United States Patent

[11] 3,604,165

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[54] **PANELLED DECK CONSTRUCTION FOR BUILDING**
16 Claims, 15 Drawing Figs.

[52] **U.S. Cl.** **52/263,** 52/283, 52/301, 248/357
[51] **Int. Cl.** **E04b 5/43,** F16m 11/02
[50] **Field of Search** ..... 52/261–263, 299, 480, 481, 234, 236, 624–627, 250, 275, 283, 582, 584, 580, 589, 300, 301; 287/54 B; 248/357

[56] **References Cited**

UNITED STATES PATENTS

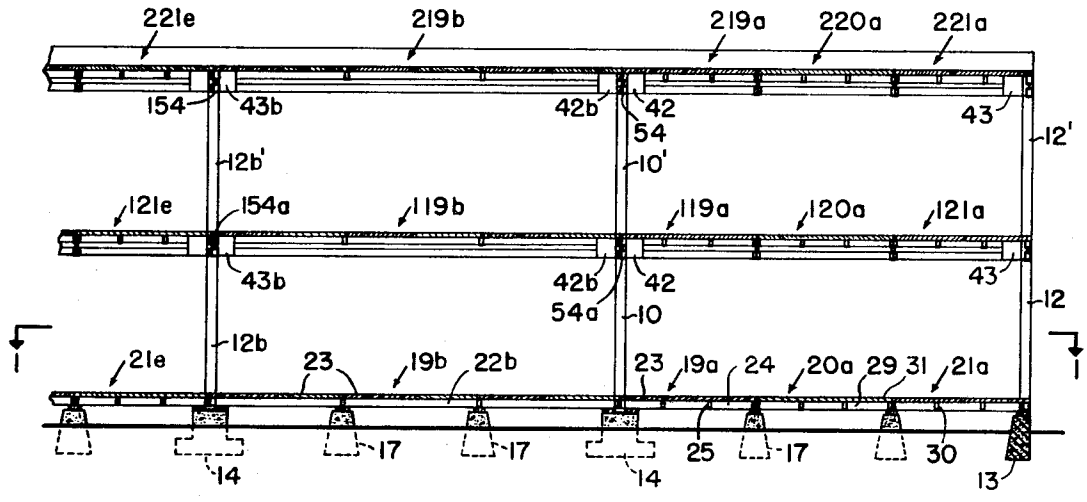
734,192	7/1903	Randolph	52/301
992,739	5/1911	Meier	52/582
2,022,255	11/1935	Scott	52/589
2,138,927	12/1938	Keller	52/283
2,140,772	12/1938	Slayter et al.	52/580
1,314,271	8/1919	Kopp	52/261
1,928,797	10/1933	Skar	52/236

FOREIGN PATENTS

1,061,783	3/1967	Great Britain	52/263
1,079,751	8/1967	Great Britain	52/236
1,184,688	2/1959	France	287/54 B

Primary Examiner—Frank L. Abbott
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Attorney—Milmore & Cypher

ABSTRACT: In a building having posts, a deck (either the ground floor, an elevated floor or the roof) is constructed from rectangular prefabricated panels which are arranged in parallel in each quadrant about a post, the panel orientations being progressively 90° different within successive quadrants, an outside panel of each quadrant having an outer edge radiating from a post and formed with a beam along that edge, and the ends of the panels of an adjoining quadrant being connected to that beam. Each panel may have additional frames for interconnection. The ground floor panels can be supported from the ground, as by a concrete slab or abutment; the other decks are supported from the posts, to which the means are supportedly connected. One form of connection includes an attachment block fast on each post having attachment faces to which the beams are attached, e.g., by bolts, if desired through spacers which are permanently attached to the ends of the beams and strengthen the beam ends.



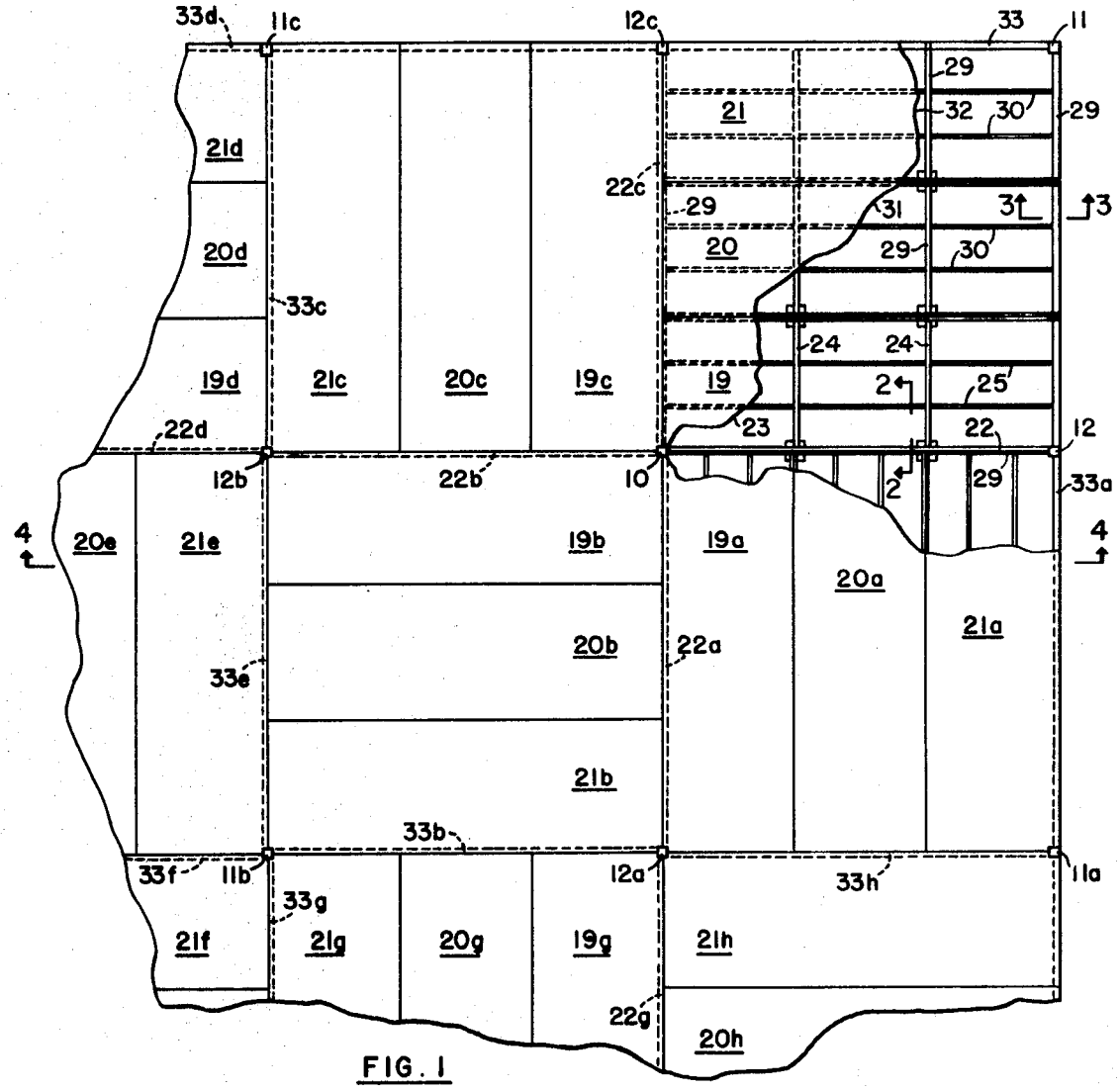


FIG. 1

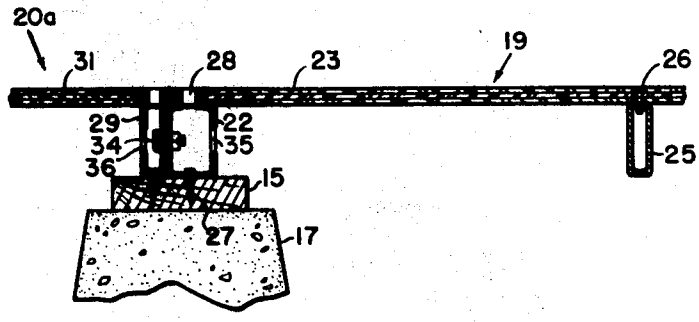


FIG. 2

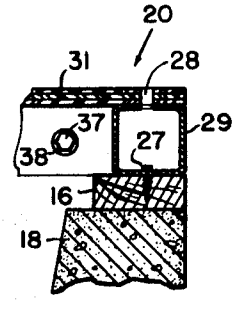


FIG. 3

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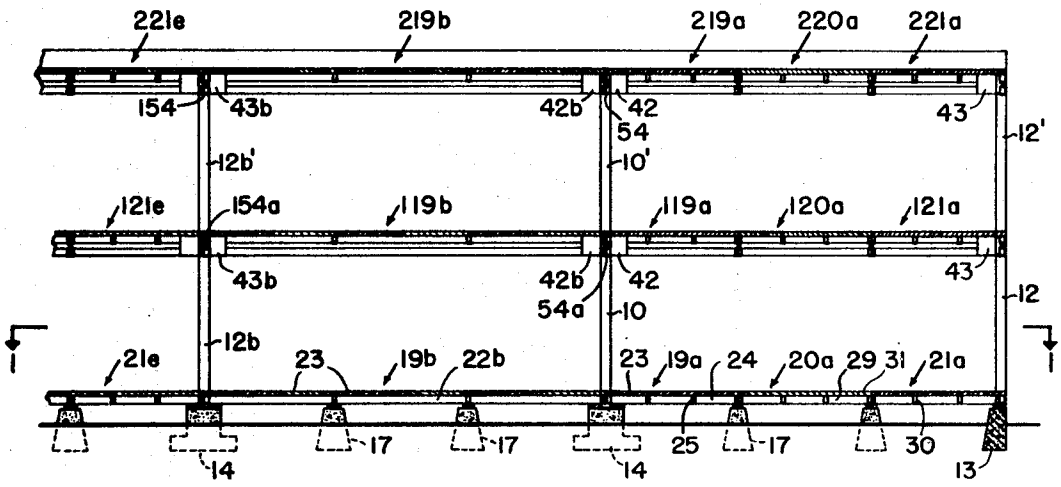


FIG. 4

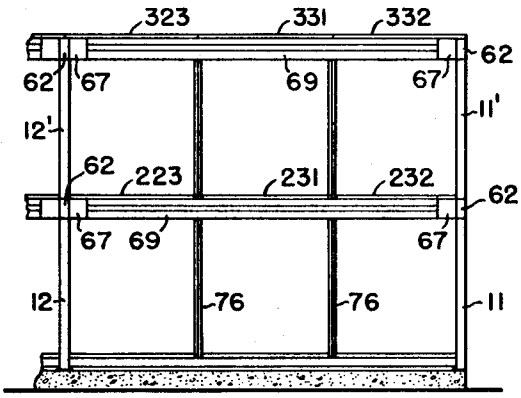


FIG. 5

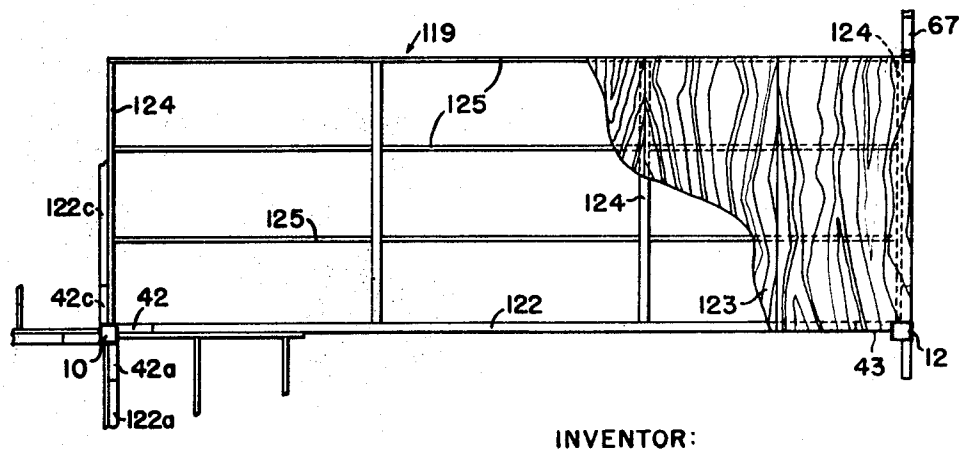


FIG. 6

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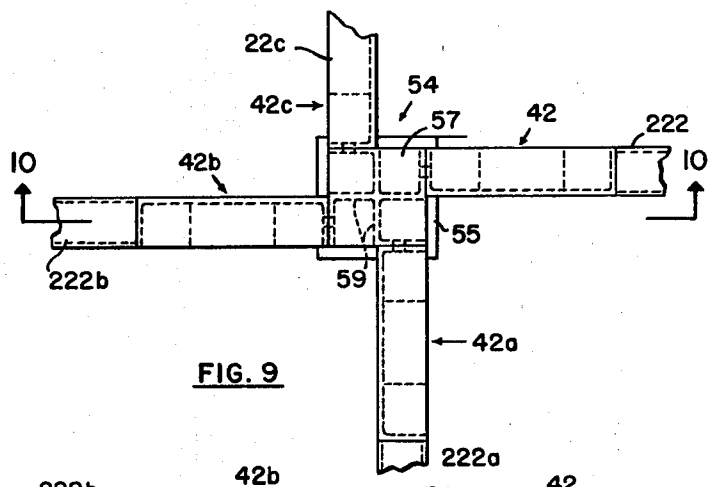


FIG. 9

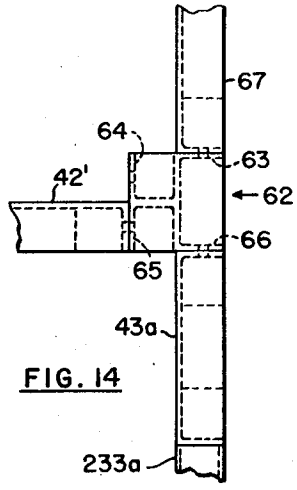


FIG. 14

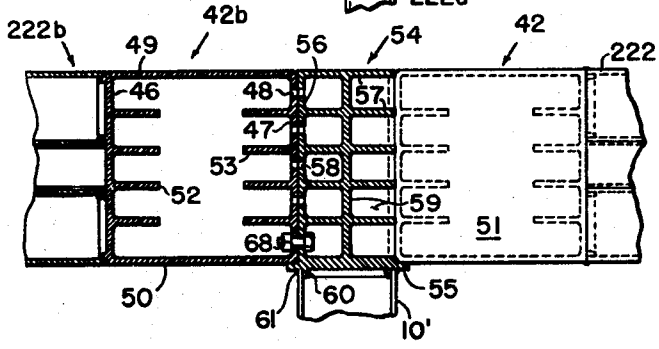


FIG. 10

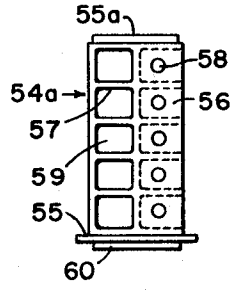


FIG. 12

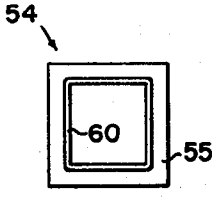


FIG. 11

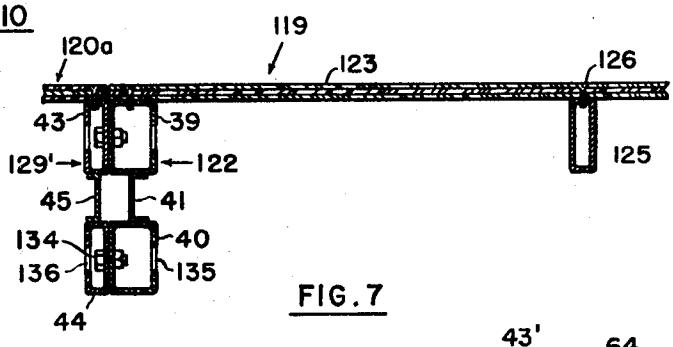


FIG. 7

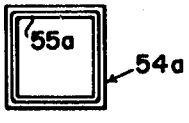


FIG. 13

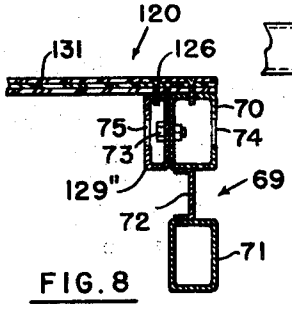


FIG. 8

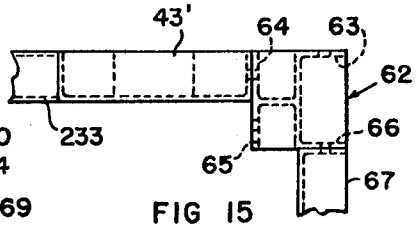


FIG 15

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PANELLED DECK CONSTRUCTION FOR BUILDING

The invention relates to deck constructions in building structures (including true, model and toy structures), such as ground or elevated floors and roofs. It is particularly concerned with decks formed from a plurality of smaller panels than the building module, several of such panels being arranged ro form a quadrant or section and four of such quadrants or sections being disposed about a post of a building; it is further concerned with the construction of such panels and with an attachment block by which such decks can be supported from the posts.

In recent years buildings have been designed in modular form, using posts spaced apart at predetermined intervals and floor or roof panels of standardized sizes which could be prefabricated, transported to the erection site and there rapidly assembled. However, prior designs, while permitting the addition of modules in side-by-side relationship, used module units which were independent structural units, sometimes having certain members in common, and the designs did not permit the addition of module units which cooperated structurally, as by affording support from one module to another. Further, since the deck panels necessarily were of sizes less than the module since large panels, e.g., 30 feet square, cannot be readily transported and handled by construction crews, beams or trusses extending between posts which were independent of the panels had to be used. Beams, trusses and the like are herein generically called "beam means."

The present invention further develops the concept of modular building forms and provides a deck construction in which deck panels of reasonable size, e.g., 10×30 ft., can be used, and obviates the use of some or all beam means which are independent of the deck panels, especially those independent beam means which in prior constructions extended to interior posts.

Further, the invention provides a deck construction in which additional modular units can be added in both orthogonal directions to build up a composite deck of any size, the outline of which need not be rectangular. In such a composite deck the modular units cooperate with neighboring units structurally to afford support from one unit to the panels of the adjacent unit.

The novel arrangement of the panels can be used for the ground floor, which may be supported directly from abutments or a masonry or concrete subfloor and not supportedly connected to the posts, as well as for elevated decks which are supported from the posts. While the beam means formed as a part of certain panels can be smaller and/or of lighter construction in the case of abutment-supported panels than in the elevated panels, they are alike in function and can be similarly constructed.

A further feature of the invention is the provision of a simple and sturdy means for supportedly attaching the deck panels to the tops of posts, the term "post" being used herein to denote columns of various types, including sections of columns.

In this specification the terms "quadrant" and "section" have the same connotation as far as the structure of the deck is concerned, the former expression being used to denote one of four sections that, together, form the basic pattern of the deck.

In summary, according to the invention the deck is formed of four quadrants which surround a post, each quadrant containing two or more, e.g., three deck panels, the orientation of the panels in each quadrant differing progressively by 90° from the orientation of the panels in the adjoining quadrant, and each quadrant has a beam panel with a margin situated at the edge of the quadrant with beam means extending along said margin and the other panel or panels of the same quadrant lie parallel to and to the side of the beam panel which is remote from the beam means, and all ends of the

panel which lie adjacently to a beam panel of another quadrant are fastened to the beam means of the latter. Deck panels without beam means have, and those with beam means preferably have, depending upon the material used for the sheet providing the deck surface, a frame to which said sheet is attached. This sheet may be, for example, of wood plyboard, pressed board, plastic or ceramic.

Additional deck sections, each constructed from a plurality of panels as described above for one quadrant, may be added on any side of the rectangle formed by said quadrants to extend the deck area.

In the case of decks which are supported form the posts, the beam means are fastened supported to the post at the center of the four quadrants and are supported in any suitable manner from the building structure at their outer ends, as by fastening to another post.

The means by which the end of a beam means is supported from a post may, in a preferred embodiment, comprise an attachment block having a supporting part which is readily attached to the top of a post and a plurality of attachment walls oriented in several different directions, e.g., 90° apart, and spaced from each other so as to provide an access space to the inner face of the wall from the side thereof, and said wall has connecting means, such as holes for bolts or rivets, or is formed to facilitate welding thereto. These attachment walls are advantageously joined by integral horizontal walls which afford strength and stiffness and form cells which are accessible from the sides. The supporting part preferably has at its bottom a boss of outline to have a telescoping or at least a positioning fit with the top end of the post; the boss can be shaped to facilitate welding the block to the post. A similar boss can be provided at the top of the block for attaching another post extending upwardly therefrom.

The beam means on panels provided therewith may in some embodiments be attached to the attachment block directly; however, it is usually desirable to form the beam of structural elements that are not well suited for making either a welded or bolted connection, and in such cases it is advantageous to provide at the end of the beam means a spacer and connecting element which is permanently attached to the beam means, as at the prefabrication plant, and has a connecting wall that can be attached to one of the walls of the block. This member preferably has a plurality of vertically spaced, horizontal walls extending from the connecting wall which form cells which are open to the side and which stiffen the member.

The invention will be further described in greater detail with reference to the accompanying drawings which show principally one preferred embodiment by way of illustration, minor variants being also shown, wherein:

FIG. **1** is a plan of a ground floor deck, taken on the line **1—1** of FIG. **4**, showing four quadrants and portions of three additional deck sections, parts being broken away;

FIGS. **2** and **3** are sections taken on the correspondingly numbered lines of FIG. **1**, showing on an enlarged scale the support and certain interconnections between panels;

FIG. **4** is a section through the building, on the line **4—4** of FIG. **1**;

FIG. **5** is a fragmentary elevation of the building;

FIG. **6** is a plan of a beam panel for an elevated deck, on an enlarged scale and with parts broken away;

FIGS. **7** and **8** are views corresponding to FIGS. **2** and **3**, respectively, of panels used in the elevated deck;

FIG. **9** is a plan of an attachment block suitable for the roof deck, showing also the connecting and spacer members and portions of the beam means, to an enlarged scale;

FIG. **10** is a section on the line **10—10** of FIG. **9**;

FIG. **11** is a bottom view of the attachment block;

FIG. **12** is an elevation of a modified form of the attachment block, suitable for use at an intermediate floor;

FIG. **13** is a plan of the block of FIG. **12**;

FIG. **14** is a plan, similar to FIG. **9**, showing a modified form of attachment block suitable for posts on the outside of the building; and

FIG. 15 is a plan similar to FIG. 14, using the same attachment block at the corner of a building.

Referring to FIGS. 1 and 4, the building structure comprises a plurality of posts situated in a modular pattern, e.g., in a square grid with 30 ft. between post centers. With reference to the four quadrants to be described, there are a center post 10, four corner posts 11–11*c* at the corners of a 60-ft. square, and four intermediate posts 12*c*–12*c* at the midpoints of the sides of the square, set in foundations 13 or 14. As is further shown in FIGS. 2 and 3, the building provides a suitable base for supporting the ground floor, such as wooden sills 15 or 16 mounted on a concrete abutments or piers 17,18 which are positioned on a square grid at 10-ft. intervals.

The deck includes, and may consist of, four quadrants surrounding the center post 10, constructed alike but differently oriented, and that at the upper right of FIG. 1 will be described. It includes a beam panel 19 having its first edge at the margin of the quadrant, which margin extends outwardly from the post, preferably but not necessarily on a line which intersects the center of the post. The opposite margin of this panel, herein called the second margin, abuts another panel 20 which is parallel to the beam panel. The number of other panels in a quadrant depends upon the sizes of the panels, and the illustrative embodiment has two other panels 20 and 21. All three panels have identical outlines (save for corner cutouts to accommodate the posts), such as 10×30 ft., although this equality of sizes is not essential to the invention. The reference numbers 19*a*–19*c*, 20*a*–20*c* and 21*a*–21*c* denote corresponding panels of the other three quadrants. The orientations of the panels in successive quadrants are progressively 90° apart, so that the panels 19*a*, 20*a*, 21*a* of the second quadrant are perpendicular to the panels 19, etc., of the first quadrant, and the shorter ends of the panels of the second quadrant lie adjacently to the first margin of the beam panel 19.

Each beam panel has beam means extending along its first margin. This may, for example, be a rectangular metallic tube 22 as appears in FIGS. 1 and 2, extending beneath the panel sheet 23; however, composite beams or trusses can be used. Advantageously the beam panel includes a frame formed from suitable stock, such as rectangular metal tubes 24 and 25, extending transversely and longitudinally, respectively, welded to each other and to the tube 22, and preferably having the same depth but narrower and/or lighter than the tube 22, so that the panel can rest on the sills 15 and 16. The panel sheet, e.g., wood plyboard, is attached to the frame by sheet metal screws 26 (FIG. 2) and the frame, including the beam means, are secured to the sills by screws 27, inserted through holes 28 formed in the top walls of the tubes 22, 24 and 25 and in the panel sheet. It is thereby possible to form the panel sheet of several smaller pieces, such as pieces 5×10 ft. in size as indicated in FIG. 4.

Similar frames, formed from transverse members 29 and longitudinal members 30, e.g., metal rectangular tubes welded together, are provided also for the other panels 20, 21, to which panel sheets 31 or 32 are attached by sheet metal screws as previously described. These frames preferably have the same depths as the frame of the beam panel to rest on the sills. Further, the last panel of each quadrant, viz, the panel 21, has extending along its outer margin auxiliary beam means 33, which may be constructed as was described for the beam means 22. Preferably, each frame of each panel includes parts extending along and under the margins of the panels, to permit adjoining panels to be interconnected.

Thus, the shorter end of each panel which lies adjacently to a beam means of another quadrant may be connected thereto by suitable means, such as bolts 34, which extend through aligned holes in the adjoining members, as appears in FIG. 2. These bolts can be installed through access holes 35 and 36 which are formed opposite to the aligned holes in the juxtaposed frame or beam tubes. Optionally, but preferably, the several panels of each quadrant are similarly interconnected along their lengths by similar bolts 37, applied by access holes 38, as shown in FIG. 3.

The margins of the panels at the exterior of the building rest on the sills 16, as shown in FIG. 3.

FIG. 1 further shows parts of adjoining deck sections in the interior of the building. These are constructed as was described above for the quadrants. For example, one section includes panels 19*d*, 20*d* and 21*d*, which are connected to the auxiliary beam means 33*c* of the panel 21*c* in the manner shown in FIG. 2, the panel 19*d* having beam means 22*d*; another section includes panels 20*e* and 21*e*, which are connected to the beam means 22*d*, the panel 21*e* having auxiliary beam means 33*e* to which the ends of the panels 19*b*, 20*b* and 21*b* are connected. Similarly arranged are the panels 19*g*, 20*g* and 21*g* of another section with their ends connected to the beam means 33*b* of the panel 21*b*, the panels 20*h* and 21*h* of still another section with their ends connected to the beam means 22*g* of the panel 21*g*, and one panel 21*f* of a further section connected at its end to the auxiliary beam means 33*g* of the panel 21*g* and carrying the auxiliary beam means 33*f* to which the panels 20*e* and 21*e* are connected.

Considering next the deck construction for an elevated floor or the roof, these decks have the same plan as the floor shown in FIG. 1, and the plan is therefore not repeated. However, the panels have heavier beam means and auxiliary beam means, while their frame members may also be heavier. Referring to FIGS. 4, 6, 7 and 8, a beam panel 119 includes a beam means 122, formed from upper and lower rectangular metallic tubes 39 and 40, interconnected by a structural channel 41 which is welded thereto and forms a web. The auxiliary beam means on the panels remote from the beam panel (corresponding to the part 33, but not shown) are similarly constructed. These composite beam means and auxiliary beam means are shorter than the panels, and a connecting and spacing member 42 or 43 is permanently fixed to each end at the prefabrication plant, e.g., by welding. Each panel includes metallic frames which include, for the beam panels, transverse and longitudinal metal tubes 124 and 125. These frames for the several panels are constructed as was previously described, save that all frame elements which adjoin a beam means or an auxiliary beam means of another panel preferably have (and any other elements, especially those at the peripheries of the panels may have) a depth as great as that of the beam means. For example, (see FIG. 7) the frame element 129′ of the panel 120*a* is constructed of an upper and a lower metal tube 44′ and 44, interconnected by a structural channel 45. These adjoining deep beam means and frame elements are interconnected to support the latter from the former by suitable means, such as bolts 134 provided on both the upper and the lower tubes, attached through access holes 135 and 136. Other adjacent panels are similarly interconnected, but using bolts at only one level if necessary. The screws 27 and the holes 28 are not used. Finally, certain frame elements situated at the exterior of the building, such as the element 129″ of the panel 120, shown in FIG. 8, may be positioned inwardly from the margin of the panel sheet 131 for the purpose described below; however, this is not necessary in all designs.

Except for the differences noted in the foregoing paragraph, the panels of the elevated floor and roof are constructed and arranged as was previously described for the ground floor deck, and corresponding elements are designated by corresponding reference numbers, increased by 100 for the elevated floor and by 200 for the roof.

The spacing and connecting members are best shown in FIGS. 9 and 10, wherein four identically constructed members 42–42*c* appear, welded to the ends of the beam means 222–222*c* of four roof beam panels. Each member is of integral construction and includes a welding wall 46 and a connecting wall 47, the latter having a plurality of holes 48 for bolts, rivets, or the like. Upper and lower horizontal walls 49 and 50 and a connecting vertical wall 51 interconnect the end walls 46 and 47, and reinforcing and stiffening walls 52 and 53 extend inwardly from the end walls at heights displaced vertically from the holes 48, being also connected to the vertical wall 51 and forming intervening cells which are open to one side of the wall 47.

The roof is supported on posts, such as the posts **10'**, **11'** and **12'**. The top of each post carries an attachment block **54** which is of integral construction and provides a supporting part **55**, four attachment walls **56** oriented in four mutually perpendicular directions, and a plurality of horizontal stiffening walls **57**, which are displaced vertically from holes **58** formed in the attachment walls in alignment with the holes **48**. The walls **57** unite the four attachment walls to provide intervening cells which are open to one side and behind each attachment wall. It may be noted that the attachment walls are about one-half as wide as the block and are situated to one side of the central vertical plane, to be in alignment with the beam means **22**, **22***a*, etc. of FIG. **1**. The interior of the block further has vertical walls **59** which are integral with the horizontal walls. The bottom of the block has attachment means for fastening the block to the post. For example, this may be in the form of a boss **60** which has a telescoping fit with the post and may provide a backup surface for applying a weldment **61** between the post and block. This bottom boss is further shown in FIG. **11**.

The attachment blocks **54***a* for the elevated floor are of similar construction and are shown in FIGS. **12** and **13**. They have bosses **55***a* formed at their tops for telescoping fits with the higher posts **10'**, **12***b'*, *etc., in addition to the bottom bosses 60 by which they are fastened to the lower posts 10, 12b*, etc. These blocks are otherwise constructed as described for the blocks **54**, and like reference numbers denote like parts. It is evident that the blocks **54***a* can also be used for the roof, the additional top bosses **55***a* being not utilized.

While the blocks **54** and **54***a* can also be used with posts at the exterior of the building, special fittings are occasionally necessary to avoid placing interconnecting beam means at an angle to the building front. It is, therefore, in these locations, desirable to use a different block **62**, illustrated in FIGS. **14** and **15**, which show respectively the connections at an intermediate and at a cornerpost. Except for the plan view, which shows a different arrangement of four attachment walls **63–66** located on only three sides of the block, they are constructed as described for the other blocks. FIG. **14** shows a connecting member **42'** (at the end of beam means **222** which is remote from the center post) connected to an attachment wall **65**, and a connecting member **43***a* at the end of an auxiliary beam means **233***a* connected to the wall **66**. FIG. **15** shows a connector **43'** at the end of an auxiliary beam means **233** attached to the wall **64**. A special beam, carrying or formed with connecting members **67**, is attached to one wall of each block, and will be described below.

All attachments to the attachment walls may be by rigid tension means, e.g., rivets or bolts, such as the bolts **68** (FIG. **10**), the ends of which are accessible through the laterally open cells.

It is evident that the attachment blocks can be made with different sizes, as to accommodate posts of different dimensions.

Moreover, alternate interior posts have attachment blocks which are mirror images of each other. Thus, the blocks **154** and **154***a* shown in FIG. **4** are enantiomorphic to the blocks **54** and **54***a* shown in FIGS. **9–13** and are not, therefore, separately shown. It is, of course, also possible to use at these alternate posts inverted blocks constructed as shown for the block **54***a*.

The decks of the elevated floor and roof decks are assembled by attaching the spacer and connector members at the ends of the beam means of beam panels to attachment blocks on adjacent posts. Thus, FIG. **4**, the beam panel **119***b* is installed by attaching the members **42***b* and **43***b* to the attachment blocks **54***a* and **154***a*, respectively. The other panels of the same quadrant or section are installed successively and bolted to the previously installed panels, the auxiliary beam means of the last panel of the quadrant or section being attached to adjacent posts by connecting members and blocks. The end of the panels are then bolted to beam means or auxiliary beam means in adjacent quadrants or sections, to form a deck of desired area.

Special provision must be made to support the ends of panels adjacent to the exterior of the building, and various expedients are possible. As is shown in FIGS. **5**, **8**, **14** and **15**, there may be provided a special beam **69**, formed from upper and lower rectangular metal tubes **70** and **71** and interconnected by a web member **72**, the beam being welded at its ends to the connecting members **67**. This beam is carried by the blocks **62** and lies adjacently to the frame member **129''**, to which it is fastened by a bolt or series of bolts **73**, access holes **74** and **75** being provided. As appears in FIG. **5**, the building facade may have auxiliary posts **76**, to facilitate installation of wall panels. These auxiliary posts may be smaller than the main posts and/or may support the adjoining ends of the panels.

It is evident that there can be many variants in the structural details of the deck and attachment blocks without departing from the spirit of the invention or the scope as defined in the appended claims. For example, the frames on certain panels can be omitted when small panels or material having sufficient strength are used, as when the construction is used on a small scale in mock up models or for toys.

I claim as my invention:

1. In a building structure which includes posts, a deck which includes four quadrants surrounding a post, each quadrant comprising:

a. a single beam panel having first and second oppositely disposed long margins of lengths substantially equal to a side of said quadrant positioned with the first margin at an outer edge of the quadrant which bounds said side and extending away from the post and shorter transverse margins, the beam panels in successive quadrants being oriented progressively 90° from the orientation of the beam panel in the quadrant adjacent thereto, each beam panel including:
   1. beam means extending substantially along said first margin thereof through the full length thereof, and
   2. panel means attached to said beam means,

b. at least one other single panel in each quadrant having a first margin of equal length as and positioned adjacently to the second margin of the beam panel and having shorter transverse margins, each said other panel having
   1. frame means extending substantially along said first margin thereof and
   2. panel means attached to said frame means, and

c. means connecting a shorter margin of each of the panels of each quadrant to the same beam means of the beam panel of the adjacent quadrant.

2. The deck defined in claim **1** wherein:

a. said building structure has at least nine posts of which four are situated at the corners of a rectangle which corresponds in area to the four deck quadrants, one intermediate post is situated at each side at the junction of deck quadrants, and the said first-mentioned post is situated approximately at the center of the rectangle,

b. each beam means of a beam panel is supportedly attached to the center post at its near end and to one of the intermediate posts at its outer end,

c. the building structure includes support means at the periphery of said rectangle, and

d. the portions of said beam panels and the other panels which are adjacent to said support means are supported thereby.

3. The deck defined in claim **1** which includes:

a. in addition to the four deck quadrants, at least four additional deck sections shaped like and including panels as specified for one quadrant, two of the additional sections being situated along one outer edge of two adjacent quadrants and other two additional sections being situated along an outer edge formed by one of said two and by a third quadrant which is adjacent to the common quadrant,

b. the building structure providing a post at each corner of each quadrant and each corner of each additional section which is remote from said quadrants,

c. the panels of the additional sections being oriented at right angles to the panels of the respectively adjoining quadrants,
d. the panels of each quadrant and of each additional section which is remote from the beam panel thereof having auxiliary beam means along the margin thereof which is parallel to and remote from the first margin of said beam panel,
e. means supportedly attaching the two ends of each beam means and of each auxiliary beam means to different posts, and
f. means supportedly connecting the margins of the panels which lie adjacently to a beam means or to an auxiliary beam means of an adjacent quadrant or section to said adjacent beam means or auxiliary beam means, respectively.

4. The deck defined in claim 1 wherein:
a. each of said beam panels has connector means at the second margin thereof, and
b. the deck includes means connecting the frame of the other panel of the same quadrant to the connecting means of the beam panel.

5. In a building structure which includes a base which affords support over an area extending over said four quadrants, a floor constructed as defined for the deck of claim 1, each of said panels being supported by said base.

6. The deck defined in claim 1 wherein:
a. each of said panels is rectangular in outline and all panels have substantially the same length measured parallel to the first margins thereof, each panel having a width less than said length, and
b. the aggregate of the widths of one beam panel and the one or more other panels in the same quadrant is substantially equal to said length.

7. The deck defined in claim 6 wherein each quadrant contains at least two of said other panels disposed on the side of the beam panel which is remote from said beam means and parallel thereto, the frame means of each said other panels being connected to the beam means of a beam panel of the adjacent quadrant.

8. The deck defined in claim 1 which includes:
a. means at said post supportedly connecting the near ends of said beam means to the post, and
b. means in the building structure for supporting the ends of said beam means which are remote from said post and the margins of the panels which are at the edges of the quadrants lying outwardly from other quadrants of the deck.

9. The deck defined in claim 8 wherein each quadrant contains at least two other panels disposed on the side of the beam panel which is remote from said first edge and in parallel relation, the frame means of each other panel being connected to the beam means of a beam panel of the adjacent quadrant, and the other panel in each quadrant which is farthest from the beam panel having auxiliary beam means at the margin thereof which is parallel to and remote from the first margin of said beam panel.

10. The deck defined in claim 8 wherein said near ends of the beam means are connected to the post by:
a. an attachment block which is fast on the post, and
b. a connector member interconnecting the block to and which is a permanent part of the beam means.

11. The deck defined in claim 10 wherein said connector member is a spacer fixed to an end of the beam means and of stiffer construction than the beam means, said attachment block and connector member having juxtaposed attachment walls joined together by means extending through aligned holes in said walls.

12. A post-cap which includes:
a. a supporting part adapted to be supportedly attached to the top of a building post,
b. four vertical walls extending upwards from said supporting part and forming, in plan, a cross defining four quadrants,
c. a plurality of vertically spaced, horizontal walls within each quadrant and integral with the vertical walls which bound the respective quadrant, and
d. a vertical attachment wall for each of said quadrants oriented with its outer face 90° from the outer faces of the attachment walls of adjacent quadrants, each attachment wall being spaced outwardly from the vertical wall which is in rear thereof and being integral with the adjacent horizontal walls, each said attachment wall having at least one bolting hole extending therethrough at a level between horizontal walls and each cell defined by an attachment wall and adjacent horizontal walls which has a bolting hole being laterally open.

13. A post-cap according to claim 12 wherein said four vertical walls are integral with said supporting part and with each other.

14. A post-cap according to claim 13 wherein each attachment wall has a width approximately one-half of the width of the post-cap, is situated to the same corresponding side of the nearest vertical wall, and is integral with said nearest vertical wall.

15. A post-cap according to claim 13 which includes a plurality of more than two vertically spaced, horizontal walls in each quadrant, said attachment walls having a plurality of vertically spaced bolting holes situated at levels between different pairs of adjacent horizontal walls, all of said parts being a unitary casting wherein said four vertical walls are integral with said supporting part and with each other and the attachment walls are integral with the nearest vertical wall.

16. In combination with the post-cap according to claim 12, a spacer and connecting member adapted to be permanently attached to the end of a beam means, said member haVing integral therewith a connecting wall which lies against one of said attachment walls and one or more holes aligned with the holes in the adjacent attachment wall, and tension members extending through said aligned holes fastening the connecting wall to the adjacent attachment wall.