

Sept. 23, 1969

H. F. CAMPBELL
BUILDING ERECTION SYSTEM

3,468,094

Filed Feb. 5, 1968

5 Sheets-Sheet 1

FIG. 1

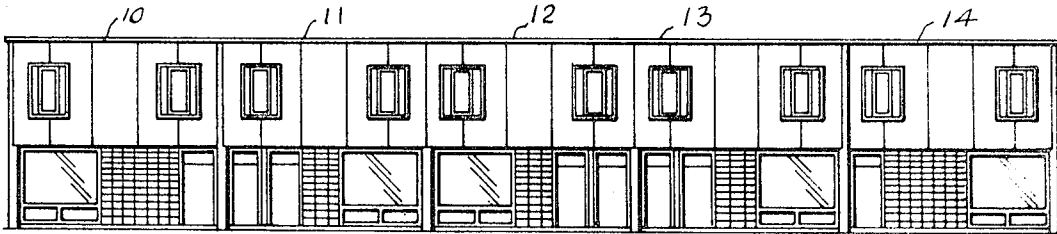


FIG. 2

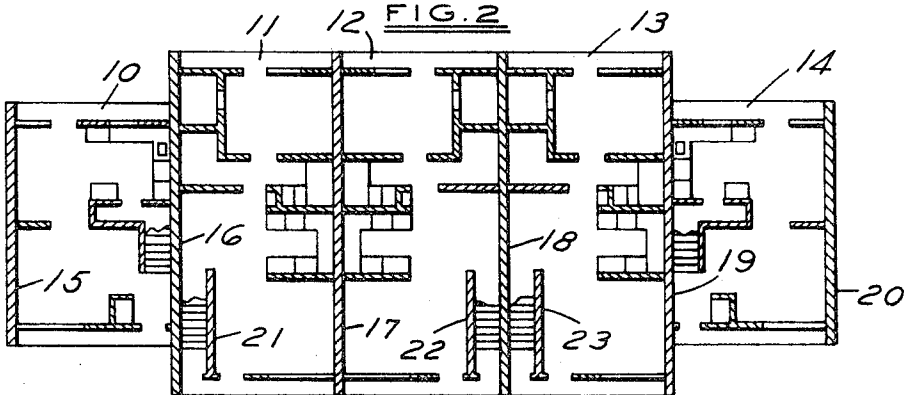


FIG. 3

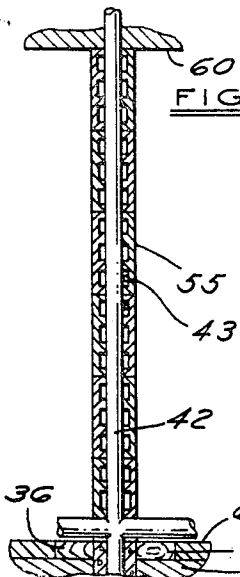
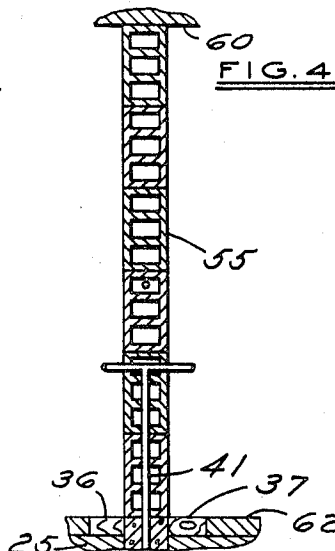


FIG. 4



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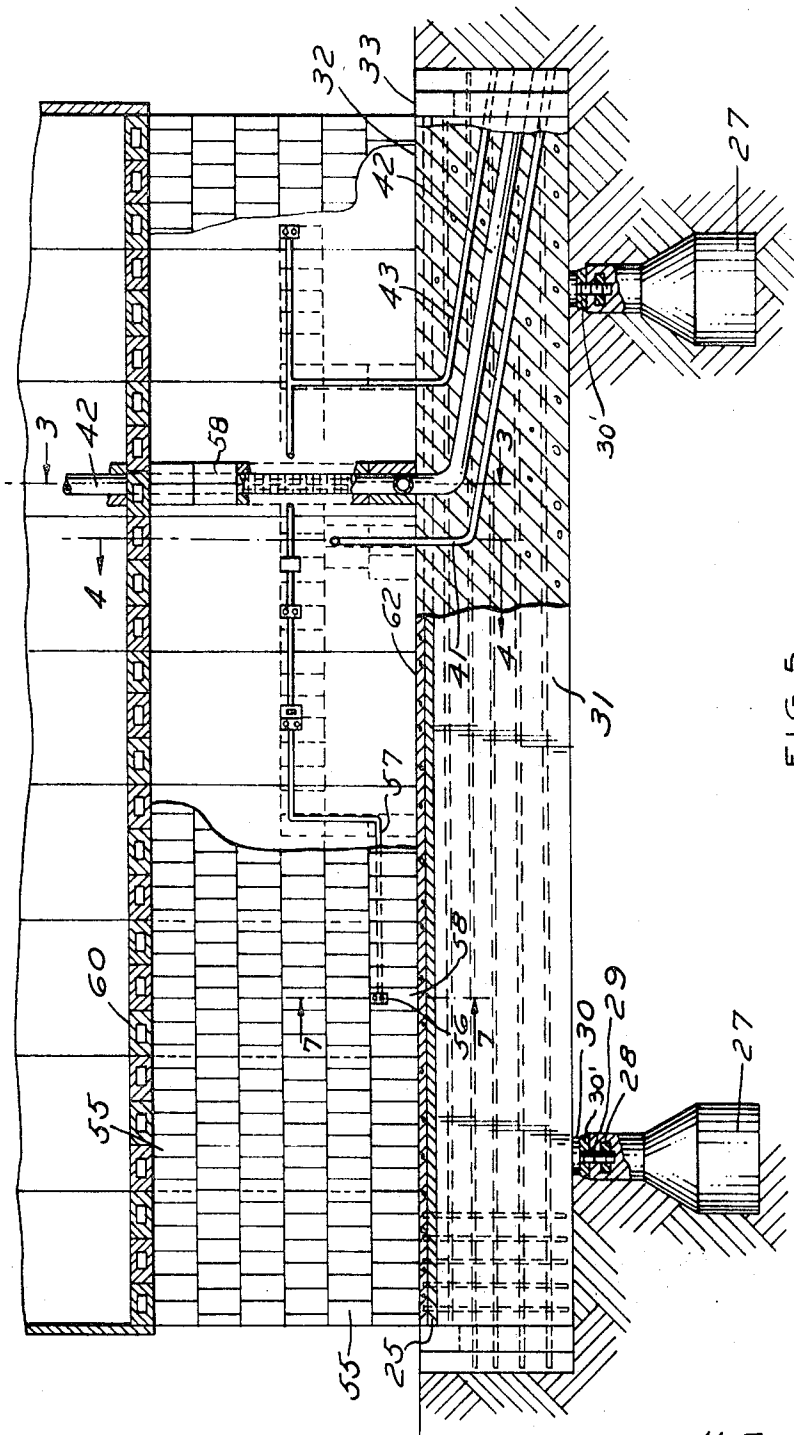
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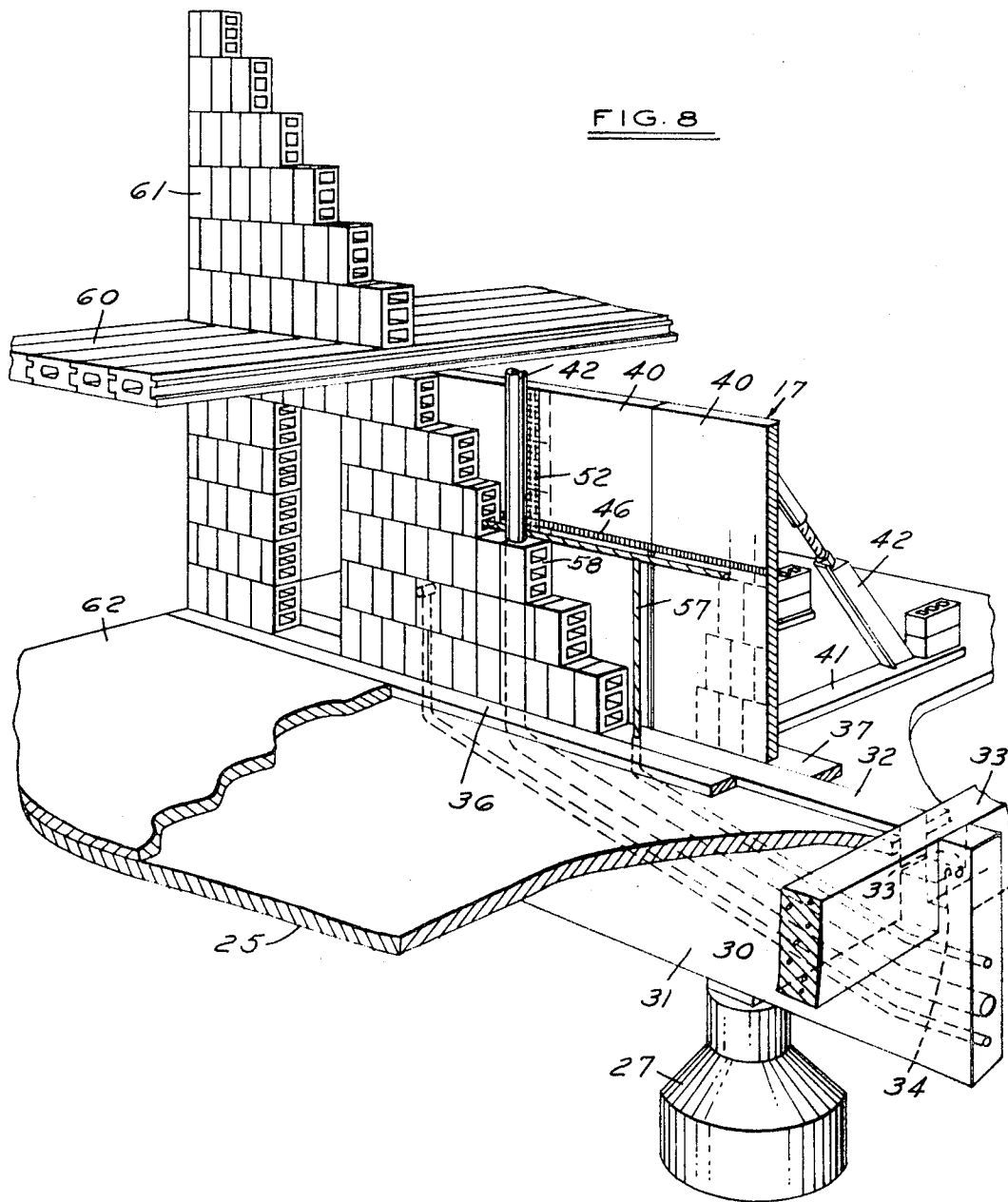
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BUILDING ERECTION SYSTEM

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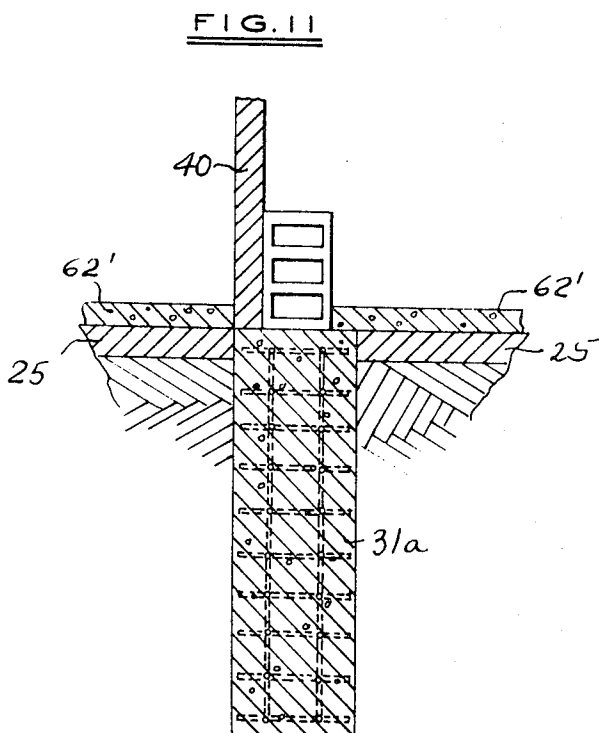
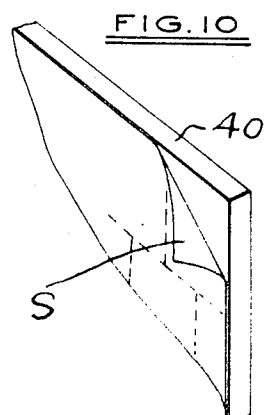
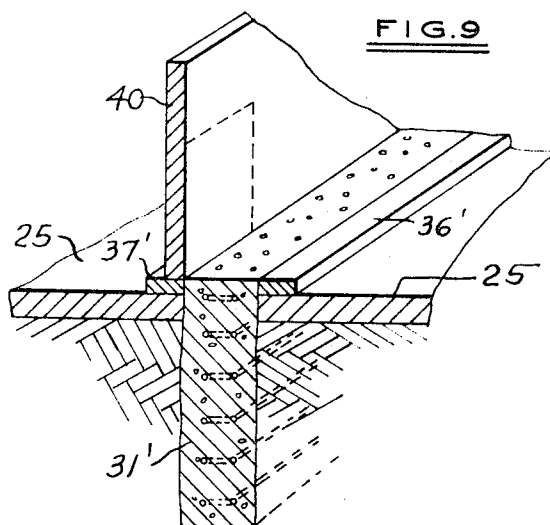
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BUILDING ERECTION SYSTEM

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5 Sheets-Sheet 3



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BUILDING ERECTION SYSTEM

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U.S. Cl. 52—742

13 Claims

ABSTRACT OF THE DISCLOSURE

The building system disclosed herein comprises laying a layer of material such as asphalt on the ground at the building site, cutting through the asphaltic material and excavating at the areas of the foundation. Footings are placed in the areas of the foundations and concrete is poured for the footings. Precast concrete foundation beams are then inserted through the cut areas of the asphaltic material, set on the footings and leveled with the upper edge of each beam extending above the top surface of the asphaltic material. Modular erection panels are erected in side-by-side relation on the asphaltic material adjacent the upper edges of the concrete beams and are aligned and plumbed. Each of the erection panels has color coded indicia thereon corresponding to utility lines and connections and block positions. Blocks are then erected on the foundation beams in accordance with the layout of the indicia means on the panels and simultaneously utility lines and connections are made during the erection of the blocks. Finally, the erection panels are removed. If the terrain of the building site is undisturbed, the footings may be omitted and the foundation can be poured directly into the excavation, the erection panels and blocks being then erected on the poured foundation members.

This invention relates to building systems and particularly to systems for building low cost housing.

A major factor in building construction is the necessity of the utilization of skilled labor. This is a result of the fact that the erection of the various components of the building requires skilled personnel.

Among the objects of the present invention are to provide a building system which can utilize unskilled personnel under the supervision of skilled work leaders or foremen; which systems results in an efficient, attractive building that is low in cost and can be erected quickly; which system can be utilized to construct buildings under adverse climatic conditions.

In the drawings:

FIG. 1 is an elevational view of a representative building made in accordance with the invention.

FIG. 2 is a floor plan of the building shown in FIG. 1.

FIG. 3 is a fragmentary sectional view taken along the line 3—3 in FIG. 5.

FIG. 4 is a fragmentary sectional view taken along the line 4—4 in FIG. 5.

FIG. 5 is a part sectional fragmentary vertical elevational view of a portion of the building shown in FIG. 2.

FIG. 6 is a vertical elevational view similar to FIG. 5 showing the relative positions of parts prior to erection of the wall shown in FIG. 5.

FIG. 7 is a fragmentary sectional view taken along the line 7—7 in FIG. 5.

FIG. 8 is a fragmentary part sectional perspective view of a portion of the building embodying the invention during erection.

FIG. 9 is a fragmentary vertical sectional perspective view through a modified form of the invention.

FIG. 10 is a perspective view of a modular erection panel utilized in the building system.

FIG. 11 is a fragmentary vertical sectional view through a further modified form of the invention.

Referring to FIGS. 1 and 2, the building system embodying the invention can be used to erect buildings of various types such as the type which has separate living units or apartments, 10, 11, 12, 13 and 14 in side-by-side relationship. The units may be single or multiple story as will become apparent.

The system particularly relates to the erection of load bearing walls such as the wall 15, 16, 17, 18, 19, 20, 21, 22, 23.

Referring to FIG. 8, which is a fragmentary part sectional perspective view of a portion of a typical wall 17 (FIG. 2), in accordance with the invention, a layer of material, such as asphaltic material, is applied to the ground in the area of the building site and extends at least to the perimeter of the building to be built on the building site. At the areas where load bearing walls are to be placed, the asphalt layer 25 is cut and the earth beneath is excavated. At longitudinally spaced points along the cut, vertical excavations are made and concrete is poured to form the footings 27. As shown in FIG. 6, the footings 27 have molded or set in the top portions thereof nuts 28 into which large bolts 29 having plates 30 on the upper ends thereof are threaded. Non-shrinking mortar 30' is placed under each plate 30. The plates 30 are then leveled by the use of a target placed thereon before the mortar sets.

A precast reinforced concrete foundation beam or member 31 is then placed on the spaced plates 30 (FIG. 6) after the plates 30 have been leveled with the upper edge 32 of the beam 31 extending above the surface of the layer 25. The layer 25 is also cut and excavated along the side edge at right angles to the reinforcing members 31 to provide space for precast wall members 33 forming what is commonly termed a rate wall. The members 31, 33 have complementary notches 34, 35.

Alignment members 36, 37 of wood or similar material are then laid on and fastened to the asphalt layer 25 on opposite sides of the foundation member 31 with the upper surfaces of the members 36, 37 flush with the upper surface of the member 31.

Where the terrain of the building site is undisturbed, instead of utilizing precast beams which are set on footings, the footings may be eliminated and the foundation members poured in place in the excavations made through the asphaltic material. In such a case, the alignment members 36', 37' (FIG. 9) are utilized as a leveling surface for screeding the upper end of the foundation 31'.

Then in accordance with the invention, a series of modular erection panels 40 are erected on the member 37 with their surfaces vertical. The panels may have integrally extending therefrom horizontal members 41 and an extensible assembly 42 between the rear face of the panel 40 and the member 41 to permit adjustment for setting up the panel with its front face extending vertically.

Where the upper surface of the foundation beam 31a is sufficiently wide as shown in FIG. 11, the alignment members 36, 37 may be omitted and the erection panels 40 set directly on the foundation 31a.

As shown in FIG. 5, the precast foundation member 31 has embedded therein lines 41, 42, 43 for utilities, the lines extending from one end of the beam to the top face 32 of the member 31.

In practice, the worker places a chalk line on the upper end of the foundation beam 31 extending longitudinally thereof at the areas where the wall 17 is to be located. The panels 40 are then brought into position. The endmost panels 40a, 40b are then aligned and plumbed. A line or string is extended between the upper ends of the endmost

panels 40a, 40b and the remaining panels 40 are then brought into alignment and plumbed with respect to this line.

When assembled in side-by-side relationship with their front faces extending vertically, the panels provide a vertical wall for guiding the construction of the wall of the building. In addition, the panels bear indicia which is color coded as to the shape and location of the utility line and connection. Furthermore, the panels preferably bear indicia which indicate the location and shape of each block in the area of the utility lines and connections.

Thus, as shown in FIG. 6, some of the panels bear color coded indicia indicative of the electrical line as at 46 and connectors or connector boxes as at 47, 48, 49, 50 herein shown as red. Some of the panels have color coded indicia for water lines and connections as shown at 51 herein shown as blue. Some of the panels further have color coded indicia for waste, sewage and vent lines as at 52 herein shown as yellow. In the areas of the utility lines and connections, the panels 40 have markings showing the shape and size of the blocks which are adjacent the utility lines and connections. Thus, as shown in FIG. 5, the block shapes and locations at the connector points are shown.

As can be seen from FIG. 5, the proper selection of panels 40 is made in accordance with the plans of the building so that the panels will become aligned with the lines 41, 42, 43 of the foundation member 31.

The unskilled worker can then proceed to erect the cement blocks 55 preferably in vertical relationship and preferably utilizing a plastic adhesive rather than concrete mortar. The worker or workers start from the endmost erection panels 40a, 40b utilizing small plates 40' as guides for the end of the wall. In the area where electrical connectors are to be made, the worker utilizes the block shapes and sizes as shown on the indicia of the panels. It is preferred that the indicia of block at these points be in the form of a vertical column which is erected and then the remaining blocks of the wall brought into adjacent relationship thereto (FIGS. 5, 7, 8). At places where there is to be an electrical connector 56 and line 57 as evidenced by the indicia 47, 46, the unskilled laborer will note the colored indicia and, accordingly, both select blocks 58 to allow space for the connector and, at the same time, position a line 57 and select a connector or box within the block and through the openings in the block to make the connection. The worker will similarly use the colored indicia to position other conduits, lines and connections, not only for electricity but for water, waste and vents in accordance with the colored indicia on the panels 40 as shown in FIG. 6, selecting block, connections and lines in accordance with the colored indicia. It should be understood that in accordance with the system, the lines for the utilities and various connections and connection boxes will also preferably be color coded to conform with the colored indicia on the panels.

After the wall has been erected, the panels are removed.

If the building is to have additional stories, combined ceiling and floor members are placed upon and between the load bearing walls. Preferably, pre-stressed precast panels 60 are placed across the load bearing walls and further load bearing walls 61 can be erected in a similar manner for the second and subsequent floors.

The final surface of the first floor of the building is preferably formed by applying a layer 62 of concrete over the asphalt layer 25 to the level of the upper surface of the alignment members 36, 37, when they are used. If alignment members 36, 37 are not used, then the concrete 62' is poured directly over the asphalt into overlying relationship with the foundation members as shown in FIG. 11.

Interior walls which are not load bearing are then erected on the concrete surface. The interior walls may be similarly erected by the use of erection panels having indicia thereon for locating utility lines and connections.

Alternatively, the interior walls may be made by conventional method. The exterior walls are erected in the form of curtain walls of conventional panels and window structures.

When alignment members 36, 37 are used, they serve the additional function of providing a tacking strip for carpeting and of insulation for preventing the heat transfer between the foundation members and the interior of the room.

The indicia applied to the erection panels can be painted or otherwise formed on the face of the panels, but is preferably applied to sheets S of plastic or paper that are adhered to the face of the panels by pressure sensitive adhesive (FIG. 10).

It can thus be seen that there has been provided a system wherein unskilled labor can be used with skilled supervision to produce a low cost housing.

What is claimed is:

1. The method of building which comprises

laying a layer of material on the ground at the building site,

cutting through the material and excavating at the areas of the foundations,

excavating openings for footings through said cut through areas,

pouring concrete for the footings,

inserting a precast concrete foundation beam through the cut areas of the material,

leveling the concrete slabs on the footings such that the upper edge of the slab extends above the top surface of the material,

erecting a plurality of modular erection panels in side-by-side relation,

aligning and plumbing the vertical faces of said panels,

providing indicia means on the faces of at least some of said panels corresponding to block positions and utility connections and lines,

erecting block on said foundation members utilizing the faces as a guide and in accordance with the layout of the indicia means on the panels,

simultaneously positioning utility lines and connections in accordance with the indicia means on the panels,

and finally removing said panels.

2. The method set forth in claim 1 including the step of providing indicia means on said erection panels which is color coded to different types of utilities.

3. The method set forth in claim 1 including the step of providing indicia means on said erection panels which corresponds to the shape and location of the utility lines and connections.

4. The method set forth in claim 1 including the step of providing indicia means on said erection panels which corresponds to the shape and location of the block adjacent the utility lines and connections.

5. The method set forth in claim 1 including the step of erecting a second wall in the same manner as the first mentioned wall and thereafter laying precast concrete members across the tops of said walls.

6. The method set forth in claim 1 including the step of providing conduits in the foundation beams for utilities.

7. The method set forth in claim 1 including the step of applying alignment members on the layer of material adjacent and on opposite sides of the upper edges of the foundation beams with the upper surfaces of said alignment members substantially flush with the top surface of said foundation beams and thereafter erecting said modular erection panels in side-by-side relation on one of said alignment members.

8. The method of building which comprises

laying a layer of material on the ground at the building site,

cutting through the material and excavating at the areas of the foundations,

pouring concrete for the foundation through the cut areas of the material,

leveling the upper surface of the foundation,

erecting a plurality of modular erection panels in side-by-side relation on one of said alignment members,

aligning and plumbing the vertical faces of said panels,

providing indicia means on the faces of at least some of said panels corresponding to block positions and utility connections and lines,

erecting block on said foundation members utilizing the faces as a guide and in accordance with the layout of the indicia means on the panels,

simultaneously positioning utility lines and connections in accordance with the indicia means on the panels,

and finally removing said panels.

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erecting a plurality of modular erection panels in side-by-side relation,
aligning and plumbing the vertical surfaces of said panels,

providing indicia means on the faces of at least some of said panels corresponding to block positions and utility connections and lines,
erecting block on said foundation members utilizing said faces as a guide and in accordance with the layout of the indicia means on the panels,
simultaneously positioning utility lines and connections in accordance with the indicia means on the panels, and finally removing said panels.

9. The method set forth in claim 8 including the step of providing indicia means on said erection panels which is color coded to different types of utilities.

10. The method set forth in claim 8 including the step of providing indicia means on said erection panels which conforms to the shape and location of the utility lines and connections.

11. The method set forth in claim 8 including the step of providing indicia means on said erection panels which corresponds to the shape and location of the block adjacent the utility lines and connections.

12. The method set forth in claim 8 including the step

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of providing alignment members along the sides of the cut-out portions of the material,

leveling said members and utilizing said members to screed the upper surface of the foundation poured in said excavated portions.

13. The method set forth in claim 8 including the step of erecting a second wall in the same manner as the first-mentioned wall and thereafter laying members across the tops of said walls.

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U.S. Cl. X.R.

52—105, 127, 169, 220, 234, 294, 747