ABSTRACT

A building construction wherein a precut building framework is initially erected, and provided with receivers for interposing between a plurality of strengthening and bracing members.
BUILDING CONSTRUCTION FRAMEWORK WITH RECEIVERS FOR BRACING MEANS

BACKGROUND OF THE INVENTION

While the building construction of the present invention is capable of adaptation to commercial, as well as residential buildings, it has been primarily developed for use in the latter, wherein very rapidly rising costs both in labor and materials have combined to place new residential construction beyond the economic reach of many families.

SUMMARY OF THE INVENTION

Accordingly, it is an important object of the present invention to provide a building construction which is capable of effectively reducing building costs, to permit of enjoyment of new building construction by many more families than now possible.

It is a further object of the present invention to provide a building construction wherein a skeletal framework is prefabricated and assembled at the site without requiring skilled construction personnel to effect substantial savings in cost.

It is a further object of the present invention to provide a building construction wherein the average homeowner, or other persons without special building construction skills, may quickly and easily complete a residence or like building utilizing a structural framework in accordance with the teachings of the present invention.

It is still a further object of the present invention to provide a building construction having the advantageous characteristics mentioned in the preceding paragraphs, which is extremely simple in structure for economy in manufacture and assembly, durable and reliable throughout a very long useful life, and which is capable of employment in a wide variety of differently styled, attractive buildings.

Other objects of the present invention will become apparent upon reading the following specification and referring to the accompanying drawings, which form a material part of this disclosure.

The invention accordingly consists in the features of construction, combinations of elements, and arrangements of parts, which will be exemplified in the construction hereinafter described, and of which the scope will be indicated by the appended claims.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a top perspective view, partially broken away, illustrating a building construction framework of the present invention, with some strengthening members in place therein.

FIG. 2 is a generally vertical, sectional view taken approximately along the line 2—2 of FIG. 1, being broken away to conserve drawing space.

FIG. 3 is a partial perspective view in the general region of line 3 in FIG. 1, being broken away and enlarged for clarity.

FIG. 4 is a partial perspective view similar to FIG. 3, showing certain components thereof in exploded condition.

FIG. 5 is a partial interior perspective view, as taken from the right in FIG. 2.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now more particularly to the drawings, and specifically to FIG. 1, thereof, a building framework is there generally designated 10, and is illustrated as being of generally rectangular configuration in plan, but may be of any desired layout or plan. The building 10 may include a conventional foundation, as at 11, or other suitable foundation, such as a slab, as desired. At spaced locations about the foundation 11, upstanding therefrom, are a plurality of columns 12, 13, 14, 15 and 16. In the illustrated embodiment, the columns 12, 13, and 14 are all disposed in alignment with each other, while the columns 14, 15, and 16 are also in alignment with each other and disposed in a plane generally normal to the plane of the aligned columns 12, 13, and 14.

Disposed generally horizontally, and extending between each pair of adjacent columns 12—16, is an upwardly facing lower wall member, as at 20, 21, 22, and 23. More specifically, the lower wall member 20 extends generally horizontally between the columns 12 and 13, while the lower wall member 21 extends generally horizontally between columns 13 and 14, the lower wall member 22 extending between columns 14 and 15, and the lower wall member 23 extending between columns 15 and 16. Further, each of the lower wall members 20—23 is superposed above and supported, either directly or indirectly, by the foundation 11. In the illustrated embodiment, the lower wall members 20—23 are each supported by a base member or plate resting flat on the foundation 11, a beam resting on the base plate, and the floor on the beam. More specifically, a base plate 26 rests flat on the foundation or footing 11, extending between the columns 12 and 13, while a similar base plate 27 rests flat on the foundation 11 extending between the columns 13 and 14, a base member 28 rests flat on the foundation extending between the columns 14 and 15, and a base member 29 rests flat on the foundation extending between the columns 15 and 16. The base members 26, 27, 28, and 29, are preferably secured to the foundation or footing 11, as by anchors 30, see FIG. 2. A beam 31 rests on the outer margin of the base member 26, extending between the adjacent columns 12 and 13, while a beam 32 rests on the outer margin of the base member 27 extending between the adjacent columns 13 and 14, a beam 33 resting on the outer margin of the base member 28 extending between the columns 14 and 15, and a beam 34 resting on the outer margin of the base member 29 and extending between the adjacent columns 15 and 16.

The building 11 may be viewed along by a plurality of additional beams, as at 35 in FIG. 2, extending parallel to the beam 33, all of which beams may combine to support a generally horizontal floor 36. Resting on the floor 36, extending along and directly over the beam 31 is a bottom plate 37, while a bottom plate 38 rests on the floor directly over and extending along the beam 32, an additional bottom plate 39 resting on the floor directly over the beam 33, and a bottom plate 40 resting on the floor directly over the beam 34. The construction thus far described may be generally conventional, the base members 26—29, beams 31—34, floor 36 and plates 37—40 all being fabricated of wood, in the conventional manner, or of other suitable materials.

Extending longitudinally along and superposed on each of the plates 37—40 is a lower wall member, which is thereby supported, though indirectly, by the foundation 11. Seated directly on the plate 37, being longitudinally coextensive therewith to extend between adjacent columns 12 and 13, is the lower wall member 20. Similarly, the lower wall member 21 extends longitudinally along and is seated on the plate 38, between the columns 13 and 14, while the lower wall member 22 is seated on the plate 39, extending longitudinally therealong between adjacent columns 14 and 15, and the lower wall member 23 is seated on the plate 40 extending longitudinally therealong between the columns 15 and 16. Each of the lower wall members 20—23 may be fabricated advantageously of metal, preferably of angle iron or steel so as to have the constant cross-sectional configuration of a right angle. The lower wall members are each arranged with there right angular cross-section configuration so that one flange is generally horizontal and seats in flat facing engagement on the upper side of the nether plate. For example, the lower wall member 21 may have one flange 42 disposed generally horizontally and seated flat on the nether plate 38, while the lower wall member 22 may have one flange 43 disposed generally horizontally and seated flat on the nether plate 39.

Located in parallel, vertically spaced relation over each lower wall member 20—23 is a respective, downwardly facing, upper wall member, as at 44, 45, 46 and 47. The upper wall members 44—47 are each suitably secured in position extending horizontally between an adjacent pair of columns 12—16.
as will appear more fully hereinafter, directly over and in vertically spaced relation with a respective lower wall member 20-23. More specifically, the upper wall members 44-47 are each advantageously fabricated of iron or steel angle stock, so as to have a constant right angular cross-sectional configuration, with one flange of each upper wall member disposed generally horizontally in parallel spaced facing relation with the horizontal flange of the associated lower wall member. For example, the upper wall member 45, as best seen in FIG. 3, has one flange 47 disposed generally horizontally in spaced parallelism with the horizontal flange 42 of the adjacent lower wall member 21. Also, the upper wall member 46, see FIG. 2, has one flange 48 disposed generally horizontally in spaced parallelism with the horizontal flange 43 of its adjacent lower wall member 22.

Further, the lower wall members 20-23 are each arranged with its other or remaining flange disposed generally vertically and extending upwardly from the associated plate, while the upper wall members 44-47 are each arranged with their other or remaining flanges disposed vertically and depending from the horizontal flanges. More specifically, the vertical flanges of adjacent lower and upper wall members are disposed in a generally coplanar relation, extending toward and terminating short of each other. Thus, the lower wall member 21 includes an upstanding or generally vertical flange 50, while the adjacent upper wall member 45 includes a vertically depending flange 51, the flanges 50 and 51 extending along the outer sides of their respective members, and being generally coplanar with each other. Similarly, the lower wall member 22 and upper wall member 46 are provided with generally vertically disposed outer flanges 52 and 53, respectively, which flanges are generally planar, as best seen in FIG. 2.

The columns 12-16 are also advantageously fabricated of iron or steel angle members. In particular, the outer or corner columns 12, 14 and 16 may each be fabricated of a single angle member, having its right angularly spaced flanges arranged each in the plane of a respective wall of the building structure 10. This may be seen in FIG. 1. The intermediate or wall columns 13 and 15 are advantageously fabricated of a pair of right angle structural members arranged with a pair of flanges bolted together and the remaining flanges generally coplanar with each other. This construction may be seen in FIGS. 3 and 4, wherein the column 13 is composed of a pair of right angle structural elements 55 and 56 arranged with one pair of flanges 57 and 58 bolted or otherwise secured together in facing relation, and the other or remaining pair of flanges 59 and 60 extending away from each other in generally coplanar relation. That is, the adjacent or coplanar flanges 59 and 60 are disposed generally planar with the wall of the intermediate column 13, while the facing flanges 57 and 58 extend inwardly from the coplanar flanges.

At an elevated location, the angle elements 55 and 56 have their coplanar flanges 59 and 60 cut away, as at 61 and 62 in FIG. 4, leaving only the facing upper extremities of the flanges 57 and 58. Each lower wall member 20-23 extends, or has its end portion extending into the interior of the adjacent angular column; and similarly, each of the upper wall members 44-47 has its opposite ends extending into the interior of the adjacent angular column elements. Suitable fastening means may be provided, such as threaded fasteners, or the like permitting of quick and easy assembly and erection.

Preferably a top wall plate, as at 64, 65 and 66 may be superposed directly on the top wall members 44, 45 and 46. Further, the top wall plate 66 may extend along and over both top wall members 46 and 47. One mode of connection is illustrated in FIG. 4, the column element 56 being provided interiortly with an apertured, horizontal plate 68, and the adjacent ends of top plate 65 and top wall member 45 being fastened or otherwise suitably bolted to the plate 68.

In addition, each of the lower wall members 20-23 is provided with a plurality of upfacing stud receiving sockets, or clips, for example the lower wall member 21 being provided with the receivers 70, and the lower wall member 22 being provided with the receivers 71. The receivers 70 and 71 may each be fabricated of metal sheet bent into a generally U-shaped configuration, and more specifically to a U-shappe configu ration, including a lower flange 72, and a pair of spaced leg portions 73 and 74 upstanding from the flange portion. One of the legs, say leg 74 may project upwardly beyond the other leg 73. As best seen in FIG. 5, the receivers or clips 70 are each located with their flange portion 72 fixedly secured, as by welding or other suitable means, to the horizontal flange 42 of the lower wall member 21, while the leg portions 73 and 74 of each receiver are open in one direction toward and closed by the vertical or outer flange 50. Thus, the receivers 70 open inwardly from the lower wall member 21 toward the interior of the structure 10. The longer leg portions 74 may be provided with fastener receiving openings, as at 75, if desired.

In addition, the upper wall members 44-47 are each also provided with a plurality of stud receiving sockets or clips. For example, the upper wall members 45 and 46 may each be provided with a plurality of downwardly facing, generally U-shaped stud receivers or clips, as at 76 and 77, respectively. Further, the upper wall member clips 76 and 77 are located in vertical alignment with respective lower wall member clips 70 and 71. The upper wall member clips, best seen in FIG. 5, may be J-shaped section, including a bight portion 77 welded or otherwise fixed to the underside of the horizontal flange 47, and having depending legs 78 and 79, the latter extending beyond the former. The space between legs 78 and 79 is closed on the outer side by depending flange 51, and opens inwardly toward the interior of the building structure 10. Here again, suitable fastener receiving openings may be provided, say through the longer leg portion 79, as at 80.

It will now therefore be readily apparent that vertical members or studs, such as 2 x 4's inches, may be quickly and easily inserted to extend vertically between the adjacent pairs of lower and upper wall members, each stud having its opposite ends received in respective lower and upper stud receivers 70 and 77.

In addition to the structure described hereinbefore, the framework of building construction 10 includes a plurality of roof trusses, as at 85, 86 and 87, see FIG. 1. The roof trusses 85-87 are each preferably fabricated of metal, such as iron or steel structural members, being disposed in parallel spaced vertical planes at an elevation spaced over the floor 36. In particular, the roof trusses 85 and 87 are located at opposite ends, and may be considered as end trusses, while the truss 86 is located between the end trusses and may be considered an intermediate roof truss. The several roof trusses 85-87 are in alignment or registry with each other, and may be generally symmetrical about a central plane, assuming the overall configuration of an isosceles tringle.

More specifically, the intermediate roof truss 86 may include a rafter 88 which extends obliquely upwardly and inwardly from an upper region of the adjacent intermediate column 13 to an upper or ridge point for connection there to a like rafter 89 extending obliquely downwardly and laterally outwardly from the rafter 88. The rafters 88 and 89 may be connected together by a generally horizontally extending tie beam 90, and a medial or king post 91 may extend generally vertically between a midpoint of the tie beam 90 and the ridge point or connection between rafters 88 and 89. There may be provided auxiliary or queen posts, as at 92 and 93 extending vertically between mid-regions of respective rafters 88 and 89 and the nether region of tie beam 90. Additionally, diagonal struts 94 and 95 may extend between the upper ends of respective posts 92 and 93, and the lower end of king post 91.

As best seen in the enlarged views of FIGS. 3 and 4, the rafter 88 may include a pair of elongate channel members 97 and 98 disposed in longitudinally extending back-to-back relation. In particular, the channel members 97 and 98 may be received in the respective cutouts 61 and 62 of column angle members 55 and 56. The upper portions of angle member flanges 57 and 58 are thus interposed in sandwiched relation between the webs or rafter channels 97 and 98, and the facing...
portions may be fixedly secured together, as by suitable fastening means, as at 99 in FIG. 3. The rafter channels 97 and 98 are thus fixedly secured in adjacent, spaced back-to-back relation, and have their upper or ridge ends suitably fixed to the upper end of king post 91. Also, the rafter channels 97 and 98 continue to extend obliquely downwardly and outwardly through the respective column cutouts 61 and 62 and beyond the column 13 to provide eave extensions, as at 100 and 101.

The end roof trusses 85 and 87 may be similar to the intermediate roof truss 88, except that the end truss rafters are preferably fabricated of a single structural member or channel.

That is, the outer or end trusses 85 and 87 include rafters 103 and 104, respectively, which extend obliquely upwardly and laterally inwardly from respective corner columns 12 and 14. The end trusses 85 and 87 may also include respective king posts 105 and 106, respective tie beams 107 and 108, respective auxiliary posts 109 and 110, and respective struts 111 and 112, all similar to the intermediate truss 86.

However, the rafters 103 and 104 are only single structural members or channels respectively disposed in parallel spaced facing relation with the channels 97 and 98 of rafter 88. The rafters 103 and 104 may be suitably secured to the upper end portions of respective corner columns 12 and 14, in the same manner as individual channels 97 and 98 of intermediate rafter 88 are secured to their respective adjacent column members 55 and 56. Also, the rafter channels 103 and 104 may include extensions 114 and 115 extending obliquely downwardly and laterally outwardly beyond their respective columns 12 and 14, parallel to the extensions 100 and 101 of intermediate rafter 88.

All of the roof truss structure described hereinbefore may advantageously be fabricated of structural steel or iron and suitably secured together. In addition, if desired on the external or outer sides of the end rafters 103 and 104 there may be secured longitudinally extending wooden members, as at 116 and 117, say 2 x 4's inches. Additional wooden members or 2 x 4's inches may be secured to outer surfaces of the columns, as at 118 and 119 on columns 14 and 16.

It will now be appreciated that the rafters of adjacent roof trusses include channel members of U-shaped cross-section disposed in longitudinally extending, parallel spaced facing relation with respect to each other. Interorly of each rafter channel member, at spaced location therealong, are secured a plurality of angle members, brackets or receivers, as at 122 in channel 98, see FIGS. 1, 3 and 4. The angle members or receivers 122 are welded or otherwise suitably fixed in position within the channel 98, extending transversely thereacross between the channel side walls, and advantageously formed with fastener receiving openings, if desired. Additionally, the rafter channel 104 in parallel spaced facing relation with the rafter channel 98 is provided with like angle members or receivers, obscured in the drawings, the receivers of channel 104 being in respective alignment with the receivers 122 of channel 98. The end rafter channel 103 is also provided interorly thereof and at spaced locations therealong with a plurality of angle members, brackets or receivers 123, which may be identical to the angle members 122. Similarly, the channel 97 in parallel spaced facing relation with the channel 103 is provided with angle members, brackets or receivers (obscured in the drawings) in respective alignment with the brackets or receivers 123.

By this construction, there is permitted the extension between adjacent facing pairs of rafter channels of a plurality of purlins, such as 2 x 6 wooden members. A plurality of such purlins are shown at 125 extending in parallel relation with each other between the facing channels 103 and 97, each purlin having its opposite ends suitably secured to an aligned pair of purlin receivers 123. A similar plurality of purlins extends between the facing pair of rafter channels 98 and 104, having their opposite ends suitably secured to respective aligned purlin receivers 122.

If desired, the distal or outer ends of the rafter channels may be cut in a vertical plane, and provided with an end closure or member, as at 127 and 128 on rafter channels 97 and 98 in FIGS. 3 and 4. This permits the quick and easy securement of an eaves board or the like, as at 129 in FIG. 3.

From the foregoing, it is seen that the present invention provides a building construction wherein the skeleton of steel can be quickly and easily assembled and erected, providing for simple and efficient insertion and securement of studs and purlins, and wherein the instant invention fully accomplishes its intended objects.

Although the present invention has been described in some detail by way of illustration and example for purposes of clarity of understanding, it is understood that certain changes and modifications may be made within the spirit of the invention.

What is claimed is:

1. A building construction comprising a generally horizontal upwardly facing lower wall member adapted to be supported by a foundation, columns adapted to upstand from the foundation at spaced locations along said lower wall member, a generally horizontal downwardly facing upper wall member extending between and supported by said columns in spaced relation over said lower wall member, rafters extending in parallelism with each other obliquely upwardly in one direction from respective columns, a plurality of stud receivers on the lower and upper sides of said lower and upper wall members respectively, for receiving upright studs extending between said lower and upper wall members, and a plurality of purlin receivers on the facing sides of adjacent rafters for receiving purlins extending between said adjacent and upper wall members, columns and rafters being fabricated of structural metal, and said stud receivers comprising generally J-shaped clips having their bight portions fastened to said wall members with the clips of lower and upper wall members in respective facing relation with each other, said rafters comprising channels in facing relation with each other, and said purlin receivers comprising flanged members fixed in said channels in respective alignment with each other, whereby said flanged members and the flanges of said channels combine to effectively support purlins.

2. A building construction according to claim 1, said columns each having a right angle upper and frontal configuration with one flange parallel to the plane of said wall members and the other flange parallel to the adjacent rafter, said columns each having one flange cut away for passage of the adjacent rafter, and fastener means securing the other flange of each column to the adjacent rafter.

3. A building construction according to claim 1, said wall members each having a right angle cross-sectional configuration with one flange of each wall member in horizontal facing parallelism with one flange of the adjacent upper wall member and the other flange of each wall member disposed generally vertically and coplanar with the other flange of the adjacent upper wall member, and said J-shaped clips having their bight portions fixedly secured to said one flanges of said wall members and opening between the leg portions of said clips in said one direction toward said other flanges of said wall members.

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