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Felciai

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[54] MULTI UNIT DWELLING STRUCTURE

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[21] Appl. No.: 228,672

Related U.S. Application Data

[63] Continuation-in-part of Ser. No. 143,390, May 14, 1971, abandoned.

[30] Foreign Application Priority Data

May 5, 1971 France 71.17266

[52] U.S. Cl. 52/79, 52/227, 52/236

[51] Int. Cl. E04b 1/34

[58] Field of Search 52/146, 169, 234, 236, 227, 52/73, 83, 30

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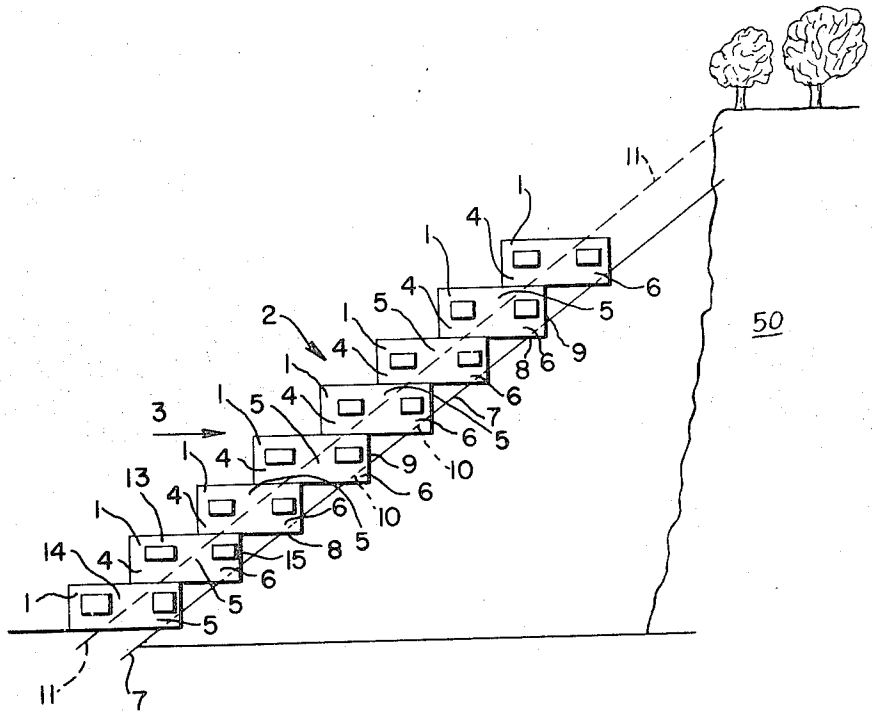
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[57] ABSTRACT

A multi unit dwelling structure comprising a plurality of individual dwelling units positioned and secured together in adjacency. The units may be arranged in a horizontal row or a tier inclined both to the horizontal and to the vertical and the horizontal rows may be arranged in an inclined tier. The structure is supported by a member, such as a cable, positioned to support the lower portions of each dwelling unit and the units are not suspended below the cable support. The cables are attached to the rooms and the adjoining rooms may be subjected to a compressive pre-stress prior to being attached to the cables.

6 Claims, 6 Drawing Figures



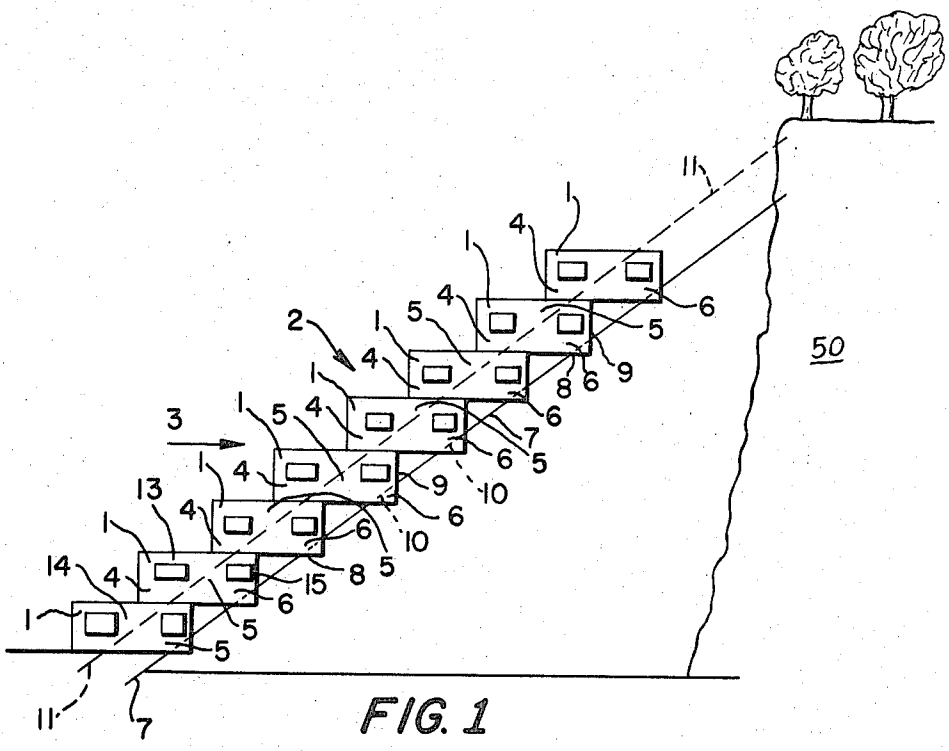
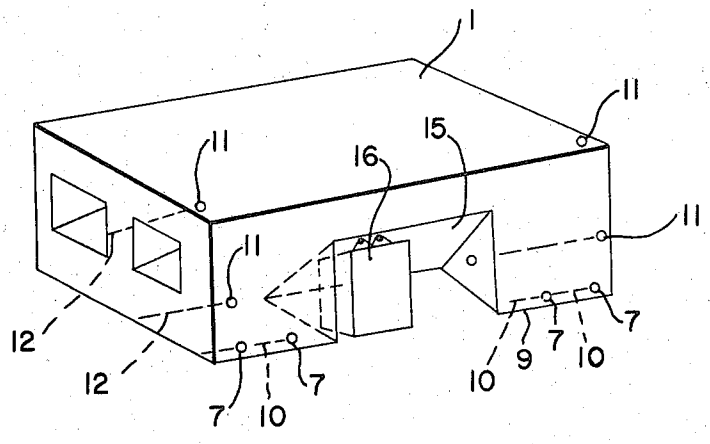


FIG. 1

FIG. 2



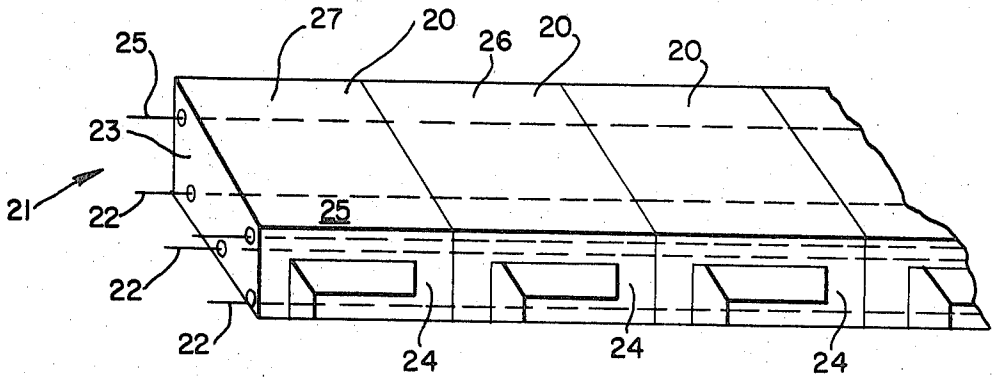


FIG. 3

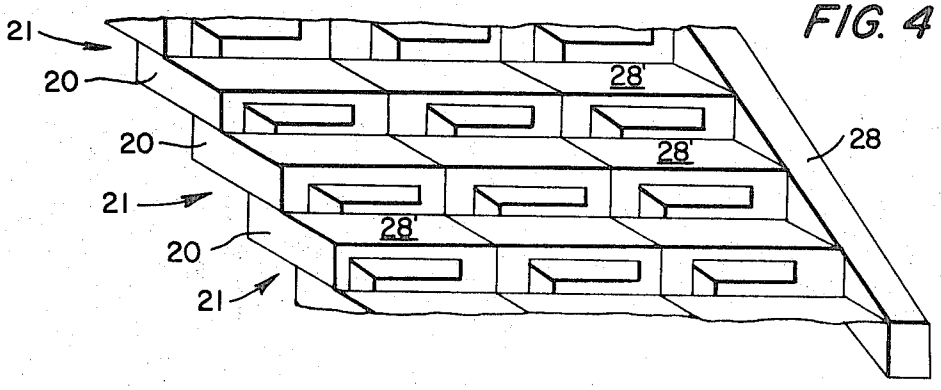
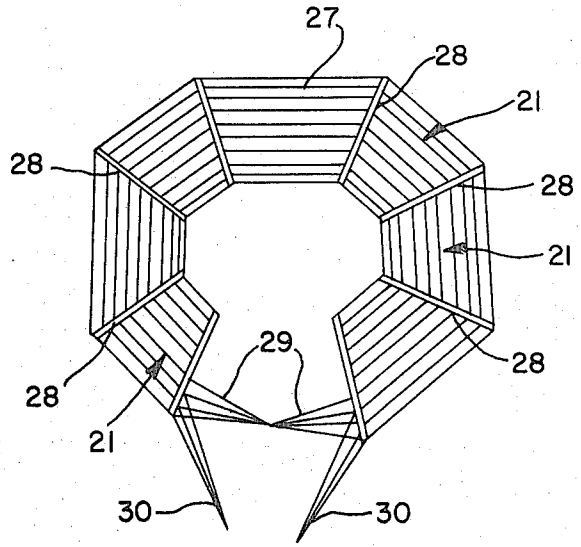


FIG. 4

FIG. 5



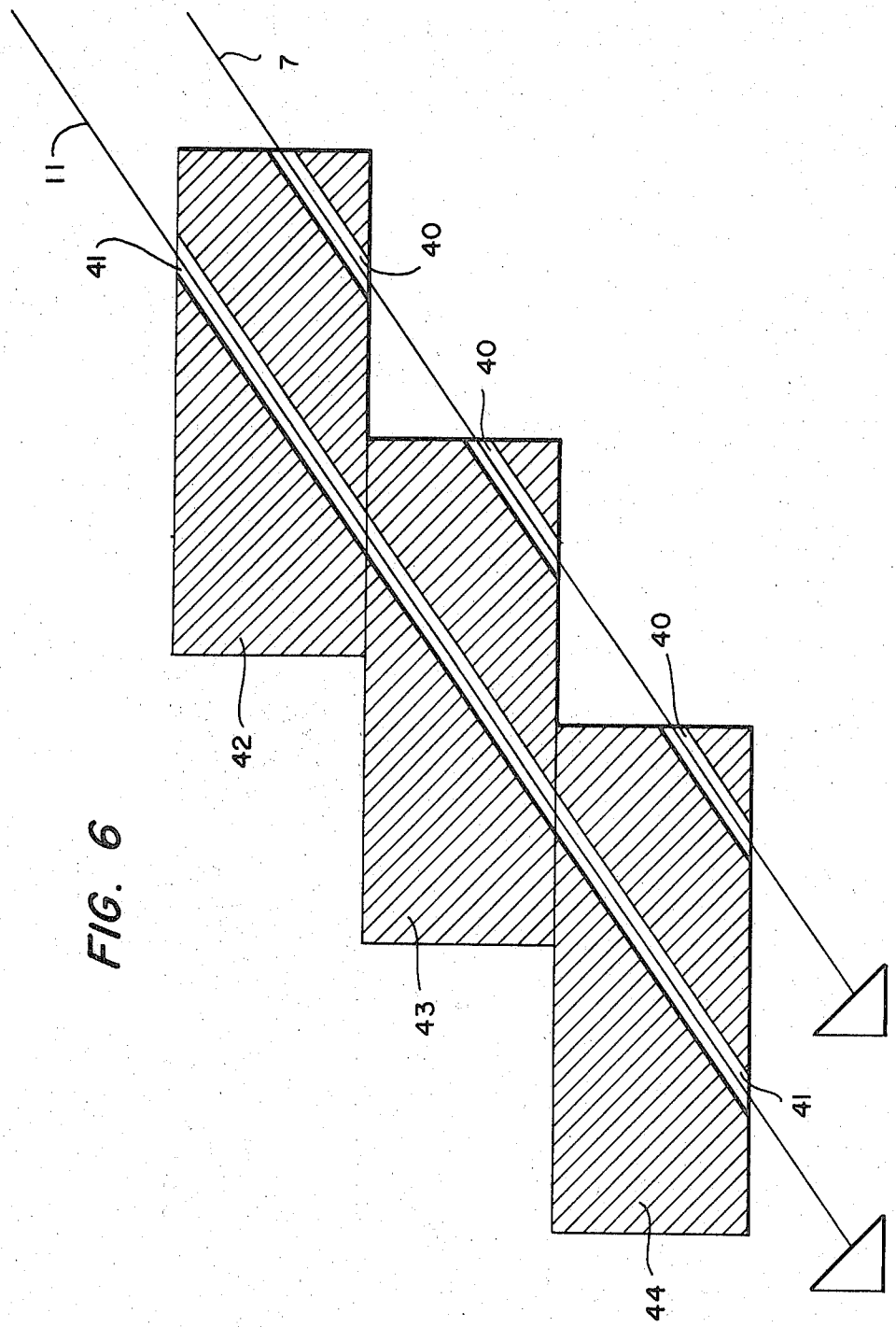


FIG. 6

MULTI UNIT DWELLING STRUCTURE

CROSS REFERENCE TO RELATED APPLICATIONS

This is a continuation-in-part of my co-pending application Ser. No. 143,390, filed in May 14, 1971, for "Multi-Unit Dwelling Structure" and now abandoned.

BACKGROUND OF THE INVENTION

The present invention relates to a self-supporting system of dwellings as a novel architectural building unit.

Light weight dwelling units can be effectively utilized in the present invention are disclosed in more detail in my copending applications Ser. Nos. 57,946 now abandoned and 57,947 filed July 24, 1970, now U.S. Pat. No. 3,719,012.

BRIEF SUMMARY OF THE PRESENT INVENTION

A multi unit dwelling structure according to the present invention comprises a plurality of individual dwelling units positioned in adjacency, means for securing adjacent dwelling units together, and a support member extending below the upper portion of the adjacent units and supporting the units above the ground in adjacency. The support member, for example a cable, is secured to each dwelling unit through which it passes. In a preferred embodiment, adjacent units are subjected to a compressive pre-stress prior to being attached to the support cables. In one embodiment, the structure comprises a plurality of individual dwelling units formed into a tiered stack one on top of the other, each of said dwelling units being offset, in a horizontal direction, relative to the lower dwelling units such that a first portion of each dwelling unit is located above a portion of each next lower unit and a second portion of each dwelling unit extends outwardly in said direction beyond each next lower unit whereby the dwelling structure is inclined to the horizontal and to the vertical, means for securing each dwelling unit to the next lower dwelling unit, and a support member passing underneath and being attached to the second portion of each of said dwelling units for supporting the said structure in said inclined orientation. In an alternative embodiment, the structure comprises a plurality of individual dwelling units in side by side adjacency formed into a horizontal row, means for securing each dwelling unit to each adjacent unit, and a support member extending below and being attached to the upper portion of all of the adjacent units in said row and supporting the units above the ground in side by side adjacency. The horizontal and inclined arrangements can be combined in a structure comprising a plurality of horizontal rows of units, the rows being tiered. A structure in the shape of a polyhedron can be assembled from a plurality of tiered rows, each section of tiered rows constituting a face of the polyhedron.

DESCRIPTION OF THE FIGURES

There follows a detailed description of the preferred embodiments of the invention to be read together with the accompanying drawings which are provided for purposes of illustration.

FIG. 1 is a diagrammatic side view of a portion of a dwelling structure comprising a plurality of units arranged in an inclined tier.

FIG. 2 is a diagrammatic perspective view of an individual dwelling unit of the structure of FIG. 1.

FIG. 3 is a diagrammatic perspective view of a portion of an alternative dwelling structure comprising a plurality of building units arranged in a horizontal row.

FIG. 4 is a diagrammatic perspective view of a portion of a building structure incorporating a plurality of the horizontal rows of FIG. 3.

FIG. 5 is a diagrammatic plan view of a building structure including a plurality of the structures of FIG. 4.

FIG. 6 is a diagrammatic sectional side view of a portion of the dwelling structure of FIG. 1 showing attachment of a cable support to individual units.

According to the invention, the self-supporting or monopiece system is characterized by the fact that it permits the fixation and support of light dwellings on one or a multiple of levels, and in a direction either horizontal, or in any inclination relative to the horizon.

This construction, according to the invention, is remarkable in the fact that it permits:

a. a new architecture, with the possibility of forms totally non-existent to date;
b. the reclaiming of the land for agricultural use for practically the total amount of inhabitable surface;
c. the construction of dwellings with individual hanging gardens;
d. the construction of dwellings at right angles with a cliff, above valleys, or at very great height.

With reference to FIGS. 1 and 2, one of the embodiments of the invention comprises a plurality of individual dwelling units 1 formed into a tiered stack 2 one on top of the other, each of the units being offset in a horizontal direction indicated by arrow 3 relative to the lower dwelling units such that a first portion 4 of each dwelling unit is located above a portion 5 of each next lower unit and a second portion 6 of each dwelling unit extends outwardly in said direction beyond each next lower unit. The dwelling structure is thus inclined with respect to the horizontal and the vertical. Each unit is secured, by conventional means (not shown) such as bolts, welding, concrete, or the like, to the next lower unit. A support member 7 passes underneath the portion 6 of each dwelling unit for supporting the structure in its inclined position. The lower end 8 of the cable 7 is secured by conventional means to the ground and its upper end is secured by conventional means to a fixed support, artificial or natural, such as cliff 50 (FIG. 1). The dwelling units themselves can be any conventional type, and are preferably light weight in construction. Preferred light weight dwelling units are those disclosed in my copending applications Ser. Nos. 57,946 and 57,947, filed July 24, 1970.

The dwelling units shown in FIGS. 1 and 2 are each arranged individually in a horizontal plane, and are laid (and not suspended from) over a plurality of cables 7. These cables go partially through the floor 8 and partially through the rear walls 9 of each unit in slots 10 provided for this purpose. Additional cables 11 may also be passed through the sides of the dwelling unit to provide further rigidity, slots 12 being provided for this purpose. The system is completed in the following manner: the second dwelling 13 will be applied partially over the first dwelling 14 and secured thereto in any conventional manner such as by bolts or welding the third dwelling over the second, etc. Each unit is each time rigidly secured to the next one. The result is to

solve the problems relative to the mechanical stress of a bent beam, i.e.: the strained portion is made secure by the cables the compressed portion is assumed by the contact and fixation of one dwelling unit over another, the floor of one dwelling and the ceiling of the other having the required resistance.

Once the extremities of each supporting cable is affixed to its final base of footing, which may be a tower or column, a cliff at one extremity, and the ground at the other extremity, or between two mountain sides, this system has a strength sufficient to enable it to have a great span or weight capacity, as well as sufficient rigidity to resist climatic dynamic effects, such as wind, snow, etc., as well as variations in loading in the course of use. Moreover, it provides, in front of each dwelling, a space which may be used as a garden, terrace, or the like.

Access to these dwellings will be through an inclined gallery or shaft **15** including one or more elevators **16.** This gallery or shaft may also include stairs as well as all the pipeworks, automatic garbage chute, etc.

With reference to FIG. **3,** another embodiment of the invention comprises a plurality of individual dwelling units **20** arranged in side by side adjacency formed into a horizontal row **21.** Each of the units is secured to its neighbor by means of bolts, welding, or the like, and the entire row is supported by cables **22** extending below the upper portion **23** of all of the adjacent units and supporting all of the units above the ground level in side by side adjacency.

Cables **22** preferably pass through the floor of each unit transversely with respect to the main facade **24** of each unit. Cables **25** may also be located in the walls of the units. The system is completed in the following manner: the second horizontal dwelling **26** will be applied, by means of bolts or any other means, with one of its lateral sides against a lateral side of the first horizontal dwelling **27,** the third dwelling will be secured to the second, and so forth, for the formation of a rigid and stable horizontal system.

For hi-rise dwellings, this system will be completed as shown in FIG. **4.** Each layer or floor of a row **21** of dwelling units, formed as above, will be in contact, through bolts or adhesives or other means, with the next upper layer or floor, each row being offset so as to form tiers. The horizontal upper surface **28'** of each tier serves as a terrace, garden, etc., for the dwelling located in the tier above. The anchoring of the cables at their extremity is effected in this embodiment on towers **28** made of reinforced concrete or steel, of any form, inclined with respect to the horizontal with the same inclination as the dwellings. These towers or columns may be arranged each time in a different and revolving direction in plan view as shown in FIG. **5** so as to form a system in which the cables, at each level, will constitute a polygon, regular or uneven, closed or open, or in which the cables may be joined in a cluster **29.**

The latter feature thus will permit the towers to be supported equally and to be constantly under tension, on the one hand, and on the other hand, to be under tension in a manner sufficiently uniform for the proper stability of the building. The whole unit makes a sort of inverted truncated pyramid.

The layers or floors of dwellings may not make a complete turn around the pyramidal system. In that event, cables **30** will be stretched from the sides of those towers which do not support any dwellings to footings or bases located on the ground, so as to counterbalance the opposite loaded portions.

Access to all levels of dwelling layers of the building will be obtained through inclined elevators and stairs located inside of the towers. Garbage-chutes, which will also be inclined, are preferably of the automatic type.

As shown in FIG. **6,** the cables **7** and **11** pass respectively through channels **40** and **41** located in each dwelling unit and positioned in alignment as shown. The channels are shown large, relative to the cables, for simplicity. According to the present invention, the cables are attached to each dwelling unit by any convenient means such as mechanical fasteners, adhesives, and the like. Suitable mechanical fasteners include, for example, screw plates, loops, eyes, collars, and the like. Suitable adhesives include concrete and synthetic resins. In the illustrated example, after passing the cables through channels **40** and **41,** adhesive is poured into the channels and permitted to set whereby the individual units **42, 43** and **44** are each individually attached to the cables. As mentioned above, the units are also secured to one another. The assembly is therefore quite rigid.

Improved strength can be achieved by stressing the units relative to the cables. This can be done by holding the cables under tension prior to securing the individual units to the cables, or by compressing the units by means of jacks or other compressive devices prior to securing the compressed units to a cable, or by both of these procedures. For example, in the embodiment of FIG. **6,** cables **7** or **11** or both can be held under tension prior to using concrete or other securing means in channels **40** and **41** respectively to secure the units to the cables. Alternatively, or in addition to tensioning the cables, a unit may be compressed in the direction of the cables by any suitable means such as by cables tightened by turnbuckles. After the units are secured to the cables, the compressive pre-stress force is removed. While this aspect of the invention has been illustrated in connection with the embodiment of FIG. **1,** it will be readily apparent that horizontally disposed units illustrated in FIG. **3** can be similarly attached to the supporting cables and similarly pre-stressed. The amount of compressive pre-stress used according to the invention can vary widely. The purpose of using compression is to compensate for deformation due to variations of the ordinates of the elastic lines. Maximum compressive force is limited, of course, by the mechanical resistance of the individual units.

It is well understood that the present invention is not limited to the embodiments described and illustrated, which are only given as an example; other modifications may be brought thereto without departing from the scope of the present invention.

What is claimed is:

1. A multi-unit dwelling structure comprising a plurality of individual dwelling units formed into a tiered stack one on top of the other, each of said dwelling units being offset, in a horizontal direction, relative to the lower dwelling units such that a first portion of each dwelling unit is located above a portion of each next lower unit and a second portion of each dwelling unit extends outwardly in said direction beyond each next lower unit whereby the dwelling structure is inclined to the horizontal and to the vertical, each of said units in-

cluding an elongate aperture for receiving a support cable, said apertures being longitudinally aligned, means for securing each dwelling unit to the next lower dwelling unit, and a cable support member passing through said aligned apertures of each of said dwelling units for supporting the said structure in said inclined direction, said cable support member being secured at its lower end to a point on the ground and at its upper end to a fixed support at a point elevated with respect to said point on the ground, said dwelling units thus being supported above the ground on the cable span extending in said inclined direction between the ground and said fixed support.

2. A multi unit dwelling according to claim 1 wherein said fixed support exists in nature.

3. A multi unit dwelling structure according to claim 1 wherein each of said dwelling units includes a floor and rear wall, said cable passing therethrough.

4. A multi unit dwelling structure according to claim 1 wherein each dwelling unit includes a ceiling, a floor, and a wall, and wherein each unit is offset in said direction with respect to the next lower unit a distance sufficient to form an open area adjacent the wall of each unit above the ceiling of the next lower unit.

5. A multi unit dwelling structure according to claim 1 including a plurality of said tiered stacks, each tiered stack positioned in side by side adjacency.

6. A multi unit dwelling structure according to claim 5 comprising a plurality of sections, each section comprising a plurality of said tiered stacks, each of said tiered stacks forming the side of a polyhedron.

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