ABSTRACT: A building structure adapted to be supported on a relatively small area, and which comprises a central support column extending substantially for the full height of the building structure, a foundation wall concentrically surrounding the lower portion of the central column and extending upwardly above ground level, a floor including a number of radially extending floor trusses secured in cantilevered fashion to the central column and foundation wall and floor decking supported by said floor trusses, a roof disposed above the floor and including a number of radially extending roof trusses secured to said column and roof decking covering the roof trusses, and a plurality of vertical posts extending between the floor and roof adjacent the radially outer end portions thereof.
The present invention relates to a building structure which is adapted to be supported on a relatively small area and which is thereby suitable for use as a home, vacation cottage, mountain retreat, open pavilion or the like. More particularly, the invention relates to a building structure having a foundation covering a relatively small central area, a central support column and a plurality of radially extending cantilevered trusses carried by the column and foundation for supporting the structure above ground level.

Conventional buildings are erected on a foundation which underlies substantially the entire structure. While such a construction has obvious advantages from a structural point of view, it tends to limit flexibility of the design and appearance of the building. Also, in the case of vacation homes, cottages or the like which are often constructed on mountainous, hilly, or rocky terrain, it is difficult if not impossible to find a suitably sized level area on which to place the foundation.

Several attempts have been made to overcome these deficiencies of conventional buildings, but these attempts have proven equally unacceptable. Basically, these attempts have proposed one of two general approaches which involve the use of either a relatively large, central support column extending substantially throughout the height of the building and from which the remainder of the building structure is suspended, or a plurality of spaced support columns or pilings. The large central column reduces to a considerable extent the usable area within the building and the pilings collectively encompass a relatively large area under the building.

With the foregoing in mind, it is an object of the present invention to provide a building structure which is supported by a foundation which covers a relatively small central area and which therefore may be easily positioned on uneven terrain.

It is a more specific object of this invention to provide a building structure which is supported on a centrally located foundation above ground level.

It is a further object of this invention to provide a building of simple and efficient structural design, and which is adapted to be extensively prefabricated at a location remote from the building site.

It is still another object of this invention to provide a building structure which presents a unique and distinctive appearance.

These and other objects and advantages of the present invention are achieved in the embodiment illustrated herein by the provision of a building structure which comprises a foundation including a substantially cylindrical wall extending upwardly from a foundation floor. The building structure has a structural system including a relatively small, central support column mounted on the floor and extending upwardly coaxially with the cylindrical wall for substantially the full height of the structure, a plurality of radially extending cantilevered floor trusses supported by the central column and the foundation wall, a like number of roof trusses emanating radially from the central column at a level above the floor trusses to define an area therebetween, with each roof truss being vertically aligned above a corresponding floor truss, and a vertical post extending between each roof truss and its corresponding floor truss adjacent the radial extremities thereof.

Some of the objects and advantages of the invention having been stated, others will appear as the description proceeds, when taken in connection with the accompanying drawings, in which.

FIG. 1 is a side elevational view of a building structure embodying the present invention;
FIG. 2 is a sectional view taken substantially along line 2-2 in FIG. 1;
FIG. 3 is a sectional plan view taken substantially along line 3-3 in FIG. 1 and illustrating a proposed internal floor plan arrangement;
FIG. 4 is a sectional plan view taken substantially along line 4-4 in FIG. 1;
FIGS. 5 and 5A are exploded perspective views illustrating the various structural components of the building structure shown in FIG. 1;
FIG. 6 is an enlarged, fragmentary sectional view of one-half of the building structure shown in FIG. 1;
FIG. 7 is an isometric view of a connector carried by the upper end of the column as seen in the upper right-hand portion of FIG. 6;
FIG. 8 is a perspective view of a roof truss to exterior post connector as seen in the upper left-hand portion of FIG. 6;
FIG. 9 is a perspective view of a roof truss to column connector as seen in the upper medial right-hand portion of FIG. 6;
FIG. 10 is a perspective view of a floor truss to column connector as seen in the lower medial right-hand portion of FIG. 6;
FIG. 11 is a perspective view of a floor truss to exterior post connector as seen in the lower left-hand portion of FIG. 6;
FIG. 12 is a perspective view of a floor truss to column connector as seen in the same area of FIG. 6 as FIG. 10;
FIG. 13 is a perspective view of a floor truss to foundation connector as seen in the lower medial portion of FIG. 6;
FIG. 14 is a perspective view of a floor truss to column connector as seen in the same area of FIG. 6 as FIGS. 10 and 12.

Referring more specifically to the drawings, a building structure embodying the features of the present invention is illustrated generally at 20. The structure includes a concrete foundation 22 having a floor 24 and an upwardly extending relatively large area extending exteriorly and a plurality of horizontal supporting surface 28. While the wall 26 is shown as being octagonal, it will be appreciated that other substantially regular polygonal or circular configurations could be employed. Also, as best seen in FIG. 5, the wall 26 includes a cutout 30 for mounting an entrance door 32.

A central support column 35 of steel or other suitable material is mounted on the foundation floor 24 and extends upwardly concentrically with the foundation wall 26 for substantially the full height of the structure. As seen in FIGS. 5 and 6, a number of connectors or brackets are suitably connected to the column, as by welding, for securing the various structural components thereto. In particular, these include a bracket 36 by which the column 35 is mounted on and is anchored to foundation floor 24, a floor to column connector 37, a ceiling to column connector 38, and a roof to column connector 39.

The building structure 20 includes a floor 40 which in turn includes a plurality of floor support members 41, which are preferably in the form of triangularly shaped, cantilevered trusses, connected at their ends to the central column and extending radially outward therefrom. In the illustrated embodiment, eight evenly spaced floor trusses are shown, and it will be appreciated that a somewhat smaller or greater number could be employed. Each floor truss 41 includes a horizontal member 42 positioned at a level above the foundation wall 26 and having a radially inner end connected to the floor to connector 37 by means of a connector 43 (FIG. 12), and an opposite end which extends radially beyond the foundation wall 26. A second member 46 is inclined radially inwardly and extends from the supporting surface 28 of foundation wall 26 to the floor to connector 37 to which it is connected by means of a connector 47 (FIG. 14). A third member 48 is inclined radially outwardly from the supporting surface 28 of foundation wall 26 to the outer end portion of horizontal member 42 to which it is connected by means of a connector 49 (FIG. 11). A fourth intermediate member 50 may also be employed which extends from the supporting surface 28 of foundation wall 26 to about the midportion of the horizontal member 42 to which it is connected by a connector 51 (FIG. 6). The second, third and fourth members 46, 48 and 50 are interconnected by a connector 52 (FIG. 13) which also serves as a bracket to anchor the floor truss 41 to the foundation wall 26 (FIG. 6).
Preferably, a horizontal joist member 53 extends between and is connected to the horizontal members 42 of adjacent floor trusses 41 (FIG. 5) at approximately the midportions thereof. The joist members 53 cooperate with the fourth members 50 and the upper surface 28 of foundation wall 26 to define generally horizontal joist cavities or openings. A substantially solid, generally isosceles trapezoidal panel 54 may be positioned in each of these openings to thereby enclose the area between the foundation wall 26, horizontal members 42 and joist members 53, with the members 50 being positioned intermediate adjacent panels. In addition, it has been found that the panels 54 serve as “shear panels” and provide resistance to rotation of the floor trusses about the central column 35. If a door 32 is positioned in the foundation, a number of suitably shaped panels 55, 56 may be positioned thereabout to completely enclose the area between the foundation and horizontal members 42.

Floor decking 57 (FIG. 5) overlies the floor trusses 41, and preferably comprises a plurality of generally isosceles triangular sections 58. The sections are interconnected in the configuration shown in FIG. 5 such that each of the two equal sides of each section overlies and is connected to one of the horizontal members 42 of the floor trusses. The sections 58 may be of any suitable construction, such as spaced top and bottom parallel panels with insulation positioned therebetween. It will be apparent to those skilled in the art, the construction permits the prefabrication of the floor sections and rapid assembly at the building site. Each, section 58 may comprise a number of individual segments (not illustrated) to facilitate handling by workmen.

A roof 60 is disposed upwardly from floor 40 and defines a space therebetween. Roof 60 includes a plurality of roof support members or trusses 61 corresponding in number to that of the floor trusses 41 which are disposed in vertically extending, spaced relation about the central column 35. Each roof truss 61 is vertically aligned above a floor truss 41, and includes a lower horizontal member 62 having radially inner end secured to the ceiling to column connector 38, and an upper inclined or rafter member 63 having one end secured to the upper horizontal connector 39 of the horizontal member 62. A vertical support member 64 is connected between the horizontal member 62 and rafter member 63 at approximately the midportions thereof, and a transverse member 65 is connected between the midportion of the rafter member 63 and the ceiling connector 38. As seen in FIGS. 2, 3 and 6, a vertical post 81 is connected between each truss 41 and the rafter 61 adjacent the outer ends thereof, and each post is connected at its lower end to the floor truss by the connectors 49 and to the roof truss by the connectors 82.

Roof decking 70 overlies the roof trusses 61 and preferably comprises a plurality of triangular sections 71 of a construction generally similar to that of the floor sections 58. In particular, each roof section 71 is of an isosceles triangular configuration with each of the two equal sides overlying and connected to one of the rafter members 63 of the roof trusses. A conventional protective roofing material, such as cedar shingles 72 (FIG. 1) may then be positioned to overlie the sections 71 to complete the roof decking 70.

When it is desired to enclose the described building structure, a circumferential wall 80 is positioned to surround the radially outer ends of the floor trusses 41 and upwardly to the roof trusses 61 horizontal members to enclose the area therebetween. The wall 80 is illustrated as being somewhat octagonal in cross section so as to present eight distinct faces about the circumference, and will be seen to include a series of panels 83 extending between the floor 40 and the roof 60 radially inside of the vertical posts 81. As shown, there are three panels 83a which may be either solid (i.e., opaque) or glass, between adjacent vertical posts 81 and a corner panel 83b is positioned between each of three panels 83a. Each corner panel may comprise for example jalousie windows in the upper portion and an electric heater (not shown) positioned in the lower portion. Of course, a door (not shown) could be substituted for one of the panels 83a to permit entry into the building structure, and a suitable bridge or stairway 85 (FIG. 2) is provided from the door to ground level. As will be apparent, the wall 80 would not be employed if the building structure were to be used as an open pavilion or the like.

While the specific dimensions of the illustrated structure are subject to wide variation depending upon the intended use thereof, typical dimensions for a mountain retreat, vacation cottage or the like, are set forth in the following table in conjunction with the dimensions shown in FIG. 2:

<table>
<thead>
<tr>
<th>Height of the roof truss</th>
<th>Height of the living area</th>
<th>Height of the floor truss</th>
<th>Height of the foundation</th>
<th>Overall height of the structure</th>
</tr>
</thead>
<tbody>
<tr>
<td>(A)</td>
<td>(B)</td>
<td>(C)</td>
<td>(D)</td>
<td>(E)</td>
</tr>
<tr>
<td>6.0 ft</td>
<td>7.5 ft</td>
<td>5.1 ft</td>
<td>5.7 ft</td>
<td>24.9 ft</td>
</tr>
<tr>
<td>Diameter of the foundation</td>
<td>Overall diameter of the structure</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(E)</td>
<td>(F)</td>
<td>10.8 ft</td>
<td>33.3 ft</td>
<td></td>
</tr>
</tbody>
</table>

From a study of the above dimensions, it will be observed that the height of the foundation is slightly less than one-fourth the overall height, and the diameter of the foundation is slightly less than one-third the overall diameter. These interrelationships are such as to provide a structurally sound foundation wherein the weight of the structure is effectively distributed between column 35 and wall 26. At the same time, the presence of the wall provides a pleasing and unique external appearance.

It will also be observed that the similarity of slope in the floor truss members 48 and the roof truss rafter members 63 gives rise to a distinctive appearance. More particularly, the inclination of the members 48 from the horizontal is substantially equal but opposite from the inclination of rafter members 63. As shown in FIG. 2, this angle is about 18°. Thus the slope of the roof 60 is complemented by the opposite slope in the exposed members 48.

In the drawings and specification, there has been set forth a preferred embodiment of the invention, and although specific terms are employed, they are used in a generic and descriptive sense only and not for purposes of limitation.

I claim:

1. A building structure adapted to be supported on a relatively small area and comprising,
   a central support column extending vertically for substantially the full height of said building structure,
   a foundation supporting said column and including a support wall substantially concentrically surrounding the lower portion of said column in spaced relation thereto and extending upwardly for a portion of the height of said building structure,
   a floor comprising a plurality of spaced floor support members extending radially outwardly from said central column and supported at their inner ends by said central column and at an intermediate point by said foundation wall, and floor decking carried by said floor support members,
   a roof disposed above said floor to define an area therebetween and being at least partially supported by said central column, and
   a plurality of vertical posts extending between and connected to the outer end portions of said floor support members and said roof.

2. The building structure according to claim 1 wherein said roof comprises a plurality of roof support members equal in number to said floor support members and connected at their inner ends to said support column and extending radially outwardly therefrom and roof decking carried by said roof support members and extending therebetween to completely cover the upper portion of the building structure.

3. The building structure according to claim 2 wherein each of said support members comprises a roof truss having a generally horizontal member, a first inclined member connected at its outer end portion to the outer end portion of said
horizontal member and defining the support for said roof decking and a second inclined member connected to and extending from the inner end of said horizontal member to a medial portion of said first inclined member to which it is connected, the inner end of said first inclined member being connected to the upper end portion of said central support column and the juncture of said horizontal member and said second inclined member being connected to the central column in downwardly spaced relation to said first inclined member.

4. The building structure according to claim 2 wherein said roof decking comprises a plurality of generally isosceles triangular sections overlying and connected to said roof support members.

5. The building structure according to claim 1 further comprising a vertical wall extending between and connected to the outer end portions of said floor support members and said roof, said wall including a plurality of enclosure panels disposed inwardly of said vertical posts to enclose the space between the roof and the floor.

6. The building structure according to claim 1 wherein each of said floor support members comprises a generally triangular floor truss having a generally horizontal member supporting said floor decking and second and third members connected to the horizontal member and to each other and defining the other two sides of the triangular shape, the juncture of said second and third members being supported and connected to said foundation wall.

7. The building structure according to claim 6 wherein each of said floor trusses further includes a fourth member extending between said juncture of the second and third members and a medial point on said horizontal member, and a horizontal joint extending laterally between adjacent said horizontal members adjacent said fourth member to thereby define a plurality of substantially isosceles trapezoidal areas bordered by the foundation wall, the fourth members, and the horizontal joint.

8. The building structure according to claim 7 wherein a substantially solid panel is positioned in at least several of the said trapezoidal areas to thereby provide resistance to rotation of the floor trusses about said central column.

9. The building structure according to claim 6 wherein the radial extent of said floor truss horizontal members is at least twice as great as the distance from said column to said foundation wall.

10. The building structure according to claim 9 wherein said roof includes rafter members inclined relative to the horizontal and the inclination of said rafter members is substantially equal to but opposite from the inclination of the third members of said floor trusses.

11. The building structure according to claim 1 wherein said floor decking comprises a plurality of generally isosceles triangular sections overlying and connected to said floor truss horizontal members.

12. The building structure according to claim 1 wherein said foundation wall includes a cutout, and including an entrance door mounted in said cutout.

13. A building structure for use as a home, cottage or the like and adapted to be supported from a relatively small flat area, said structure comprising:

a central support column extending vertically for substantially the entire overall height of said structure,
a foundation including a floor mounting said support column and a wall carried by and extending upwardly from said floor for a distance equal to about one-fourth the height of said support column and surrounding said column and being spaced outwardly therefrom a distance equal to about one-third the radial distance from said column to the perimeter of said building structure,
a plurality of triangularly shaped, cantilevered floor trusses supported at their inner ends of said central column and extending radially outwardly therefrom, each floor truss including a horizontal member positioned at a level above said foundation wall, a second member inclined radially inwardly and extending from said foundation wall to the inner end of said horizontal member, and a third member inclined radially outwardly from the outer end of said second member and said foundation wall to the outer end of said horizontal member, the outer end of said second member and the inner end of said third member being interconnected and being supported by and connected to said foundation wall to thereby support said floor trusses on said foundation wall,

floor decking overlying and connected to said floor trusses to form a supporting surface for occupants, a plurality of roof trusses supported at their inner ends on said central column and extending radially outwardly therefrom at a level above said floor trusses to define a living area therebetween, each of said roof trusses being vertically aligned above a corresponding floor truss, roof decking overlying and connected to said roof trusses to form a weatherproof surface over the living area, and

a vertical post extending between each roof truss and its corresponding floor truss adjacent the outer ends thereof.

14. The building structure according to claim 13 further comprising wall panels disposed inwardly of said posts and extending between said floor decking and said roof decking around the perimeters thereof to enclose the living area.

15. The building structure according to claim 14 wherein said floor trusses further include a fourth member extending between said interconnection of the second and third members and a medial point on said horizontal member.

16. The building structure according to claim 15 wherein there are eight floor trusses and eight roof trusses.

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