United States Patent

Verman

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[54] MODULAR ROW HOUSING

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[52] **U.S. Cl.** **52/79,** 52/236

[51] **Int. Cl.** **E04b 1/04**

[58] **Field of Search** 52/79, 234, 236

[56] **References Cited**

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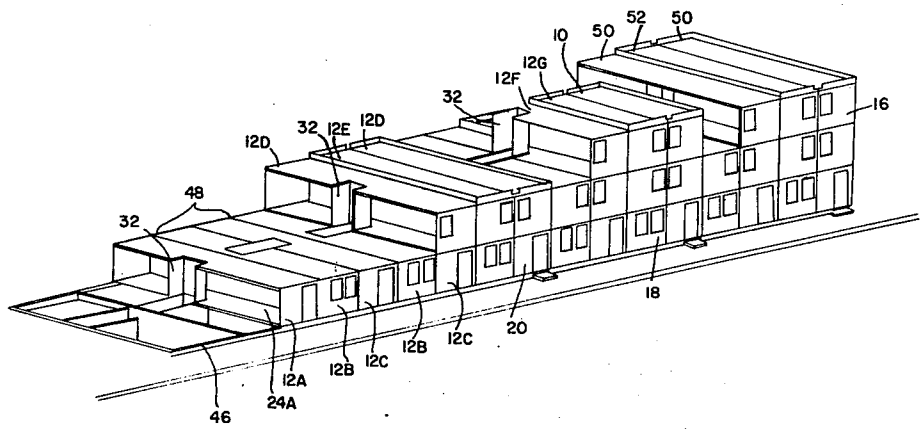
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[57] **ABSTRACT**

Modular row housing used to construct row housing units of one story or more comprising a plurality of modular units, each having a height of one story and a width corresponding to one-half of the finished width of the row housing unit, each modular unit comprising a party wall along its length, front and rear walls, a floor and a ceiling with the front and rear walls having a width corresponding to one-half of the finished width, each modular unit having an opening at the face opposite to the party wall, said opening being defined by free edges, two of said modular units being assembled together to form a single story with the free edges of each modular unit being held together in abuttment by a sealing material to close off the opening of each modular unit, thereby to provide the first story or a subsequent story of the row housing unit.

In the preferred embodiment there is at least a second story that is comprised of two modular units similar to those comprising the first story, with the second story modular units being positioned on the corresponding first story modular units and a compressible sealing material is interposed between the second story modular units and the first story modular units in order uniformly to distribute the weight to the second story modular units on the first story modular units without the necessity of a common support structure for the second story modular units.

4 Claims, 7 Drawing Figures



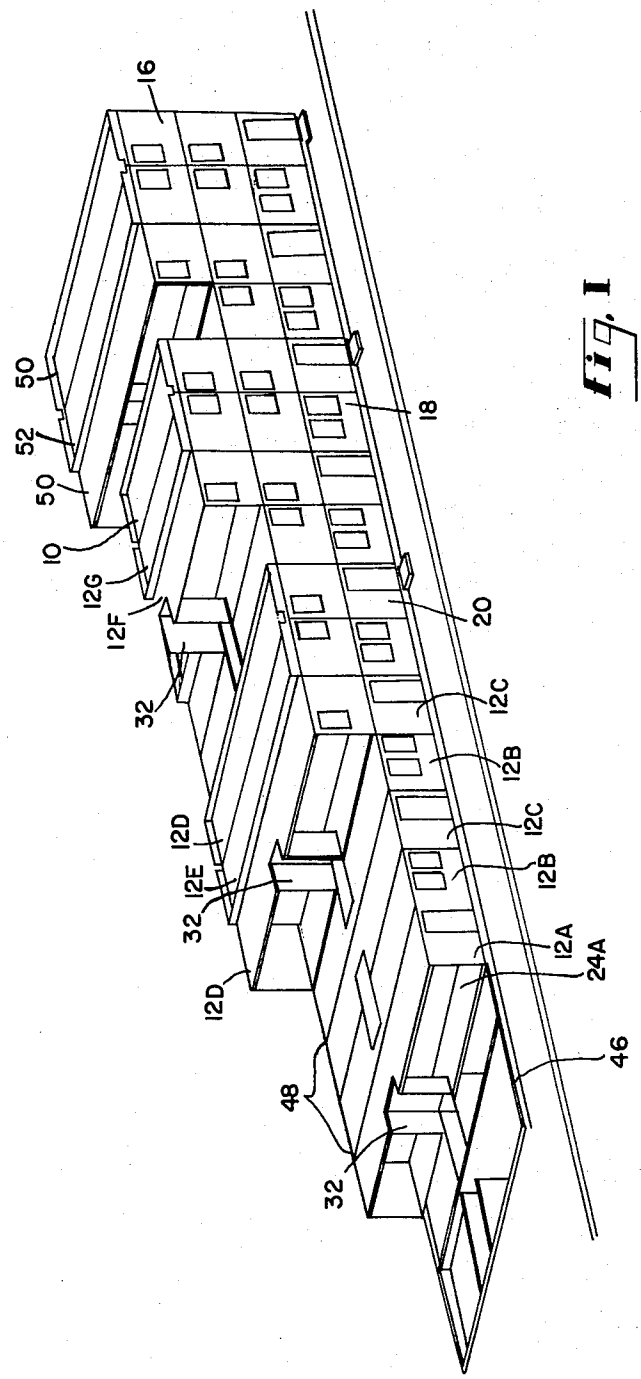


Fig. 1

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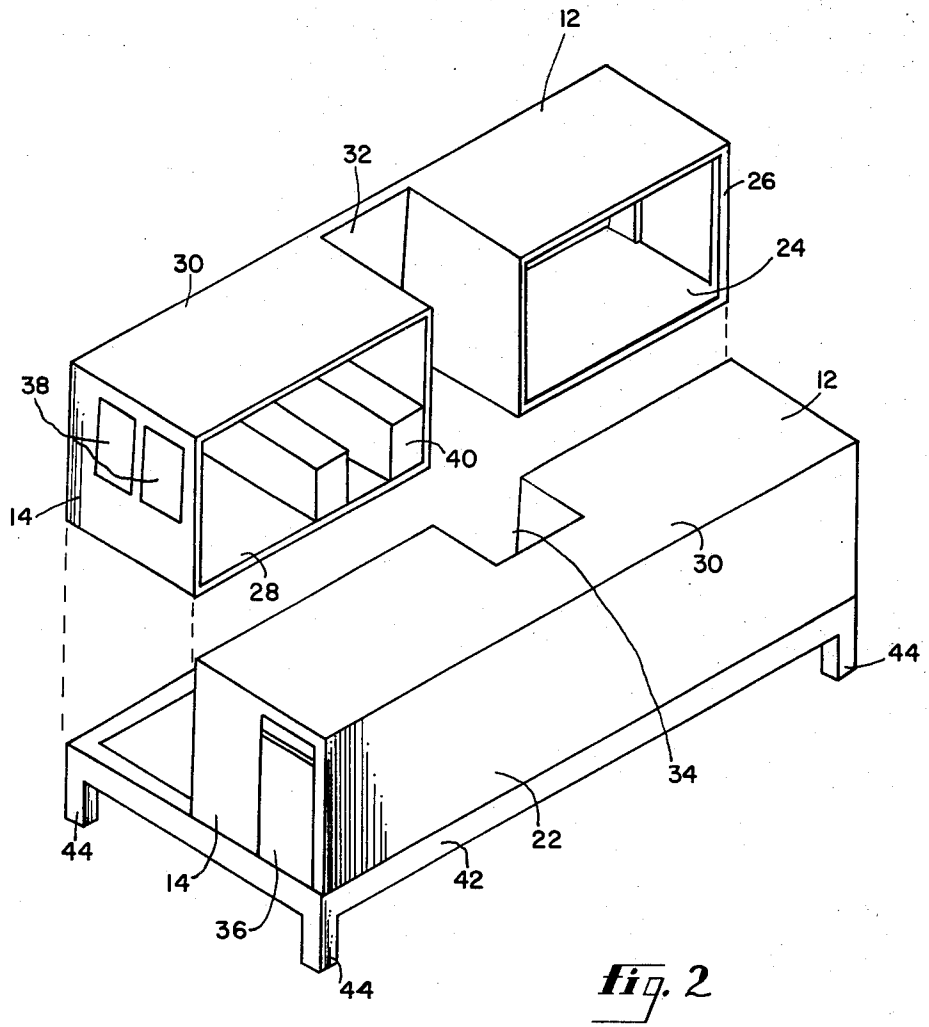


fig. 2

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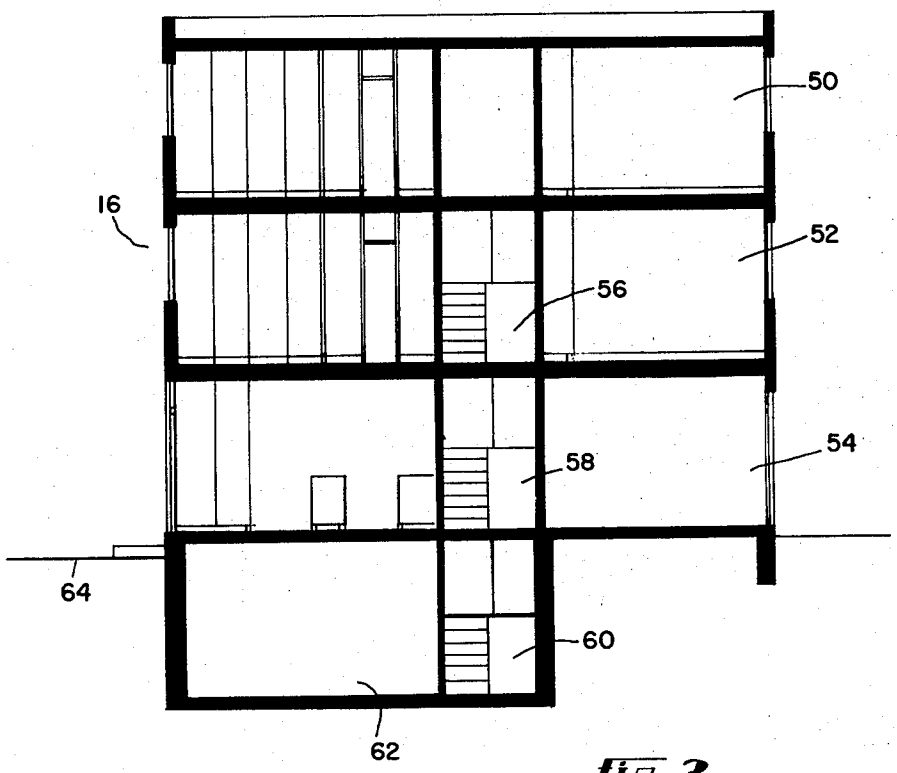


fig. 3

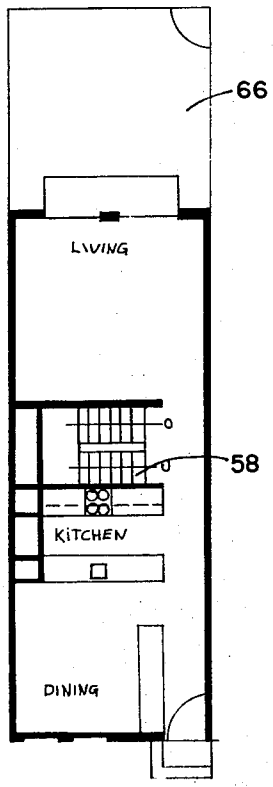


fig. 4

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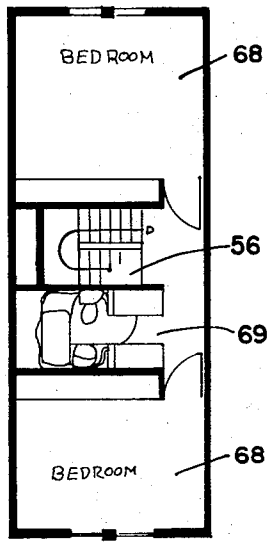


fig. 4A

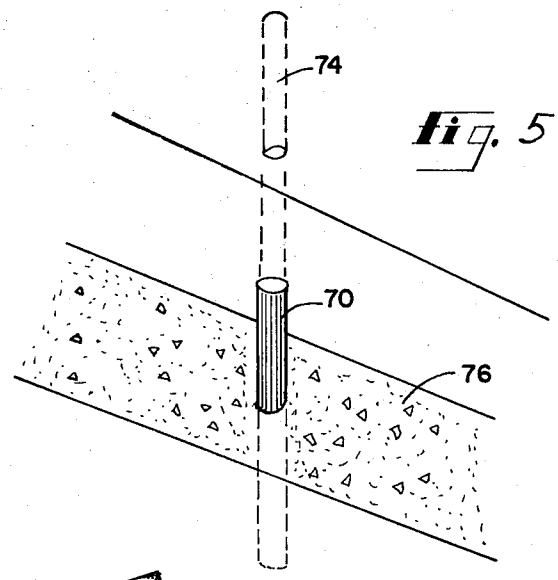


fig. 5

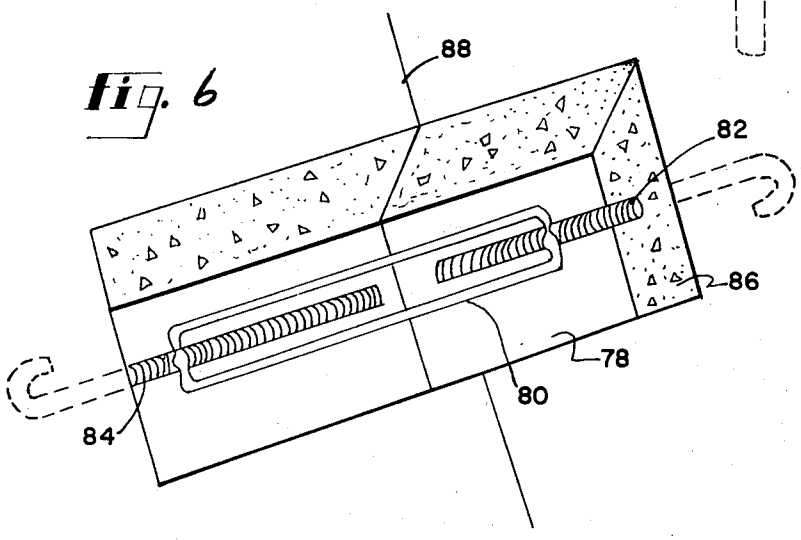


fig. 6

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MODULAR ROW HOUSING

This invention relates to modular row housing and has as its objective the provision of a novel modular unit that can be used to quickly and economically assembly large numbers of units of row housing.

There are many cities, particularly in the Eastern United States, that have a serious shortage of housing for low-income families. The row house has been the traditional answer to the problems of these cities, particularly since the row house is still the most common housing type and its proportion in the Eastern United States has actually grown since the year 1950.

The housing problem has grown much more serious in recent years because existing row housing may be 75 to 100 years old, and so it is becoming more difficult to modernize such houses with new bathrooms, kitchens, mechanical systems and adequate closet space. Caught in spiraling construction costs, a decreasing labor market, vandalism and inadequate funds, the existing supply of housing continues to deteriorate at an increasing rate.

The modular approach to building has been previously attempted, but generally in relatively expensive construction. Such an attempt is set forth in Stucky U.S. Pat. No. 3,416,273 wherein a relatively elaborate series of stiffener members are provided as a part of a large superstructure that holds and retains modular units. While this type of construction may have utility in high rise or relatively expensive housing, it is believed not to be suitable to end the row housing problem. To the same effect is van der Lely U.S. Pat. No. 3,256,652 wherein wooden frame members are assembled together in patterns that are not readily applicable to the row housing problem.

It is therefore an object of the present invention to provide modular row housing comprised of modular units which can be easily and inexpensively manufactured.

Still another object of the present invention is to provide modular row housing comprising modular units that can be transported readily from the place of manufacture to the point of use.

Still another object of the present invention is to provide modular row housing that is relatively simple to erect, and does not require the use of a superstructure.

Yet another object of the present invention is to provide modular row housing including modular units that can be assembled together to provide row housing of two, three, four or even five stories.

The foregoing as well as other objects of the invention are achieved by providing modular row housing used to construct row housing units of one story or more comprising a plurality of modular units wherein the width of each such unit corresponds to one-half of the finished width, wherein each such modular unit has an open face along the length thereof with two of the modular units being assembled together to form a single story with the free edges of each modular unit being held together in abutment wherein a compressible sealing material is applied to make a water tight joint. A second story may be similarly erected with the second story modular units being positioned on corresponding first story modular units and a compressible sealing material is imposed between the second story modular unit and the first story modular units in order to distribute uniformly the weight of a second story modular unit and a third and fourth story can be formed in a similar manner, all without the necessity of a superstructure or supporting frame.

Other objects and many of the attendant advantages of the invention will become more readily apparent by reference to the attached drawings wherein:

FIG. 1 is a perspective view showing modular row housing of up to three stories constructed, step by step;

FIG. 2 is a perspective exploded view showing one modular unit already seated upon a foundation and the corresponding modular unit about to be brought in place in abutment with the previously deposited modular unit;

FIG. 3 is a sectional view in the vertical plane showing a three story housing unit assembled in accordance with the present invention;

FIG. 4 is a plan view of the first floor of modular row housing constructed in accordance with the present invention;

FIG. 4–A is a floor plan of a second story of such modular row housing;

FIG. 5 is a view showing a technique for joining an upper story to a lower story; and

FIG. 6 shows the use of a turnbuckle in order to secure together two abutting modular units.

Referring now in greater detail to the various figures of the drawing wherein like reference characters refer to like parts there is shown generally at **10** in FIG. 1 modular row housing comprised of modular units constituting an embodiment of the present invention. The construction and use of each modular unit **12** will be appreciated from a study of FIG. 2.

It will be seen that each modular unit **12** possesses front walls **14** having a width corresponding to one-half of the finished width of each housing unit **16** (FIG. 1) or **18** or **20**.

Each modular unit **12** further includes a rear wall (not shown) that is of the same dimension as front wall **14**.

With further reference to FIG. 2 it will be seen that each modular unit **12** includes a party wall **22** and an opening or open wall **24** that is opposite to the party wall **22** and possesses in general the length and width of the party wall **22**.

With further reference to FIG. 2 it will be seen that when two of the modular units **12** are brought together as shown in FIG. 2, so that the opening **24** in each modular unit is closed off in order to complete an entire story.

Each opening **24** is defined by free edges **26** which abut against like free edges **26** of another modular unit when a story is created as in FIG. 2. The actual abutment joint is made by using a sealing material, such as sponge rubber, or other compressible material. The two modular units may be joined together by a turnbuckle arrangement as shown in FIG. 6 or using other joining techniques that will readily occur to those skilled in the art.

With reference to FIG. 2 it will be further seen that each modular unit **12** also includes a floor **28** and a ceiling **30**. Furthermore, each modular unit **12** need not be precisely identical, but instead can be tailored to the demands of the left and right hand layout of the particular story being constructed. For instance, in

FIG. 2 one of the modular units has an opening 32 that will contain most of the stairwell, whereas the complementary modular unit has a smaller opening 34 that will complete the boundaries of the stairwell.

With further reference to FIG. 2 it will be seen that each modular unit 12 includes appropriate doors 36, windows 38 and necessary interior features of construction 40.

Also, each modular unit 12 is deposited upon a foundation pallet 42 having legs 44.

The assembly of a large number of row housing units of varying characteristics is illustrated in FIG. 1. The foundation preparation is indicated at 46 wherein a basement, if desired, may be constructed. Thereafter, a modular unit 12–A having wall opening 24–A is deposited upon the foundation. However, an existing foundation may be repaired to receive modular units 12 or a new foundation, with or without legs may be provided.

An entire one story housing unit is indicated within the bracketing identified as 48 in FIG. 1 wherein the first story is comprised of modular units 12–B and 12–C that are assembled together in the manner of FIG. 2.

It will be seen that similar modular units 12–B and 12–C may be deposited upon a foundation to produce the first story of a housing unit, followed by the deposit of a second story modular unit 12–D. Here, a compressible sealing material, such as neoprene, is interposed in the interface between the second story modular unit 12–D and the corresponding first story modular unit 12–C in order uniformly to distribute the weight of the second story modular unit 12–D. By this technique, it is possible to build three, four and even five story row housing since the weight of the upper floors will be uniformly distributed upon the lower floors. This type of construction does not need any superstructure, and hence there is no need to pour concrete at the construction site.

It will be appreciated that it will be a simple matter to complete a two story housing unit 20 with the addition of a complementary second story modular unit 12–E. Furthermore, a three story dwelling may be erected with the addition of modular units 12–F and 12–G.

Where desired, a longer three story housing unit may be created by using longer modular units on all floors, such as the longer modular units 50 and 52.

It is contemplated that the basic modular unit 12 usable with the present invention will have an interior height of from eight to nine feet and a depth of approximately 25 to 35 feet. The width of each modular unit will normally be fixed between 7 and 12 feet, but this depends largely upon either the size of the lot or the custom in the particular city.

It follows that the width of row housing constructed from such modular unit will normally range from 14 to 24 feet. The wall thickness of each modular unit will range from 3 to 6 inches with the floor having a thickness of 4 inches. With these thicknesses it is possible to achieve a modular unit having sufficient strength as to support a second, third or even a fourth story of similar units without the necessity of a superstructure or network frame.

FIG. 3 is a sectional view revealing the interior of a three story housing unit, such as the dwelling 16 of FIG. 1.

It will be seen from FIG. 3 that one of the modular units 50, 52 and 54 comprising the three story unit are visible. Also seen are stairs 56, 58 and 60, the latter of which leads to a basement 62 that is below ground level 64. FIG. 3 also shows how each essentially identical modular unit 14 can be customized in the interior depending upon the interior design.

FIG. 4 is a plan view of a first floor arrangement that would be comprised of two modular units 14. The dining area, kitchen and living room are labelled on FIG. 4 and stairs 58 are readily visible. A rear yard 66 may also be provided.

FIG. 4–A shows a plan of a second floor involving front and rear bedroom 68, stairs 56 and bathroom 69. Again, the second floor is constructed of two modular units in the manner of FIG. 2, and a third floor may be similarly constructed.

The vertical securement of an upper modular unit to a lower modular unit is indicated in FIG. 5 involving the use of a length of pipe 70 that fits in a drilled opening and a lower modular unit as well as drilled opening 74 and the upper modular unit. After hole 72 is drilled, the length of pipe 70 is inserted in the hole 72 so that a portion of the pipe 70 projects above the lower modular unit, and the upper modular unit is simply deposited upon the lower unit in such a way that the exposed length of pipe 70 is directed into hole 72. As previously discussed, a layer of compressible material (such as neoprene) is utilized at the interface 76 of the upper and lower modular unit in order uniformly to distribute the weight of the upper unit upon the lower unit.

The joinder of two side-by-side modular units, such as appear in FIG. 2, is shown in FIG. 6. Here a turnbuckle 78 is utilized in order to draw the abutting modular units 12 together. A conventional turnbuckle yoke with threaded member 82 and opposite hand threaded member 84 may be embedded in the concrete 86, and then the threaded members are simply rotated until the desired degree of pressure is applied to maintain the interface 88 between modular units 12.

It is therefore seen from the foregoing that the present invention constitutes a significant contribution to low cost row housing since the necessity for a supporting superstructure is completely eliminated. By virtue of the one-half finished width of each modular unit, the actual width of the modular unit is maintained in the range of 7 to 12 feet. Thus, the modular unit can be loaded upon trucks and transported from the manufacturing plant to the erection site without too much difficulty since there is no need to incur the expense of a wide load. Where desired, the modular units may be further subdivided along their length so that each unit will have a width of from 7 to 12 feet and a depth of from about 12 to 18 feet.

It is seen that the corresponding openings along the depth of each modular unit are closed off when two such units are brought into abutment. The second or third story is completed in the same manner since each modular unit may make provisions for stairs. Compressible sealing material is interposed between vertically stacked modular units in order to uniformly distribute the weight of the modular units. Thus, even a fourth or a fifth floor is possible.

Without further elaboration the foregoing will so fully illustrate my invention that others may, by apply-

ing current or future knowledge, readily adapt the same for use under various conditions of service.

What is claimed as the present invention is:

1. Modular row housing used to construct row housing units of one story or more without the need for a supporting superstructure, said row housing comprising a plurality of concrete modular units each having a height of one story and a width corresponding to one-half of the finished width of the row housing unit, each modular unit being essentially alike on the outside and comprising a party wall along its length, front and rear walls having a width corresponding to one-half of the finished width, a floor and a ceiling, each modular unit having an opening at the face opposite to the party wall with said opening being defined by the free edges of said floor and ceiling, two of said modular units being joined together with the free edges of each modular unit being secured together in abutment to produce abutting edges which close off the opening of each modular unit to produce a first story, a turnbuckle arrangement holding said modular units together and a compressible material being interposed between said abutting edges whereby said turnbuckle is actuated to bring said edges together and to compress said material to make a tight seal, and wherein two additional modular units are positioned on said first story to form a second story with a compressible material being interposed between said first and second stories to uniformly distribute the weight of said second story on said first story, and vertically disposed pipes extending into said first and second stories.

2. The modular row housing of claim 1 wherein each modular unit has a wall thickness of from 3 to 6 inches and a floor thickness of 4 inches.

3. The modular row housing of claim 1 wherein there are three stories.

4. The modular row housing of claim 1 wherein each modular unit contains openings, stairwells, doors and windows.

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