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(54) **REINFORCED STRUCTURE APPARATUS**

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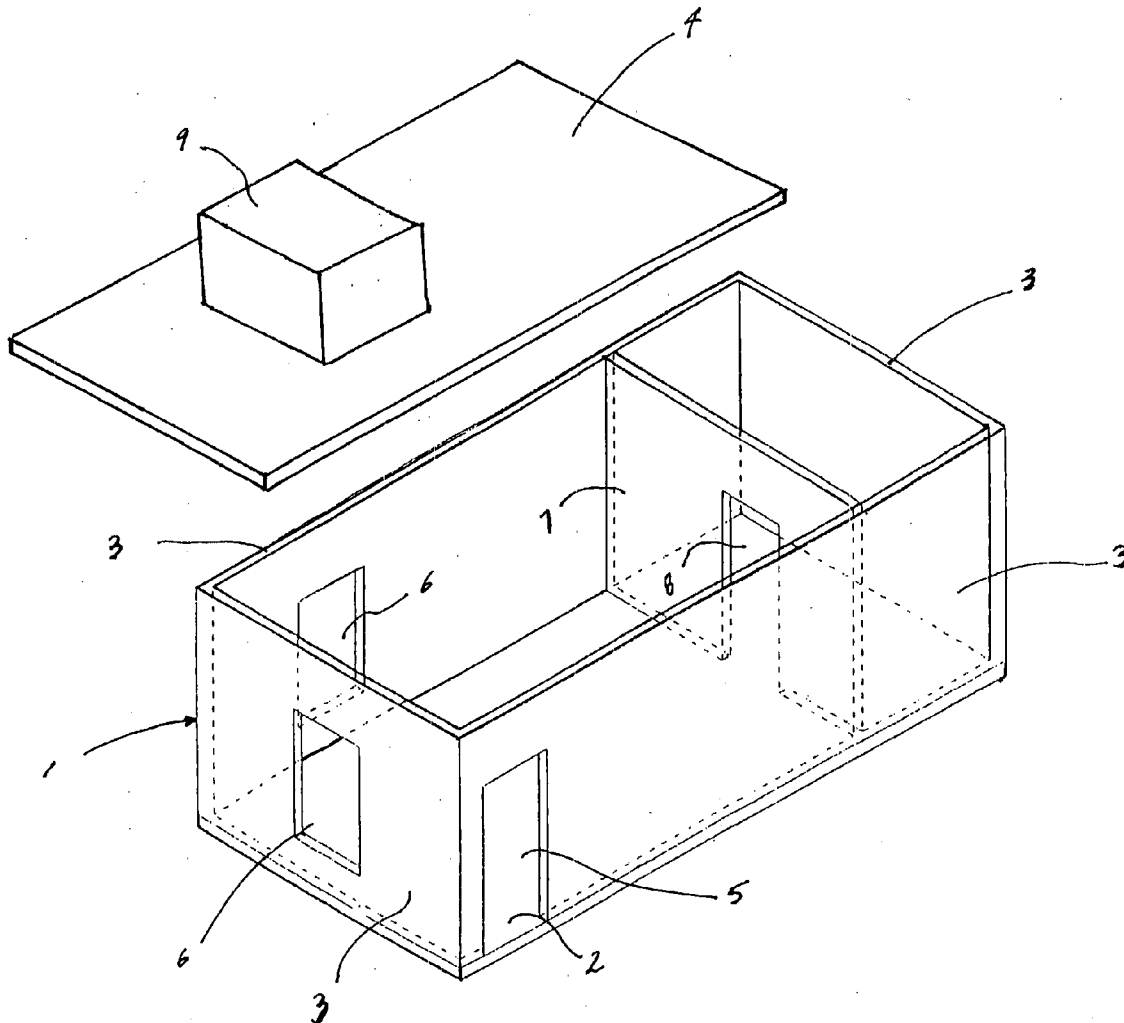
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(57) **ABSTRACT**

An apparatus for manufacturing reinforced structures wherein a hardened steel shell is constructed to desired specifications and anchored to a structure's foundation. The remainder of the structure is constructed around the hardened steel shell, thereby incorporating the steel shell as an integrated room or section of the structure.

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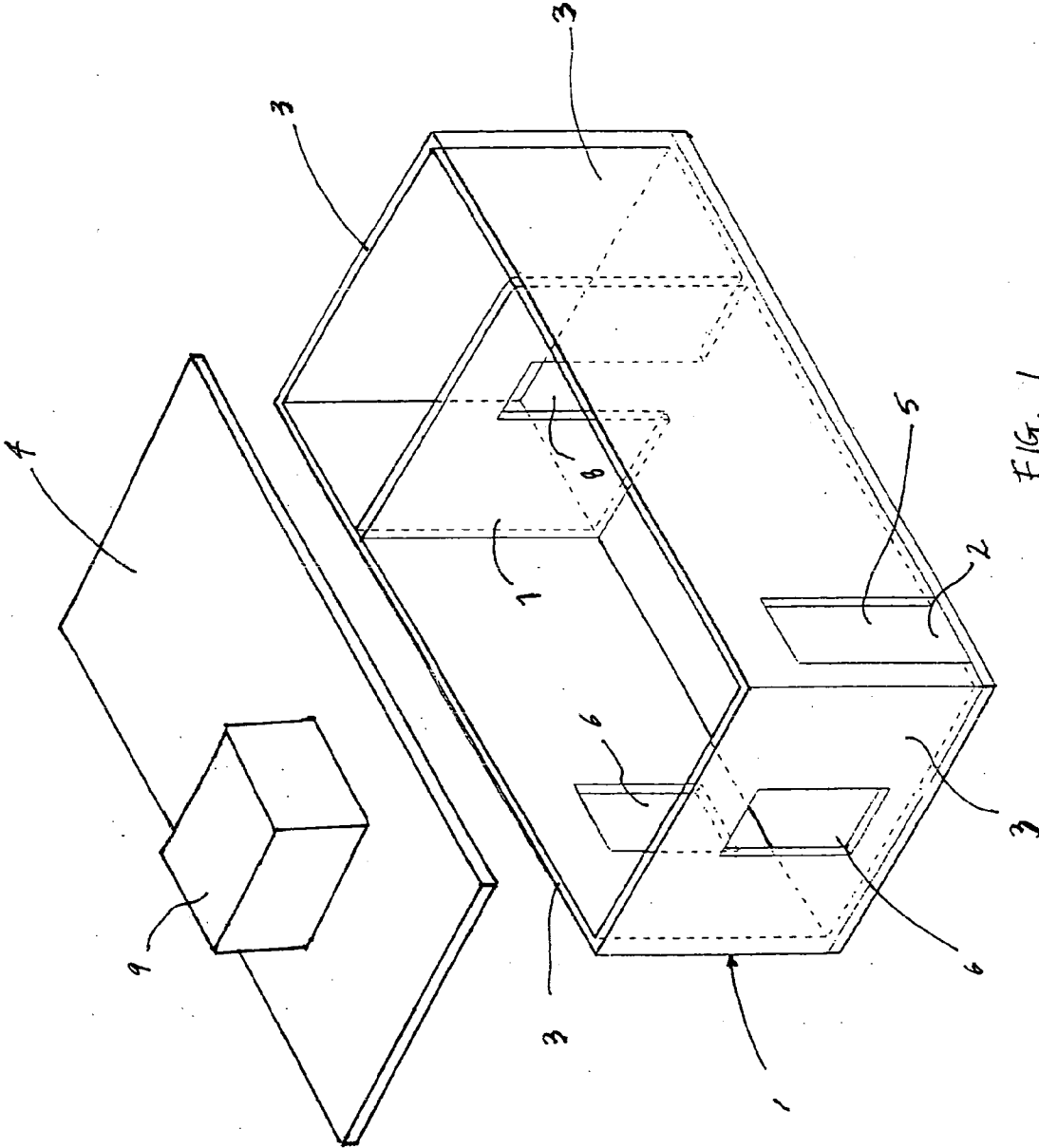
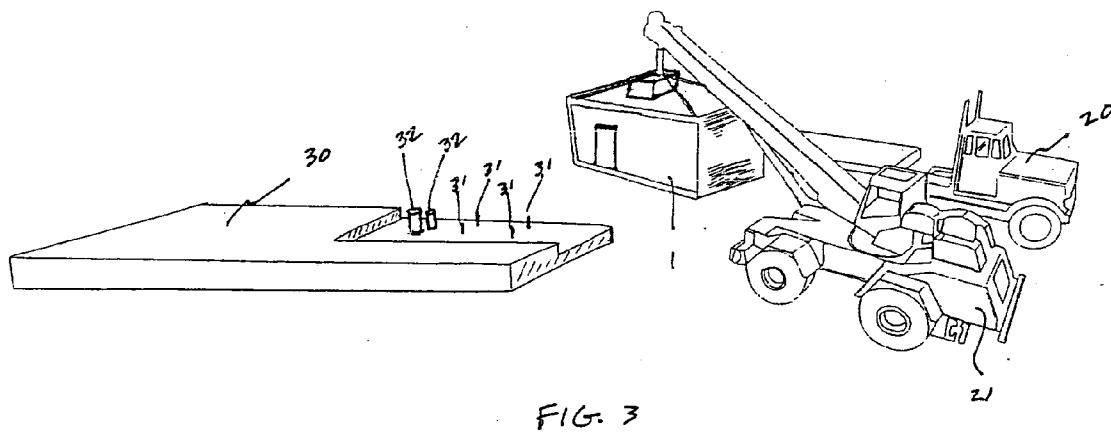
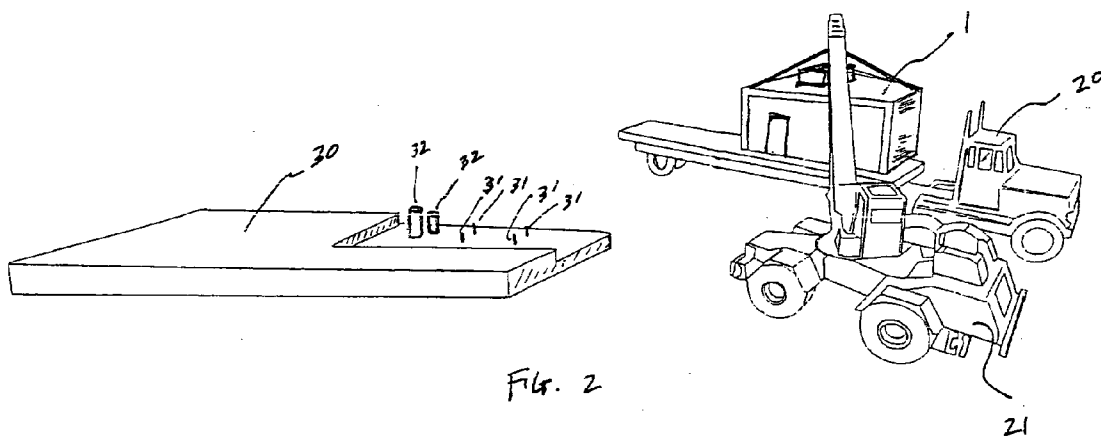


FIG. 1



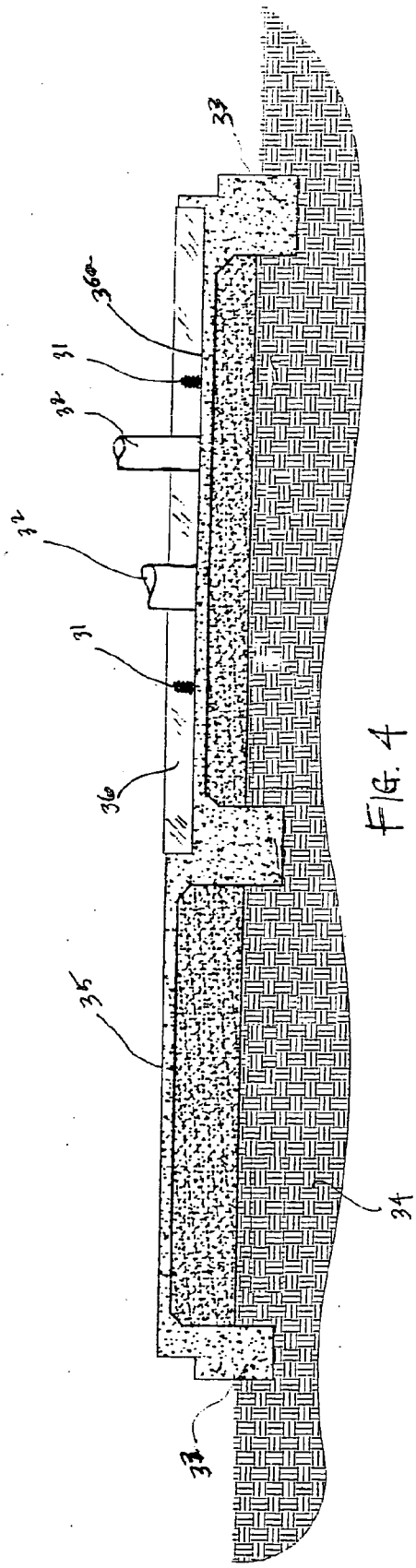


FIG. 4

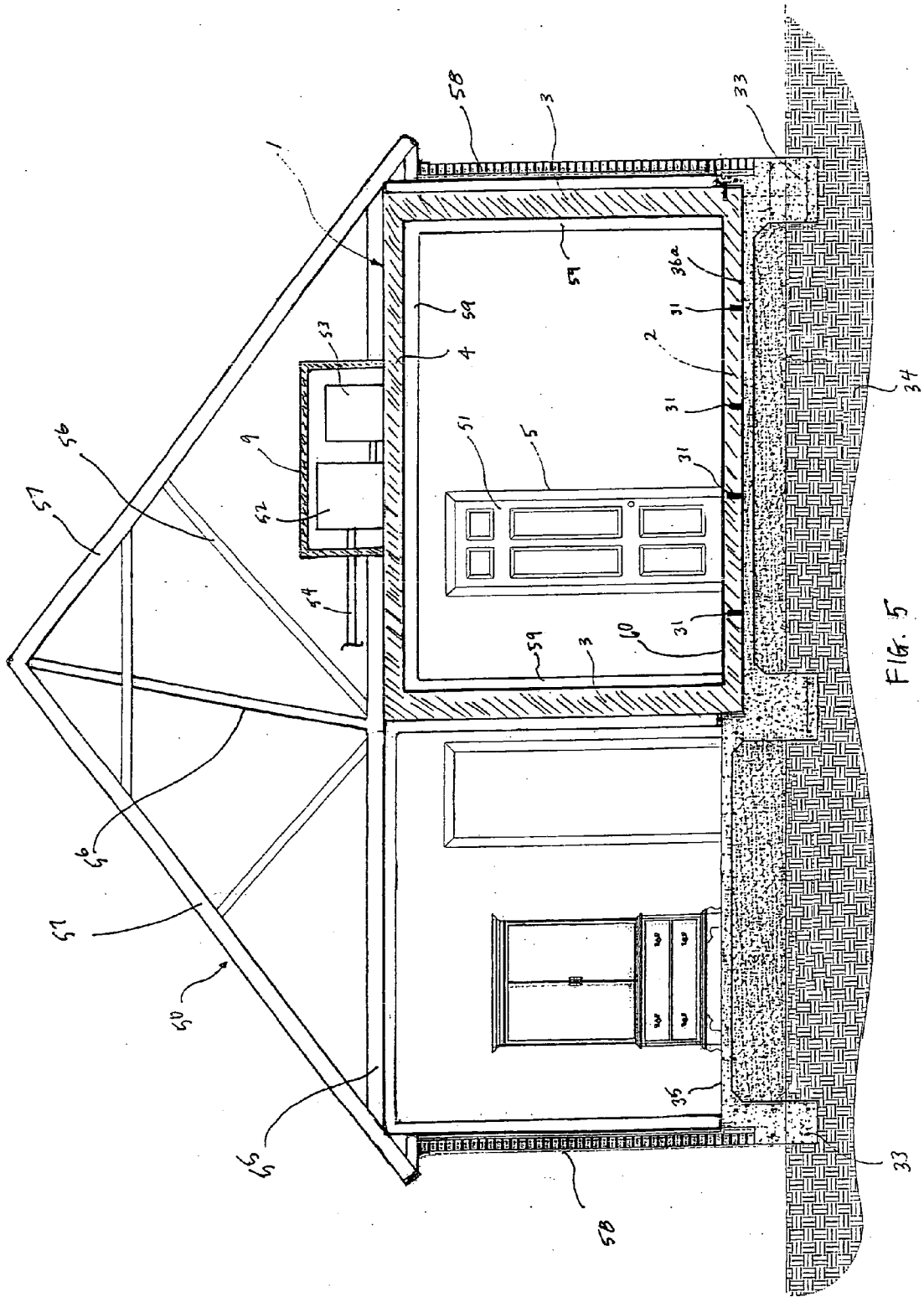


FIG. 5

REINFORCED STRUCTURE APPARATUS

CROSS REFERENCES TO RELATED APPLICATIONS

[0001] THIS APPLICATION IS A CONTINUATION OF NON-PROVISIONAL PATENT APPLICATION SER. NO. 10/967,878, FILED OCT. 18, 2004, CURRENTLY PENDING.

STATEMENTS AS TO RIGHTS TO INVENTIONS MADE UNDER FEDERALLY SPONSORED RESEARCH AND DEVELOPMENT

[0002] NONE

BACKGROUND OF THE INVENTION

[0003] 1. Field of the Invention

[0004] The present invention relates to a reinforced structure. More particularly, the present invention relates to an apparatus for manufacturing reinforced components of dwellings and other buildings. More particularly still, the present invention relates to an apparatus for reinforcing rooms and/or areas of dwellings and other buildings capable of withstanding hurricanes, tornadoes, earthquakes and other threats.

[0005] 2. Description of the Prior Art

[0006] Generally, walls of dwellings and other similar buildings are made from wood, bricks and/or hollow masonry blocks, while roofs are made from wood. Frequently, wooden trusses, especially nailed trusses, span the entire interior of such buildings. Although such buildings can be very economical to construct, they generally cannot withstand the effects of a hurricane, tornado, earthquake or other disaster. In many instances, such structures can be severely damaged, if not completely destroyed, by such a disaster. Further, buildings in general, and houses in particular, are typically not of fire resistant construction and are susceptible to considerable damage due to fires.

[0007] In addition to threats from fires and natural disasters, buildings and/or dwellings constructed using conventional methods are also vulnerable to "man-made" threats. Such man-made threats can include forced entry by intruder(s), as well as chemical, biological or nuclear attacks.

[0008] Numerous attempts have been made to protect against such threats. The concept of safe rooms, "panic rooms" and/or fallout structures within buildings and other dwellings is previously known. Generally, prior art safe rooms and the like comprise separate rooms or attachments to buildings or other dwellings which are made of fire, blast and/or break-in resistant construction. However, such safe rooms generally are not an integral part of a building itself, adding to its structural strength and integrity. Further, such specialized rooms or shelters are rarely, if ever, used unless a specific need arises.

[0009] In many areas, dwellings and other buildings can be constructed with storm shelters and/or fallout shelters in cellars or other underground locations. However, in certain geographic regions, such as in the vicinity of the Gulf of Mexico, buildings (including residential dwellings)-are often constructed without cellars because the ground water level is too high. As such, buildings in these areas typically have only a concrete slab for a foundation, and safe rooms, "panic rooms" and/or fallout shelters cannot be constructed in cellars.

[0010] Thus, the need exists for a reinforced room or section of a building or dwelling which can withstand high winds associated with tornadoes and/or hurricanes, as well as blasts from other sources. Similarly, such reinforced room or section should be fire resistant, and should be able to withstand negative effects of earthquakes. Such reinforced room or section should be an integral part of said building or dwelling, and should be able to be capable of being used and enjoyed even when not being utilized as a disaster shelter.

SUMMARY OF THE INVENTION

[0011] As opposed to specialized fallout or storm shelters that are rarely if ever used, a building incorporating the apparatus for the present invention integrates the security benefits of such fallout shelters, storm shelters and/or so-called "panic rooms" into fully functional room(s) in such building. Buildings incorporating the apparatus of the present invention offer full functionality, even when the reinforced rooms and/or sections of such buildings are not being specifically used as a shelter. Dwellings and other buildings incorporating the apparatus for the present invention are engineered to withstand tornadoes, hurricanes, forced entry by intruders and automobile intrusion, fire, ballistic damage, chemical or toxic releases, and tidal/storm surges.

[0012] Buildings incorporating the apparatus of the present invention can be designed into virtually any new construction project, or can be added into virtually any existing building or dwelling. Alternatively, the apparatus for the present invention can be used in the construction of stand-alone structures.

[0013] In the case of slab foundation buildings, a proprietary anchor system is installed within such slab. Once the slab is poured, steel room (or group of rooms) is constructed, typically at an off-site location. Thereafter, such room(s) are delivered to the construction site, set in place and mechanically fastened to such slab using anchoring devices.

[0014] Room(s) incorporating the apparatus of the present invention are equipped with their own electrical, HVAC, plumbing rough-ins and sheet rock walls/ceilings. In the preferred embodiment, such room(s) are designed to be totally self-contained, and are tied to a generator (typically powered by natural gas) that will automatically actuate when the building's standard source of power is lost.

[0015] The building or other dwelling is then manufactured around the room incorporating the apparatus for the present invention. Roof joists can be affixed to the steel room or wing, making such room immensely stronger and capable of withstanding higher wind loads, fire, ballistic forces and the like.

BRIEF DESCRIPTION OF THE DRAWINGS

[0016] FIG. 1 depicts an exploded perspective view of a steel structure of the present invention.

[0017] FIG. 2 depicts a perspective view of a steel structure of the present invention being delivered to a construction site.

[0018] FIG. 3 depicts a perspective view of a steel structure of the present invention being installed at a construction site.

[0019] FIG. 4 depicts a cross-sectional side view of a slab foundation for a dwelling or other building.

[0020] FIG. 5 depicts a cross-sectional cut-away view of a dwelling constructed using the apparatus of the present invention.

DETAILED DESCRIPTION OF A PREFERRED EMBODIMENT

[0021] Referring to the drawings, FIG. 1 depicts an exploded perspective view of a shell having an internal space formed by steel structure 1 of the present invention. Steel structure 1 can be fabricated in any number of different configurations. In the preferred embodiment, steel structure 1 is designed to fit the design parameters of a dwelling or other building into which such steel structure 1 is to be incorporated.

[0022] Although steel structure 1 can be configured any number of different ways, in the preferred embodiment of the present invention, said steel structure 1 has substantially horizontal planar floor 2, a plurality of side walls 3 and substantially horizontal planar ceiling 4. Said substantially horizontal planar floor 2, side walls 3 and substantially horizontal planar ceiling 4 together form an enclosure defining interior space within steel structure 1. It is to be observed that substantially horizontal planar ceiling 4 is anchored to the upper portion of side walls 3; however, said horizontal planar ceiling 4 is shown in exploded FIG. 1 to illustrate the interior space within steel structure 1.

[0023] In the preferred embodiment, steel structure 1 is initially fabricated from a tubular steel frame. Thereafter, steel plates having desired strength characteristics are welded to said frame in order to form substantially horizontal planar floor 2, vertical side walls 3 and substantially horizontal planar ceiling 4. Of course, while the preferred embodiment of the present invention describes use of steel, other materials such as composites having desired characteristics could be employed in place of steel in certain applications.

[0024] Still referring to FIG. 1, external doorway 5 is provided in at least one vertical side wall 3. Depending upon the configuration of steel structure 1, it may be desirable to incorporate more than one doorway into the design of steel structure 1, but this will typically depend on the desired layout of said steel structure 1. Doorway 5 permits access to the internal space of steel structure 1 defined by substantially planar floor 2, vertical side walls 3 and substantially horizontal planar ceiling 4. Similarly, optional window openings 6 can be fabricated into vertical side walls 3.

[0025] At least one optional internal wall 7 having internal doorway 3 can be constructed within the interior space of steel structure 1. Although such internal wall(s) are not required, said walls may be desirable to divide or configure the internal space within steel structure 1. By way of example, but not limitation, when steel structure 1 of the present invention is utilized as the master suite of a dwelling, it is typically desirable to incorporate one or more internal walls to define a master bath area, closet space and the like. Although such internal walls can be constructed of steel or other reinforcing material, in most applications this is not necessary because vertical side walls 3 of steel structure 1 provide desired strength characteristics for the entire internal space defined within steel structure.

[0026] In the preferred embodiment, reinforced case 9 is provided. Although reinforced case 9 can be situated in any number of different locations, in most applications said reinforced case is located on the upper surface of substantially

planar horizontal ceiling 4. Said reinforced case 9 can be used to house hot water heater(s), HVAC equipment and/or other life support components.

[0027] FIG. 2 depicts a perspective view of steel structure 1 of the present invention being delivered to an installation site. Although it is possible that such steel structure 1 can be manufactured at such installation site, in the preferred embodiment said steel structures is manufactured at another site, such as a remote fabrication facility, and then transported to an installation site via truck 20.

[0028] Referring to FIG. 3, steel structure 1 is off-loaded from truck 20 using crane 21. Said steel structure 1 is positioned on to building foundation slab 30 using crane 21. Specifically, steel structure 1 is positioned on a predetermined portion of building foundation slab 30 which has been designed to receive said steel structure 1. In the preferred embodiment, said building foundation slab 30 includes a plurality of anchor bolts 31 which are implanted or otherwise installed within said slab 30 and protrude vertically upward out of building foundation slab 30. Similarly, plumbing/utility stubs 32 extend upward from said building foundation slab 30.

[0029] FIG. 4 depicts a detailed cross-sectional view of building foundation slab 30. Said building foundation slab 30 has footers 33 which extend into ground 34. Said building foundation slab has upper surface 35 and recessed area 36 partially defined by upper surface 36a. Recessed area 36 is sized and configured to receive steel structure 1, which rests upon recessed upper surface 36a of building foundation slab 30. Anchor bolts 31 and plumbing/utility stubs 32 extend upward from building foundation slab 30 within recessed area 36. Said anchor bolts 31 and plumbing/utility stubs 32 are spaced to be received within mating apertures within substantially horizontal planar floor 2 of steel structure 1.

[0030] FIG. 5 depicts a cross-sectional view of a reinforced room constructed in accordance with the present invention within standard dwelling 50. Steel structure 1 of the present invention is incorporated within such dwelling 50. Steel structure 1 can be fabricated in any number of different configurations and typically comprises substantially horizontal planar floor 2, plurality of vertical side walls 3 and substantially horizontal planar ceiling 4. In the preferred embodiment, steel structure 1 is configured to fit the design parameters of dwelling 50. In many cases, the steel structure 1 will comprise and be coincident with the master suite of dwelling 50, but it is to be observed that said steel structure can be incorporated into in any number or other areas within dwelling 50.

[0031] Building foundation slab 30 has footers 33 which extend into ground 34. Said building foundation slab has upper surface 35 and recessed area 36 partially defined by upper surface 36a. Recessed area 36 is sized and configured to receive steel structure 1, which rests upon recessed upper surface 36a of building foundation slab 30. Anchor bolts 31 extend upward from building foundation slab 30 within recessed area 36. Said anchor bolts 31 are spaced to be received within mating apertures within substantially horizontal planar floor 2 of steel structure 1. Steel structure 1 is mechanically anchored to building foundation slab 30 using anchor bolts 31. Although not shown in FIG. 5, plumbing and/or utility fixtures (such as plumbing/utility stubs 32 in FIG. 4) are used to bring plumbing and/or electricity into the area(s) within steel structure 1.

[0032] Still referring to FIG. 5, external doorway 5 is provided in at least one vertical side wall 3 of steel structure 1. In FIG. 5, although said doorway 5 is situated along an external wall of steel structure 1, said doorway is located internally within dwelling 50. Depending upon the configuration of steel structure 1, it may be desirable to incorporate more than one such doorway into the design of steel structure 1, but this will typically depend on the desired layout of said steel structure 1 and dwelling 50. Doorway 5 permits access to the internal space of steel structure 1 defined by substantially planar floor 2, vertical side walls 3 and substantially horizontal planar ceiling 4 from other areas of dwelling 50. Reinforced, heat resistant door 51 is mounted within doorway 5. Similarly, windows manufactured from blast resistant glass or other similar material(s) can be installed within the window openings 6 in side walls 3 of steel structure 1.

[0033] At least one optional internal wall having an internal doorway can be constructed within the interior space of steel structure 1. Although such internal wall(s) are not required, said walls may be desirable to divide or configure the internal space within steel structure 1. By way of example, but not limitation, when steel structure 1 of the present invention is utilized as the master suite of a dwelling, it is typically desirable to incorporate one or more internal walls to define a master bath area, closet space and the like. Although such internal walls can be constructed of steel or other reinforcing material, in most applications this is not necessary because vertical side walls 3 of steel structure 1 provide desired strength characteristics for the entire internal space defined within steel structure 1.

[0034] Reinforced case 9 is provided on the upper surface of substantially planar horizontal ceiling 4 of steel structure 1. Said reinforced case 9 can be used to house generator 52, HVAC equipment 53 and/or other life support components, such as a hot water heater. Gas line 54 supplies fuel to generator 52.

[0035] After said steel structure 1 is installed on building foundation slab 30, other portions of dwelling 50 can be constructed. For example, joists 55 and truss members 56 can be used to support roof 57. Where desired, external surfaces of dwelling 50 can be equipped with desired finishes, such as brick surfaces 58. Internal surfaces of steel structure can be equipped with sheet rock 59 and flooring 60. In the preferred embodiment, steel structure 1 blends seamlessly into dwelling 50 and is not visible from the outside or inside living area of dwelling 50.

[0036] In certain applications, a room or other section of building installed in accordance with the present invention can include a positive pressure system. Such positive pressure system prevents chemical, biological or other agents from entering the living space defined by steel structure 1.

[0037] Whereas the invention is herein described with respect to a preferred embodiment, it should be realized that various changes may be made without departing from essential contributions to the art made by the teachings hereof.

What is claimed:

- 1. A reinforced structure comprising:
 - a) a foundation;
 - b) a building, having a plurality of rooms, attached to said foundation; and
 - c) a steel shell structure having an internal space and at least one opening extending into said internal space,

wherein said steel shell structure is anchored to said foundation and is substantially coincident with at least one room of said building.

2. The reinforced structure of claim 1, wherein said steel shell structure comprises a tubular steel frame.

3. The reinforced structure of claim 2, wherein said steel shell structure further comprises a plurality of steel plates attached to said tubular steel frame.

4. The reinforced structure of claim 1, further comprising at least one wall covering material on at least one internal surface of said steel shell structure.

5. The reinforced structure of claim 4, wherein said at least one wall covering material comprises sheet rock.

6. The reinforced structure of claim 1, further comprising at least one finish material to at least one external surface of said steel shell structure.

7. The reinforced structure of claim 6, wherein said at least one finish material is brick.

8. A reinforced structure comprising:

- a) a foundation;
- b) a building, having a plurality of rooms, attached to said foundation;
- c) a steel shell structure having an internal space and at least one opening extending into said internal space, wherein said steel shell structure is anchored to said foundation and is substantially coincident with at least one room of said building; and
- d) an electrical generator wired to at least one electrical outlet disposed in said steel shell structure.

9. The reinforced structure of claim 9, wherein said electrical generator is disposed within a steel case attached to said steel shell structure.

10. The reinforced structure of claim 8, wherein said electrical generator is fueled by natural gas.

11. The reinforced structure of claim 8, wherein said steel shell structure comprises a tubular steel frame.

12. The reinforced structure of claim 9, wherein said steel shell structure further comprises a plurality of steel plates attached to said tubular steel frame.

13. The reinforced structure of claim 8, further comprising at least one wall covering material on at least one internal surface of said steel shell structure.

14. The reinforced structure of claim 11, wherein said at least one wall covering material is sheet rock.

15. The reinforced structure of claim 8, further comprising at least one finish material to at least one external surface of said steel shell structure.

16. The reinforced structure of claim 13, wherein said at least one finish material is brick.

17. The reinforced structure of claim 8, wherein said steel shell structure further comprises at least one window opening.

18. The reinforced structure of claim 17, further comprising at least one window having blast resistant glass in said at least one window opening.

19. The reinforced structure of claim 8, wherein said steel shell structure further comprises at least one doorway opening.

20. The reinforced structure of claim 17, further comprising at least one reinforced door in said at least one at least one doorway opening.

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