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Simpson et al.

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[45] **July 17, 1973**

[54] **INTERLOCKING BUILDING CONSTRUCTION**

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[21] Appl. No.: **110,073**

[52] **U.S. Cl.**..... **52/236,** 52/252, 52/263, 52/272, 52/283, 52/295

[51] **Int. Cl.**..... **E04h 1/00,** E04b 1/02, E04b 1/54

[58] **Field of Search**..... 52/236, 252, 283, 52/263, 259, 60, 587, 251, 274–279, 295, 272

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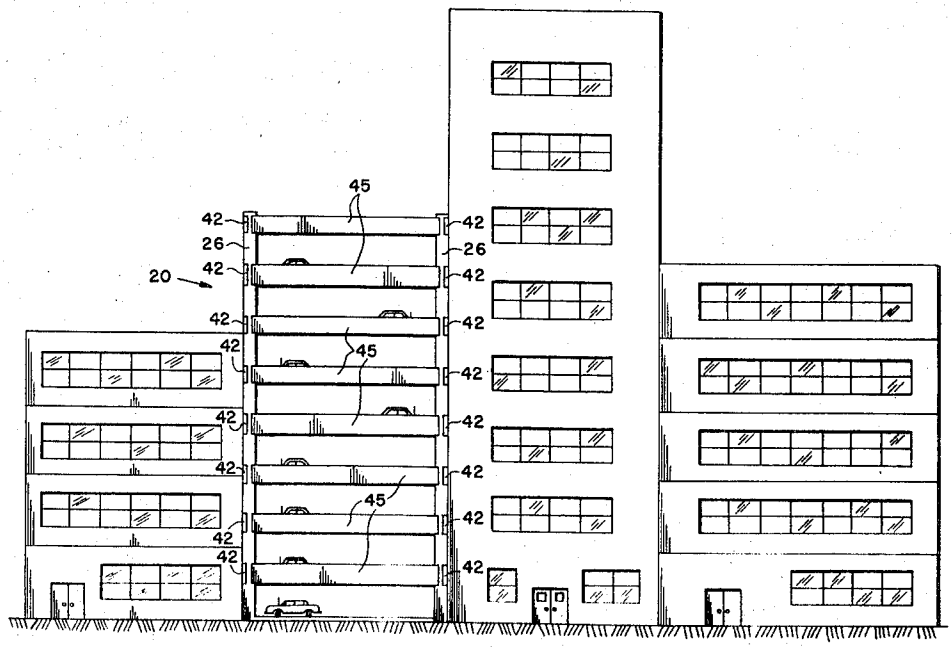
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[57] **ABSTRACT**

A method for constructing a building from a plurality of building elements comprising elongated column members with spaced rectangular notches cut therein, elongated spandrel members having spaced notched portions for interlocking with the notches on the column members and having a horizontal support surface for mounting and supporting floor members thereon. The columns and spandrel members interlock to form a rigid multi-story structure which enables the building to be constructed in sections.

26 Claims, 22 Drawing Figures


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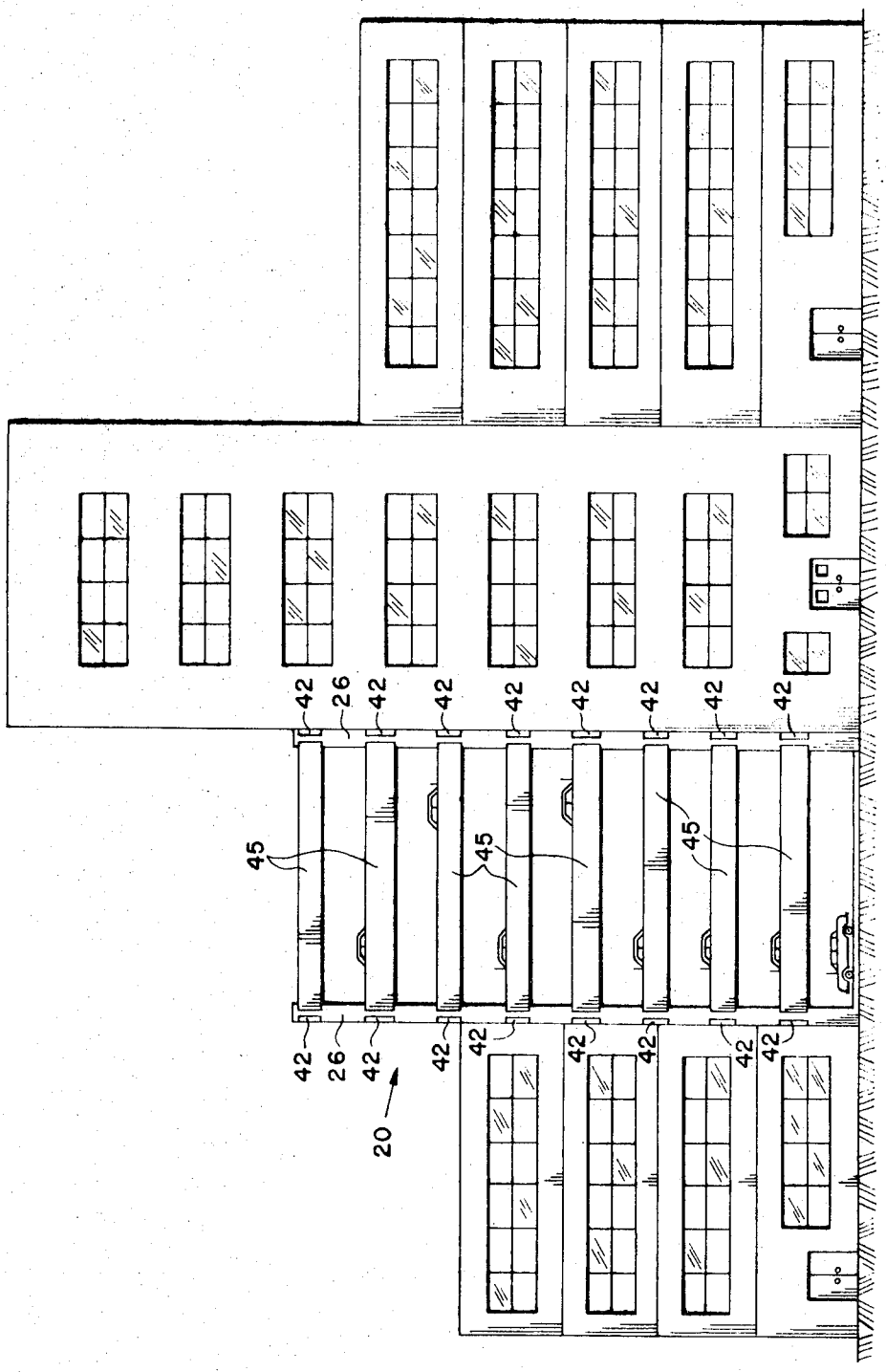


FIG. 1

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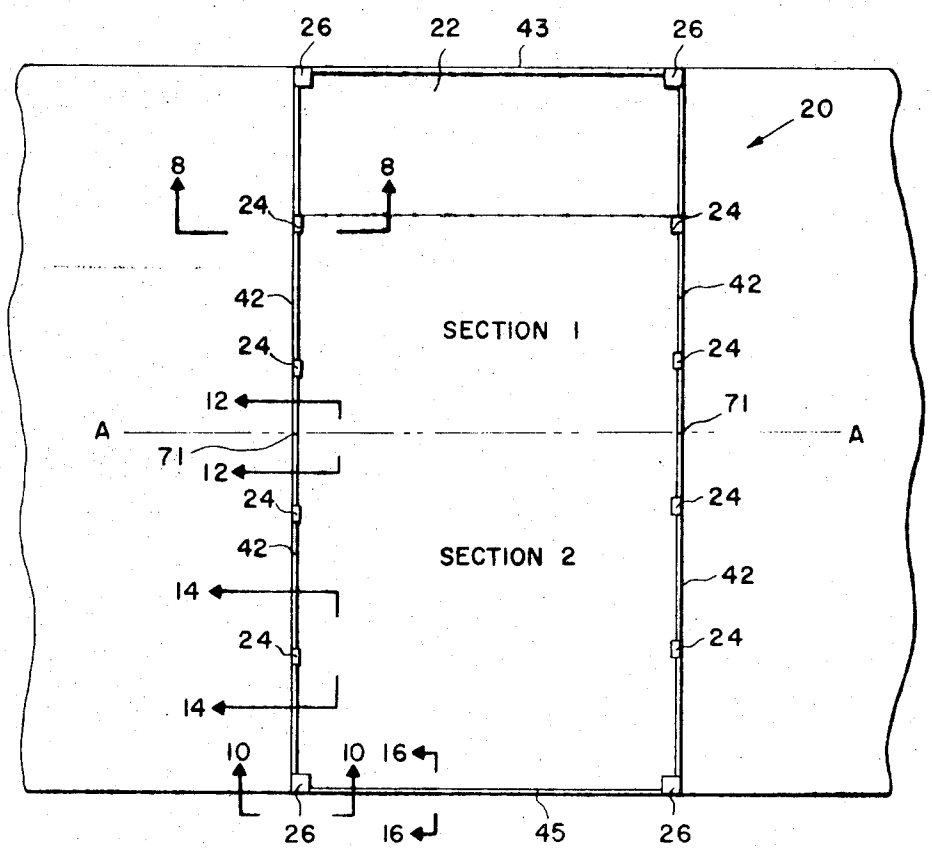


FIG. 2

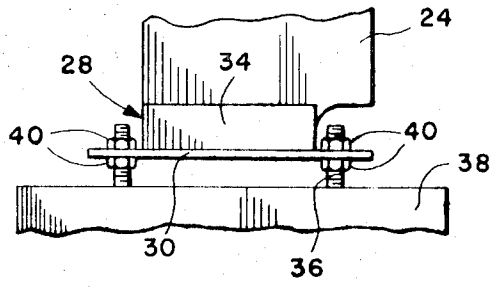


FIG. 4

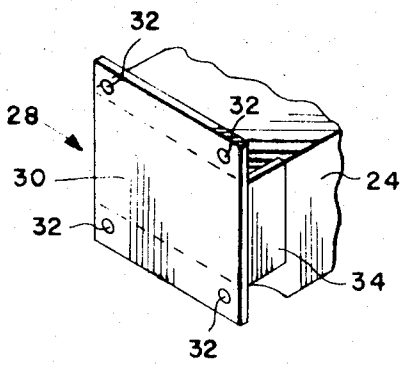


FIG. 3

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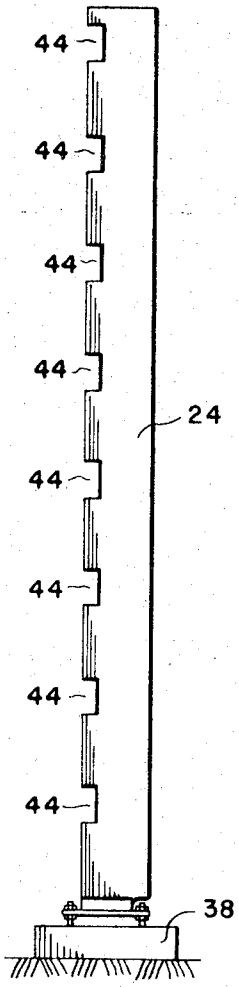


FIG. 5

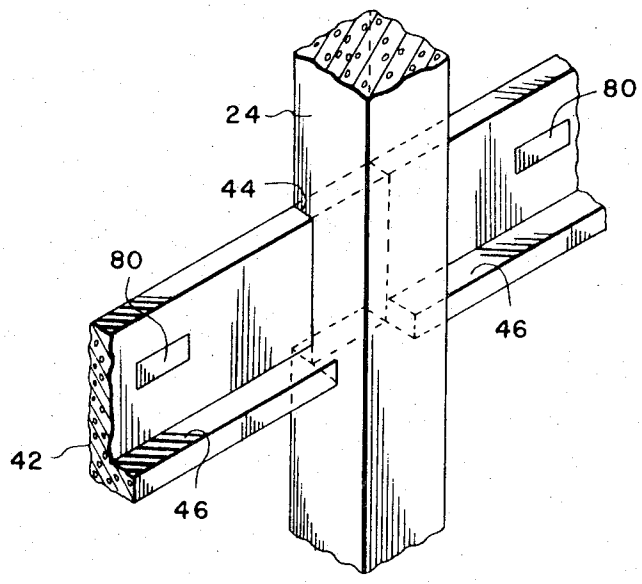


FIG. 6

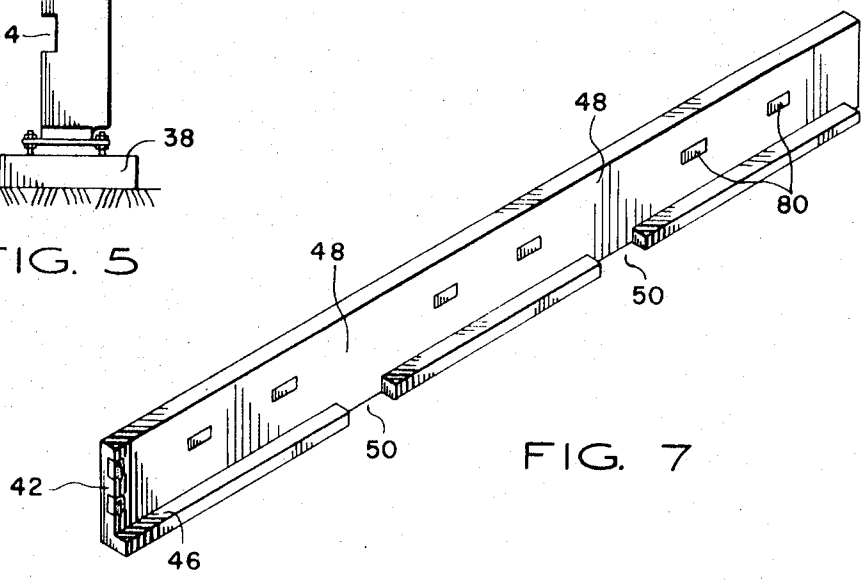


FIG. 7

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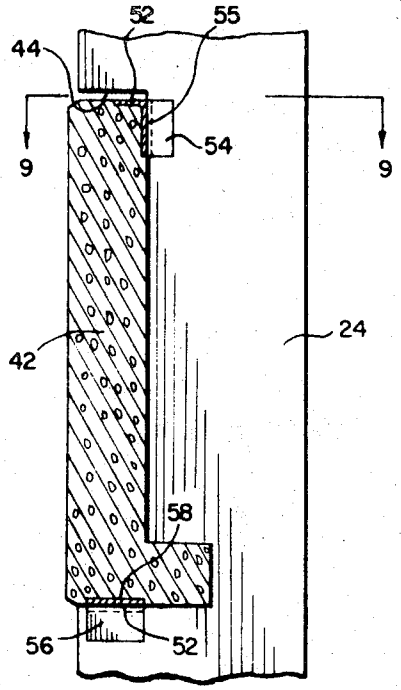


FIG. 8

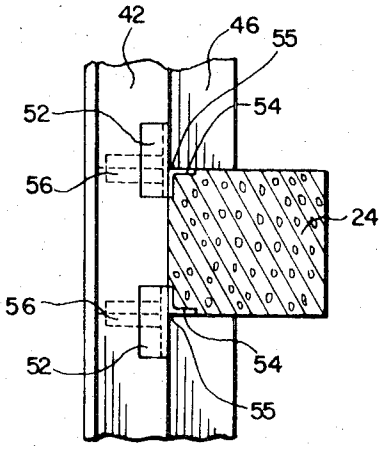


FIG. 9

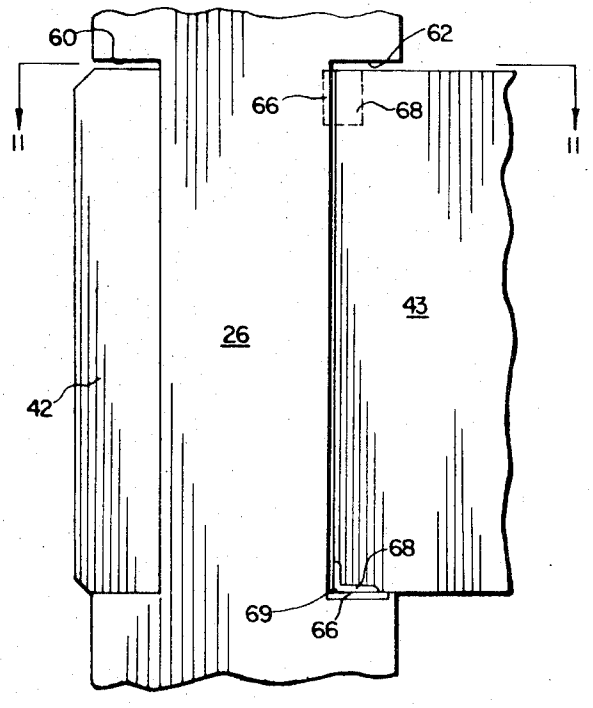


FIG. 10

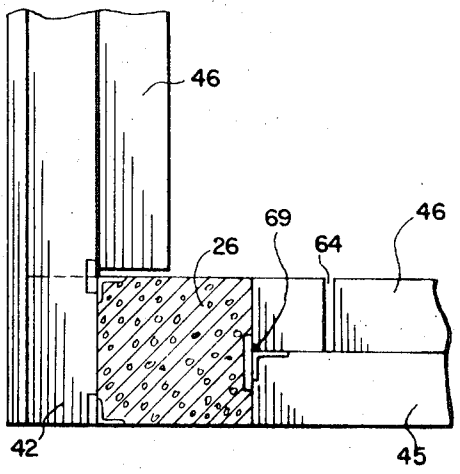


FIG. 11

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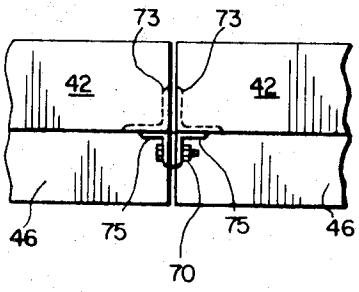


FIG. 13

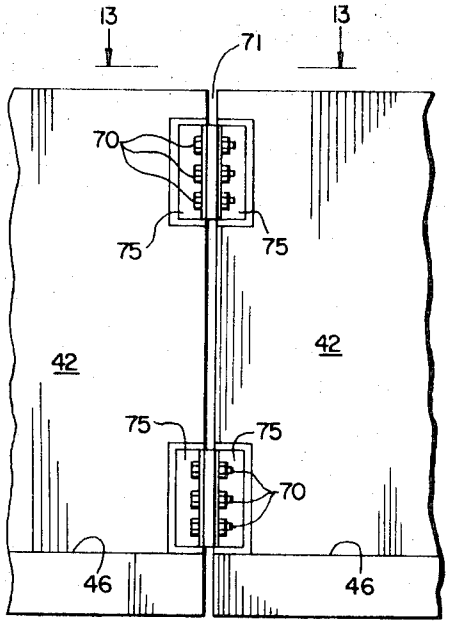


FIG. 12

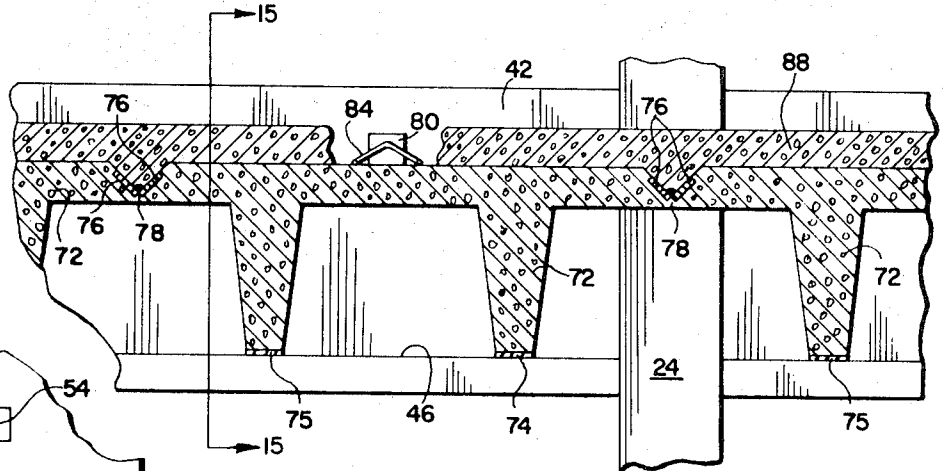


FIG. 14

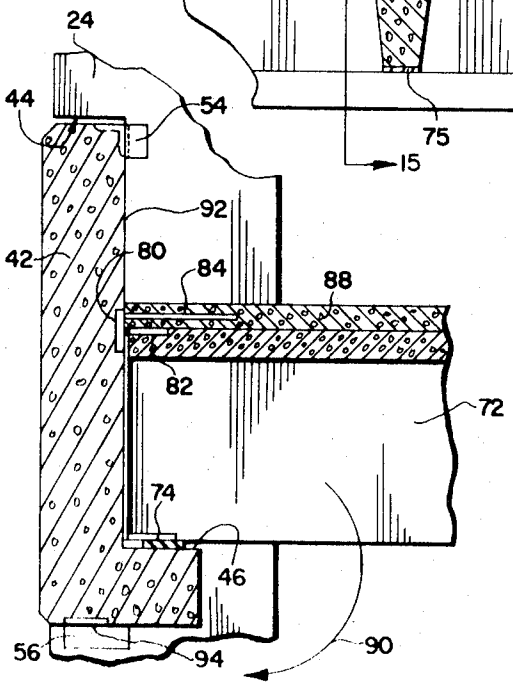


FIG. 15

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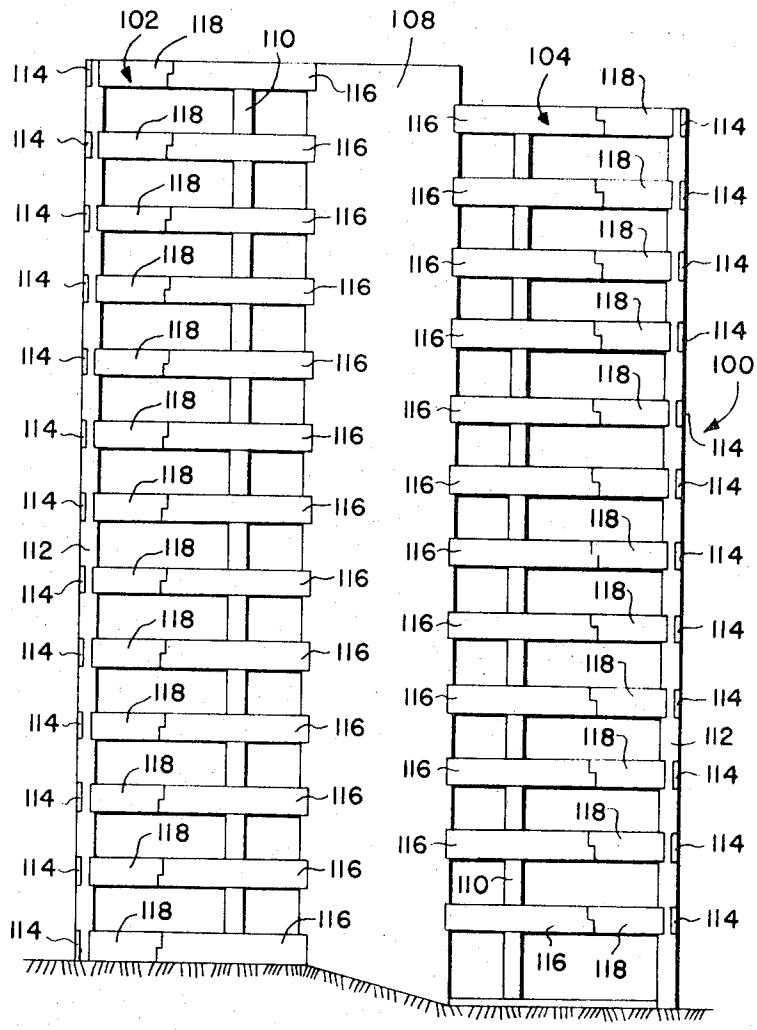


FIG. 17

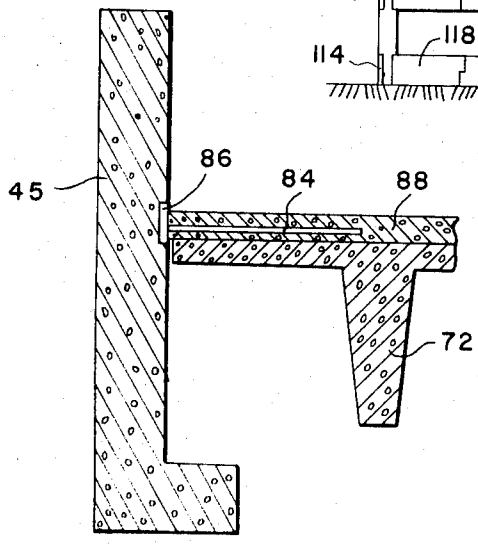


FIG. 16

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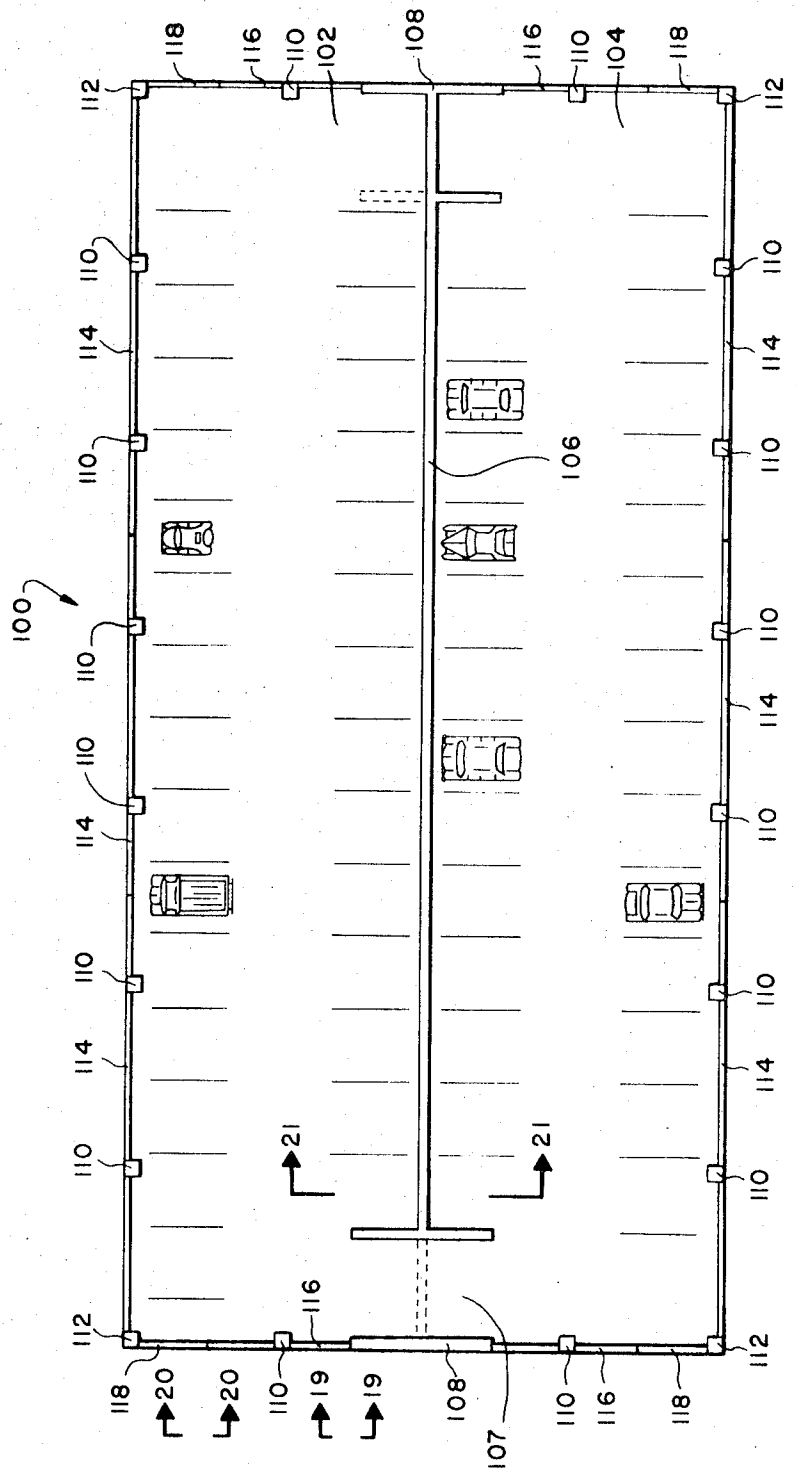


FIG. 18

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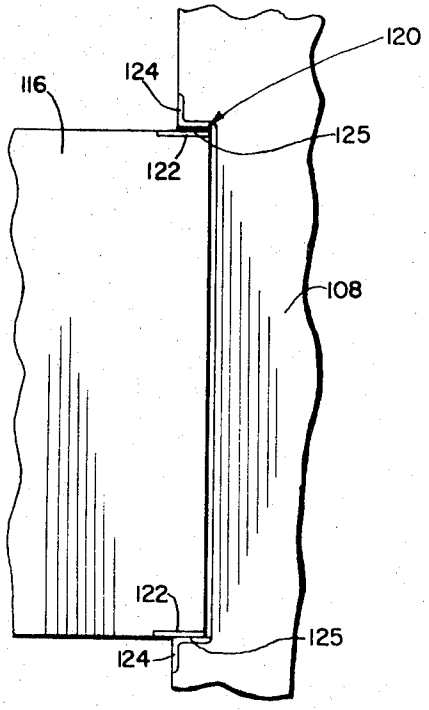


FIG. 19

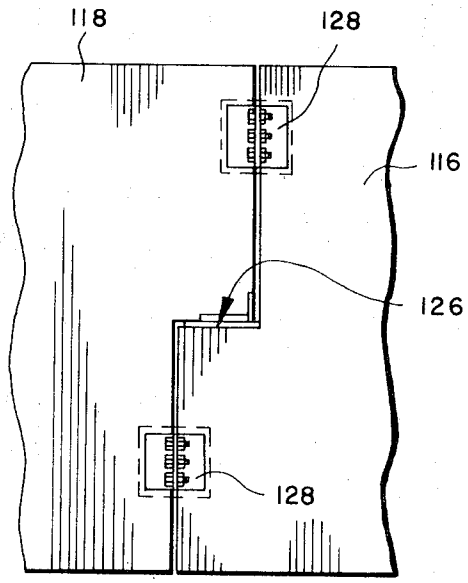


FIG. 20

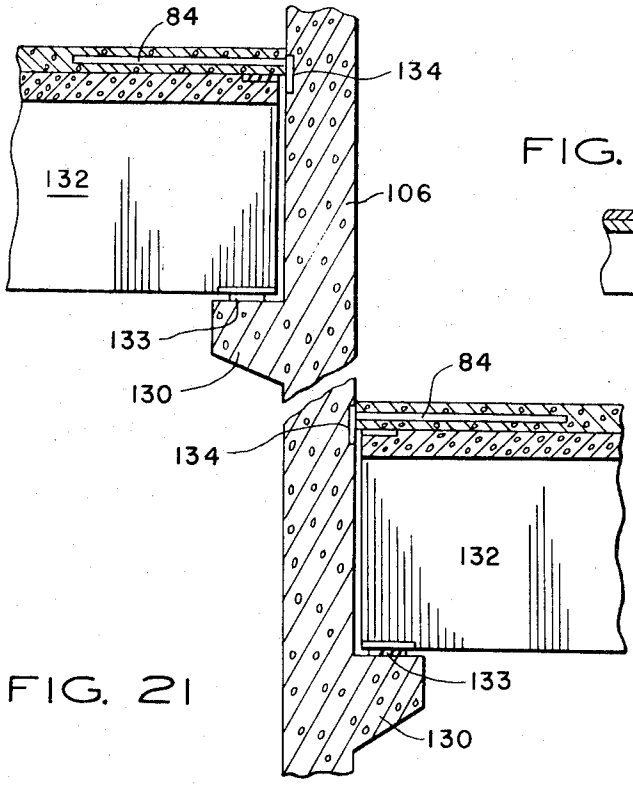


FIG. 21

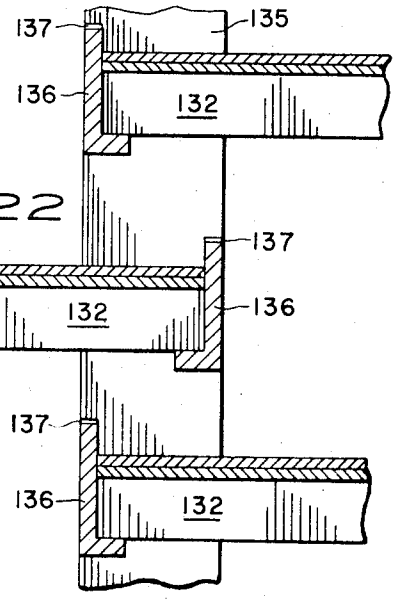


FIG. 22

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INTERLOCKING BUILDING CONSTRUCTION

BACKGROUND OF THE INVENTION

The present invention relates generally to improved building elements which can be utilized in a unique method of constructing multi-story buildings and more particularly to a new and improved building method utilizing unique building elements wherein a multi-story building can be assembled in a blind alley or other type of cramped construction site or the like without requiring a special assembly crane or working space around the building for a crane to operate.

DESCRIPTION OF THE PRIOR ART

In the construction of structural concrete multi-floor buildings, it has been a common practice to construct the lowest floor before beginning assembly of the next higher floor. In this method the building is constructed floor by floor until the top floor is completed and if precast reinforced concrete building members are used, a crane or the like is necessary to lift the members to each floor and hold them in position while they are attached. If the building is of a substantial height and floor size, and a conventional ground level crane is utilized, a clearance or working space is required around the building to provide access to all the sides of each floor. The necessity of a clearance completely around the building can be seen by considering the construction of the upper floors of the building. Once a building has reached a height, say for example, of eight or ten floors, it becomes difficult for a conventional crane located on one side of the building to lift and hold building elements on the opposite side of the building. In some of the larger buildings, it becomes difficult if not impossible to reach even the center of the building with a ground level crane.

It can be readily appreciated that buildings which are located in sites which are bounded by buildings on three sides, have narrow alleys on their sides or occupy a complete block cannot be assembled by use of conventional ground level cranes.

One method of solving this problem has been the utilization of special cranes which extend up through the building. These cranes can be raised in height as the building is constructed; thus the building is constructed around the crane. The disadvantage of this system is that these cranes are expensive and difficult to assemble and disassemble.

SUMMARY OF THE INVENTION

The general purpose of the present invention is to provide unique building elements which can be utilized in a process to construct multi-story buildings on blind sites and the like with a ground level crane. To attain this, the present invention contemplates the use of unique building elements which can be utilized to construct all the floors of a building in small vertical incremental sections which can be reached by a ground level crane. The present invention contemplates the construction of a building on a blind site or the like by assembling the rear building section first with a conventional crane and thereafter constructing adjacent sections toward the front of the site.

OBJECTS OF THE INVENTION

An object of the present invention is the provision of a method for constructing a multi-story building.

Another object is to provide a method for constructing a multi-story building in confined sites or the like.

A further object of the invention is the provision of a method for constructing a multi-story building in which the building can be constructed in vertical incremental sections.

Still another object is to provide a method for constructing a multi-story building which is simple and inexpensive to utilize.

Yet another object of the present invention is the provision of unique building elements which interlock together to form a rigid structure.

Yet a still further object of the present invention is the provision of unique building elements which are interlocking and allow the building to be assembled in sections.

Another object is to provide unique building elements which are simple and inexpensive to assemble and manufacture and produce a building which is atrractive in appearance.

Other objects and many of the attendant advantages of this invention will be readily appreciated by those of ordinary skill in the art as the same becomes better understood by reference to the following detailed description, in which:

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 illustrates a front elevation view of a building constructed utilizing the elements and method of the present invention;

FIG. 2 is a plan view of the building illustrated in FIG. 1;

FIG. 3 is an enlarged perspective view of the base of the columns utilized in the building illustrated in FIG. 1;

FIG. 4 is a side elevation of the base of the column illustrated in FIG. 3, showing the column attached to the foundation;

FIG. 5 is an elevation view of a complete column member;

FIG. 6 is an enlarged prespective view of the intersection of a column and spandrel member;

FIG. 7 is an enlarged perspective view of a spandrel member;

FIG. 8 shows a partial section of the building taken on line 8—8 of FIG. 2 looking in the direction of the arrows;

FIG. 9 shows a partial section of the building taken on line 9—9 of FIG. 8 looking in the direction of the arrows;

FIG. 10 is a detailed view looking in the direction of arrows 10—10 in FIG. 2;

FIG. 11 shows a partial section of the building taken on line 11—11 of FIG. 10, looking in the direction of the arrows;

FIG. 12 is a detail view looking in the direction of arrows 12—12 in FIG. 2;

FIG. 13 is a detail view looking in the direction of arrows 13—13 in FIG. 12;

FIG. 14 shows a partial section of the building taken on line 14—14 of FIG. 2 looking in the direction of the arrows;

FIG. 15 shows a partial section of the building taken on line 15—15 of FIG. 14 looking in the direction of the arrows;

FIG. 16 shows a partial section of the building taken on line 16—16 of FIG. 2 looking in the direction of the arrows;

FIG. 17 illustrates a front elevation view of another embodiment of a building constructed utilizing the elements and methods of the present invention;

FIG. 18 is a plan view of the building illustrated in FIG. 17;

FIG. 19 is a detail view looking in the direction of arrows 19—19 in FIG. 18;

FIG. 20 is a detail view looking in the direction of arrows 20—20 in FIG. 18;

FIG. 21 shows a partial section of the building taken on line 21—21 of FIG. 18 looking in the direction of the arrows; and

FIG. 22 is a sectional view similar to FIG. 21, illustrating an alternative configuration.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to the drawings wherein like referenced characters designate like or corresponding parts throughout the several views, there is shown in FIGS. 1 and 2 a multi-story parking garage generally designated as 20, which is constructed in accordance with the teachings of the present invention. This garage is shown in FIGS. 1 and 2 as being assembled in a blind alley with pre-existing structures on three sides. This is done for the purpose of illustrating the ease of assembling this building in confined sites but it is to be understood that the building could be constructed in spaces where there were no adjacent buildings. It is also envisioned that even though the present description is directed to a parking garage that the invention herein described could also be used in the construction of other types of buildings, such as warehouses and office buildings or the like.

For purposes of illustration, a ramp or elevator structure 22 is shown as being located in the rear portion of the parking garage 20, but it is to be understood of course that the position of the ramp or elevator structure for purposes of the present invention is immaterial, and that the ramp or elevator structure could be located in the center or even the front of the building as desired in each application.

Turning now to the structure of the parking garage 20, it can be seen that a plurality of vertical side columns 24 and vertical corner columns 26 are used. In the present invention these columns are constructed from prestressed concrete and have a plurality of inserts thereon molded therein. It should be understood of course that the columns could be made from other materials such as reinforced concrete or the like.

As can be seen in FIGS. 3 and 4, the base of the side columns 24 have a metallic mounting plate 28 integrally molded thereon. This mounting plate 28 is utilized to attach the column to the foundation of the building as will be hereinafter described. This mounting plate 28 is shown as having a flat plate-like portion 30 which is attached to the column 24 so that the plane of the plate 30 is transverse to the length of the column 24. Two side plates 34 extend perpendicularly from the plate portion 30 along the sides of the columns 24 to strengthen the attachment of the mounting plate 28 onto column 24. The plate portion 30 is provided with a plurality of bores 32 which are suitably spaced so that they will align with and allow the insertion therein of mounting studs 36 which are integrally molded into and extend from the foundation 38 in a vertical direction. By lifting the columns 24 by crane or the like to a vertical position, the mounting studs 36 can be aligned with the bores 32 as shown in FIG. 4 to attach the column 24 in a vertical position with respect to the foundation 38 by use of a plurality of nuts 40. Although the description with respect to the mounting plates 28 is shown as being attached to the side columns 24, it is to be understood of course that an identical mounting plate could be utilized for the corner columns 26 and that other methods of mounting the columns could be used.

Returning now to FIGS. 1 and 2, it can be seen that the parking garage 20 is also constructed from a plurality of side spandrel members 42, front spandrel members 45 and rear spandrel members 43, which can be formed from prestressed concrete, reinforced concrete or the like and attached to the column members. As can be seen in FIG. 5, the columns 24 each have a plurality of rectangular notches 44 in one side thereof. Referring now to FIGS. 6 and 7, it can be seen that the side spandrel members 42 have an L-shaped cross section which is discontinuous in the area where the spandrels 42 and columns 24 intersect. The shorter leg of the L-shaped cross section of the spandrel member 42 forms a shoulder or mounting surface 46 which is utilized to support the floor members of he proposed building. This mounting surface 46 along with the shorter leg of the L-shaped cross section of the spandrel member 42 is cut away from the spandrel 42 at 50 so that the spandrel 42 has a rectangular cross section in portion 48. This rectangular cross section portion 48 is of a size and shape to fit in the rectangular notch 44 in the column 24 to interlock the spandrel 42 to the columns 24 as shown in FIG. 6.

During the assembly of the building, the spandrels 42 can be lifted by a crane to engage the rectangular notches 44 into columns 24 whereupon the spandrel 42 is self-supporting. An additional attaching force between the spandrel 42 and column 24 can be provided by integrally molding metallic inserts into the columns and spandrels as shown in FIGS. 8 and 9. These integrally molded elements can then be welded or bolted together to firmly attach the members together. As shown in FIGS. 8 and 9, the spandrel 42 has two angle plates 52 integrally molded into the upper surface thereof while the column 24 has two angle plates 54 integrally molded into the upper portion of the rectangular notch 44. These plates 52 and 54 are so positioned on the spandrels and columns so that they are in contact when the spandrels and columns are in engagement whereupon they can be welded or bolted together at 55. Additional angle plates 56 may be provided in the lower portion of notch 44 and corresponding plates 58 can be integrally molded in the underside of the spandrel 42 such that the two sets of plates can be welded or bolted together at 59.

Turning now to FIGS. 10 and 11, the vertical corner columns 26 are shown as having rectangular notches 60 which are similar to rectangular notches 44 in vertical side column 24. These notches are of such a size to engage the ends of spandrels 42. The corner columns 26 are also provided with rectangular notches 62 for front spandrels 45. These front spandrels 45 have a cross-section which is identical to that of the side spandrels 42 and are provided with a mounting surface 46. As

can be seen in FIG. 11, these front spandrels 45 have the shorter leg of the L-cross section removed adjacent the ends at 64 to allow the front spandrel 43 to fit into the notch 62. Suitable metallic inserts 66 and 68 are respectively integrally molded into the corner columns 26 and front spandrels 45, respectively, and are thereafter suitably welded or bolted together at 69 to attach the respective members. Although the foregoing description was directed to the front spandrels 45, it is to be understood that the corner mounting of the rear spandrel 43 is identical to that shown in FIGS. 10 and 11.

In FIGS. 12 and 13, it can be seen that the side spandrel members 42 abut each other at 71. Each of the ends of the spandrel members 42 are provided with integrally molded angle irons 73 to which are welded or bolted angle irons 75. These angle irons 75 are in turn provided with aligned bores through which nut and bolt assemblies 70 are passed to attach the two spandrel members 42 together.

Double T-shaped floor members 72 are shown in FIGS. 14 and 15 resting on mounting surface 46 of spandrel member 42. It is to be understood that many different cross sectional shaped floor members could be used with the present invention, and that double T-shaped members were used for conveneince in describing the present invention. To position these double T-members 72 in place on the spandrel, they are lifted by crane until the web portion of the double T-rests on the mounting surface 46. A neoprene pad 74 or the like may be inserted between the flange of the double T-member 72 and the support surface 46. The edges of the double T-floor member 72 are each provided with metallic plates 76 which, when the floor members are positioned on flange 46, are welded together at 78. It can also be seen that plates 80 are integrally molded into the back side of the spandrel 42 to lie adjacent plates 82 which are integrally molded into the end of the floor members 72 so that the two plates can be welded together to attach the floor members 72 to the spandrel 42. The plate 80 has an additional function in providing a place where a hairpin type reinforcement 84 can be welded.

Referring specifically to FIG. 15, a typical loading of the spandrel member 42 can be described. Ignoring the welds attaching the various members together, it can be seen that the floor members 72 are supported on the spandrel 42 by surface 46 such that an eccentric load is placed on spandrel 42 tending to rotate it in a clockwise direction as illustrated by arrow 90. This torsional load is resisted by contact between the surfaces 92 and 94 on the spandrel and column members. Thus, the frictional force created between surfaces 94 will assist attachment as previously described to hold the loaded spandrel in notch 44.

The floor members 72 abut the front and rear spandrels 45 and 43 in a manner shown in FIG. 16. Although the floor members are not welded to the spandrels 43, a plate 86 is integrally molded into the inside of the spandrel 43 for attachment of the hairpin reinforcement 84.

Once the floor members are in place on the spandrels a floor surface 88 can then be poured directly onto the upper surface of the floor member 72 by positioning the hairpin reinforcements 84 such that they extend into the floor surface 88, the floor surface 88 will bond the spandrels and floor members together to form a rigid structure.

METHOD OF CONSTRUCTING THE BUILDING

The advantages and features of this invention will become apparent from a consideration of the method of constructing the various building elements to form a multi-story building. By referring to FIGS. 1 and 2, the assembly of the building will be described. Initially, it is to be noted that the building shown in FIGS. 1 and 2 is designed to be constructed in two separate sections, the first section being above the line A—A and the second section being below the line A—A shown in FIG. 2. Initially, the foundation portion of the building is worked in a conventional manner and the various mounting studs 36 are integrally molded into the foundation and in position to attach the columns to the foundation. Once the foundation has been completed, a crane or suitable lifting device can be moved onto sections 1 and 2 of the building site to lift the vertical side columns 24 and vertical corner columns 26 into position and hold them in position until they are attached to the mounting studs 36.

It is optional at this point as to whether only the columns for section 1 are assembled and attached to the foundation in position, or all of the columns for both sections 1 and 2 are assembled and placed in position. The contractor's decision in this matter would be dictated by factors such as the shape and size of the building site and availability of storage area for the columns. If the contractor elects only to attach columns 24 and 26 in section 1, then in the next step the contractor should assemble spandrels 42 and 43 for section 1 on the columns in a manner as previously described in FIG. 6. The spandrels should be attached to the columns for all the floors of the building in section 1, thus allowing the crane or hoist to be located in the center section 1 while it is attaching the spandrels for all the floors completely around section 1.

If the contractor elects to assemble both sections 1 and 2 at one time, he should attach all of the spandrels 42 and 43 leaving out the front spandrels 45 so that the crane will have clearance to move into and out of the construction site.

Once the spandrels are in place, the floor members can be placed onto the respective spandrels for that floor starting with the lower floors and working up to the top floor. This can be done in sections so that the crane can completely assemble the spandrels and floor members for section 1 while it is located in the center of section 2. The crane can then be moved in front of section 2 to assemble the floor members for that section.

Once all of the floor members are in place, the front spandrels 45 can be attached to the columns 26. Thereafter, the floor surfaces are poured in place in a conventional manner. It is to be understood of course that the above description does not describe the method of assembling an elevator or ramp structure because it is anticipated that any conventional ramp or elevator structure could be utilized with the building construction method of the present invention. It is also pointed out that once the building is assembled as described above, an outer surface could be attached to the building as required such as a brick front or metallic and glass window structure.

DESCRIPTION OF THE ALTERNATE CONFIGURATION

An alternate configuration for utilizing the building elements and method of the present invetnion will be described by reference to FIGS. **17** and **18** wherein the building **100** is shown as having two sections, **102** and **104**, divided by a central wall **106**. The central wall **106** is cast in place and is provided with end flanges **108** which help support the ramp structure **107** for the parking garage and provide lateral bracing. As previously pointed out with respect to the first embodiment, it is understood of course that elevators or stairwells could be utilized instead of ramp structure when the building is used for office buildings or the like. As can be seen, the building has a plurality of side columns **110** which are similar in construction to the vertical side columns **24** of the previously described embodiment. A plurality of corner columns **112** are also utilized which are similar in construction to the corner columns **26** of the previously described embodiment.

Side spandrel members **114** are similar in structure to the spandrel members **42** as described in the previous embodiment and are attached to the columns in a similar manner. The adjacent side spandrel members **114** are attached together as shown in FIGS. **12** and **13** of the previous embodiment.

Front spandrel members **116** and **118** are shown as having a different structure from the side spandrel members **114**. In FIG. **19**, it can be seen that one end of the spandrel member **116** fits into a notch **120** in the end of the flange **108** while the spandrel member **116** is provided with two plates **122** which are integrally molded therein and the notched portion **120** of the flange **108** is provided with integrally molded angle plates **124** which are aligned with the plates **122** so that the two can be welded or bolted together at **123**.

The spandrels **116** similarly engage the column **110** but have a unique end structure which is shown in detail in FIG. **20**. The end of this spandrel member **116** is stair-shaped and forms a support surface **126**. The spandrel member **118** is provided with an inverted stair-shaped end so that the two spandrel members will interlock as shown in FIG. **20**. The ends of the spandrel members **116** and **118** are each provided with attachment assemblies **128** which are identical to those shown in FIGS. **12** and **13** of the previous embodiment and are utilized to apply force which holds the members in engagement. The outer end of the spandrel **118** engages the corner column **112** in a manner as previously described in the first embodiment. It can thus be seen that the spandrel member **118** is supported in a cantilever arrangement by the spandrel member **116**.

A detail of the central wall **106** is shown in FIG. **21** as having extending shoulder portions **130** molded therein. These shoulders **130** are shown as extending from both sides of the wall for supporting the floor members **132** on their inner ends on neoprene pads **133**. As can also be seen, plates **134** are integrally molded into the central wall **106** to provide a function similar to plates **80** in the spandrel members.

An alternate configuration for replacing the central wall **106** is shown in FIG. **22**. In this configuration a plurality of central columns **135** are utilized to support two sets of members **136** identical in shape to spandrels **114**. These two sets or members **136** are mounted in notches **137** on opposite sides of the column **135** and face in opposite directions. By utilizing this configuration, the columns **135** can support double T-members **132** for the floors on either side of the column **135**.

It is to be understood of course that the assembly of the building as described in the present embodiment can be done in sections as previously described, and that the floor, spandrel and column members attach together in a manner as described with respect to the first embodiment except with respect to the attachment of the end spandrels **116** and **118** and the attachment of the floor members **132** to the central wall.

It should be understood, of course, that the foregoing disclosure relates to only preferred embodiments of the present invention and that numerous modifications or alterations may be made by those with ordinary skill in the art without departing from the spirit and scope of the invention as set forth in the appended claims.

What is claimed and desired to be secured by Letters Patent of the United States is:

1. A combination of elements for assembling a rigid multiple level structure comprising:

a. a plurality of unitary columns fixed in a vertically extending orientation, each of said columns having a plurality of notches in one side, said notches extending transverse to the length of said columns and defining a first horizontal supporting surface and a second supporting surface;

b. a plurality of unitary spandrel members attached to said columns, said spandrel members having a plurality of notch portions spaced along the length of each spandrel member, said notches defining first horizontal mounting surfaces contacting said first supporting surfaces on said corresponding columns and for horizontally supporting said spandrels, and second mounting surfaces contacting said second supporting surfaces on said columns and for preventing rotation of said spandrel in a first direction about an axis parallel to the length of said spandrel and in the plane of said first supporting surface, a third mounting surface on said spandrel,; and

c. elongated floor members attached to said spandrels with said third mounting surfaces on said spandrels for supporting said floor members in an elevated horizontal position and for transferring vertical loads concentrically to said columns.

2. A combination as defined in claim **1** wherein said notches in said columns have a rectangular cross section.

3. A combination as defined in claim **1** wherein said notches in said columns are spaced along said columns a distance equal to the floor spacing.

4. A combination as defined in claim **1** wherein said spandrel and column members are provided with mating attachment plates which are attached together.

5. A combination as defined in claim **1** wherein adjacent spandrel members are joined intermediate said columns and wherein adjacent spandrel members have connecting plates which are attached together.

6. A combination as defined in claim **1** wherein said columns have a four-sided cross section.

7. A combination as defined in claim **1** wherein said spandrel members have an L-shaped cross section.

8. A combination as defined in claim **1** wherein said floor members have a double T-shaped cross section.

9. A combination as defined in claim 1 wherein said second supporting and mounting surfaces extend in a vertical direction.

10. A combination of elements for assembling a rigid multiple level structure comprising:

a. at least one unitary column fixed in a vertically extending orientation, said column having at least one notch in one side, said notch extending transverse to the length of said column and defining a first supporting surface and a second supporting surface;

b. at least one unitary spandrel member attached to said column, said spandrel member having at least one notch portion spaced along the length of each spandrel member, said notch defining a first mounting surface which set on said first supporting surface on said corresponding column and for horizontally supporting said spandrel, and a second mounting surface contacting said second supporting surface on said column and for preventing rotation of said spandrel in a first direction about an axis parallel to the length of said spandrel and in the plane of said first supporting surface, a third mounting surface on said spandrel eccentrically positioned so that a downward vertical force on said third surface will tend to rotate said spandrel in said first direction;

c. elongated floor members attached with said third mounting surface on said spandrel for supporting said floor members in an elevated horizontal position; and

d. means for supporting said at least one spandrel at a point spaced away from said at least one column. supporting surface, a third mounting surface on said spandrel eccentrically positioned so that a downward vertical force on said third surface will tend to rotate said spandrel in said first direction; and

c. elongated floor members attached with said third mounting surfaces on said spandrels for supporting said floor members in an elevated horizontal position.

11. A combination as defined in claim 10 wherein said notches in said column have a rectangular cross section.

12. A combination as defined in claim 10 wherein said notches in said column is spaced along said column a distance equal to the level floor spacing.

13. A combination as defined in claim 10 wherein said spandrel and column members are provided with mating attachment plates which are attached together.

14. A combination as defined in claim 10 wherein adjacent spandrel members are joined intermediate said columns and wherein adjacent spandrel members have connecting plates which are attached together.

15. A combination as defined in claim 10 wherein said at least one column has a four-sided cross section.

16. A combination as defined in claim 10 wherein said spandrel members have an L-shaped cross section.

17. A combination as defined in claim 10 wherein said floor members have a double T-shaped cross section.

18. A combination as defined in claim 10 wherein said second supporting and mounting surfaces extend in a vertical direction.

19. A combination of elements for assembling a rigid multiple level structure comprising:

a. at least one unitary column fixed in a vertically extending orientation, said column having at least one notch in one side, said notch extending transverse to the length of said column and defining a first supporting surface and a second supporting surface;

b. at least one unitary spandrel member attached to said column, said spandrel member having at least one notch portion spaced along the length of each spandrel member, said notch defining a first mounting surface contacting said first supporting surface on said corresponding column and for horizontally supporting said spandrel, and second mounting surface contacting said second supporting surface on said column and preventing rotation of said spandrel in a first direction about an axis parallel to the length of said spandrel and in the plane of said first supporting surface, a third mounting surface on said spandrel eccentrically positioned so that a downward vertical force on said third surface will tend to rotate said spandrel in said first direction; and

c. means for supporting said at least one spandrel at a point spaced away from said at least one column.

20. A combination as defined in claim 19 wherein said notches in said columns have a rectangular cross section.

21. A combination as defined in claim 19 wherein said notches in said column is spaced along said column a distance equal to the level spacing.

22. A combination as defined in claim 19 wherein said spandrel and column members are provided with mating attachment plates which are attached together.

23. A combination as defined in claim 19 wherein adjacent spandrel members are joined intermediate said columns and wherein adjacent spandrel members have connecting plates which are attached together.

24. A combination as defined in claim 19 wherein said at least one columns has a four-sided cross section.

25. A combination as defined in claim 19 wherein said spandrel members have an L-shaped cross section.

26. A combination as defined in claim 19 wherein said second supporting and mounting surfaces extend in a vertical direction.

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