COLLAPSIBLE ISO CONTAINER-TYPE MODULAR SHELTER

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ABSTRACT

The apparatus and method is disclosed and seek to claim exclusivity of conception of a versatile structure that follows the maritime container ISO dimensions and that is collapsible to be stored in scanty places and/or hauled together with other collapsed units, saving transportation costs. Larger surfaces may be created by simply juxtaposing one modular unit to others, side-by-side, front-to-back or stacked. In order to allow these modules to dismount in a practical manner, the inventor conceived a “Collapsibility Mechanism”, requiring minimum labor and equipment, which is based on the two frontal frames natural swing produced from hanging them by each of the two pairs of the eccentrically oblong supports. The COLLAPSIBLE ISO CONTAINER-TYPE MODULAR SHELTER also comprises original design of profiles used in the top chassis perimeter that constitute that chassis’ main structural elements, as well as prevent rain-water to flow through the unit lateral and frontal sides, as gutters do. This “Structural-Gutter” concept may fit numerous other applications in the construction industry. Governments can benefit from this invention to alleviate urgent needs to shelter people domestically and abroad. Private businesses would also find it a practical and affordable solution for many of their requests of temporary housing or mobile shelters.
COLLAPSIBLE ISO CONTAINER-TYPE MODULAR SHELTER

[0001] This application claims benefit of Provisional Application No. 60/684,362, filed on May 25, 2005.

BACKGROUND OF THE INVENTION

[0002] The present invention intends to bring innovative solutions to the classical problem of costs related to hauling temporary housing and mobile shelters to remote distances.

[0003] Those costs and logistics complications tend to be increasingly higher when transiting with bigger structures.

[0004] Convenient collapsibility should be one of the main features of such an alternative, together with modularity to create bigger surfaces, as well as ability to be hauled together with other units in an easy and economic way.

SUMMARY OF THE INVENTION

[0005] Convenient collapsibility is the main feature of a product for its innovative practical mechanism to erect/dismantle and ability to be stored in scanty spaces when not in use, and/or when being hauled in groups of several units to distant sites with substantial reductions in transportation costs.

[0006] COLLAPSIBLE ISO CONTAINER-TYPE MODULAR SHELTER was conceived to serve as human shelter. It is a finished insulated, strong, safe and durable mobile unit, compatible with the 20’ container dimensions defined by the International Organization for Standardization—ISO norm. It uses ISO Corner Casts Fittings required by maritime containers in order to enjoy the advantages of that industry, in the sense of the wide and cost effective availability of tracks equipped with Corner Cast Fittings. Erected, COLLAPSIBLE ISO CONTAINER-TYPE MODULAR SHELTER units are hauled the same way as maritime containers. Collapsed, five COLLAPSIBLE ISO CONTAINER-TYPE MODULAR SHELTER units can fit in one high cube 40-footer maritime container. Other ancillary devices largely used by maritime containers, such as clips to bond containers together side-by-side, front-to-back or stacked, are used when juxtaposing COLLAPSIBLE ISO CONTAINER-TYPE MODULAR SHELTER units to create larger surfaces.

[0007] COLLAPSIBLE ISO CONTAINER-TYPE MODULAR SHELTER is easy to erect by using most common forklifts. Its structural upper and bottom chassis, as well as its frontal sides manufacturing process, is not different from production of metallic trusses largely used in civil construction.

[0008] COLLAPSIBLE ISO CONTAINER-TYPE MODULAR SHELTER removable lateral and frontal walls enable the creation of large spaces in record time. Lateral walls consist of a set of pre-fabricated panels commonly found in markets throughout the world: light steel—expanded polyurethane—steel laminated panels with remarkable weight resistance and thermal insulation. These wall panels are boxed into each other screwless. The panels can be of different applications: window panel, door panel or blind panel. They are interchangeable to adapt to many configurations: The frontal sides can be replaceable as well, allowing vesting the COLLAPSIBLE ISO CONTAINER-TYPE MODULAR SHELTER with a “Double Door Wall” or a “Utility Wall”. When used, this Utility Wall hosts electrical items such as power inlet plug, circuit breaker box, air conditioning, satellite tracking device. Other configurations are possible, including a hydraulic wall for WC or kitchen corners. The frontal side overall frames are always constant, so all configurations have the same fit onto the Bottom and Top Chassis grooves. Expansion possibilities through bonding one COLLAPSIBLE ISO CONTAINER-TYPE MODULAR SHELTER to another in a front-to-back position require frontal sides equipped with only overall frames (no walls in between). In this case, as in the side-by-side configuration, COLLAPSIBLE ISO CONTAINER-TYPE MODULAR SHELTER units are secured together in place by clipping one Corner Cast to another. As for preventing water to leak inside the units bonded to others, the slots (channels) left empty by the absence of lateral/frontal side walls are covered with specially designed caps.

[0009] COLLAPSIBLE ISO CONTAINER-TYPE MODULAR SHELTER works as an Intelligent Portable Building when equipped with tracking devices, which allow fungible assets to be readily located. COLLAPSIBLE ISO CONTAINER-TYPE MODULAR SHELTER is thoroughly coated with a 2-inch polyurethane layer for good insulation ability and, thereby, assuring reduced internal temperature control costs. COLLAPSIBLE ISO CONTAINER-TYPE MODULAR SHELTER easy interchangeable standard lateral wall panels and frontal sides enables the creation of any floor space dimension, allowing the composition of large complexes in record time for many different applications such as health facilities, schools, construction and emergency shelters, storages, etc. This COLLAPSIBLE ISO CONTAINER-TYPE MODULAR SHELTER versatility and good finishing make it also attractive to common dwellers in search for temporary home surface increase.

BRIEF DESCRIPTION OF DRAWINGS

[0010] FIG. 1: Roof View.
[0012] FIG. 3: Front View.
[0013] FIG. 4: Back View.
[0015] FIG. 6 shows the Collapsibility Mechanism with the unit in its three main phases: erected, in process of collapsing and dismantored.
[0016] FIG. 7: Overall Frontal Frame of the Front Side.
[0017] FIG. 8: Double-Door.
[0019] FIG. 10: Utility Wall.
[0020] FIG. 11 is a top view of the Bottom Chassis, revealing its main structural elements.
[0021] FIG. 12: is a bottom view of the Top Chassis, revealing its main structural elements, and particularly the Structural—Gutter (9 and 12).
[0022] FIG. 13 shows the layout schematic of Electrical Installation of the Door Lateral Side.
FIG. 14 shows the layout schematic of Electrical Installation of the Ceiling.

FIG. 15 shows the layout schematic of Electrical Installation of the Door Opposed Lateral Side.

FIG. 16 shows the layout schematic of Electrical Installation of the Utility Wall.

FIG. 17 shows the Lateral Side Arrangement of the Door Lateral Side of the COLLAPSIBLE ISO CONTAINER-TYPE MODULAR SHELTER Stand-Alone unit, including the screwless panel locking systems.

FIG. 18 shows the Lateral Side Arrangement of the Door Opposed Lateral Side of the COLLAPSIBLE ISO CONTAINER-TYPE MODULAR SHELTER Stand-Alone unit, including the screwless panel locking systems.

FIG. 19 shows details of the Lateral Door Frame, including its screwless panel locking system.

FIG. 20 shows details of the Lateral Door.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

The main structural components, as well as other covering sets (roof, laminated lateral walls, frontal walls) of the COLLAPSIBLE ISO CONTAINER-TYPE MODULAR SHELTER are made of steel, while floor with wood over steel cross bars. Alternatively, all those covering elements may be built with molded plastics.

FIG. 1 through FIG. 5 show the several views of the COLLAPSIBLE ISO CONTAINER-TYPE MODULAR unit. External dimensions of the Stand-Alone unit follow ISO (International Standard Organization), while internal dimensions reflect thickness of insulated walls and ceiling. Collapsed, the unit height is such that, together with other four units, fit in a 40' maritime container. The Stand-Alone module contains a double-door at one front side and a utility panel at the back side.

<table>
<thead>
<tr>
<th>External Dimensions (ISO)</th>
<th>Internal Dimensions</th>
<th>Collapsed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Length</td>
<td>Width</td>
<td>Height</td>
</tr>
<tr>
<td>19'10&quot;</td>
<td>8'</td>
<td>8'6&quot;</td>
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Collapsibility Mechanism, Front Side and Back Side

FIG. 6 through 10 refer to the conception of the collapsibility system and its main elements at the front and back sides that swing and slide through the lateral bottom rail with the help of 4 supports with wheels (42 and 43), shown in FIG. 6. As shown in FIG. 7, the Front Side comprise: U shape Column posts (15), and overall cross profiles (18 and 19). FIG. 8 shows the double door with frame (22 and 23) welded to a set of calendered steel sheets (24). It is equipped with a heavy duty container-type rubber gasket set (26), and heavy duty hinges and internal pulling/locking system. The Back Side, as shown in FIG. 9, includes the same overall frame presented in the Front Side (FIG. 1).}

U shape Column posts (15), and overall cross profiles (18 and 19). FIG. 10 shows that the center part of the Back Side of the Stand-Alone unit includes calendered steel sheets (31 and 31 B) welded together by a central rectangular tube (36), pad eyes for hoisting (27), and with a set of L profiles to support polyurethane filling and internal cladding (32 A, #2 B, 33, and 34). Electric conduits, circuit breaker box support (35) and hydraulic pipes are installed inside this Back Side, as well as the A/C, on a cut produced on 31 B. Alternatively, this cut is used for a upper small window for kitchen/bathroom corners.

Bottom Chassis

FIG. 11 shows a top view of the Bottom Chassis and its components: rectangular tubes (1 and 2) welded to each other (keeping a camber to compensate “belly” trend of lateral sides) and to 4 bottom steel Corner Casts Fittings (to fit maritime conventional container truck transportation and bonding), to U profiles (6) designed to host the lateral wall panels, and to bent front/rear cross profiles (8). Other elements include: cross members (4 and 5); water resistant plywood flooring (21) covered with PVC flooring; forklift tunnels (3); corner fixations (29) of the swingable posts welded to the Corner Cast Fittings.

Top Chassis and Electrical Installation

FIG. 12 through 16 refer to the Top Chassis and respective Electrical Installation. FIG. 12 shows a bottom view of the Top Chassis and its components: the frontal and lateral “Structural—Gutters” (9 and 12) welded to each other (keeping a camber to compensate “belly” trend of lateral sides) and to 4 top steel Corner Cast Fittings, as well as to U profiles (13 and 17) that work as grooves of the lateral wall panels and the Frontal Sides Overall Frames. Other elements include: L Roof Cross members (14) to reinforce the calendered and cambered roof panel (11), totally welded to the Structural-Gutters to prevent water leaks; pad eyes for hoisting (27); half corner fixations of the swingable frontal frames (29) welded to the Corner Cast Fittings.

FIG. 13 through 16 shows layouts of electrical system, including conduit paths, light switch, hardware outlets, lightings and ceiling outlets for removable connections used to energize removable walls and to energize other juxtaposed modular units. All units may be equipped with separate circuits for different voltages and amperages; and lighting sets. For illustration the drawings show the modular unit equipped with three sets of lightings for 2x4" lamp tubes each. FIG. 13 and FIG. 15 show layout on Lateral Sides, while FIG. 14 shows layout on Top Chassis, and FIG. 16 shows layout on Back Side.

Lateral Side Arrangement and Lateral Door and Frame

FIG. 17 and FIG. 18 regard the arrangement of the Lateral Sides and details of the locking system, on both the lateral door side (FIG. 17) as well as the opposite side (FIG. 18), while FIG. 19 details the lateral door frame and FIG. 20, the door. Overall, the Lateral Sides include a set of laminated steel—polyurethane—steel panels (37). One of the panels is the lateral door panel (37 A and 37 B) mounted with removable jamb set and respective screwless lock bar (51, 51A, 52, 53 A and 53 B). The opposite lateral side is equipped with one removable panel closing set (54 A and 54 B).
C) and respective screwless lock bar (54 B). In the Stand-Alone standard modular unit, as shown in Drawing #7/9, two other panels are window panels, mounted inside a set of internal (45) and external (44) frames. However, the conception of the COLLAPSIBLE ISO CONTAINER-TYPE MODULAR SHELTER is such that any configuration is possible by using any combination of blind-panels, window-panels, one door-panel, as described above. Juxtaposing one modular unit with others side-by-side will imply the dismissal of the entire lateral sides of both units at that juxtaposed sides.

What is claimed is: The erectable, COLLAPSIBLE ISO CONTAINER-TYPE MODULAR SHELTER, having:

1. a Collapsible Mechanism comprising two swingable overall frontal frames detachable from grooves used for mounted position, and hanging on its respective pair of eccentric oblongs during the erection or dismounting procedures and removable sets of wheeled supports to facilitate the frontal frames sliding along channel type profiles that are elements of the bottom structure and also the bottom part, that work together with the upper channel that is a structural element of the top chassis to form the pair of grooves that host the removable laminated insulated panels that box to each other to form the lateral sides of the unit and are equipped with profiles that lock, screwlessly, the lateral wall system, or alternatively that host floor and ceiling caps covering the slots of two channels left empty by the absence of walls when two COLLAPSIBLE ISO CONTAINER-TYPE MODULAR SHELTER units are juxtaposed side-by-side to each other forming a double floor plan area, and other slots consecutively, every time more area is added by continuously juxtaposing other units to form larger areas, clipped together through the lower and top extremities of the units equipped with ISO maritime container-type corners allowing hauling a stand-alone erected COLLAPSIBLE ISO CONTAINER-TYPE MODULAR SHELTER unit as it was a maritime container, or bonding together groups of five dismounted units put in top of each other forming a block of five layers of bottom chassis/frontal frames/top chassis, each one oriented by a set of four of male-female corners, of which the top male elements are the oblong holders of the frontal frames, that are used when erecting or dismounting the unit, and all of them are the supports of embedment of the four columns that are also the vertical elements of the frontal frames that support the top chassis when the unit is erected; the frames are equipped with division walls, double-doors or utility walls that support air conditioning and power supply elements and/or hydraulic system when that part of the floor plan is destined to have a corner WC or kitchen, or the frames are only frames, with no face coverings, when two units are juxtaposed front-to-back in the search of creating more floor plan area; the electrical system copes with the ability of dismounting the COLLAPSIBLE ISO CONTAINER-TYPE MODULAR SHELTER through the sets of removable connections from the ceiling conduit ring to the walls equipped with switch or outlets, as well as to other juxtaposed units not directly power supplied.

2. a system of Structural Guttering that besides being the main structural element of the top chassis, also prevent rain water to flow through the COLLAPSIBLE ISO CONTAINER-TYPE MODULAR SHELTER lateral and frontal sides, orienting that flow to go through the extremity corners of the unit, as a gutter does to roofs, and shaped as the “G” letter allowing the utilization of caps covering the edge of the two “Gs” juxtaposed one to the mirror of the other preventing water to flow between to units bonded side-by-side.

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