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ROOF STRUCTURE

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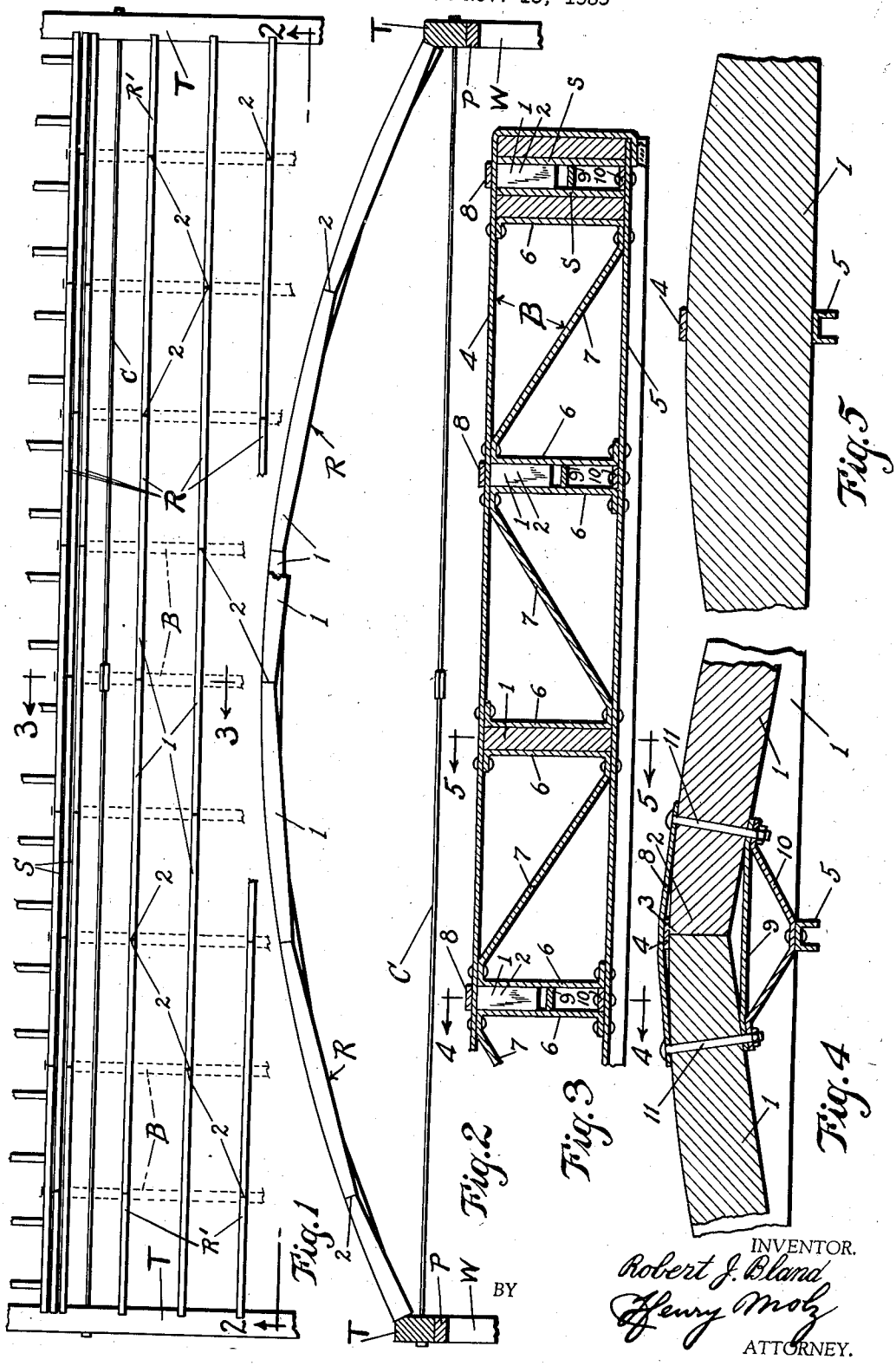


Fig. 1

Fig. 2

Fig. 3

Fig. 4

Fig. 5

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ROOF STRUCTURE

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The principal object of my invention is the fabrication of an arched-truss roof structure obviating the need of laminated rafters, and adopted to span spaces of varying size, restrained against vertical and lateral stresses, and which may be readily assembled or disassembled with ease, and at no great expense.

A further important object is to provide a roof structure unlike any the market affords, eliminating the usual intermediate truss members for the roof support, and providing a self-sustaining, non-collapsible, simple, and economical roof structure.

A further object is to provide a roof structure embracing said characteristics and employing a plurality of fabricated steel girders, each running the entire length of the building structure, rigidly joined together so as to provide maximum strength and to all intents and purposes, practically forming a one-piece roof spread.

A further and highly important object is the provision of a roof structure wherein placement of the roof joists on top of the trusses, as is common to the art, is eliminated, with a corresponding reduction in structural weight, and whereby the cost of the building structure, in turn, is materially reduced in the resultant permissible use of a lighter foundation and lighter building walls.

A further object is the provision of a roof structure restrained against collapse, and wherein an even distribution of the roof structure tied in with the building walls, eliminates an excess of weight against any part thereof.

A still further object of the herein invention is the provision of a roof structure whereby the accidental displacement or removal of any one or more portions thereof, as by the dropping of a fallen object thereon, such as an aeroplane, for example, or the burning away of a portion thereof, unaffects the remaining or undamaged portion, and readily permits of quick repairs at the least possible cost.

A still further object is the provision of a roof structure providing an ingeniously devised method of tieing in the respective ends of the rafters and for centrally-wise supporting said rafters in aligned relation with one another, the said means effectively stiffening the separate members and, as effectively reinforcing the structure as a whole for achieving the beneficial results herein claimed.

A still further object is the provision of a roof structure wherein the wooden portion thereof remains unaffected in strength in the assembly operations by the almost complete elimination of apertures drilled therethrough, a more or less common fault with most roof structures wherein a multiplicity of holes weaken and cause splitting of the wooden portion, with the resultant general weakening of the roof structure as a whole.

And a further object of the invention is to provide a roof structure embracing said characteristics and adaptable to building structures wherein the customary unsightly arched roof construction could not be employed without installation of a finished ceiling, my invention in its serviceability and appearance, eliminating this drawback, and wherefore it is in this regard as well as in others, of advantageous construction and economical to install.

Other objects and advantages of the invention will more fully appear as this specification proceeds and as is set forth in the appended claims.

I attain these objects by the device disclosed in the accompanying drawing, in which—

Figure 1 is a plan view indicating certain beams thereof by broken lines;

Figure 2 is a section on line 2—2 of Figure 1;

Figure 3 is a section on line 3—3 of Figure 1;

Figure 4 is a section on line 4—4 of Figure 3, and

Figure 5 is a section on line 5—5 of Figure 3.

Owing to the respective size of the drawing scale, it should be noted that certain parts shown in Figures 3, 4 and 5, are not shown in Figures 1 and 2 except by broken lines.

Similar numerals and letters of reference indicate like parts throughout the several views. Thus R designates the rafters in general, W, the building walls; P, plates; C, chord or tie rod; B, beam; S, spaces, and T, timbers forming part of truss.

It will further be noted that the rafters are made up of short lengths 1, 1, etc.; of material having abutting ends 2, 2 etc.; with the abutted ends alternating with or opposite the center of a short length 1 of the next rafter R; one rafter R is thus started with a full short length 1 bearing and affixed to a timber T and the next or alternate rafter R starts with a half length R bearing and affixed to a timber T. Thus the rafters are positioned in staggered relation to one another, the respective ends of each joined pair of rafters thereby meeting the adjacent rafters approximately mid-way their length, and whereby the weakness, if any, of the jointed ends is minimized by the unbroken expanse of the adjacent rafter, said alternate manner of position-

ing the rafters as is more fully shown in Figure 3 assuring that particular rigidity essential to any well built roof.

At the point where the curved rafters start at one end of a building, a plurality of rafters may be joined adjacent one another with suitable spacing S.

To prevent twisting or side sway of the rafters R, beams B which are built up of longitudinal members 4 and 5, vertical web members 6 having braces 7 formed integral therewith, tie-plates 8 and 9 and filler members 10, are employed.

The plate 9 as disclosed in Figure 4 is in parallel alignment with the longitudinal member 5. It may, however, be shaped to meet the formation of the tapered end portion of the rafter ends 2, 2 for greater bearing contact against said ends, although this is not essential since the bearing obtained as shown together with the tieing in of the plate with the rafter proper by means of the bolts 11, adequately provide for any weight that may be asserted thereagainst.

The longitudinal members 4 and 5 are parallel at a distance equal to the greatest depth of the rafter lengths 1, 1.

The bottom longitudinal member 5 is shown as a channel iron. It may as readily be flat or of any other suitable shape in cross section.

The respective parts comprising the beam B while shown as riveted together, may be otherwise secured, as by welding, for example.

The abutting rafter ends 2, 2, are tapered to form a reduction in their depth to approximately one-half that of the rafter depth as is indicated by 3; spacers 10 thereto affixed compensating for the reduction of said rafter ends, said bracing spacers 10 engaging the tie plate 9 in secured relation with the rafter proper and the tie plate 8 by means of bolts 11 as is readily apparent in Figure 4.

From the foregoing, it should be apparent that the roof construction disclosed admits of a considerable wider latitude and at an economical cost factor in its installation requirements for a safe, non-collapsible roof structure.

Less parts, secured alignment of the wooden members against shifting, a clean cut roof appearance requiring no additional ceiling coverage to provide a finished effect, ease of assembly, and as economical in repair as is first cost, these and more comprise but few of the structural characteristics that assure complete satisfaction in roof construction methods over any the market affords.

Readily produced from material obtainable in the open market and at no great expense, the invention lends itself to all building types and in many respects, is preferable to other types of roof construction.

I am aware that slight modifications may from time to time be made in the details of structure shown without departing, however, from the scope of the present invention, and as defined in the claims which are appended hereto. Hence, I do not limit my present invention to the exact description of construction herein disclosed, but what I do claim is:

1. An arched-truss roof structure comprising a plurality of arched trusses, a supporting structure to which ends of the trusses are secured, each of said trusses including a plurality of sections joined end to end, and means for joining the sections of the trusses in abutting relation and for reinforcing the roof structure including beams extending transversely of and between the trusses at the joints thereof, each of said beams including an upper longitudinal member lying upon the upper sides of joints in the trusses, a lower longitudinal member disposed in spaced relation to and beneath said joints, and web members joining said upper and lower longitudinal members, upper tie plates overlapping the section joints of the trusses and lying upon the upper longitudinal members of said beams, lower tie plates disposed beneath said joints, spacing members disposed between and for securing together the lower tie plates and lower longitudinal members of said beams, and fastenings passing through and securing together said upper tie plates, the sections of the trusses, the lower tie plates and said spacing members.

2. An arched-truss roof structure comprising a plurality of arched trusses, a supporting structure to which ends of the trusses are secured, each of said trusses including a plurality of sections joined end to end, and means for joining the sections to the trusses in abutting relation and for reinforcing the roof structure including beams extending transversely of and between the trusses at the joints thereof, each of said beams including an upper longitudinal member lying upon the upper sides of joints in the trusses, a lower longitudinal member disposed in spaced relation to and beneath said joints, web members joining said upper and lower longitudinal members, upper tie plates overlapping the section joints of the trusses and lying upon the upper longitudinal members of said beams, lower tie plates disposed beneath said joints, spacing members disposed between and for securing together the lower tie plates and lower longitudinal members of said beams, fastenings passing through and securing together said upper tie plates, the sections of the trusses, the lower tie plates and said spacing members, said web members being arranged in pairs spaced apart to engage opposite sides of the sections at the joints, and said lower tie plates between and engaged with said web members.

3. An arched truss roof structure comprising a plurality of arched trusses arranged side by side, a supporting structure for said trusses, each of the trusses including a plurality of sections in end abutting relation, a plurality of beams extending side by side transversely of the trusses and including upper and lower longitudinal members arranged above and below the trusses and web members joining said upper and lower members, and tie means for joining the sections to one another and the upper and lower members of said beams to said sections at the joints of the latter.

4. An arched truss roof structure comprising a plurality of arched trusses arranged side by side, a supporting structure for said trusses, each of the trusses including a plurality of sections in end abutting relation, a plurality of beams extending side by side transversely of the trusses and including upper and lower longitudinal members arranged above the trusses and web members joining said upper and lower members, and tie means for joining the sections to one another and the upper and lower members of said beams to said sections at the joints of the latter, the joints of the section of adjacent trusses being staggered.

5. Arch construction including arch sections in end abutting relation, a beam intersecting the joint of the arch sections and including upper

and lower longitudinal members extending above and below said sections, tie plates extending transversely of the longitudinal section above and below the joint thereof, angular members secured to the lower longitudinal member and engaging and supporting the lower tie plate, webs joining the upper and lower members of said beam and having the tie plates engaged between them, and fastenings for securing together said tie plates, sections and said angular members.

6. Arch construction including arch sections in end abutting relation, a beam intersecting the joint of the arch sections and including upper and lower longitudinal members extending above and below said sections, tie plates extending transversely of the longitudinal section above and below the joint thereof, angular members secured to the lower longitudinal member and engaging and supporting the lower tie plate, webs joining the upper and lower members of said beam and having the tie plates engaged between them, and fastenings for securing together said tie plates, sections and said angular members, said upper longitudinal member lying beneath and engaged with the upper tie plate as well as with the upper sides of the sections over the joint thereof.

7. Arch construction including arch sections in end abutting relation, a beam intersecting the joint of the arch sections and including upper and lower longitudinal members extending above and below said sections, tie plates extending transversely of the longitudinal section above and below the joint thereof, angular members secured to the lower longitudinal member and engaging and supporting the lower tie plate, webs joining the upper and lower members of said beam and having the tie plates engaged between them, and fastenings for securing together said tie plates, sections and said angular members, said upper longitudinal member lying beneath and engaged with the upper tie plate as well as with the upper sides of the sections over the joint thereof, said lower longitudinal member being spaced below said lower tie plate, said angular member being secured between its ends to the lower longitudinal member and having its ends secured by said fastenings to said lower tie member.

8. An arched truss roof structure comprising a plurality of arched trusses arranged side by side, a supporting structure for said trusses, each of the trusses including a plurality of sections in end abutting relation, a plurality of beams extending side by side transversely of the trusses and including upper and lower longitudinal members arranged above and below the trusses and web members joining said upper and lower members, and tie means for joining the sections to one another and the upper and lower members of said beams to said sections at the joints of the latter, each of said sections being tapered towards its ends, the joints of the sections of adjacent trusses being staggered, certain of the sections being engaged between their ends and on their upper and lower faces with the upper and lower longitudinal members of said beams.

9. An arched roof structure comprising a plurality of arched trusses arranged side by side, a supporting structure for said trusses, each of the trusses including a plurality of sections in end abutting relation, a plurality of beams extending side by side transversely of the trusses and including upper and lower longitudinal members arranged above and below the trusses and web members joining said upper and lower members, tie means for joining the sections to one another and the upper and lower members of said beams to said sections at the joints of the latter, certain of the sections of the trusses at a point between their ends having upper and lower faces engaged with the upper and lower longitudinal members respectively.

10. An arched truss roof structure comprising a plurality of arched trusses arranged side by side, a supporting structure for said trusses, each of the trusses including a plurality of sections in end abutting relation, a plurality of beams extending side by side transversely of the trusses and including upper and lower longitudinal members arranged above and below the trusses and web members joining said upper and lower members, tie means for joining the sections to one another and the upper and lower members of said beams to said sections at the joints of the latter, said sections of said trusses being substantially equal in depth at a point midway between their ends and with the space between the upper and lower longitudinal members of said beams and being reduced in depth towards their ends, and arranged so that the joints in one truss are out of line with the joints in the adjacent trusses.

11. An arched truss roof structure comprising a plurality of arched trusses arranged side by side, a supporting structure for said trusses, each of the trusses including a plurality of sections in end abutting relation, a plurality of beams extending side by side transversely of the trusses and including upper and lower longitudinal members arranged above and below the trusses and web members joining said upper and lower members, tie means for joining the sections to one another and the upper and lower members of said beams to said sections at the joints of the latter, said web members lying against opposite sides of the sections at the joints thereof and being vertically disposed.

12. An arched truss roof structure comprising a plurality of arched trusses arranged side by side, a supporting structure for said trusses, each of the trusses including a plurality of sections in end abutting relation, a plurality of beams extending side by side transversely of the trusses and including upper and lower longitudinal members arranged above and below the trusses and web members joining said upper and lower members, tie means for joining the sections to one another and the upper and lower members of said beams to said sections at the joints of the latter, said web members lying against opposite sides of the sections at the joints thereof and being vertically disposed, and diagonal braces joining said upper and lower longitudinal members between said web members.

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