacent struts 14 are welded to opposite sides of the uppermost bottom chord 10 at points longitudinally spaced from each other so that a downward continuation of these struts would intersect at the lowermost bottom chord 11 as indicated by the broken lines 14' in Figs. 1 and 2.

In order to carry the load through to the lowermost bottom chord 11, a load bearing plate, as indicated at 19 is connected to the spaced bottom chords 10 and 11 as by welding indicated at 20. Thus the struts 14 and load bearing plates 19 provide a continuous web member between the upper chords 12 or 13, downward through the uppermost bottom chord 10 to the lowermost bottom chord 11.

An inclined strut 14a is attached to each end of the uppermost chord 10 at a point longitudinally spaced from the lower end of the adjacent vertical strut 15 and a load bearing plate 14a is attached, as by welding, to the bottom chord mem-

bers 10 and 11 at this point for the same purpose as the load bearing plates above described.

The upper end of a vertical strut 15a is attached to each upper chord adjacent to the point of attachment of the upper end of the adjacent inclined strut 14a, the lower end of the strut 15a being attached to the uppermost bottom chord 10, and a load bearing plate 19b being connected to the bottom chord members 10 and 11 directly below the strut 15a.

An inclined strut 14b is attached at its upper end to the adjacent upper chord at a point adjacent to the upper end of the vertical strut, the lower end thereof being attached to the chord 10 at a point spaced from the lower end of the endmost strut 14, and a load bearing plate 19c is located between the spaced bottom chords 10 and 11 adjacent to the lower ends of the strut 14b and the adjacent endmost strut 14.

Although a truss of this character may be constructed of top and bottom chords and struts in the form of bars, of round or other cross sectional shape, or in the form of any desired structural shape, for the purpose of producing a roof truss having a maximum of strength with a minimum of weight, it is preferred that the top chords, the spaced bottom chords and the struts all be formed of the particular V-shape structural member shown in the drawings.

This V-section structural member may be rolled or otherwise formed from a strip or sheet of steel of necessary or desired gauge and width, and as shown in the drawings the central portion of the strip is formed into substantially a V or triangle comprising the substantially flat top or bottom wall 20, as the case may be, connected through the curved bends 21 at each end, with the converging flat side walls 22, having the spaced, oppositely curved, rounded bends 23 at the apex of the V or triangle, forming a central longitudinal slot 24, the metal being then bent outwardly in opposite directions from the slot, forming the oppositely disposed, lateral flanges 25 located in the same plane, the terminal edges thereof being preferably bent at an angle, as indicated at 26, to stiffen and reinforce the structural member.

In order to hold the width of the slot 24 to a definite spacing, as well as to stiffen and reinforce the structural member and hold it rigidly in the formed position, the slot may be welded at spaced intervals as indicated at 27.

As best shown in Fig. 7, in which the cross section of the V-shape structural member is shown enlarged, it will be seen that the tubular portion thereof is of a height, from the bottom wall 20 to the reinforcing flanges 25, substantially equal to the maximum width of the tubular portion, whereby, with the reinforcing flanges at the narrow side of the tube, a cross section is provided of substantially uniform strength in any position in which the structural member is located, making this an ideal cross sectional shape for use as either top or bottom chords, or struts, in a truss of the type disclosed.

By making the truss of such V-shape structural members, the maximum compression value is provided in the top chords and in the struts, and the maximum tension value is provided in the spaced bottom chord members.

With a truss such as above described, a ceiling may be attached to the lowermost bottom chord 11 by means of screws, nails or other fastening devices located in the slot 24 of said chord, and in the same manner a horizontal wall or floor of any suitable material may be attached to the uppermost bottom chord 10, spaced above said ceiling and forming an air space therebetween through which a heating or cooling agent may be circulated to control the temperature within the structure upon which said roof trusses are installed.

I claim:

1. A fabricated truss including a top chord, a pair of vertically spaced bottom chords, struts connected at their upper ends to the top chord and connected at their lower ends to the uppermost of the bottom chords, and load bearing plates extending between and connected to the uppermost and lowermost bottom chords beneath the points of connection of the struts to the uppermost of the bottom chords.

2. A fabricated truss including a top chord, a pair of vertically spaced bottom chords, angular struts connected at their upper ends in pairs to the top chord and connected at their lower ends at longitudinally spaced points to the uppermost of the bottom chords, and load bearing plates extending between and connected to the uppermost and lowermost bottom chords beneath the points of connection of the struts to the uppermost of the bottom chords.

3. A fabricated truss including a top chord, a pair of vertically spaced bottom chords, angular struts connected at their upper ends in pairs to the top chord and connected at their lower ends at longitudinally spaced points to the uppermost of the bottom chords, and load bearing plates extending between and connected to the uppermost and lowermost bottom chords beneath the points of connection of the struts to the uppermost of the bottom chords so that downward extensions of the struts will pass through the load bearing plates and intersect at the lowermost bottom chord.

4. A fabricated truss including a top chord, a pair of vertically spaced bottom chords, angular struts connected at their upper ends in pairs to the top chord and connected at their lower ends at longitudinally spaced points to the uppermost of the bottom chords, and load bearing plates extending between and connected to the uppermost and lowermost bottom chords beneath the points of connection of the struts to the uppermost of the bottom chords so that downward extensions of the struts will pass through the load bearing plates and intersect at the lowermost bottom chord, vertical struts connected at their upper ends to the top chord and at their lower ends to the uppermost bottom chords and a load bearing plate connected to the uppermost and lowermost bottom chords directly below each vertical strut.

5. A fabricated truss including a top chord, a pair of vertically spaced bottom chords, end plates connected to opposite ends of the top chord and the lowermost bottom chord, the ends of the uppermost bottom chord terminating at points inwardly from the ends of the lowermost bottom chord, a vertical strut connected to each end of the uppermost bottom chord and to the top chord, a load bearing plate connected to the spaced bottom chords directly below each vertical strut, angular struts connected at their upper ends to the top chord and connected at their lower ends to the uppermost bottom chord, and load bearing plates connected to the spaced bottom chords directly below the points of connection of the angular struts to the uppermost bottom chord.

6. A fabricated truss including a top chord, a pair of vertically spaced bottom chords, end

plates connected to opposite ends of the top chord and the lowermost bottom chord, the ends of the uppermost bottom chord terminating at points inwardly from the ends of the lowermost bottom chord, a vertical strut connected to each end of the uppermost bottom chord and to the top chord, a load bearing plate connected to the spaced bottom chords directly below each vertical strut, angular struts connected at their upper ends in pairs to the top chord and connected at their lower ends at longitudinally spaced points to the uppermost bottom chord, and load bearing plates connected to the spaced bottom chords directly below the points of connection of the angular struts to the uppermost bottom chord so that downward extension of the angular struts will pass through the load bearing plates and intersect at the lowermost bottom plate.

7. A fabricated truss including a top chord, a pair of vertically spaced bottom chords, struts connected at their upper ends to the top chord and connected at their lower ends to the uppermost of the bottom chords, and load bearing plates extending between and connected to the uppermost and lowermost bottom chords beneath the points of connection of the struts of the uppermost of the bottom chords, the bottom chords each comprising a structural member having its longitudinal central portion bent into triangular form with a narrow groove in one side thereof, each wall of the groove being formed upon a substantial radius, the edge portions of the strip being oppositely bent on each side of the groove forming substantially flat flanges, whereby the lowermost bottom chord may support a ceiling and the uppermost bottom chord may support a floor, with air spaces therebetween.

8. A fabricated truss including a top chord, a pair of vertically spaced bottom chords, struts connected at their upper ends to the top chord and connected at their lower ends to the uppermost of the bottom chords, and load bearing plates extending between and connected to the uppermost and lowermost bottom chords beneath the points of connection of the struts to the uppermost of the bottom chords, the bottom chords each comprising a structural member having its longitudinal central portion bent into triangular form with a narrow groove in one side thereof, each wall of the groove being formed upon a substatial radius, said groove being welded together at spaced points whereby the walls of the groove are rigidly held to a definite spacing, the edge portions of the strip being oppositely bent on each side of the groove forming substantially flat flanges, whereby the lowermost bottom chord may support a ceiling and the uppermost bottom chord may support a floor, with air spaces therebetween.

9. A fabricated truss including a top chord, a pair of vertically spaced bottom chords, angular struts connected at their upper ends in pairs to the top chord and connected at their lower ends at longitudinally spaced points to the uppermost of the bottom chords, and load bearing plates extending between and connected to the uppermost and lowermost bottom chords beneath the points of connection of the struts to the uppermost of the bottom chords so that downward extensions of the struts will pass through the load bearing plates and intersect at the lowermost bottom chord, vertical struts connected at their upper ends to the top chord and at their lower ends to the uppermost bottom chords and a load bearing plate connected to the uppermost and lowermost

bottom chords directly below each vertical strut, and end plates connected to the end portions of the top chord and the lowermost bottom chord at points spaced outwardly from said vertical struts.

10. A fabricated truss including a top chord, a pair of vertically spaced bottom chords, end plates connected to opposite ends of the top chord and the lowermost bottom chord, the ends of the uppermost bottom chord terminating at points inwardly from the ends of the lowermost bottom chord, a vertical strut connected to each end of the uppermost bottom chord and to the top chord, a load bearing plate connected to the spaced bottom chords directly below each vertical strut, angular struts connected at their upper ends to the top chord and connected at their lower ends to the uppermost bottom chord, and load bearing plates connected to the spaced bottom chords directly below the points of connection of the angular struts to the uppermost bottom chord, and end plates connected to the end portions of the top chord and the lowermost bottom chord at points spaced outwardly from said vertical struts.

11. A fabricated truss including a top chord, a pair of vertically spaced bottom chords, end plates connected to opposite ends of the top chord and the lowermost bottom chord, the ends of the uppermost bottom chord terminating at points inwardly from the ends of the lowermost bottom chord, a vertical strut connected to each end of the uppermost bottom chord and to the top chord, a load bearing plate connected to the spaced bottom chords directly below each vertical strut, angular struts connected at their upper ends in pairs to the top chord and connected at their lower ends at longitudinally spaced points to the uppermost bottom chord, and load bearing plates connected to the spaced bottom chords directly below the points of connection of the angular struts to the upermost bottom chord so that downward extension of the angular struts will pass through the load bearing plates and intersect at the lowermost bottom plate, and end plates connected to the end portions of the top chord and the lowermost bottom chord at points spaced outwardly from said vertical struts.

12. A fabricated truss including a top chord, a pair of vertically spaced bottom chords, struts connected at their upper ends to the top chord and connected at their lower ends to the uppermost of the bottom chords, and load bearing plates extending between and connected to the uppermost and lowermost bottom chords at spaced points throughout the length of said bottom chords.

13. A fabricated truss including a top chord, a pair of vertically spaced bottom chords, angular struts connected at their upper ends in pairs to the top chord and connected at their lower ends at longitudinally spaced points to the uppermost of the bottom chords, and load bearing plates extending between and connected to the uppermost and lowermost bottom chords at spaced points throughout the length of said bottom chords.

STANLEY MACOMBER.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
717,923	Rapp	Jan. 6, 1903