

[54] **BUILDING STRUCTURE**

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[51] Int. Cl. **E04b 7/18**

[58] Field of Search..... 52/90, 92, 93, 201, 238

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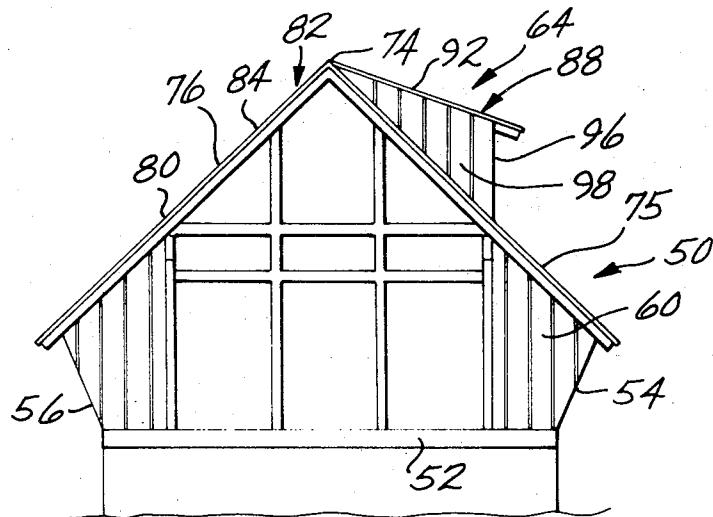
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[57] **ABSTRACT**

A building structure adapted for erection as a prefabricated house. The building has a gabled roof section and a dormer roof section with a second story, the primary loads of the roof structure being supported by two longitudinal second floor main support beams which are in turn supported by vertical columns which carry the roof loads to supporting ground structure. The dormer section has either one or two dormers formed in the roof structure. In the dormer section the roof supporting structure is modified to include a dormer ridge beam supported at the ends, with the dormer roof loads being carried partly to the second floor main beam through a dormer wall and partly by the dormer ridge beam. Through the length of the house, the roof extends below the second floor level and joins to the house sidewalls which are canted upwardly and outwardly from the first floor level.

4 Claims, 8 Drawing Figures



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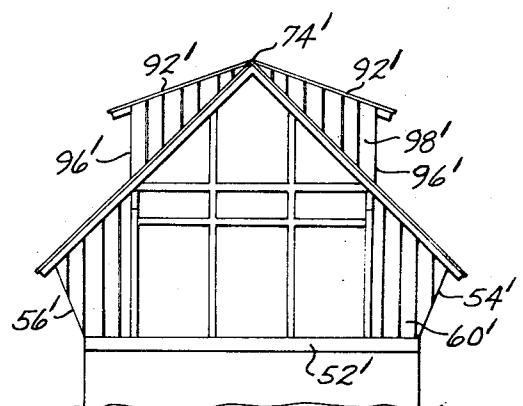
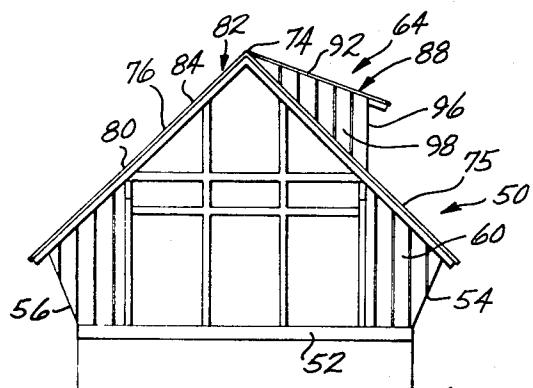


Fig. 2.

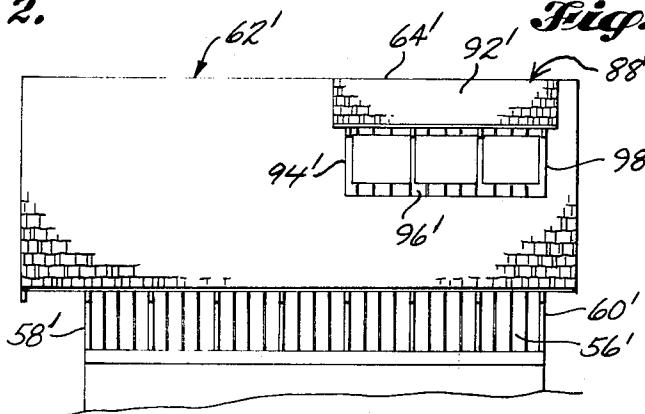
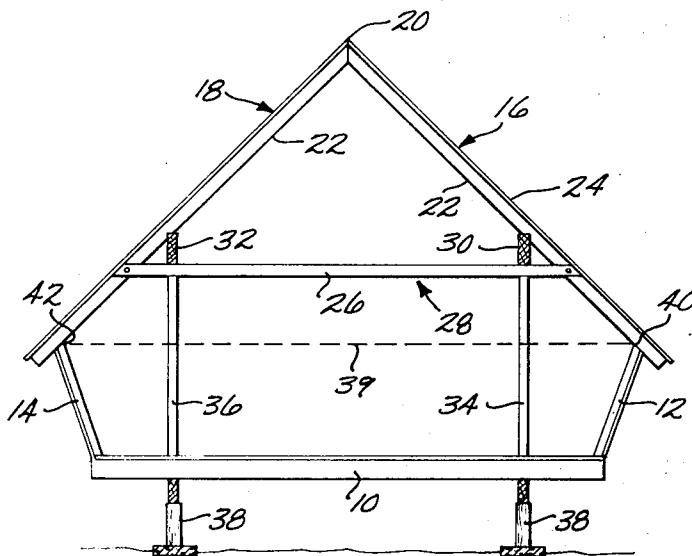


Fig. 3.

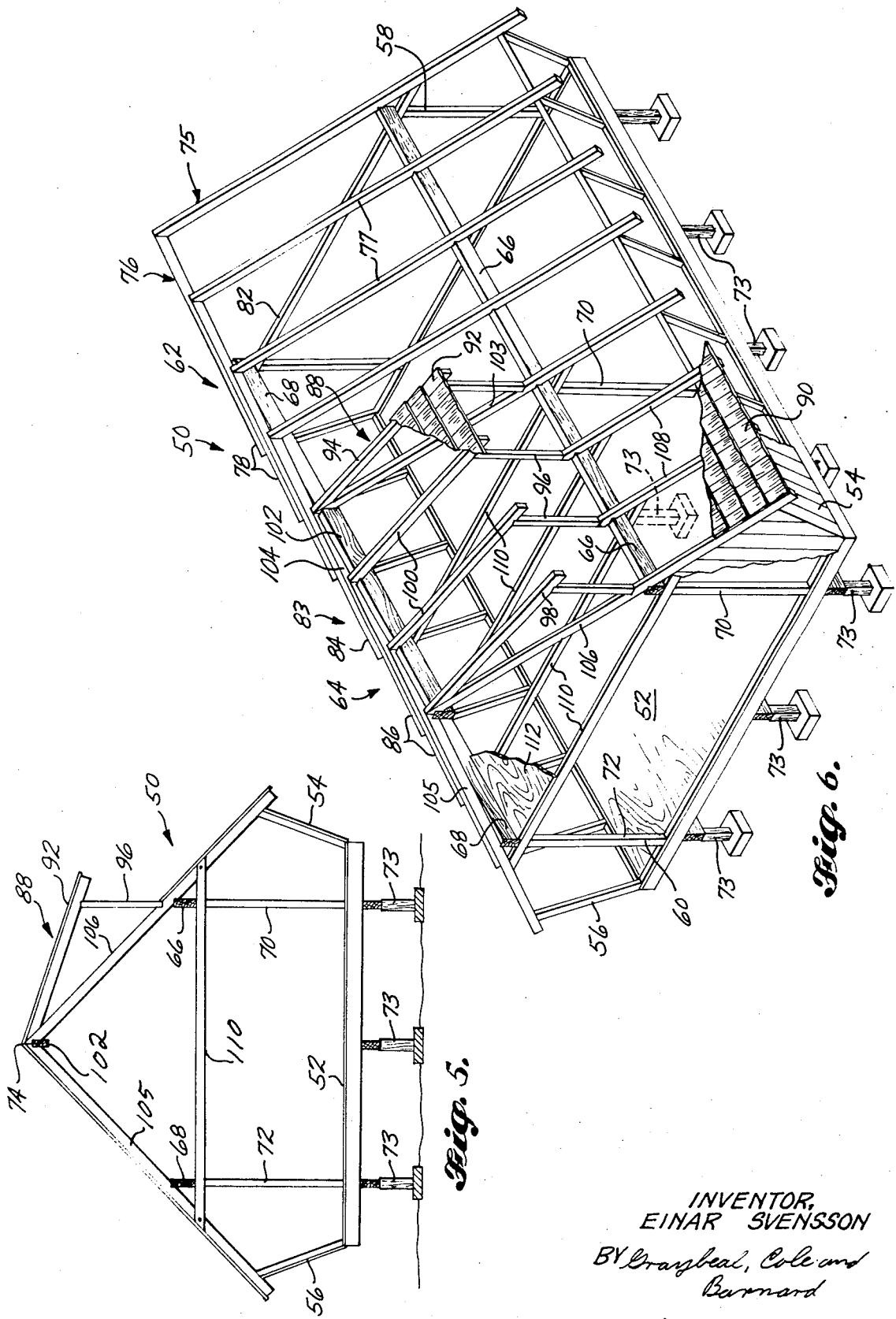
Fig. 4.



PRIOR ART

Fig. 1.

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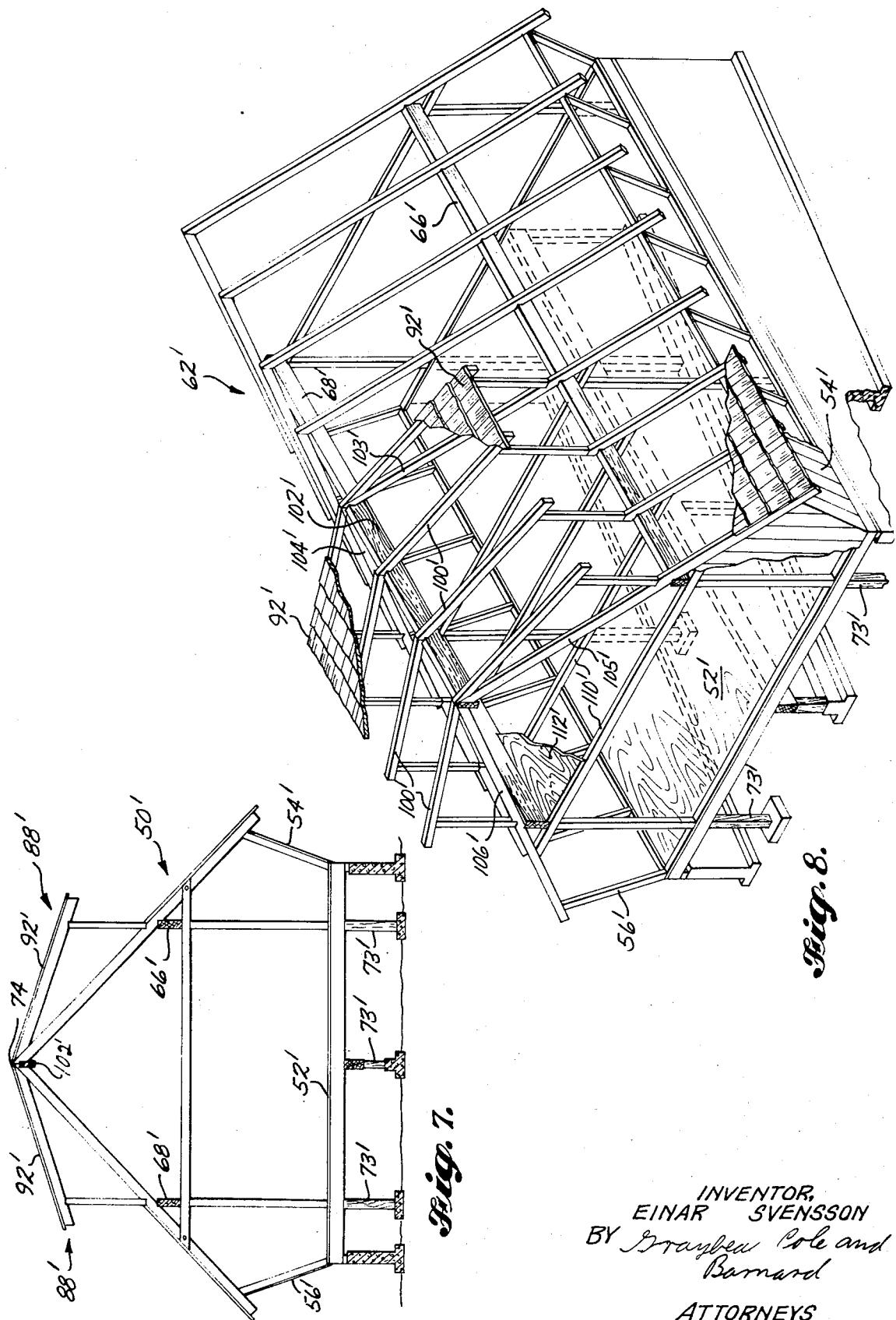
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BUILDING STRUCTURE

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to a building structure, particularly a vacation type house adapted for simple and fast erection from prefabricated parts.

2. Description of the Prior Art

The most relevant prior art known to the Applicant is that contained in U.S. Pat. No. 3,462,894, the inventor in that patent being the same as in the present invention. To assist in understanding the nature of the present invention, the house disclosed in that issued patent is shown in FIG. 1 of the present application and designated as prior art.

As shown in FIG. 1, the prior art structure comprises a first floor 10, two sidewalls 12 and 14, and a gable-like roof comprising two roof sections 16 and 18, which join to one another at the longitudinal center ridgeline 20 of the house. The roof structure comprises a plurality of rafters 22 which extend from the ridgeline 20 downwardly and outwardly at approximately a 45° angle from the horizontal to a related one of the two sidewalls 12 and 14. Pairs of adjoining rafters 22 are each disposed in a respective transverse plane and are spaced evenly along the front-to-rear lengthwise dimension of the house. The rafters 22 are joined together by the roof panels 24 which are secured to the rafters 22. Two or more of the pairs of adjoining rafters 22 have a horizontal tie beam 26 connected to its two adjoining rafters 22 at the approximate second floor level of the house. Thus, a pair of adjoining rafters 22 along with its tie beam 26 forms a rigid triangulated roof truss generally designated 28.

The primary load carrying structure for the roof assembly comprises two longitudinal main support beams 30 and 32 positioned on opposite sides of the house. These two beams 30 and 32 are located at the approximate second story level of the house, and are supported by a plurality of vertical posts 34 and 36 which reach downwardly to transmit the beam loads to ground support structure 38. The first floor 10 can also be supported from the ground support structure 28 or can be provided with other ground support structure. The rafters 22 of the roof rest on, and are connected to, the two beams 30 and 32 at a location moderately outside of the center point of the rafters 22. Thus, the primary vertical loads from the roof are transmitted from the rafters 22 to the beams 30 and 32 downwardly through the posts 34 and 36 to ground support structure 38. The two sidewalls 12 and 14 connect to the outer edges of the two roof sections 16 and 18, but do not carry the primary roof loads.

The overall configuration of the house disclosed in U.S. Pat. No. 3,462,894, which is shown in FIG. 1 of the drawings of the present invention is such that the first floor 10 and sidewalls 12 and 14 have the overall shape (taken in transverse section) of an inverted trapezoid with the smaller base coinciding with the first floor 10, and the legs of the trapezoid coinciding with the sidewalls 12 and 14. The upper base of the trapezoid would be an imaginary horizontal line 39 drawn from the upper edges 40 and 42 of the sidewalls 12 and 14, and located intermediate the second and first floor levels of the house. The configuration of the upper portion of the house is that of a right isosceles triangle

placed on top of the lower inverted trapezoid. The two legs of the isosceles triangle coincide with roof sections 16 and 18, and the base of the triangle coincides with the upper trapezoid base 39. The support structure of this prior art house is such that the sidewalls 12 and 14 can be placed at an outward location and canted outwardly to obtain this stylish configuration, since the walls 12 and 14 are not required to carry the primary loads from the roof structure. These loads are carried in the aforescribed manner by the beams 30 and 32 and their support columns 34 and 36.

To expand second floor space of the house (i.e., the house portion above the crossbeams 26), the inventor of the present invention had previously segmented some of the rafters 22 at the approximate location of the beam 30 and simply raised these rafters and provided sidewalls to form a dormer. However, structural difficulties involved in such a modification were not completely resolved. The problem was to provide a basic overall configuration and support structure of this prior art house yet modify this basic structure to expand the usable second floor area by means of a dormer construction and resolve the structural problems related thereto.

SUMMARY OF THE PRESENT INVENTION

In the present invention the basic configuration of the prior art house shown in U.S. Pat. No. 3,462,894 and its basic structural support system are maintained. One section of the house is modified to make one or two dormers so as to provide an expanded second floor. The basic configuration of the prior art house is maintained in the dormer section, with the following modifications. Those portions of the rafters 22 in the dormer area that lie between the ridge line 20 and line of the main support beams 30 or 32 are swung upwardly about the ridge line 22 to provide a dormer roof. A ridge beam is provided along the length of the dormer section, and this ridge beam is supported at the front and rear end of the dormer section. The outer ends of the dormer rafters are supported partly by the ridge beam and partly by the main support beams 30 or 32, and the outer portions of the rafters 22 adjacent the dormer are supported partly by the longitudinal main support beams 30 or 32 and partly by the adjacent sidewall 12 or 14. In addition, the crossbeams 26 in the area of the dormer section serve as floor joists for the second floor in the dormer area.

Thus, it is an object of the present invention to provide a house having the basic configuration and structural support system shown in U.S. Pat. No. 3,462,894 through the length of the house, and yet provide a dormer section in a portion of the house without departing appreciably from this basic uniformity.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a front elevational view of the framing of a prior art house shown in U.S. Pat. No. 3,462,894;

FIG. 2 is a rear elevational view of a first embodiment of the present invention;

FIG. 3 is a rear elevational view of a second embodiment of the present invention;

FIG. 4 is a side elevational view of the house shown in FIG. 3;

FIG. 5 is a rear elevational view of the framing of the house shown in FIG. 2;

FIG. 6 is an isometric view of the framed house shown in FIG. 5, with the rear of the house being in the foreground;

FIG. 7 is a rear elevational view of the framing of the house shown in FIGS. 3 and 4; and

FIG. 8 is an isometric view of the house shown in FIG. 7 with the rear of the house being in the foreground.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

The first embodiment of the present invention is shown in FIGS. 2, 5 and 6. In this first embodiment, there is shown a house 50, with a first floor 52, right and left sidewalls 54 and 56, respectively, and front and rear walls 58 and 60, respectively. The lengthwise dimension of the house is from front to rear, and the width dimension is transverse to the longitudinal lengthwise dimension. The front portion of the house 50 is a gabled roof section 62, and the rear portion of the house is a dormer roof section 64.

The order of description of this first embodiment is as follows. First will be described those elements of the house which are common to both the gabled roof section 62 and the dormer roof section 64; then the gabled roof section 62 will be described, and finally the dormered roof section 64.

The main support structure for the roof of the house comprises a right and left main longitudinal support beam 66 and 68, respectively, located at the approximate second story level of the house on opposite sides thereof. These beams 66 and 68 are each supported by a plurality of vertical posts 70 and 72 which in turn transmit the beam loads to ground support structure indicated at 73. As shown herein, the loads from the first floor 52 are also supported by the ground support structure 73. The first floor 52, sidewalls 54 and 56, longitudinal main support beams 66 and 68, columns 70 and 72 and the ground support structure 73 are substantially uniform throughout the length of the house. Also, the house 50 has a single longitudinal roof ridge line 74 which extends the length of the house.

To describe the front gabled roof portion 62 of the house 50, there is a gabled roof comprising right and left portions 75 and 76 (the framing of these is shown in FIG. 6) which join at the house ridge line 74 and extend downwardly and outwardly to the sidewalls 54 and 56, respectively. This gabled roof 75 - 76 comprises right and left rafters 77 and 78, respectively, with pairs of rafters 77 and 78 in the same transverse plane being joined one to another at the ridge line 74 and extending downwardly to their related sidewalls 54 and 56. The several rafters 77 rest on and are fixedly connected to the main support beam 66 at a location on the rafter 77 moderately outside of the center point thereof. The rafters 78 are similarly connected to the main support beam 68. The rafters 77 as well as the rafters 78 are covered with roof panels 80 which are connected to adjacent rafters 77 or 78, not only to provide cover, but to provide support structure between the rafters 77 and also the rafters 78.

The forwardmost pair of rafters 77 and 78 are connected one to another by a cross beam 82 located at the approximate second story level of the house 50. This cross beam 82 with its connected rafters 77 and 78 forms a rigid triangulated truss and thus provides

lateral support for the front ends of the main support beams 66 and 68. The main roof loading is transmitted through the rafters 77 and 78 to the two main support beams 66 and 68, which in turn transmit these roof loads through columns 70 and 72 to the ground support structure 73. The front portion of the two sidewalls 54 and 56 carries some secondary loads exerted on the outer portions of the two roof sections 75 and 76.

To describe the dormer section 64 of the house 50 of the first embodiment of the present invention, there is a single dormer on the right side of the house (as viewed from the rear). Thus, the roof portion 83 of the dormer section 64 has its left side 84 substantially identical to the left roof section 76 of the front gabled roof section 62 of the house 50. Accordingly, the left side 84 of the roof has a plurality of rafters 86 which extend from the ridge line 74 downwardly and outwardly to the left to the sidewall 56. These rafters 86 are connected to the beam 68, and the primary loads of the roof section 84 are carried directly by the beam 68.

The right hand portion of the dormer section 64 comprises a dormer 88 and a lower roof portion 90. The dormer 88 comprises a dormer roof 92, a dormer front wall (located at 94), a dormer sidewall 96 and a dormer rear wall 98.

The dormer roof 92 comprises a plurality of dormer rafters 100 which extend from the house ridge line 74 outwardly at a moderate slope and terminate at a location above the main support beam 66. The side support wall 96 extends from the outer edge of the rafters 100 and reaches downwardly to the main support beam 66.

At the ridge line 74 at the location of the dormer section 64 there is provided a ridge beam 102 which is located directly below the juncture points of the rafters 86 and 100. The forward end of the ridge beam 102 is supported by two rafters 103 and 104 which carry the loads from the front end of the ridge beam 102 down to the main support beams 66 and 68. The rear end of the beam 102 is supported by the rafters 105 and 106 which are located at the rear of the house and extend from the rear of the ridge beam 102 down to the main support beams 66 and 68, respectively, and to the sidewalls 54 and 56, respectively. Thus, it can be seen that the loads on the dormer roof 92 are supported partly by the dormer sidewall 96 and partly by the ridge beam 102, with these loads in turn being transmitted to the beams 66 and 68.

The roof portion 90 below the dormer 88 comprises a plurality of rafters 108 which extend from the support beam 66 outwardly to the sidewall 54. Thus, the loads from the roof portion 90 are shared partly by the support beam 68 and partly by the house outer wall 54.

Reaching between the upper portion of the rafters 108 and the approximate mid-portion of the rafters 86, are a plurality of cross beams 110, each of which connects to a related pair of rafters 86 and 106. Besides providing lateral support for the rafters 86 and 106 and the beams 66 and 68, these cross beams 110 serve as floor joists for the second floor 112 of the dormer section 64.

The second embodiment of the present invention is shown in FIGS. 3, 4, 7 and 8. Components of the second embodiment which are similar to corresponding components of the first embodiment will be given like numerical designations, with a prime (') distinguishing those of the second embodiment.

It can be seen that the house 50' of the second embodiment of the present invention comprises a first floor 52', right and left sidewalls 54' and 56', front and rear walls 58' and 60', a gabled roof section 62', and a dormer roof section 64'. Further, there is a right and left main support beam 66' and 68' and a longitudinal ridge line 74'. The gabled roof portion 62' is substantially the same as the gabled portion 62 of the first embodiment, so this will not be described in detail in the description of the present embodiment. 10

The dormer roof section 64' of the second embodiment comprises two dormers 88'. Each dormer comprises a dormer roof 92', a front wall 94', sidewall 96', and rear wall 98'. The roof 92' of each of the dormers 88 comprises a plurality of rafters 100' which join to a ridge beam 102'. As in the first embodiment, the front end of the ridge beam 102' is supported by two rafters 103' and 104', and the rear portion of the ridge beam is supported by a pair of right and left rear rafters 105' and 106', which extend from the rear end of the ridge beam 102' downwardly to connect to the main support beams 66' and 68'. As in the first embodiment, there are a plurality of cross beams 110', which serve as floor joists for the second floor 112' in the dormer area. 25

Thus, it can be seen in both the first and second embodiments of the present invention that throughout the length of the house the basic design configuration and the basic support structure are maintained throughout the length of the house, while providing an expanded second floor dormer section. 30

Now, therefore, I claim:

1. In a house having a front and a back end and adapted for quick erection from prefabricated parts 35 said house comprising:

a first floor level adapted for a ground support; a second floor level above said first floor level;

two longitudinal main support beams extending the length of the house located approximately at the 40 second floor level of the house and positioned on opposite sides of a vertical longitudinal plane through the roof ridge line of the house;

a plurality of vertical columns means on said first floor level and supporting each of said two main 45 support beams for transferring the primary loads of a gabled roof and a dormered living section for the house to the first floor level and its associated ground support;

a pair of outwardly inclined sidewalls with one each 50 of said pair extending upwardly from each side of the length of the first floor to a location coinciding with connection points for a gabled roof portion defined by planes extending from the roof ridge line to each of the upper edges of said pair of 55 sidewalls;

a gabled roof section covering at least one portion of the house along its length, said gabled roof section comprising pairs of rafters positioned in transverse planes and spaced at intervals along the length of 60 the house, said rafters further characterized in that each pair of rafters are joined one to another at the roof ridge line and each pair of joined rafters extend oppositely, downwardly, and outwardly from the ridge line for connection to respective ones of 65 said main support beams and continuing further downwardly and outwardly for connection to the top edge of said outwardly inclined sidewalls;

said house being further characterized in that it comprises a dormer living section including at least a first dormer positioned above second floor level; said first dormer comprising a load supporting longitudinal dormer ridge beam positioned in said vertical longitudinal plane of said roof ridge line;

a first dormer sidewall means extending upwardly from at least one of said pair of main support beams for transmitting its primary loading to its respective main support beam; a pair of end walls for said first dormer; a first dormer roof from said load supporting ridge beam to said first dormer sidewall, said dormer ridge beam and said dormer sidewall means further characterized by extending longitudinally over a length normally occupied by a plurality of roof rafters from said support beam upwardly to said longitudinal roof ridge line, which plurality of rafters are removed and define an expanded dormered living space;

said house and dormer structure further comprising rafter means supportably connected to said load supporting dormer ridge beam for transmitting at least a portion of any dormer roof loading on the dormer ridge beam to at least one of said pair of longitudinal main support beams; beam

a lower roof section means covering a portion of the first floor interior and extending from the respective one of said main support beams connected to said first dormer sidewall and extending from said first dormer sidewall downwardly and outwardly to an upper edge of a respective one of said house sidewalls for transferring loading from said lower gabled roof section partially to said one respective main support beam and partially to said respective house sidewall.

2. The house defined in accordance with claim 1 and having additional dormered living section and further comprising a second dormer also positioned above said second floor level and commonly connected to said load supporting dormer ridge beam, said second dormer comprising:

another dormer sidewall means for said second dormer extending upwardly from the remaining one of said pair of main support beams for transmitting its primary loading to its respective main support beam;

rafter means supportably connecting said load supporting dormer ridge beam to said respective main support beam for said second dormer;

a dormer roof from said commonly-connected dormer ridge beam to said second dormer sidewall, said dormer ridge beam and said dormer sidewall means further characterized by also extending longitudinally over a length normally occupied by a plurality of roof rafters from said support beam upwardly to said longitudinal roof ridge line, which plurality of rafters are removed and define a double expanded living space within said first and second dormers;

a pair of end walls for said second dormer connected together with the pair of end walls for said first dormer by said load supporting dormer ridge beam; and

a second lower roof section means covering a portion of the first floor interior and extending outwardly from the respective one of said main support beam connected to said second dormer sidewall and extending from said second dormer sidewall 5 downwardly and outwardly to an upper edge of a respective one of said house sidewalls for transferring loading from second lower roof section partially to said respective main support beam and partially to said respective house sidewall.

3. A house in accordance with claim 2 wherein: said first dormer ridge beam is longitudinally aligned with said roof ridge line; and said rafter means further comprises at least two joined rafter pairs lying in the planes of said gabled 15 roof and connected at points adjacent the ends of

said dormer ridge beam and also connected to said pair of main support beams, said rafter means further characterized in that one rafter each from said pair of joined rafter means respectively connect one end wall each of said pair of first dormer end walls with said first dormer sidewall to define said closed expanded living space above said second floor.

4. A house as defined in claim 1 wherein said rafter 10 means further comprise:

at least a pair of cross beam means at the second floor level with one each of said pair of cross beam means connected to one each of said pair of joined rafters for laterally supporting and rigidizing said double dormered living section.

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