United States Patent [19]

Elmore

[11] **3,848,376**

[45] **Nov. 19, 1974**

[54] **SYSTEM FOR ANCHORING MODULAR HOUSING UNITS**

[75] Inventor: **Richard R. Elmore,** Herrin, Ill.

[73] Assignee: **Dura-Plex Industries,** Peoria, Ill.

[22] Filed: **Sept. 15, 1972**

[21] Appl. No.: **289,485**

[52] **U.S. Cl.**..... **52/169,** 52/274, 52/293, 52/295

[51] **Int. Cl.**..... **E02d 27/00,** E04b 5/32, E04b 1/35

[58] **Field of Search** 52/270, 259, 742, 743, 52/294, 295, 250, 263, 274, 293, 491, 169

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Primary Examiner—Frank L. Abbott
Assistant Examiner—Leslie A. Braun
Attorney, Agent, or Firm—Johnson, Dienner, Emrich, Verbeck & Wagner

[57] **ABSTRACT**

This invention discloses a novel system for anchoring modular housing units which are assembled from prefabricated panels at the building site. The wall panels are formed with an offset base portion so that when the wall panels are assembled on the footing provided at the building site a generally continuous ledge around the outer perimeter of the floor plan area for the housing unit is provided. A layer of fill sand is spread throughout the interior floor plan area, and a concrete floor layer is poured on top of the fill sand and extends to the outer perimeter of the floor plan area to cover the top of the continuous ledge and thereby provide an effective anchor for the housing unit. Further structural integrity is provided by connecting reinforcement rods between the concrete floor and the footing.

3 Claims, 4 Drawing Figures

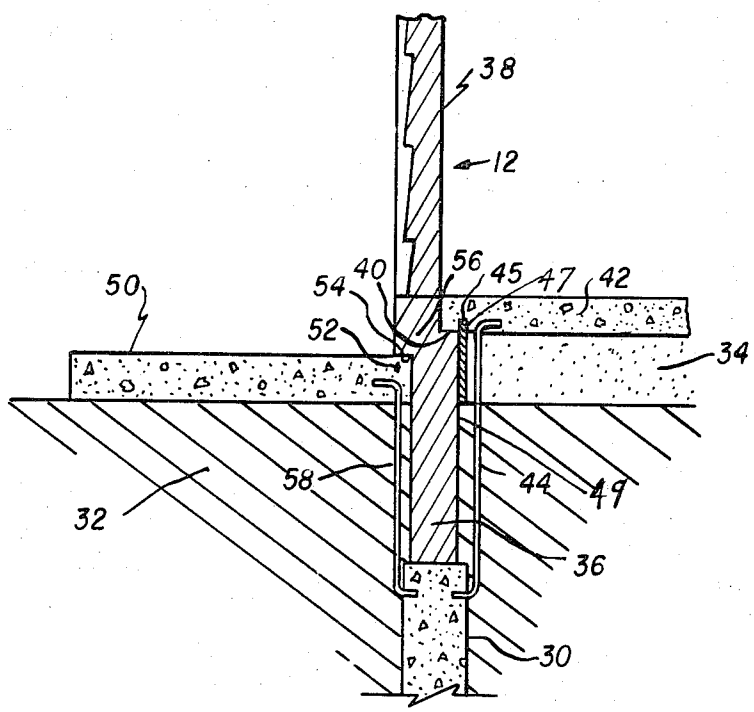


FIG. 1

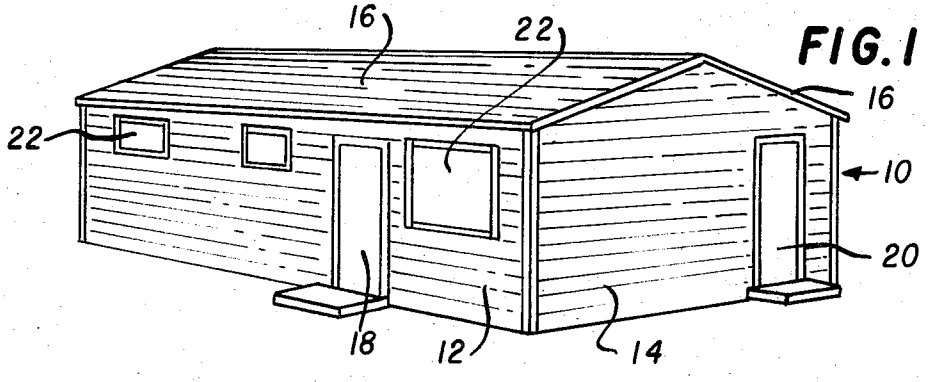

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FIG. 2

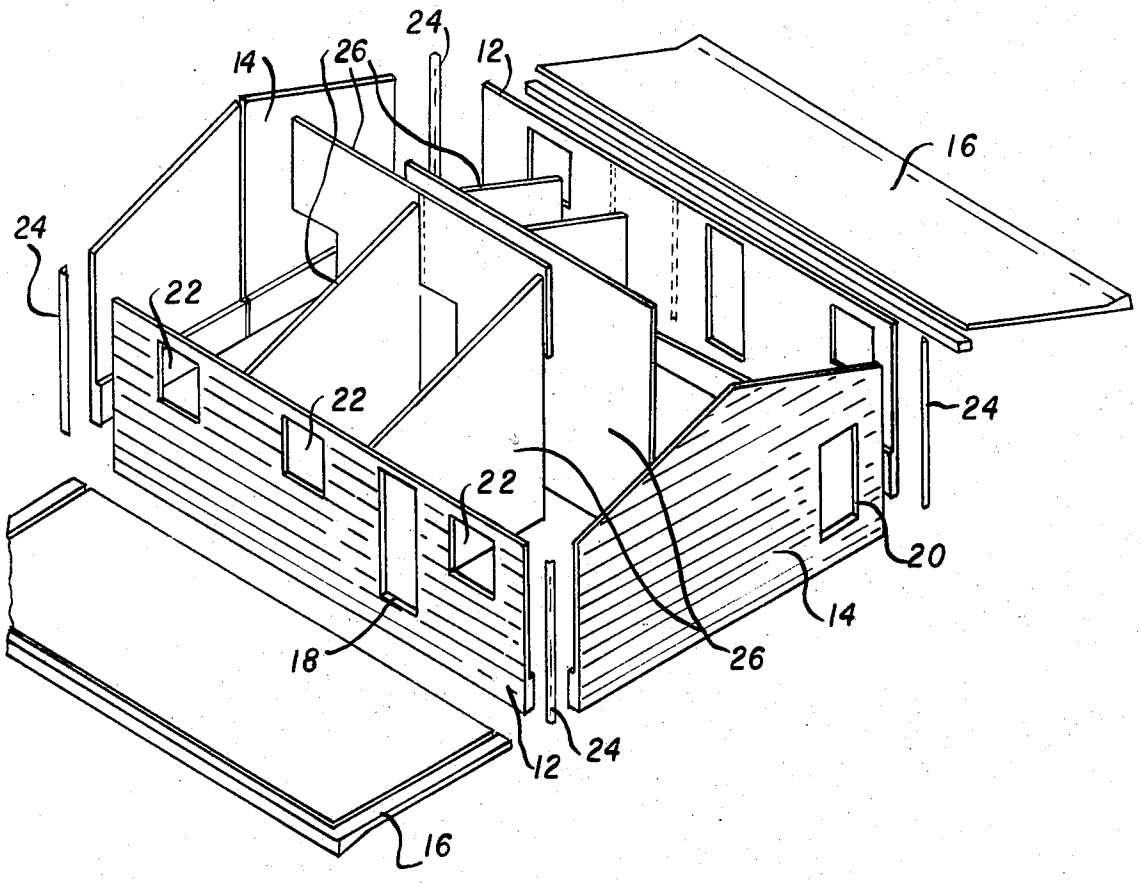

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FIG. 3

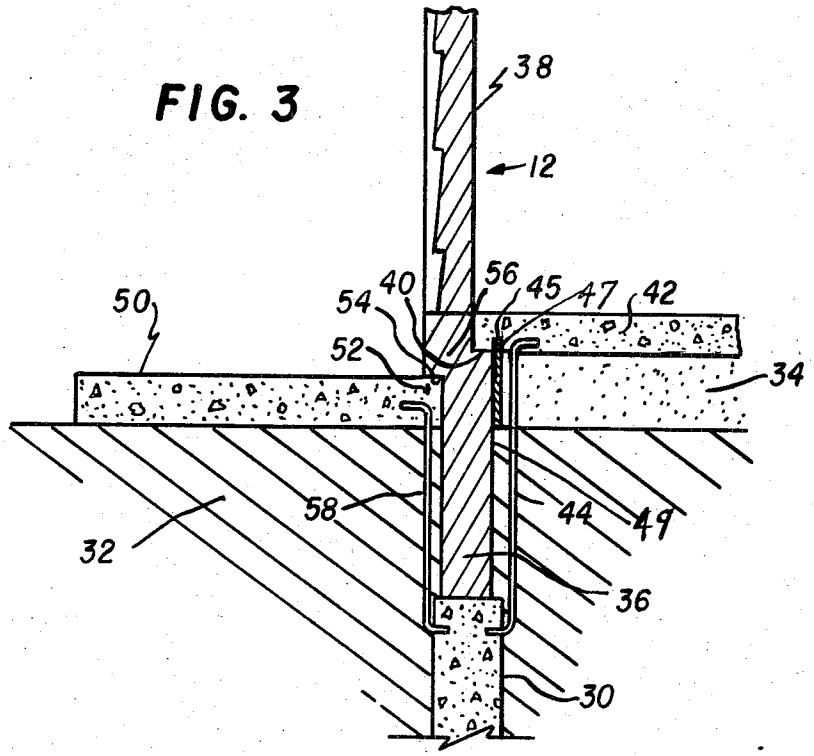
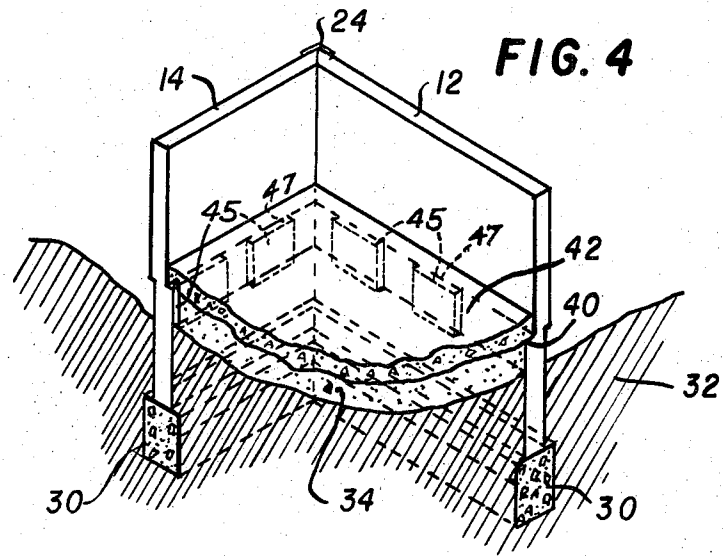

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FIG. 4


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SYSTEM FOR ANCHORING MODULAR HOUSING UNITS

BACKGROUND OF THE INVENTION

This invention relates to a system for anchoring modular housing units constructed from pre-fabricated panels.

Recent trends in housing construction have introduced the concept of modular housing to permit mass-produced homes and eliminate many of the conventional on-site construction techniques which contribute to high building costs. The modular housing concept employs pre-fabricated structural components, such as wall and roof sections which are transported to the building site and assembled to form a housing module or unit. These modular building structures are completely self supporting eliminating the need for conventional support frame work.

Because the above described modular building structures are completely self supporting there is an existing need for an economical system for anchoring the building structures at the building site. This invention satisfies this need by providing a novel anchoring arrangement which uses the concrete floor to anchor the modular housing unit.

SUMMARY OF THE INVENTION

A system for anchoring modular housing units at the building site are constructed from a plurality of prefabricated panels to provide a self supporting building structure. The pre-fabricated wall panels are assembled together with their lower base portion disposed on a footing which was previously poured to correspond to the interior floor plan for the housing unit. After the panels are assembled together, the dirt fill is shoveled on opposite sides of the wall panel up to the grade level and a layer of sand is spread across the interior floor plan area of the housing unit. This operation is followed by pouring a concrete layer or floor on top of the sand such that extends to the outer perimeter and covers a ledge formed at the junction of the base portion and upper vertical portion of each wall panel to thereby anchor the housing unit. Lock means are provided for interconnecting the wall panels and the concrete layer. Further anchoring strength can be provided by tying the footing to the concrete floor through the use of steel reinforcement rods installed at selected intervals around the perimeter between the footing and concrete floor.

DESCRIPTION OF DRAWINGS

For a better understanding of this invention, reference may be made to the accompanying drawings, in which:

FIG. **1** is a perspective view of a modular housing unit;

FIG. **2** is a perspective view of the interior and exterior wall panels and roof sections of the modular housing unit of FIG. **1** prior to assembly;

FIG. **3** is a partial vertical sectional view illustrating the system for anchoring the foundatiion and wall-floor structure to provide the modular housing units as shown in FIG. **1**; and

FIG. **4** is a vertical sectional view showing the foundation and wall-floor structure of a corner of the modular housing of FIG. **1**.

DESCRIPTION OF PREFERRED EMBODIMENT

Referring to FIG. **1**, a modular housing unit or structure is illustrated and generally designated by the reference numeral **10**. The modular housing unit **10** is constructed in accordance with what are generally termed "pre-fabricated" building techniques and includes in the illustrated embodiment four generally vertically disposed outer walls which support roof sections to define an enclosed modular housing unit having a generally rectangular plan interior area. The outer walls of the modular housing unit **10** comprise front and rear walls **12** and end walls **14**. The roof sections are indicated at **16** being formed of two inclined roof sections to define a roof peak as shown. The front wall has a door **18** providing access to the interior of the house and a similar door **20** is provided in end wall **14**. Any number of windows, such as shown at **22**, may be provided in the wall structural panels as desired to accomplish suitable natural lighting consistent with the overall size of the housing unit constructed.

The modular housing unit **10** is built primarily from structural panels which are molded to the required dimension and then transported to a building site for assembly into the modular building unit. These panels are pre-fabricated under controlled factory condition to form complete wall panels, roof panels, etc. All of these panels are completely finished before leaving the manufacturing facility and require assembly operations only at the construction site.

There is shown in FIG. **2**, the pre-fabricated panels required to provide modular housing unit **10**. The wall panels **12, 14** are molded with **45** degree bevels at each end. These beveled ends when butted together form a mitre-joint and are fastened together with adhesives. A corner cap **24** is attached along each corner by means of structural adhesives to provide a stronger joint and a finished appearance. Pre-fabricated panels may also be used to provide interior walls **26** for dividing housing unit **10** into rooms.

Referring now to FIGS. **3** and **4**, there is shown a foundation construction embodying the principles of this invention and suitable for anchoring the structural wall panels **12** of a modular housing unit **10**. At the construction site, a concrete footing **30** for supporting the lower edge of the structural wall panels **12** is poured to define a rectangular outline corresponding to the exterior dimensions of the floor plan of housing unit **10**. The footing **30** is formed below ground level and with the lower edge of the wall structural panel **12** resting in place on the footing, dirt fill **32** is shoveled on opposite sides of the wall panel up to the grade level indicated in FIGS. **3** and **4**. A sand base layer **34** is placed on top of the dirt fill within the interior area defined by the wall panels.

It is noted that the base portion **36** of the wall panels **12, 14** is vertically offset from the upper vertical portion **38** to define a generally horizontal shoulder or ledge **40**. This ledge **40** is continuous and defines the outer limits of the interior floor area. Once the exterior wall panels **12** are set in place on the footing **30**, a concrete floor **42** is poured across the inner floor area of the house unit and rests on top of the ledge **40**. This results in the weight of the floor **42** bearing directly on the wall panels **12** to effectively anchor the structure.

To prevent any shifting between the floor **42** and wall panels **12,** the floor **12** and wall panels **12** are tied together by means of a novel lock means **45** in the form of a plurality of spaced upstanding plates **47** which extend upwardly into the concrete floor **42** from the inner wall surface **49** of base portion **36.** These plates **47** may be either integrally formed as part of the wall panels **12** or alternatively fastened to inner wall surface **49.**

The anchoring strength is further increased by tying the footing **30** to the concrete floor **42** by means of a plurality of steel reinforcement rods **44.** these reinforcement rods **44** are installed at selective intervals around the exterior walls as needed. Thus, the footing **30,** the floor **42,** and the exterior walls **12** with lock means **45** extending up and into the concrete flooor **42,** are joined together into a single unit of maximal structural integrity.

At the entrance of each of the doorways **18** in the housing unit **10,** concrete entry platforms **50** are poured with its inner edge **52** seated under the shoulder **54** formed at the offset juncture **56** of the upper vertical portion **38** and base portion **36** of one of the wall panels **12.** One or more reinforcement rods **58** interconnect the entry platform **52** and footing **30** as shown in FIG. **3.**

I claim:

1. In a housing unit, a prefabricated, unitary wall panel having an upper portion extending above a grade level and delimiting an outer perimeter of a portion of an interior area of said unit and a footing below the grade level and supporting said wall panel, and anchoring means for said wall panel comprising a base wall panel portion offset toward said interior area portion from said upper portion of said wall panel for forming a ledge at said perimeter of said interior area portion, a layer of concrete spaced from said footing and extending over said ledge for anchoring said wall panel with said layer and over said interior area portion for forming a part of a floor of said unit, and at least one locking member connected to said base portion of said wall panel and extending from said wall panel and above said ledge into said layer of concrete for locking said wall panel and said layer against separation in a direction normal to said wall panel.

2. A system as in claim **1** wherein said layer is spaced from said footing by said base portion of said wall panel and comprising means additional to said wall panel extending between said floor part of said layer and said footing and tying said layer to said footing for anchoring said layer to said footing.

3. In a housing unit having a prefabricated, unitary wall panel having an upper portion extending above a grade level and delimiting an outer perimeter of a portion of an interior area of said unit and a footing below said grade level and supporting said wall panel, a system for anchoring said wall panel comprising: a base wall panel portion offset toward said interior area portion from said upper portion of said wall panel for forming a ledge at said perimeter of said interior area portion delimited by said wall panel; a layer of concrete spaced from said footing by said base wall panel portion and having a portion extending over said ledge for anchoring said wall panel with said layer and a portion extending over said interior area portion for forming a part of a floor of said unit; and plate means connected to said base portion of said wall panel and extending parallel to said wall panel and above said ledge into said layer for locking said panel and said layer against separation in a direction normal to said wall panel.

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