

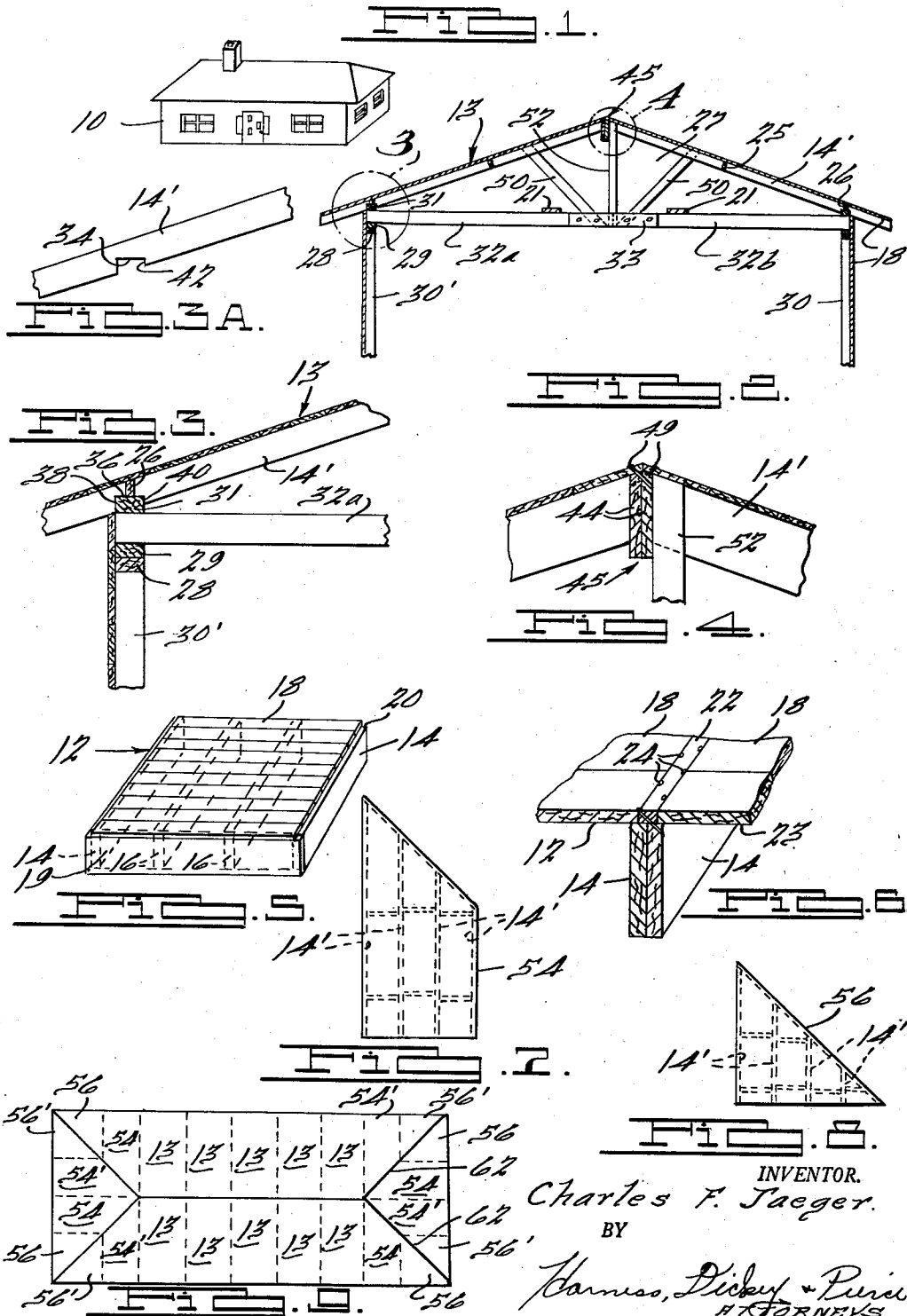
April 21, 1959

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2,882,557

PREFABRICATED HOUSE PANELS AND METHOD OF ASSEMBLING THEM

Filed March 5, 1956



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2,882,557

PREFABRICATED HOUSE PANELS AND METHOD OF ASSEMBLING THEM

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Application March 5, 1956, Serial No. 569,418

2 Claims. (Cl. 20—2)

This invention relates to improved house panels and methods of assembling them to form wall, floor and roof sections of houses.

One object of the instant invention is to provide an improved house construction.

Another object is to provide improved panels for house construction and improved methods of assembling them to form floors, walls and roofs.

Another object is to improve methods of assembling panel sections to form floors, walls and roofs of houses.

These and other objects are accomplished by the instant invention which provides improved roof panels including rafters having three-sided notches cut therein to engage the plates extending along the side wall studs of a house frame for positive engagement therewith. Roof panels according to the invention also include ridge portions which are secured to and extend along the ends of the rafters of each panel. The ridge portions of two opposite panels are adapted to be secured together to form a full, standard ridge. According to another feature of the invention, alignment and securing together of adjacent panels of walls, floors or roofs is facilitated by constructing the panels so that the sheathing or sub-flooring extends over only a portion of the end joists, studs or rafters of each panel leaving a portion of the edge of the joist, stud or rafter exposed. When two panels are abutted, there is a gap in the sheathing between the two panels, and this gap is then filled with a spline nailed alternately along its length to the two abutting joists, studs or rafters. In nailing, this spline draws the adjoining joists, studs or rafters into alignment and firmly secures them together to form a smooth, even joint between the panels. No nails or other fastening means need be driven through the complete thicknesses of the abutting members.

The invention will be described in greater detail in connection with the accompanying drawing of which:

Figure 1 is a perspective view of a prefabricated house according to the invention;

Fig. 2 is a transverse, cross-sectional view of a prefabricated house according to the invention showing the frame members thereof;

Fig. 3 is an enlarged view of the portion of the structure shown in Fig. 2 within the circle 3 thereof;

Fig. 3a is a fragmentary, elevational view of a rafter according to the invention, particularly showing the three-sided notch therein;

Fig. 4 is an enlarged view of the portion of the structure shown in Fig. 2 within the circle 4 thereof;

Fig. 5 is an isometric view of a floor panel according to the invention;

Fig. 6 is a fragmentary view of two floor panels according to the invention illustrating the spline method of securing them together;

Fig. 7 is a plan view of a hip roof panel according to the invention;

Fig. 8 is a plan view of another roof panel according to the invention; and

Fig. 9 is a schematic, plan view of a hip roof according to the invention.

A "prefabricated" house according to the instant invention has improved strength, stability and rigidity as compared to previous prefabricated houses. All exterior

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walls, the floors and the roof of the house may be made of prefabricated sections precision cut and assembled on jigs in a factory. Even such relatively difficultly made structures as hip roofs may be readily assembled of prefabricated panels according to the invention. The complete shell, including the exterior walls, roof and floor of a house such as the one shown in Fig. 1 may be made of wooden panels generally similar to the panel 12 shown in Fig. 5 and including longitudinal, spaced, parallel supporting members 14 and 16 secured together by sheathing 18 that completely covers the upper edges of the intermediate members 16, but only partially covers the upper edges 20 of the end members 14. As shown in Fig. 6, two such sections 12 and 23 may be fastened together by a spline 22 which is laid over the exposed surfaces of the supporting members 14 when they are abutted together, and fitted between the sheathing 18 of the respective panels. The spline 22 is nailed to both of the members 14 by nails 24 spaced along its length, alternate ones of the nails 24 being driven diagonally through the spline 22 and into one of the members 14, other ones of the nails 24 being driven in a diagonally opposite direction through the spline 22 and into the other one of the members 14. The nailing tends to align the two members 14 with each other and to produce a smooth, even joint between the two panels 12 and 23.

The wall and floor panels differ principally in the sizes of the structural members 14 and 16. Generally 2" x 8" lumber is used to form floor joists, whereas 2" x 4" lumber suffices for wall studs. The roof panels are generally similar to the wall and floor panels, except for certain essential details to be described hereinafter, and the rafters may be of 2" x 6" lumber. In all of the panels the sheathing may, of course, be applied diagonally across the joists, rafters or studs instead of perpendicularly as shown. A header member 19 is secured across one end of each of the floor panels to form exterior wall sheathing when the panels are assembled in a house. Ceiling panels are also provided, but without the sheathing 18. The ceiling panels comprise spaced, parallel joists secured together by a header across one end and a catwalk brace 21 (Fig. 2) secured across the upper edges of the joists adjacent to their other ends.

The construction of roof panels according to the instant invention and the manner in which they are fitted to the walls of the house are shown in detail in Figs. 2-4. The roof panels include rafters 14' covered by roof sheathing 18. The rafters 14' are reinforced by bridging members 25 set between pairs of rafters of each panel. Header members 26 are provided between the rafters 14' adjacent to their outer ends to seal the attic space 27 against weather. In assembly the floor of the house (not shown) is set upon a suitable foundation, such as a basement or spaced piers. Wall panels including studs 30 are set upright around the perimeter of the floor. Door frames and windows are included in preselected ones of the wall panels and are conventionally secured therein. The wall panels are nailed together by splines 22, as shown in Fig. 6. A pair of plates 28 and 29 extend over and are secured to the upper end of the studs 30. The lower plate 28 is constituted by headers preassembled as part of the individual wall panels. The upper plate 29 is preferably made of relatively long pieces of lumber that overlap the joints between the individual panels and reinforce the splines 22 to hold the panels together. Ceiling panels including joists 32a and 32b are laid upon the upper plates 29 and fastened together at the center of the house by scabs 33. The ceiling panels are secured by nailing the joists 32 to the plates 29, thus providing lateral support to the walls.

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A roof supporting plate 31 is laid upon and secured to the upper side of the joists 32 generally in alignment with the plates 28 and 29 that rest upon the studs 30. This plate 31 is firmly nailed to the ceiling joists 32 and may, if desired, form part of the preassembled ceiling panels.

The rafters 14' of the roof panels rest upon and engage the roof supporting plate 31. As shown particularly in Fig. 3a, each of the rafters 14' is provided with a three-sided notch 34 accurately cut closely to fit the plate 31. When the roof panels 13 are in place, the notches 34 of the rafters engage not only the upper surface 36 of the plate 31 but also both sides 38 and 40 of the plate. The inner edge 42 of the notch engages the interior side 40 of the plate so that the outward thrust of the rafter 14' is borne by the plate 31 without the use of nails or other supplementary fastening means.

As shown in Fig. 4, one end of each of the roof panels 13 is covered by a ridge section 44 which is secured to the ends of the rafters 14' and is about one-half the thickness of a standard ridge. Thus, when two roof panels 13 are placed opposite each other in position to form a full-width roof section, their respective ridge sections 44 may be fastened together to form a ridge 45 of standard thickness. The roof sections may be assembled by simply laying the individual roof panels 13 upon the ceiling joists 32 in the approximate locations where it is desired to erect them. Opposed panels 13 are then lifted at the center of the house to bring the rafter notches 34 into engagement with the plates 31. The roof panels 13 are tilted by raising their inner edges to a joint above the normal position of the ridge 45 and then released so that the ridge sections 44 fall into abutment with each other. The ridge sections 44 are then nailed together firmly to fix the complete roof section in position. If desired, the rafters 14' may be nailed by diagonally driven nails to the plates 31, but such nailing is not necessary since the notches 34 provide positive engagement with the plates 31 and prevent movement of the roof section with respect to the walls of the house in any but a vertical, upward direction.

The roof may be reinforced by truss members 50 secured between central portions of the rafters 14' and the center of the ceiling joists 32. If "clear span" construction is desired it is preferred to support the joists 32 centrally by means of vertical hangers 52 extending from the ridge ends of the rafters 14' downwardly to the joists 32.

A typical panel layout for a hip roof is shown in Fig. 9 and comprises a series of rectangular roof panels 13, eight trapezoidal panels 54 and 54' and eight triangular panels 56 and 56'. Each of the rectangular panels 13 is exactly similar to the panel 13 heretofore described. The trapezoidal panels 54 and 54' are generally similar to the rectangular panels 13 except that in place of a ridge section 44 disposed across the ends of the rafters 14' and perpendicular thereto they include hip rafter sections (not shown) disposed diagonally across the ends of the rafters. All except one of the rafters 14' of the trapezoidal sections 54 and 54' are jack rafters, being progressively shorter, one with respect to another. Each of the trapezoidal sections 54 and 54' includes a single common rafter 14' which is joined to a rafter 14' of the adjoining rectangular roof panel 13 by means of a spline 22, as heretofore described. The triangular sections 56 form the corners of the roof and comprise jack rafters of progressively shorter lengths capped by a hip rafter section. The hip rafter sections of abutting trapezoidal and triangular panels 54, 54' and 56, 56' are nailed together as the ridge sections 44 to form hip rafters indicated by the lines 62.

When a hip roof is placed upon a house according to the instant invention, the ceiling joist structure is modified according to known techniques so that joists under

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the hip sections of the roof lie in planes parallel to the jack rafters of the hip sections. This construction is desirable in order to reinforce the end walls of the house against the thrust of the hip sections.

The various features of the instant invention greatly facilitate house construction in that they permit maximum use to be made of factory preassembly methods with their economies and increased accuracy of fabrication. Although it might appear that the use of double joists, studs and rafters along the lines where the individual floor, wall and roof sections meet would increase the cost of construction, it has been found that the overall cost of the house is reduced substantially. The resulting effect of the doubling up of joists, studs and rafters at the junctions of the individual panels is to increase the strength of the house, while at the same time reducing its cost through labor-saving, relatively efficient preassembly methods.

The individual panels may be completed to an unexpected degree before shipment for erection. For example, the subflooring may be completely installed on the floor panels 12, and the sheathing may be completely installed on the wall panels and may be substantially complete on the roof panels. Portions of the roof panel sheathing are shipped separately for installation after erection so that nailing of the rafters 14' to the plates 31 may be conveniently done from outside the house. Certain types of siding may even be factory assembled upon the wall panels. The provision of the separate ridge sections 44 obviates the need to ship a separate, single, difficultly manageable ridge member.

There have thus been described improved prefabricated house panels and methods of assembling them to form wall, floor and roof sections of houses of improved strength and rigidity.

What is claimed is:

1. A prefabricated roof panel for a building comprising a plurality of spaced, parallel rafters, sheathing secured to and extending over said rafters, bridging members secured between pairs of said rafters, and a ridge member secured across the ends of said rafters, said ridge member being adapted to be abutted against a similar ridge member carried by another similar panel in juxtaposed relationship thereto and secured thereto to form a ridge having twice the thickness of said ridge member.

2. In a building construction, a plurality of preformed wall panels, a plurality of preformed ceiling panels supported upon said wall panels, a pair of horizontal plate members fixed to and extending along the top of said ceiling panels along opposite sides of said building construction, roof panels supported upon said plate members, each one of said roof panels including rafters extending from a ridge to one of said plate members, each one of said rafters having a three-sided downwardly facing notch formed in its lower edge, said plate members being fittingly received within the notches of said rafters, said notches engaging the top surface and two opposite side surfaces of said plate members to support said roof panels thereabove, opposite ones of said roof panels abutting each other at said ridge and exerting an outward thrust on said plate members.

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