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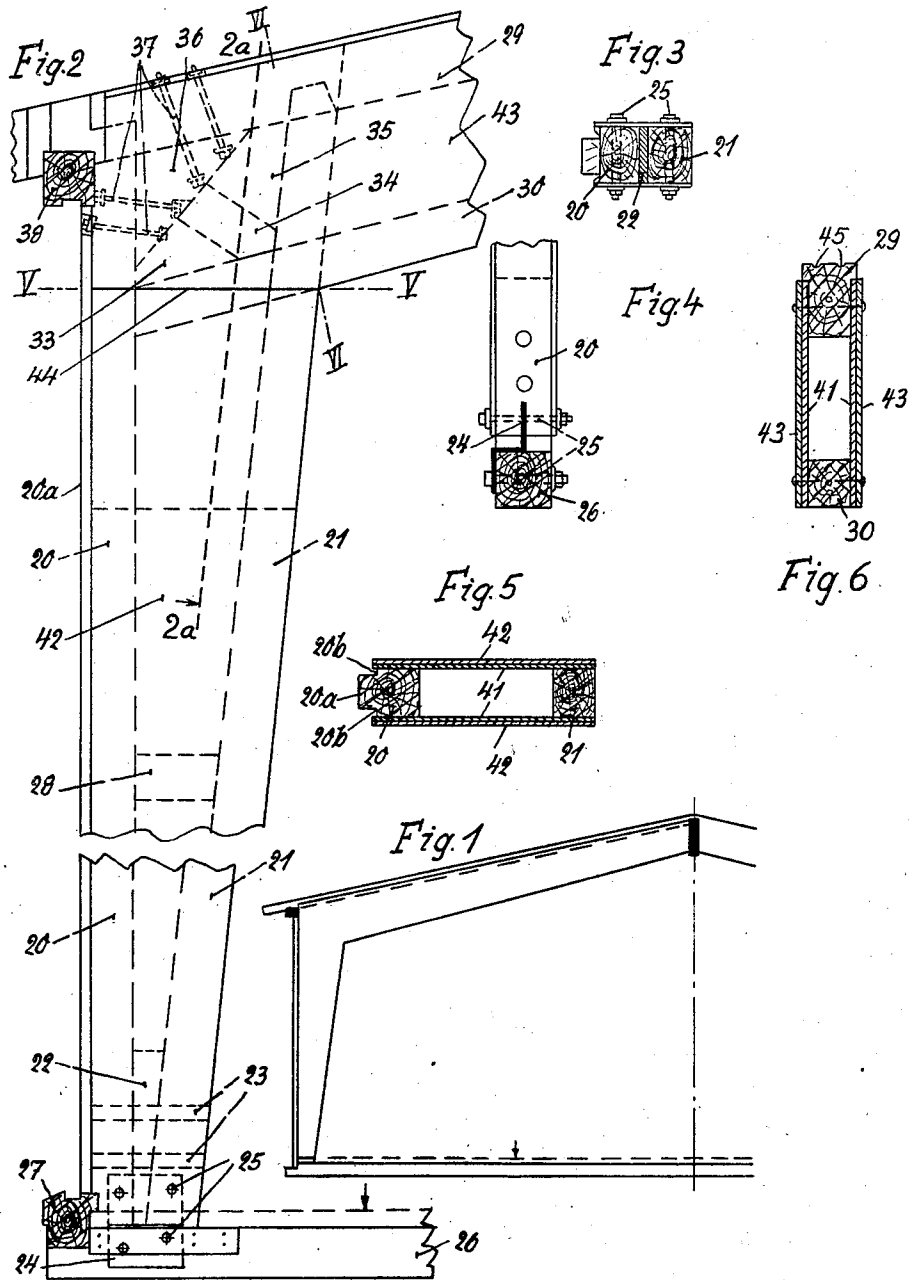
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2,390,180

WOODEN FRAME TRUSS

Filed Oct. 19, 1938

3 Sheets-Sheet 1



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WOODEN FRAME TRUSS

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3 Sheets-Sheet 2

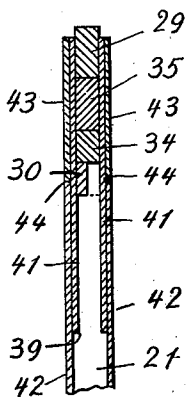
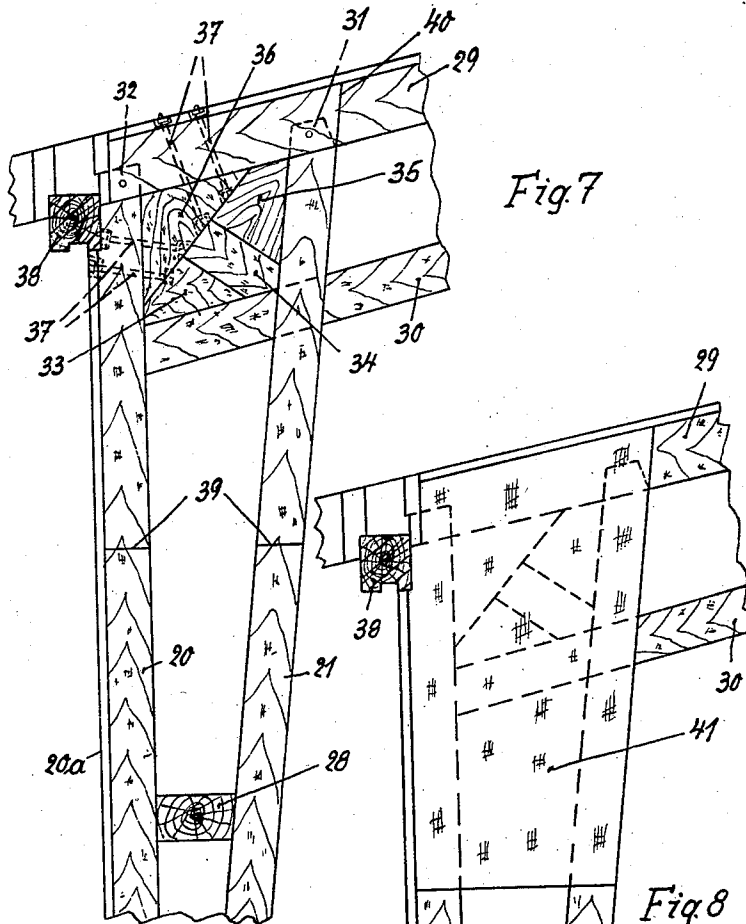


Fig. 2a

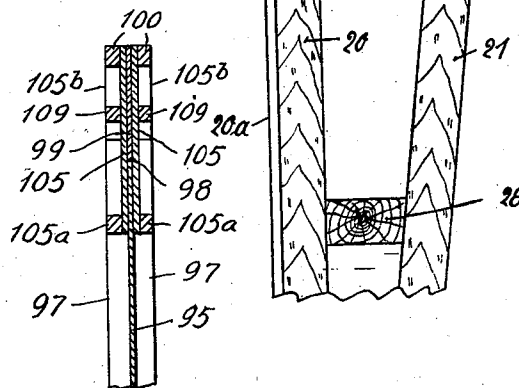


Fig. 9a

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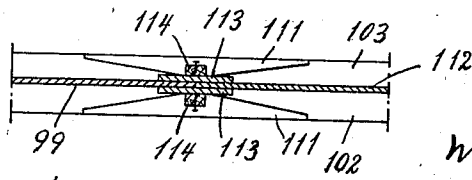
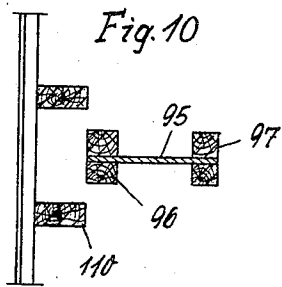
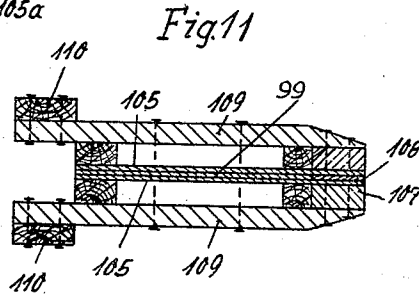
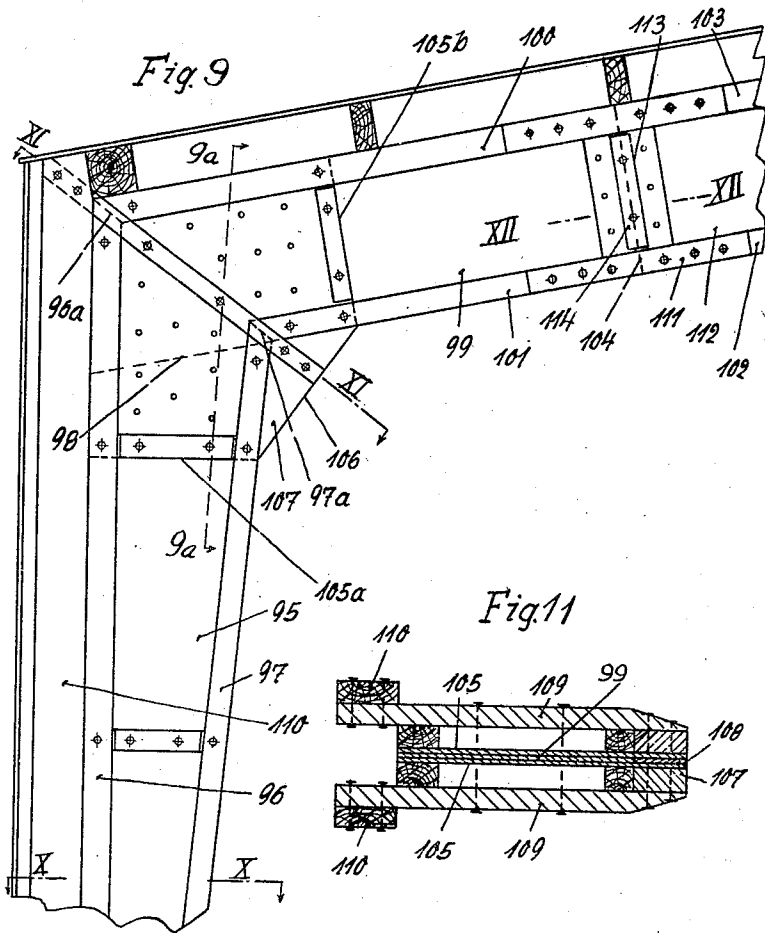
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WOODEN FRAME TRUSS

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3 Sheets-Sheet 3



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# UNITED STATES PATENT OFFICE

2,390,180

## WOODEN FRAME TRUSS

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vested in the Alien Property Custodian

Application October 19, 1938, Serial No. 235,842  
In Germany January 26, 1937

6 Claims. (Cl. 20—0.5)

This invention relates to frame trusses of box or I-cross-section in which the webs consist of plywood and the flanges of rectangular timber, all the parts being secured together by means of artificial resin glue. It thus relates to wooden solid wall frame trusses which are extremely well adapted to the nature of the material.

The invention deals with the problem of satisfactorily transmitting by simple means the forces arising at the structural and assembly junctions. According to the invention this problem is solved by a joint covering plate having the full height of the girder being glued in at each corner of the frame in a suitable depression in the rectangular timber flange. This joint covering plate transmits not only the forces in the web but also the forces in the flanges. The said plate can be adapted to the contour of the upper end of the truss upright. In frame trusses of I-cross-section however the joint covering plate or each of the plates arranged on both sides of the web is preferably so constructed as to project over the inner corner of the frame. At this projecting part of the plate by means of lining pieces the cheeks of stiffening tongues are secured which extend over the outer side of the flanges and so far over the outer frame corner that the ends of the cheeks projecting beyond the outer frame corner can be connected with the wall uprights of the construction.

The invention makes possible the construction of frame trusses of box or I-cross-section, the continuous webs of which consist of plywood while the flanges consist of rectangular timber, all parts being secured together by glueing. The frame trusses constructed according to the invention have a very great strength and are suitable for large spans. The external appearance of these trusses is exactly the same as that of the known welded steel frame trusses.

Some constructional examples of the invention are illustrated in the accompanying drawings.

Fig. 1 shows diagrammatically the profile of a continuous wall frame truss.

Fig. 2 shows on a larger scale the left-hand truss upright and the jointing part of the cross member. The frame corner is fitted with the joint covering plate according to the invention.

Fig. 2a is a vertical section on the line 2a of Fig. 2.

Fig. 3 is an elevation from below of the foot of the truss.

Fig. 4 is a side elevation of the truss foot according to Fig. 3.

Fig. 5 is a plan view of the truss upright in section on line V—V of Fig. 2.

Fig. 6 is an end elevation of the cross member in section on the line VI—VI of Fig. 2.

Fig. 7 shows the truss corner before the application of the plywood plates on the same scale as in Fig. 2.

Fig. 8 shows the same frame corner as in Fig. 7 after the application of the joint covering plate.

In Figs. 9 to 12 a second constructional form of the truss with I-cross-section according to the invention is illustrated.

Fig. 9 is an elevation of the truss corner.

Fig. 9a is a vertical section on the line 9a of Fig. 9.

Fig. 10 is a section through the upright on the line 10—10 in Fig. 9.

Fig. 11 is a section on the line 11—11 of Fig. 9.

Fig. 12 is a section on the line 12—12 in Fig. 9.

The truss upright consists of the two rectangular timber flanges 20 and 21 which at their foot ends are connected together by means of a glued in wooden wedge piece 22 and hard wood dowels 23. The foot covering consists of a Z-shaped metal member 24 which is secured in the foot by means of screw bolts 25. By means of the covering 24 the foot of the truss upright rests upon the bearing timber 26 as shown in Fig. 4. 27 is the longitudinal sill which rests on the heads of the bearing timbers. About halfway up between the rectangular timbers 20 and 21 a rectangular timber member 28 is inserted. This member 28 is firmly secured to the two flanges both by glueing and by nailing. 29 and 30 are the flanges of the truss cross member which also consists of rectangular timber. The flange 21 of the upright is extended beyond the flange 30 of the cross member and is tenon jointed to the upper member 29 (reference numeral 31). At the point of intersection the flanges 21 and 30 are interleaved with one another. The flange 30 is extended up to the inner side of the flange 20 of the truss web while the upper end of the flange 20 is tenon jointed to the left-hand end of the flange 29 at 32. The space in the corner enclosed by the flanges 20, 21, 29 and 30 is completely filled by means of three pieces of rectangular timber 33, 34 and 35 and a hard wood cleat 36. The pieces of rectangular timber are glued together and to the flanges. The bolts 37 serve for connecting the hard wood cleat with the flanges 20 and 29 during the assembly of the truss. When left in the truss they increase the strength and stiffness of the corner. 38 is a wall frame which together with the bearing sill 27

serves for securing the wall plates which are not illustrated. Fig. 7 shows the arrangement described before glueing on the plywood plates. The flanges 20 and 21 are provided on each side with a recess which begins at the point 39 and extends to the upper edge of the flange 29. The flange 29 is also provided with a corresponding recess, the right-hand end of which is indicated by the line 40. In this recess on each side of the truss there is inserted firstly a joint covering plate 41 of plywood as shown in Fig. 8. This plate is secured to the surface of the rectangular timbers which it touches by means of glue, preferably artificial resin glue. It serves for transmitting the forces from the truss upright to the cross member and vice versa and bridges over the joint at the corner of the plywood web plates 42 and 43. This joint is indicated in Fig. 2 by the reference 44; at this point the abutting plywood plates 42 and 43 are glued together. The flanges 20 and 21 are also covered by means of the plywood plates 42. Since the plywood plate 42 is secured to these rectangular timbers by glueing on all surfaces where it touches the flanges there is obtained an upright of box form cross-section consisting entirely of wood. The same applies to the truss cross-member which consists of a girder with box form cross-section, the web being formed by the two plywood plates 43 and the flanges by the two rectangular timbers 29 and 30. Fig. 5 shows that the flange 20 of the upright is also provided with a part 20a projecting over the outer edge of the web 42 which also has two grooves or channels 20b running in the same direction. In the vicinity of the joint covering plate 41 the outer wall of each groove 20b is formed from the correspondingly projecting edge of the plate 41. This arrangement is made for securing the wall plates which are not illustrated.

Figs. 9 to 11 show another constructional form for a truss of I-cross section. The upright consists of the plywood web 95 and the flanges each made of two glued-on rectangular timbers 96, 97. The web 95 extends from the foot which is not illustrated up to the joint 98 while the flanges 96 and 97 end at the points 96a, 97a. At these points suitable rectangular timber members 100, 101 are applied and glued on, which extend in the direction of the flanges 102, 103 of the cross member. The members 100, 101 are glued on to a plywood web 99 in exactly the same way as flanges 96 and 97 and like this web end at the line 104. This line is the joint between the upright and the cross member. The plywood web 99 extends from the line 104 up to the left-hand edge of the flange 96. At the line 98 the lower end of the plywood plate 99 abuts against the upper edge of the plate 95. The joint is effected by means of artificial resin glue and is bridged over by a joint covering plate 105 also consisting of plywood. As is shown in Fig. 11, such a joint covering plate 105 is arranged on each side of the plywood web plate 99. Each joint covering plate 105 extends from the line 105a to the line 105b. The inner edge of the joint covering plate however does not follow the line of the inner edges of the flanges 97 and 101 but extends beyond the inner corner of the truss. The inner corner of each joint covering plate 105 thus follows the line 106. On the parts of the joint covering plate projecting over the inner corner of the frame rectangular lining members 107 are glued; moreover the space between the two projecting parts of the two joint covering plates is

filled by an inserted triangular plate 108. All the parts are connected together by means of artificial resin glue. The timbers 96, 97, 100 and 101 are provided with suitable recesses where they meet the joint covering plates. The frame corner is stiffened by means of wooden plates 109. The wooden plates are bolted to linings 107 and the ends of the two joint covering plates which project over the inner frame corner and extend beyond the outer side of the flanges. They extend beyond the outer corner of the frame and are bolted to the wall uprights 110. At the joints 104 the rectangular timbers 100, 101, 102 and 103 are sharpened as shown in Fig. 12. Fig. 12 shows a plan view in section on the line 12-12 of Fig. 9. On account of this sharpening of the timbers wedge-shaped spaces are formed in which suitable wooden wedges 111 are inserted. The wedges 111 project over the joints and are bolted to the flanges. The joints between the plywood web plate 112 of the cross member and the plywood plate 99 is bridged over by a wooden plate 113, such a plate being provided on each side of the joint. Moreover wooden plates 114 are provided which are bolted together.

All the connections between the individual components are effected by glue joints with artificial resin glue or an equivalent glue with the exception of those which are specifically stated to be bolted joints.

What I claim is:

1. In a continuous wall frame truss, a truss upright and a truss cross member, the said cross member and the said upright each comprising an outer flange, an inner flange and at least one wooden web plate, each said flange consisting of timber with rectangular cross section, and being connected to the sides of the web-plate by means of glue with one face lying flush with the respective edge of the web-plate, the web-plate of the cross member abutting with the upper end of the web-plate of the upright, the abutting ends of said web-plates being connected together by means of glue, and a joint covering plate at the frame corner covering the glue-joint between the abutting ends of the web-plates, the said joint-covering plate reaching from the outer bounding line to the inner bounding line of the web-plate of the cross member and from the outer bounding line to the inner bounding line of the upright, the said joint covering plate having its faces connected to all said flanges and to the web-plates by means of glue.

2. In a continuous wall frame truss, a truss upright and a truss cross member, each of said upright and cross member comprising two flanges consisting of timbers of rectangular cross section, and at least one web-plate formed of plywood, the said timbers and the said web-plate being connected together by means of glue, the web-plate of the truss cross member abutting against the upper end of the web-plate of the truss upright, the said web-plates being connected together by means of glue, each flange of the truss upright being provided with a recess at both faces parallel to the web-plate, the width of each said recess being equal to the width of the respective flange, each said recess reaching from a point below the joint between the upper end of the web-plate of the truss upright and the end of the web-plate of the truss cross member to the upper end of the flange, each flange of the truss cross member being provided with a recess at both faces parallel to the web-plate, the width of

the said recess being equal to the width of the flange, each said recess reaching from the end of the flange to a point beyond the inner flange of the truss upright, and a joint covering plate, the said recesses forming a space for the reception of said joint covering plate reaching from the outer bounding line to the inner bounding line of the frame corner, the depth of said space being equal to the thickness of the joint covering plate, the last mentioned plate having its faces connected to the flanges and to the web-plates by means of glue.

3. In a continuous wall frame truss with box cross section, a truss upright and a truss cross member, each upright and cross member comprising an outer flange, an inner flange and two web-plates, the flanges consisting of timber with rectangular cross section, the said web-plates being formed of plywood, the web-plates and the flanges being connected together by means of glue, the two flanges of each upright extending up to the outer flange of the cross member, the web-plates of the cross member abutting the upper ends of the web-plates of the upright, the abutting ends of said web-plates being connected together by means of glue, a first recess provided in the two faces of each flange of the truss upright, which are parallel to the web-plates, each said recess extending from a point below the joint between the abutting ends of the web-plates of the cross member and of the upright to the upper end of the flanges a second recess provided in the two faces of each flange of the cross member and extending from the end of each flange to a line lying in the plane of the inner face of the inner flange of the truss upright, the width of each said recess being equal to the width of the corresponding flange, a joint covering plate at each side of the frame corner inserted in the said recesses so as to fill out the space between the recesses and the respective web-plates, each joint covering plate having a thickness equal to the depth of the recesses and extending from the outside of the outer flange to the inside of the inner flange of the truss upright the faces of the joint covering plate being glued to the flanges and web-plates of the upright and cross-member.

4. In a continuous wall frame truss as claimed in claim 3, the inner flange of the cross member abutting against the outer flange of the truss upright, the inner flange of the cross member

being connected to the inner flange of the truss upright by means of a halved joint at the point of intersection, the space enclosed by the flanges of the cross member and of the truss upright being completely filled by means of wood-pieces, which are glued together and to the flanges.

5. In a continuous wall frame truss with I cross section, a truss upright and a truss cross member, each of said upright and cross members comprising a web-plate made of plywood, an outer flange and an inner flange, each said flanges consisting of two timbers of rectangular cross section, the two said timbers of each flange being arranged at opposite sides of the web-plate and connected to said web-plate by means of glue, the web-plate of the cross member abutting at its end with the upper end of the web-plate of the truss upright, the abutting ends of the said web-plates being connected by means of glue, each timber of each flange of the truss upright being provided with a first recess at that side, at which it is connected to the web-plate by means of glue. each said first recesses extending from the upper end of each flange to a point below the joint between the abutting ends of the web-plates, each timber of each flange of the cross member being provided at its end with a second recess at that side at which the timbers are connected with the web-plate by means of glue, each said second recess reaching from the end of each flange to a point beyond the joint between the abutting ends of web-plates, each said first and each said second recesses having a width equal to the width of the flange timbers and all recesses having equal depth, joint covering plates at the frame corner arranged at opposite sides of the joint between the abutting ends of the web-plates, each said joint covering plate being inserted in the respective first and second recesses so as to completely fill the said recesses, and having its faces connected to the web-plates and to the flanges by means of glue.

6. In a continuous wall frame as claimed in claim 5 a part of each said joint covering plate projecting across the inner corner of the frame truss, a filling plate inserted in the space between the projecting parts of the two joint covering plates at the frame truss corner and being connected to the said joint covering plates and to the web-plates by means of glue.

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