Jan. 14, 1969 J. W. CHANEY 3,421,270

PREFABRICATED ROOF

Filed March 10, 1967 Sheet 1 of 2

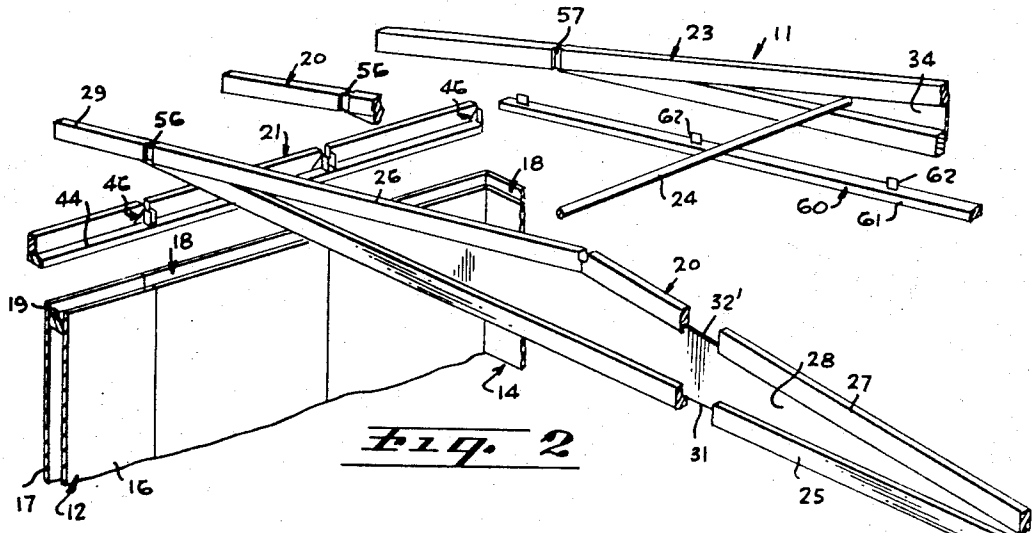


Fig. 2

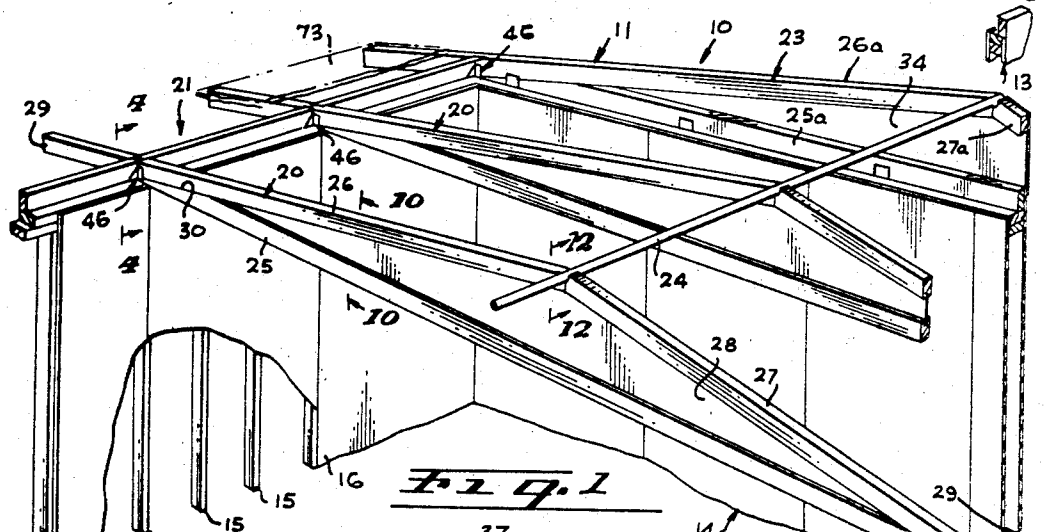


Fig. 1

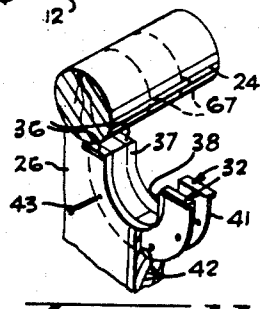


Fig. 11

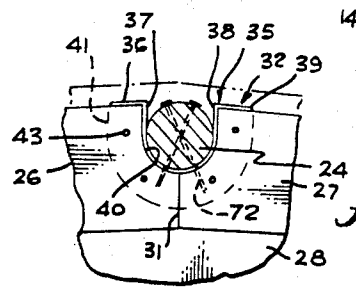


Fig. 12

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Fig. 3

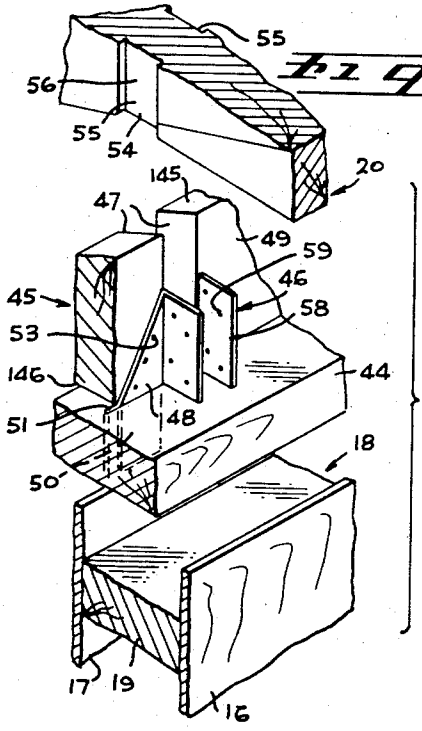


Fig. 4

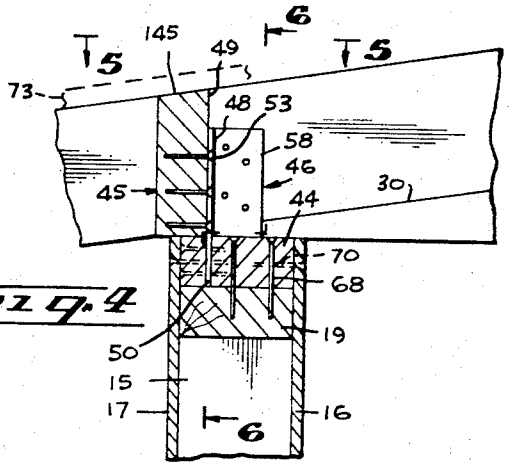


Fig. 5

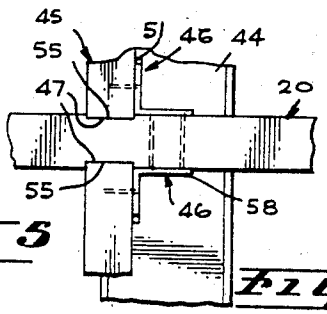


Fig. 10

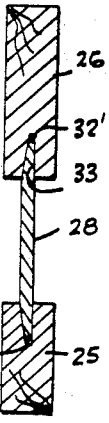


Fig. 6

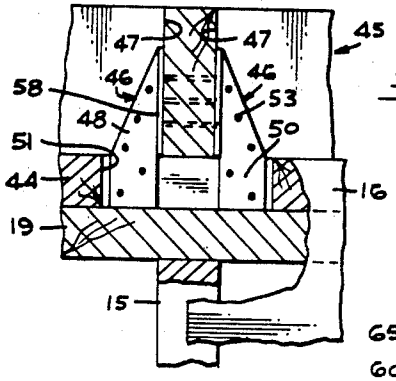


Fig. 7

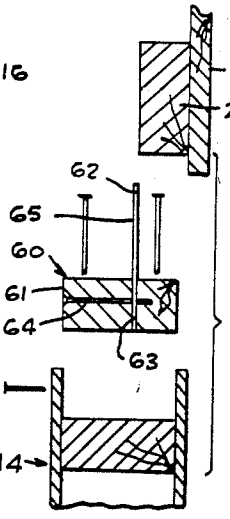
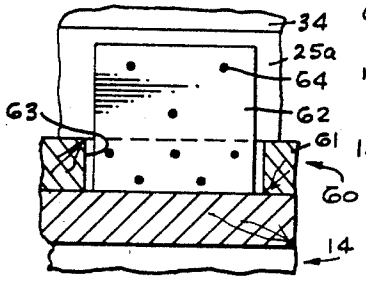


Fig. 8

Fig. 9



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PREFABRICATED ROOF

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Continuation-in-part of application Ser. No. 280,269, May 14, 1963. This application Mar. 10, 1967, Ser. No. 622,140
U.S. Cl. 52—90 10 Claims
Int. Cl. E04b 7/02; E04b 1/00; E04b 1/32

ABSTRACT OF THE DISCLOSURE

A prefabricated roof including a series of spaced beams and a ridge pole extending therebetween, with the beams having upper surfaces inclined upwardly to a peak location at which the beams are recessed beneath the planes of the inclined surfaces to receive the ridge pole essentially beneath those planes. The ridge pole may have spaced markings at which it is to be connected to the beams, to facilitate accurate spacing of the beams during assembly.

Cross reference to related application

This application is a continuation-in-part of my co-pending application Ser. No. 280,269, filed May 14, 1963, now Patent No. 3,308,584, on "Prefabricated Roof Structure."

Background of the invention

The invention relates to prefabricated roof structures for homes and other buildings, of a type in which as much as possible of the construction work is performed at a manufacturing plant by mass production methods, in a manner producing a number of component subassemblies or parts which may be very easily assembled by relatively unskilled labor at the actual building location.

Though there have in the past been numerous proposals for different types of prefabricated houses or other building structures, none of these with which I am familiar has met with the commercial success which would be desired, usually by reason of such factors as the complexity of the subassemblies utilized as the building units in the different systems, their excessive cost, difficulty of manufacture and/or assembly, inadequate structural strength, inability of the different designs to satisfy the usual code requirements, and other similar deficiencies. Because of these problems, most construction of houses and similar small buildings is even to the present date performed by conventional carpentry methods according to which the various boards and other components are cut to size, fitted, secured together, and otherwise almost completely shaped and assembled right at the construction location.

Summary of the invention

The present invention discloses a unique prefabricated roof structure including a series of desirably substantially identical beams which are pre-manufactured at a factory and are easily assembled with an interconnecting ridge pole at the point of use. The preferred construction of the beams per se, and their manner of connection to the supporting walls, are disclosed and claimed in my above mentioned co-pending application.

The present invention has the advantage of so locating the ridge pole that it may effectively interconnect the beams in properly spaced position, but with the ridge pole being received low enough relative to the beams to avoid interference by the ridge pole with the roof covering which is ultimately secured to the beams. More particularly, the beams may be defined as having upper surfaces which are inclined upwardly to predetermined peak portions of the beams, and as having recesses which extend downwardly into the material of the beams at those peak locations, and to a level beneath the planes of the inclined upper surfaces of the beams. The ridge pole is then received within the recesses, and is itself desirably located essentially beneath the planes of the upper inclined surfaces of the beams, and may be nailed to the beams to secure them together in spaced relation. Preferably, the ridge pole has markings which are preformed on it in a manner indicating accurately the proper spacing of the beams, so that the ridge pole serves as a measuring element or jig for facilitating ultimate assembly of the roof structure. The beams desirably carry brackets at the recess locations, which brackets may connect together two inclined top members of each beam, and which brackets may also be recessed in correspondence with the beams themselves for reception of the ridge pole.

Brief description of the drawings

FIG. 1 is a fragmentary perspective representation of a building having a roof structure whose framework is constructed in accordance with the invention, with the framework being illustrated as it appears prior to application of the actual top roofing material thereto;

FIG. 2 is a view similar to FIG. 1, but showing the various prefabricated sections of the roof structure separately, that is, in exploded form;

FIG. 3 is a fragmentary exploded view similar to a portion of FIG. 2, but greatly enlarged;

FIG. 4 is an enlarged fragmentary vertical section taken on line **4—4** of FIG. 5;

FIG. 5 is a fragmentary plan view taken on line **5—5** of FIG. 4;

FIG. 6 is a fragmentary vertical section taken on line **6—6** of FIG. 4;

FIG. 7 is a fragmentary exploded vertical section illustrating the manner in which the parts interfit at one end of the building;

FIG. 8 shows the parts of FIG. 7 after interconnection;

FIG. 9 is a fragmentary vertical section taken on line **9—9** of FIG. 8;

FIG. 10 is a vertical section taken on line **10—10** of FIG. 1;

FIG. 11 is a fragmentary perspective view representing the manner in which the ridge pole connects to one of the beams; and

FIG. 12 is an enlarged fragmentary vertical section taken on line **12—12** of FIG. 1.

Description of the preferred embodiment

Referring first to FIG. 1, I have illustrated at **10** a corner of a building having a roof structure **11** embodying the invention. The building **10** may typically be considered as of rectangular horizontal section, having two parallel vertical side walls **12** and **13** (FIG. 1), and having two parallel vertical end walls **14** (only one shown) disposed perpendicular to the side walls **12** and **13**. Each of the walls **12**, **13** and **14** may include the usual vertically extending two by four studs **15** to which are nailed inner and outer skin structures **16** and **17**, which skins may take the form of four foot by eight foot panels of plywood or the like. As will be apparent from FIG. 2, the upper edges of skins **16** and **17** project upwardly beyond the upper ends of studs **15**, to form top grooves **18** extending along the upper edges of all of the side and end walls. Within grooves **18** there are mounted first horizontally extending "plate" members, taking the form of

two by fours received within the grooves and nailed to the upper ends of studs **15**.

The roof structure **11** includes a series of identical parallel beams **20** extending transversely of the building and supported at their opposite ends on side walls **12** and **13**. The end portions of the beams are connected to a pair of prefabricated top plate assemblies **21** and **22** extending along the upper edges of side walls **12** and **13**. At the very ends of the building, above end walls **14**, are utilized two end beams **23** (only one shown in FIG. 1). The peaks of the various beams are interconnected by a ridge pole **24**.

Each beam **20** is of triangular configuration, being formed of a bottom horizontally elongated wooden member **25**, two oppositely inclined upper edge boards **26** and **27**, and a vertical panel member **28**. Member **25** may typically be of nominal two inch by four inch cross section, and members **26** and **27** may typically be of nominal two inch by six inch cross section. The outer ends of members **26** and **27** project outwardly beyond the opposite ends of members **25**, at **29**, to support the outwardly projecting eaves of the building. The ends of member **25** are cut off to form inclined surfaces **30** which engage and are rigidly secured to the undersurfaces of elements **26** and **27**, as by nailing or gluing these parts together. At the peak of the triangle formed by each beam **20**, the two boards **26** and **27** meet at abutting vertical surfaces **31** (FIG. 12), and are secured together by a pair of vertical brackets and ridge pole supports **32**.

Load forces are transmitted vertically from inclined upper members **26** and **27** to the lower horizontal element **25** through panel **28**, which may take the form of a triangular sheet of plywood, or other flat rigid sheeting material. The triangular configuration of panel **28** is essentially the same as that defined by members **25**, **26** and **27**, so that member **28** has a horizontal bottom edge **31** (FIG. 10) connected to member **25**, and two oppositely inclined converging top edges **32'** of an inclination corresponding to, and attached to, members **26** and **27** respectively. As seen clearly, each of the edges **31** and **32'** is received within a mating groove **33** formed in the upper surface of member **25**, or the undersurface of member **26** or **27**. The edges of panel **28** taper progressively as seen in FIG. 10, and the grooves are of similarly tapering cross sectional shape, so that the panel edges may nest very tightly within the grooves in a manner preventing any lateral shifting movement of the retained panel edges, and thereby assuring effective and accurate location of the panel relative to members **25**, **26** and **27**. The panel is secured to the other parts by gluing the tapering edges of the triangular panel to the members **25**, **26** and **27** at locations within grooves **33**, and continuously along the periphery of panel **28**. Thus, elements **25**, **26**, **27** and **28** form together a strong prefabricated beam structure which is capable of taking very heavy load forces in use.

The end beams **23** which are provided at opposite ends of the building may be of different construction, to include a triangular outer skin element **34** which is nailed or otherwise secured rigidly to the outer surfaces of three triangularly arranged boards **25***a*, **26***a* and **27***a*. These boards **25***a*, **26***a* and **27***a* may be structurally the same as, or very similar to, the corresponding elements **25**, **26** and **27** of the rest of the beams. Element **34** may overhang the side wall slightly as shown at **134** in FIG. 8, to provide for water runoff.

Ridge pole **24** is a rigid straight typically wooden member which preferably is of straight cylindrical external shape. The two connecting and supporting elements **32** (FIGS. 11 and 12) secured to each beam **20** or **23** may be formed of sheet metal deformed to provide an upper turned flange **35** which extends along the upper edge of element **26** at **36**, then extends downwardly at **37** and back upwardly at **38** to form a U-shaped socket for receiving pole **24**, and finally extends essentially horizontally at **39** for a short distance along the upper surface of member **27**. Parts **26** and **27** are notched out to form together a U-shaped recess or socket **40** corresponding in vertical section to the shape of portion **37–38** of the elements **32**. Projecting downwardly and outwardly from the flange portion **35** (**36**, **37**, **38**, **39**) of element **32**, this element has a radially outwardly projecting fin **41** which is received within an arcuate saw cut or narrow recess **42** formed in parts **26** and **27**, and is secured to those parts by fasteners **43**. Each of the fasteners **43** is driven horizontally through the wood of one of the members **26** or **27**, and through apertures which are preformed in fins **41** of the two carried elements **32**, so that each part **32** is secured tightly to both of the elements **26** and **27**, and therefore acts to retain these parts together in assembled relation. It is contemplated that fasteners **43** may be nails, but it is preferred that they be fasteners of the type referred to as "drive screws," that is, screws having a very long pitch so that they may be driven rather than screwed into their installed positions. If desired, a single one of the elements **32** may of course be utilized instead of the illustrated two, in each of the beams, through two elements are preferred.

As seen best in FIG. 2, each of the prefabricated top plate assemblies **21** includes a horizontally elongated top plate proper **44**, which, like plate **19** is desirably of nominal two inch by four inch cross section. Plate **44** is adapted to be received within groove **18** above element **19**, and to be nailed to element **19**, with the upper surface of plate **44** then being received in horizontal alignment with the horizontal upper edges of skins **16** and **17** of the side and end walls.

In addition to top plate element **44**, each assembly **21** includes a series of longitudinally aligned blocking members **45**, which are secured to plate **44** by brackets **46**. Elements **45** may be approximately of nominal two inch by five inch cross section, with the upper edge **145** being cut at an inclination corresponding to the upper surfaces of members **26** and **27**, and with members **45** overhanging the outer edge of element **44** a short distance at **146** as will be apparent from consideration of FIGS. 3 and 4. Adjacent ones of the members **46** have opposed parallel vertical end surfaces **47** (FIGS. 3 and 5) between which an end of one of the beams **20** is received and confined in assembled condition of the roof structure. Elements **45** are secured to top plate **44**, in the illustrated relationship, by brackets **46**, each of which has a first vertical portion **48** engaging an inner surface **49** of one of the elements **45** and projecting downwardly at **50** (FIG. 3) into a saw cut or other narrow vertical slit **51** formed in plate **44**. Nails **52** (FIG. 4) are driven into element **44** and through preformed openings in portion **48** of each bracket **46**, to rigidly secure the bracket to member **44**. Similarly, nails may be driven through openings in the upper portion of bracket **46** at **53** (FIGS. 3 and 4) and into element **45** to secure parts **44** and **45** together through the medium of the bracket.

The spacing between parallel opposed vertical surfaces **47** of adjacent members **45** is accurately predetermined to exactly receive and confine a reduced thickness portion **54** of one of the beams **20**. This reduced thickness portion is formed in the beam, near its end, by providing two vertical grooves **55** in the opposite sides of members **25** and **26**, or **25** and **27**, with the grooves being dimensioned to exactly receive and interfit with the ends of the engaged boards **45**. The spacing between the inner surfaces **56** of grooves **55** corresponds substantially exactly to, or may be vary slightly less than, the previously mentioned spacing between surfaces **47** of elements **45**. Each of the end beams **23** may have a corresponding vertical groove at **57** (FIGS. 1 and 2) in only one of its sides, for receiving an end one of the blocking members **45**.

To attach the beams in position, each bracket **46** has a portion **58** (FIG. 3) turned at right angles to portion **48**, and disposed parallel to surfaces **47**, at locations such that two of the spaced portions **58** engage opposite sides of each of the members **26** and **27**, to be secured there-

to by nails driven through preformed apertures **59** in portions **58**. The end one of the elements **45** carries at its extremity a single bracket **46** which similarly engages and is nailed to element **26***a* or **27***a*.

The top plate assembly **60** (FIGS. 1 and 2) which extends along the upper edge of each end wall **14** of the building, includes a plate element **61** which may be the same as element **44** of assembly **21**, except that it does not carry blocking members **45** and brackets **46**. Instead, element **61** carries a series of spaced upwardly projecting brackets **62**, which may be simple sheet metal elements (FIG. 7) received within vertical saw cuts or narrow slits **63** in element **61**, and secured therein by nails **64** driven through elements **61** and **62**. The sheet metal elements **62** project upwardly above element **61**, at **65** (FIG. 7), and may contain preformed apertures **66** through which nails may be driven into member **25***a* to secure beam **23** to assembly **60** through the medium of brackets **62**.

To now describe the manner of assembly of the roof structure illustrated in the figures, assume first of all that the various walls **12**, **13** and **14** have been erected to the condition illustrated in FIG. 2, to provide four vertical walls having groves **18** extending along their upper edges. The roof is delivered to the building site in the form of a number of prefabricated units, including the required number of main beams **20**, two end beams **23**, prefabricated top plate assemblies **21** of proper length to extend along side walls **12** and **13**, and prefabricated top plate assemblies **60** of a length to extend along the end walls **14**. Also included is a ridge pole **24** cut to a length corresponding to the length of the peak portion of the roof to be formed, and with the ridge pole preferably having formed on it markings **67** which are measured to indicate exactly where the opposide side surfaces of each beam are to meet the ridge pole.

After erection of the walls of the building, the next step may be to place top plate assemblies **21** and **60** within the proper grooves **18** in the tops of the walls, following which these assemblies may be secured in those positions by driving nails downwardly through elements **44** and **61** into the lower plate elements **19** (as indicated at **68** and **69** in FIGS. 4 and 8). Also, nails may be driven horizontally through the inner and outer skins of the side wall structures and into elements **44** and **61**, as indicated at **70** and **71** in FIGS. 4 and 8.

Beams **20** may be moved into position successively, by slipping each of the beams downwardly at the proper location so that its grooved reduced thickness portion **54** is received between the opposed end surfaces **47** of a pair of blocking members **45**. Nails are driven through apertures **59** of brackets **46** and into the beams to secure the beams in these positions. Also, end beams **23** are moved into position, and are secured in their assembled positions by nails driven through brackets **46** and **62** and into members **25***a*, **26***a* and **27***a*.

The peak portions of the beams are secured in proper relation by locating ridge pole **24** within connector parts **32** carried by the peaks of the beams, and then driving nails downwardly through the ridge pole and into members **26**, **27**, **26***a* and **27***a*, as indicated at **72** in FIG. 12. Before driving these nails into the ridge pole and a particular beam, the pole and beam are accurately located relative to one another, by aligning markings **67** with the opposoite sides of the beam, so that the peaks of the beams are spaced proper distances apart, corresponding to the distances that the ends of the beams are spaced apart. Thus, the beams are maintained in parallel relation.

After the entire illustrated roof frame has been assembled, conventional sheeting or other roofing material may be applied to the upper surfaces of the beams, and the upper surfaces of blocking elements **46**, and with this sheeting material being receivable above ridge pole **24** by virtue of the fact that the ridge pole is recessed downwardly so that the uppermost surface of the ridge pole is essentially aligned with the top surfaces of beam elements **26**, **27**, **26***a* and **27***a* (see FIG. 12). In FIGS. **1**, **4** and **12**, the top sheeting is indicated fragmentarily and in broken lines at **73**.

I claim:

1. A prefabricated roof structure for a building including a plurality of similar beams, individual ones of said beams including two oppositely inclined upper members having upper surfaces which are inclined upwardly and toward one another to a predetermined peak location, said two members of an individual beam having having adjacent complementary recesses formed therein at said peak location, and a ridge pole to extend between said beams and be received partially within each of said recesses of the two members of an individual beam and at a location essentially beneath the planes of said upper surfaces, said two recesses in the two members of an individual beam forming together a combined overall recess which faces and opens upwardly in a relation enabling said ridge pole to be moved downwardly into the recess and then be retained therein, and said two members having portions which project toward one another at the underside of said combined recess and are secured in fixed relative positions prior to movement of said ridge pole downwardly into the combined recess.

2. A prefabricated roof structure as recited in claim **1**, including a bracket interconnecting said two members at said peak location and lining both of said two complementary recesses but open to movement of said ridge pole downwardly into the bracket.

3. A prefabricated roof structure as recited in claim **1**, including a bracket interconnecting said two members at said peak location and lining both of said two complementary recesses but open to movement of said ridge pole downwardly into the bracket, said bracket having portions projecting into and retained and located within slits in said two members and having another portion defining an arcuate seat forming an upwardly opening ridge pole receiving recess shaped essentially the same as said combined recess formed by the two members.

4. A prefabricated roof structure as recited in claim **1**, in which said ridge pole is externally substantially cylindrical, and said two recesses in the two members of an individual beam are both of upwardly facing partially cylindrical configuration to complementally embrace different portions of the underside of the cylindrical ridge pole.

5. A prefabricated roof structure as recited in claim **1**, including spaced markings on said ridge pole designating a plurality of predetermined locations at which said ridge pole is to be connected to a plurality of beams.

6. A prefabricated roof structure as recited in claim **1**, including spaced markings on said ridge pole, and nails securing said ridge pole to a series of said beams at the locations of said spaced markings to form an assembled frame for a roof having said ridge pole located essentially within said recesses and beneath the planes of said inclined surfaces.

7. A prefabricated roof structure as recited in claim **1**, in which said ridge pole is externally substantially cylindrical, and said two recesses in the two members of an individual beam are both of upwardly facing substantially identical partially cylindrical configuration to complementally embrace different portions of the underside of the cylindrical ridge pole, there being a bracket interconnecting said two members at said peak location and lining both of said two complementary recesses but open to movement of said ridge pole downwardly into the bracket, said bracket having a peripheral flange projecting into and retained and located within slits in said two members and having a portion connected to said flange and defining an arcuate seat forming an upwardly facing ridge pole receiving recess shaped essentially the same as said combined recess formed by the two mem-

bers, and nails extending through said members and said flange to secure said bracket to the members.

8. A prefabricated roof structure as recited in claim **1**, including a bracket interconnecting said two members at said peak location and lining both of said two complementary recesses but open to movement of said ridge pole downwardly into the bracket, said bracket having a peripheral flange projecting into and retained and located within slits in said two members and having another portion defining an arcuate seat forming an upwardly opening ridge pole receiving recess shaped essentially the same as said combined recess formed by the two members, and nails extending through said members and said flange to secure said bracket to the members.

9. A prefabricated roof structure for a building including a plurality of similar beams, individual ones of said beams including two oppositely inclined upper members having upper surfaces which are inclined upwardly and toward one another to a predetermined peak location, said beams containing upwardly facing recesses at said peak locations, a ridge pole to extend between said beams and be received within said recesses, a bracket interconnecting said two members of an individual beam at the location of said recess in that beam and having flange portions projecting into slits in the two members, and nails extending through said members and through said flange portions of the bracket within said slits to secure the bracket to said members.

10. A prefabricated roof structure as recited in claim

9, including a pair of said brackets interconnecting said two members at said peak location and having flanges projecting into spaced slits in the members, said two brackets having additional portions lining said recess at spaced locations, and at least one nail extending through said ridge pole and into one of said members at a location between said additional portions of the two brackets.

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P. C. FAW, JR., *Assistant Examiner.*

U.S. Cl. X.R.

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