The fabricated construction of a house in which a pair of spaced and parallel stays on the opposite sides of the house each include two steel stay members welded together in the upper portions and diverging in the lower portions from each other toward the lower ends, concrete foundations to which the lower ends of the stay members are secured and which are partially buried in the ground, a roof frame structure extending between and secured to the upper portions of the parallel stays, a floor frame structure extending between and secured to the lower portions of the parallel stays and including longitudinal bars and crosspieces connecting the longitudinal bars and other house structural components provided between the roof and floor frame structures.

2 Claims, 10 Drawing Figures
FABRICATED CONSTRUCTION OF A HOUSE

BACKGROUND OF THE INVENTION

In districts subject to frequent violent windstorms and/or severe earthquakes, houses are required to possess a strength sufficient to withstand such natural phenomena. Therefore, in order to provide a sufficient strength to the houses, it has been a common practice for the houses to be fabricated with massive structural components which inevitably result in increased production cost and an increase in the floor space of such houses.

Such disadvantages have been experienced in the fabrication of frame houses as well as those of reinforced concrete. In the case of frame houses, as is well known in the art, it has been customary to use a great number of braces which prop the diagonally positioned portions of house structural components so that the braces function as dynamic reinforcing means. However, the employment of such braces imposes a limitation on the layout of windows, doorways and the like and consequently, such houses lack convenience and comfort.

SUMMARY OF THE INVENTION

This invention relates to the fabricated construction of houses and more particularly, to houses which can effectively withstand external forces due to natural phenomena such as violent winds and earthquakes and which can be fabricated at relatively low costs.

One object of the present invention is to provide a house which has a simple fabricated construction, occupies a relatively small floor space and can be fabricated easily and at reduced expenses.

Another object of the present invention is to provide a house which does not require any reinforcing means such as braces and accordingly, open areas such as windows, doorways and the like are not subject to any limitation thereby affording convenience and comfort in dwelling to the occupants of the house.

A further object of the present invention is to provide a house which does not require any reinforcing means such as braces and accordingly, in which the rooms and passages connecting between the rooms can be easily designed as described to give a high degree of comfort to the occupants of the house.

A still further object of the present invention is to provide a house which has such a fabricated construction that only the principal structural members have sufficient strength to properly maintain the strength of the house whereas other auxiliary structural members are not required to possess strength sufficient to maintain the strength of the house whereby expenses for the fabrication of the house can be reduced.

A still further object of the present invention is to make it possible to freely enlarge the floor space of a house by successively providing a plural of principal structural members in the longitudinal direction of the house in two or more consecutive series.

According to the present invention, there is provided a fabricated construction of a house comprising parallel stays each including two stay members having a required strength and welded together in the upper portions with the lower portions diverging from each other toward the lower portions; concrete foundations on the ground to which the lower portions of the stay members are secured; a roof frame structure extending between and secured to the upper portions of the stays and including an assembly of longitudinal beam members and purlins; a floor frame structure extending between and secured to the lower portions of said stays and including an assembly of side longitudinal bars; and various house structural members necessary to complete the house, with the last mentioned members being provided between the roof and floor frame structures.

The above and other objects and attendant advantages of the present invention will be more clearly understood to those skilled in the art from a reading of the following detailed description referring to the accompanying drawings which show one preferred embodiment of the house construction fabricated by the present invention for illustrative purpose only, but not for limiting the scope of the invention in any way.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a side elevational view of only the principal frame structures and foundations of a house fabricated in accordance with the present invention;

FIG. 2 is a front elevational view taken substantially along the line II — II of FIG. 1, the view looking in the direction of the arrows;

FIG. 3 is a view partly in elevation and partly in section on an enlarged scale of only one of concrete foundations shown in FIG. 1;

FIG. 4 is a fragmentary enlarged view of the portion denoted "IV" in FIG. 1;

FIG. 5 is a top plan view of only the roof frame structure shown in FIG. 1;

FIG. 6 is a top plan view of only the floor frame structure shown in FIG. 1;

FIG. 7 is a top plan view of only the concrete foundation arrangement of the house shown in FIG. 1; and

FIGS. 1 through 10 are side, horizontal, and front sectional views, respectively, of a house fabricated by assembling the principal frame structures and concrete foundations as shown in FIGS. 1 through 7 with other house structural members.

PREFERRED EMBODIMENT OF THE INVENTION

In the drawings, reference character A denotes support stays positioned on both the sides of a house with each stay comprising two H-shaped steel members 1 (FIG. 2) which are welded together at an angle in a position closely adjacent to the upper end portions and diverge from each other toward lower end portions 1' (FIG. 2). The lower end portions are secured to suitably spaced concrete foundations 3 which are partially buried in the ground as indicated at 2. A roof frame structure B extends between and is fixedly secured to the stay members 1 in a manner to be mentioned hereinafter. A floor frame structure C also extends between and is fixedly secured to the stay members 1 thereby to complete the principal frame and support structure assembly of the house including the concrete foundations. The concrete foundations 3 are integrally connected to each other adjacent the ground 2 (FIGS. 1, 2 and 7) by means of horizontal concrete bar members (FIG. 7) whereby the foundations are firmly held in position. Each concrete foundation 3 has a pair of anchor bolts 3a partially embedded therein with the upper ends of the bolts extending beyond the upper end of the foundation and a pair of L-shaped back-to-back anchor plates 3b are fixedly secured at the horizontal legs thereof to the extending upper ends of the bolts 3a.
while the upright legs of the anchor plates are welded to the inner surfaces of the opposite flanges of the H-shaped stay members. Transverse connection bars of H-shaped steel extend across the roof frame structure B and floor frame structure C, respectively between the stay members on both the sides of the house and are welded at the opposite ends to the stay members so as to stabilize the stays A. The connection bars are immediately below the roof and floor frame structures B and C, respectively and support the structures from below. The roof frame structure B comprises a pair of spaced beams or eave forming members which extend in the longitudinal direction of the house on both sides thereof and a plurality of spaced parallel purlins extending between the eave forming members and welded thereto. Roofing members (see FIG. 8) formed of steel sheets or any other suitable material are laid on the roof frame structure B in a suitable arrangement and held in position by any conventional suitable fastening means. Since the roofing members assume the same plane as they are laid on the roof frame structure B, in order to facilitate drainage on the roof assembly, although the overall roof assembly is shown being in an inclined disposition in the illustrated embodiment, suitable spacer members having progressively different heights (not shown) may be laid on the purlins and held in position by any suitable fastening means and the roofing members may then be laid on and secured to the spacer members without departing from the scope of the invention.

The floor frame structure C comprises a pair of spaced side bar members and formed of H-shaped steel which extend in the longitudinal direction of the house and form the opposite side edges of the floor frame structure, a plurality of transverse bar members extending between and secured at the opposite ends to the side longitudinally extending side bar members respectively. The floor frame structure C further comprises a pair of intermediate bracing bar members which intersect to each other and extend between the opposite side bar members in the transverse direction and in the longitudinal direction, respectively of the floor frame structure C and the bracing bar members are secured at the ends to the transverse bar members and side edge bar members respectively. Spaced connection bar members extend between and are secured at the ends to the opposite side stays A in a position right below the floor frame structure C and the side bar members are mounted on and welded to the connection bar members. In order to assure and stabilize the unitary assembly of the component members of the floor frame structure C the component members of the roof frame structure B and the component members of the stays A, fastening bars are arranged in a X-shape are secured at the opposite ends to the corners defined by the opposite side edge bar members the adjacent transverse bar members of the floor frame member C and the side bar members of the floor frame structure and connection bar members, respectively and each of the fastening bars comprises a pair of portions which are connected to each other by a turnbuckle and furthermore, inclined propping bars formed of H-shaped steel sections extend between the roof frame structure B and the floor frame structure C with the upper ends secured to the underside of the longitudinal side bar members adjacent to the adjacent ends thereof and the lower ends secured to the side bar members respectively. Similarly, inclined propping bars formed of H-shaped steel sections extend between the floor frame structure C and the stays A in a position offset inwards of the upper ends of the propping bars with the upper ends secured to the underside of the longitudinal side bar members adjacent to the adjacent ends thereof and the lower ends secured to the lower ends of the stay members.

When the ground is substantially horizontal as shown in FIG. 1, the stay members and the concrete foundations may be of the same height, respectively, but when the house is to be built on the ground having a slope, in order to compensate for the slope of the ground, the concrete foundations have different heights instead of as shown in FIG. 1 or the length of the lower portions of the stay members which extend below the connection bar members are varied in accordance with a particular ground slope.

Auxiliary structural component members such as wall panels, partitions and flooring which complete the house are respectively secured to the component members of the above-mentioned various frame structures in any suitable conventional manner and the load of all the auxiliary component members is supported by the stays through the floor frame structure C including the foundations.

Reference numeral 16 denotes external walls in which a doorway 17, windows 18 and the like are suitably provided and the interior of the fabricated house is suitably divided into a number of rooms by partitions 19 as desired. The external walls and partitions are not required to possess a strength sufficient to support the structural components of the house, but only to perform their expected functions.

According to the present invention, since the entire construction of the house is held between the roof frame structure B and floor frame structure C which have a substantial strength and these frame structures are supported by the stays A, the external walls, the partitions and the like structural components need merely possess a strength sufficient to maintain their proper shapes. Therefore, the house structural components other than those of the principal frame structures can be of less strength in comparison to that of the conventional house structural components and thus, the fabrication costs of the entire house construction are reduced.

In the foregoing, the invention has been described with reference to a specific illustrative embodiment. It will be evident, however, that variations and modifications, as well as substitution of equivalent parts or elements for those shown herein for illustration, may be made without departing from the broader scope and spirit of the invention as set forth in the appended claims. The specification and drawings are accordingly to be regarded in an illustrative rather than in a restrictive sense.

What is claimed is:

1. In a building construction, a basic support frame structure comprising in combination:

- a pair of principal structural-steel stay members disposed in mutually parallel side frame relationship and defining the outermost limits of the building construction and the principal load bearing structure and forming substantially uninterrupted usable space therebetween;
said stay members being substantially inverted V-shaped in side elevation and comprising diverging structural load-bearing elements rigidly secured to each other at their upper ends;
concrete foundation elements fixedly secured on a support surface in rectangular, spaced relationship, each of the foundation elements being respectively secured to one of the lower ends of said stay member elements;
a series of lower and upper connection bars respectively forming floor and roof beams extending transversely between said stay members, within the span of the lower ends thereof, and fixedly secured thereto,
a floor structure assembled on said floor beams, intermediate of the upper and lower ends of said stay members and including forwardly and rearwardly extending distal ends in cantilever relation to the diverging elements of said stay members,
a roof structure assembled on said upper roof beams, above said floor structure, intermediate of said stay member elements and extending at distal ends beyond said diverging elements and defining a cantilever forwardly and rearwardly extending roof portions, the distal ends of said forward and rear roof and floor portions being disposed outwardly beyond the reactangularly spaced foundation elements, each of said foundation elements being connected to horizontal bar members disposed in rectangular relation for stabilizing the structure,
integral prop elements diverging upwardly in the plane of the stay member elements, from the foundation elements to intermediate portions of said floor structure, and other integral prop elements, diverging upwardly in the plane of said stay member elements, from the intersection of said stay members and said floor structure to intermediate portions of said roof structure, and tension members disposed in X-shaped relation transversely between upper ends of said stay members, above said roof structure.

2. The structure as claimed in claim 1 including tension members extending in X-shaped relation between said stay members and outer ends of and beneath said floor structure.

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