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(54) **Title:** MODULAR IMPERMANENT HOUSING SYSTEM

(57) **Abstract:** The present invention provides at short notice a fast-and-easy-assemble *modular impermanent housing system*, which is an immediate response to the human need for basic emergency shelter. The system is divided into five major divisions: the main structural framing system, sub-framing system, fenestration system, utility system and the architectural finishing system. The main focus is the main structural framing system which comprises pre-cut, pre- engineered and pre-fabricated building components starting from the concrete footingl; connected to the steel cylindrical pedestal pipe (2,3); followed by a cube-connector (4); and then the first batch of the plurality of steel beams (5) and brackets (6) system; succeeded by the steel cylindrical pipe ρost (7,8); the second batch of steel beams (10) and bracket (11) system follows next; and lastly is the roof framing holder plate (12). An adjustable cube-connector (9) will serve as the x-factor that makes the present invention a modular impermanent housing system adaptable to sloping or any kind of site terrain.

# MODULAR IMPERMANENT HOUSING SYSTEM

## FIELD OF THE INVENTION

The present invention relates to a *building system for housing* and in particular, *modular impermanent housing* which is an immediate response to the human need for basic emergency shelter. More particularly, as the term *impermanent* is defined in the thesaurus, the present invention relates to the terms such as adaptable, adjustable, alterable, changeable, easy-assemble, easy-disassemble, expandable, extendable, flexible, kaleidoscopic, many-sided, metamorphic, mobile, modifiable, movable, transferable, upgradeable and variable which are all features of the present invention and are all giving the future shelter occupants the opportunity to maximize its potentials and the greatest options for personalization, personal contact and personal control of their house.

## BACKGROUND OF THE INVENTION

The number of people living out their days in the squalid areas is almost a billion. The backlog in housing locally is almost 5 million. It is quite clear that despite good efforts, authorities will have a hard time to keep up with the demand especially if they will continue to keep *permanent housing* as their sole solution for the global problem.

After the onslaught of either natural or man-made disasters, emergency shelters or immediate *impermanent housing* systems are urgently needed. The usual move of the authority is to transfer the victims to temporary evacuation centers such as school buildings, churches, multi-purpose halls or campsites. But the evacuees cannot stay there for long and the authorities do not have an immediate solution to shelter the homeless victims for them to start a new life.

In most incidents of killer floods in the past, water level only reaches not more than the first-storey of the houses. It seldom happened that it reaches the second floor level. Evidently, most people are found staying atop the roof of their bungalow shacks during the calamity - because they do not want to leave their home. They are only forced to leave because they cannot withstand the harsh weather outside. But if only they are securely covered and safe in an elevated area, even if their ground floor is already submerged by flood, they will not abandon their house. They treasure their property that gives them too much sentimental value. They wish that their house had the ability to float during flood.

Accidentally, temporary or *informal impermanent housing* are unnoticeably provided during emergency period. Materials used are only those immediately available within the area. But this type of old, used and easy to deteriorate, un-sanitary materials is not decent enough to provide shelter for the catastrophe casualties to regain their lost dignity.

Almost all housing projects or developers offer permanent housing that is still not that easy to afford. That is why it is also not easy to immediately provide shelter for the homeless. Permanent housing takes a lot of time to build and requires the service of skilled artisans and professional technical people for its execution. Sometimes, it even involves complex methodology process of erection or assembly and it requires heavy equipment and power tools that are complicated to the common people. Even where the work quality in permanent housing is acceptable, there is a strong element of rejection because the occupants feel that the house design is forced on them.

Permanent housing, by being physically permanent or fixed, neglects to consider the growth of its occupants. Even if the occupants only start as a small family, time will come that the family will grow in size and grow in life status. Also by being pre-designed to be fixed, permanent housing models are not originally adaptable to sloping terrains. It tends to use precious fertile flat farmlands instead of plentiful infertile rock slopes or hillsides.

Houses as of this period only relates to automobile thru the motor homes. Even long time ago, automobiles are already been treated like a house but never it had happened that a house treated to become like an automobile. Houses that like an automobile will have its model changed and that can be upgraded for a later version each year; or it can be accessorized, modified, changed parts and upgraded like a computer with after-market genuine parts by soon to be enthusiasts; or it can have winch for steady anchorage; or it can be custom-built, a classic, or a soon to be vintage model; or it will be out in the market with different colors and editions like sports or limited editions or futuristic versions; or it can be all power or fully automated with security features and alarm; or it can have its own electrical system that can be solar powered, battery powered or engine powered; or it can have its own built in appliances and furniture that can be covered with different fabrics like leather; or it can be an entry for trade shows and exhibits; or it can be bought through installment terms, with insurance packages and can be sold easily through deeds of sale; or it can be manufactured as a whole self-running complete package unit in big volume and can be exported in other countries; or it can also give prestige to its owner. The present invention is also potential of these innovative features.

Accordingly, it is an object of the present invention to provide a new and improved building system for impermanent housing, which overcomes the aforesaid problems as well as to maximize its potentials for more innovative features. Specifically, it is within the scope of the present invention to provide new and improved pre-cut, pre-fabricated and pre-engineered building components and accessories needed for the proper execution of the modular impermanent housing system.

It is an important object of the present invention to provide at short notice an affordable fast and easy-assemble basic building system that can immediately shelter disaster victims in any area and in any terrain. Moreover, this basic

modular impermanent building system can be easily disassembled, relocated or transferred, upgraded or can be granted to its occupants for transfer of ownership and converted into permanent structures in the future.

It is also an object of the present invention to provide a building system that will involve the common people who will occupy the structures for its construction -- equipped only with their rudimentary building skills and simple tools, they can easily erect their own shelter and can voluntarily help for the construction of their neighbor's shelter, thus, encouraging a spirit of heroic community volunteerism.

It is further an object of the present invention to provide its future occupants a sense of dignity, belongingness, privacy, control and pride as a result of their own creativity by giving them freedom thru the present invention to continue enhancing, upgrading, personalizing and maximizing the potential of their basic shelter in many original ways that can reflect their own personalities, aesthetic concerns and preferences of styles and that can fit their culture, lifestyle and predetermined family structure and size.

It is a consequential object of the present invention to provide a genuine meaning and interpretation of the term "modular" in impermanent housing system wherein the present invention's basic modular house unit will be the basic module unit and the additional other modules are the adjunct module units, not just the material parts of the house like pre-fab-wall claddings. Moreover, it is an object of the present invention to provide a modular system wherein multiple options are permissible for the basic modular house unit, such as *multi-unit* or the multiple vertical attachments of additional adjunct module units on every side of the basic modular house unit (fig.1A) and *multi-level* or the variable horizontal attachments of additional adjunct module units to the basic modular house unit (fig.1C).

As a still further object, the present invention is designed to complementarily use and support other readily available products and systems in the market that are mostly compatible with its own building components and system.

Again, as a still further object, the present invention is also designed to become a structure that can give features exactly like that of an automobile; features like that of a computer; can float like a boat during flood (fig.6); can be used as a basic unit for intelligent or smart houses, plug-in houses, solar-energy powered houses; a structure that can be used not only as a house but as different types of structures like school buildings, health clinics, churches, or any type it is capable of (fig.4); and a structure that will give its occupants a special kind of experience and prestige of owning one.

## SUMMARY OF THE INVENTION

In accordance with the principles of the present invention, a new and improved building system with new and improved building system components and accessories is provided as modular impermanent housing system (fig.6). More particularly, it will be a system divided into five (5) different divisions which includes pre-fabricated and pre-engineered framing and finishing systems with components and connection fittings that will enable modular impermanent housing system to become the quick solution for emergency situations and to address the backlog problem in housing.

The 8 divisions of the invention shall include: I ) the *main structural framing system*, which includes (in a set of four) first, a pre-engineered (pre-eng), pre-fabricated (pre-fab) reinforced concrete footing **1** with built-in anchor bolts and a sloped top surface for drainage system (fig.8); second, a pre-eng and pre-fab structural steel cylindrical pipe column pedestal **3** that is welded with steel plate at the bottom and top end **2** and can be welded with a cubed plate connector **4** (fig.9); third, the cubed plate connector **4** which is composed of five equal-sized plates welded together to form a cube, open at the top portion with pre-punched holes to accommodate the connector bolts that will pass through it (fig.10); fourth, the first of plurality of batch of pre-eng and pre-fab beam and bracket system for the floor framing using special steel beam sections **5** (fig.11) welded with steel plates at both ends with pre-punched holes for bolt connections and special steel bracket section **6**, welded with angled plate, welded on its web end on both ends also with pre-punched holes for bolts accommodation (fig.12); fifth, a pre-eng and pre-fab structural steel cylindrical pipe column post **7** that is welded with steel plate at the bottom and top end and can also be welded with a cubed plate connector **8** (fig.13); sixth, the adjustable cubed plate connector **9** which is composed of a combination of welded plates symmetrical divided into two which will form a cube when formed together, sandwiching the column **7**, also with pre-punched holes to accommodate the connector bolts that will pass through it (fig.14); seventh, the second batch of pre-eng and pre-fab beam and bracket system for the roof beam framing using special steel beam sections **10** welded with steel plates at both ends with pre-punched holes for bolt connections (fig.11) and special steel bracket section **11**, welded with angled plate welded on its web end on both ends also with pre-punched holes for bolts accommodation (fig.12); and eight, the pre-eng and pre-fab rafter holder **12** or the square steel plate welded with two identical plates that will hold the roofing rafters (fig.15). Only secondary but still an integral part of the present invention, II ) the *sub-framing enclosure system*, which includes first, the special floor and framing system, that can use either wooden boards or planks or steel plate flooring framed with steel sections or pre-fab concrete slab or concrete on steel decking; second, exterior wall and framing system, that can either use boards walling framed with steel sections or any pre-fab wall panels or the conventional CHB's; third, the interior wall and framing system, that can either use boards walling framed with steel sections or any pre-fab wall panels or also the conventional CHB's; fourth, the roof and framing system, that can use steel or wooden framing for its rafters and purlins and any contemporary roofing materials even the indigenous; and fifth, the ceiling and framing system, that can use any board

even indigenous materials on steel framing or metal furring. Also secondary but still an integral part of the present invention, III ) the *fenestration system*, which includes first, the doors, that can use steel, wood or plastic or any existing product available in the market; second, the windows, that can use a new and specially designed type of window (fig.18) that best fit the design of the present invention as a whole or any existing product available in the market; and third, the louver vents that is made either of steel or metal, aluminum or plastic (PVC). Also secondary but still an integral part of the present invention, IV ) the *utility system,* which includes first, the plumbing lines and fixture for the water supply and drainage system; second, the electrical lines and fixture, and third, the auxiliary lines and fixture. Last but not the least, also secondary but still an integral part of the present invention, V ) the *architectural and finishing system,* which includes pre-fab stairs, balcony/canopy, painting, special wall and floor finishes, built-in closets, nook counters, bed, sofa and other furniture and exterior and interior design and decorations that will include accessories like the winch (fig.19) and the hook and eye (fig.20) which will serve as an emergency anchorage to keep the structure firm on the ground especially during calamities.

Consequently, the first division or the main structural system, as the most important part and focus of the present invention being a strong basic structural easy-to-assemble modular system, can use any temporary material available during emergency situations like calamities or catastrophes and can be solely used to provide instant affordable impermanent shelter for the homeless. In addition, with its adjustable system (fig.5), it can easily adapt with any terrain or geographical condition so it can be erected even on un-fertile sloping hillsides and not on flat fertile lands.

Furthermore, since the present invention is more affordable than most low-cost housing available, it will be easier for the authorities to provide housing for the homeless and cope up with the rapidly increasing backlog in housing. Still furthermore, the present invention is not limited for low-cost housing only because it has the potential to be upgraded like a computer, or into a floating house (fig.6) in times of killer floods to save lives and save properties, or it can be modified like an automobile that it can be accessorized and personalized – truly a means to bridge the gap between the rich and the poor.

Also in accordance with the principles of the present invention, a spirit of heroic community volunteerism is a deemed result of the artistically and philanthropically designed system. Through the type of its simple method of assembly or construction, it allows to involve any common people in the community and encourage them to participate in its erection thus saving labor cost and the need of skilled artisans and technical professionals. In fact, the basic unit can be completely assembled within a day, easily. It is a house that has the potential to grow in accordance with its occupant's growth, whether in size or in life's progress. And since it allows space for its occupants to personalize and maximize the potentials of their unit, it will be a house that also helps them develop and maximize their own potentials and a house that is really acceptable to them, not forced.

## BRIEF DESCRIPTION OF THE DRAWINGS

Further objects, features, principles and advantages of the present invention will become apparent upon the consideration of the following detailed description of presently preferred embodiments when taken in conjunction with the accompanying drawing, wherein:

FIGURE 1A-1D is a top plan view and cross sectional views of the deemed genuine meaning and interpretation of the term "modular" in impermanent modular housing system;

FIGURE 2A–2G are series of cross-sectional view illustrations showing the multi-level options of the present invention;

FIGURE 3A – 3C are top plan views of the different housing options or the different types of housing commonly offered in the real estate business that the present invention is capable of;

FIGURE 4A – 4C are top plan views of the examples of different types of structures besides from a house the present invention is capable of;

FIGURE 5A to 5B is a cross sectional view to manifest the adaptability of the present invention to various irregular and sloping terrains and to evince the system behind it of how it is possible;

FIGURE 6 are cross sectional views that apparently demonstrates the potential of the present invention to survive in calamities especially killer floods;

FIGURE 7A to 7C is a top plan view, a cross sectional view, and an isometric view, in particular order, of the main structural framing system of the present invention;

FIGURE 8 is a multi-view: plan, section and isometric view of the pre-fab foundation **1** showing its details as also an invention within the invention;

FIGURE 9 is a multi-view of the pre-fab structural steel cylindrical pipe column pedestal **3,2** showing its details as also an invention within the invention;

FIGURE 10 is a multi-view of the pre-fab welded cubed plate connector **4** showing its details as also an invention within the invention;

FIGURE 11 is a multi-view of the pre-fab special steel beam sections **5,10** showing its details as also an invention within the invention;

FIGURE 12 is a multi-view of the pre-fab special steel bracket section **6,11** showing its details as also an invention within the invention;

FIGURE 13 is a multi-view of the pre-fab structural steel cylindrical pipe column post **7,8** showing its details as also an invention within the invention;

FIGURE 14 is a multi-view of the pre-fab adjustable cubed plate connector **9** showing its details as also an invention within the invention;

FIGURE 15 is a multi-view of the pre-fab rafter holder **12** showing its details as also an invention within the invention;

FIGURE 16 is an exploded isometric view illustrating in sequence the procedure of erecting the system showing the connections of each building component as well as their available options.

FIGURE 17 is a perspective view of the pre-fabricated cantilevered beam**55** for balconies and corridors with the pre-fabricated balcony railing**56**;

FIGURE 18 is a perspective view of the specially designed type of window fenestration fit for the architectural character of the present invention;

FIGURE 19 is a perspective view of an example of an accessory of the present invention resembling a winch;

FIGURE 20 is a perspective view of another example of an accessory of the present invention resembling a hook and eye;

FIGURE 21 is a perspective view of the specially designed pre-fab toilet and bath floor slab fit for the modular plan of the present invention;

FIGURE 22 is a perspective view of the specially designed pre-fab kitchen counter slab fit for the modular plan of the present invention;

FIGURE 23 is a perspective view of the specially designed pre-fab dining nook counter fit for the modular plan of the present invention;

FIGURE 24 is a perspective view of the specially designed pre-fab modular closet and cabinet fit for the modular plan of the present invention;

FIGURE 25 is a perspective view of the specially designed pre-fab stairs and railing fit for the modular plan of the present invention;

## DETAILED DESCRIPTION OF ILLUSTRATIVE EMBODIMENTS OF THE INVENTION

### First Embodiment

Referring to FIGURE 1, the meaning of the term "modular" in *modular impermanent housing system* is simply interpreted by the principles of the present invention. FIGURES 1A and 1B shows the multi-unit feature of the present invention. The basic modular unit **13** can be attached by physically similar adjunct modular units **14** on every face: front, rear, left and right side, for expansion to address the need for growth of its occupants. The basic modular unit **13** that stands independently as a complete house is shown attached by adjunct modular units **14,** which are also units that can independently stand as a complete house. FIG. 1C shows the multi-level feature of the present invention meaning adjunct modular units **14** can be attached to the basic modular unit **13** on either top or bottom face of the cube structure. The multi-unit and multi-level feature and capability of the present invention is apparently shown in FIG. 1D proving that the present invention truly represents not only the development in impermanent housing system but also the genuine modular housing system.

FIGURE 2 is a series of illustrations showing the multi-level options of the present invention. A bungalow or a single storey basic modular unit **13** is shown attached with pre-fabricated modular roofing **16** in FIG.2A. In FIG.2B, a modular loft **15** is added atop the basic modular unit **13** to make it a one-storey house with loft. A full adjunct modular unit **14** is added atop the basic modular unit **13** is shown in FIG.2C and the house metamorphosed into a two-storey shelter. If a modular loft **15** will be added atop the two-storey shelter, it will be transformed into a two-storey with attic residence as shown in FIG.2E. FIG.2F demonstrate that if there are 2 adjunct modular units **14** placed atop the basic modular unit **13,** the house will become a three-storey high abode. Meanwhile, a two-storey with roof deck**44** is displayed in FIG.2G evidently justifying the flexibility of the present invention. This diversity of stacking system being modular in principle will not be possible without the application of the main framing system of the present invention.

Attributing to FIGURE 3, the different types of housing commonly offered in the real estate business is exhibited. The present invention is well planned conforming to the Building Code and to the strict restrictions of any subdivisions. FIG.3A evince a single-detached basic modular unit **13.** If adjunct modular unit **14** will be added at the side of the basic modular unit **13,** a duplex unit is composed. But if the basic modular unit **13** is attached in the property line without any adjunct modular unit **14** attached along its side, a single-attached unit is manifested. And if adjunct modular units **14** are attached at both sides of the basic modular unit **13,** double-attached unit is provided. Attaching adjunct modular unit **14** at the rear of the basic modular unit **13** meanwhile accommodates the plan for future expansion of the occupants. This modular features of the present invention with its considered modular unit

dimensions limitations proclaims that it complies with every necessary general codes and restrictions giving no problem to its occupants and making it a hassle-free indication in purchasing their new house.

The present invention as shown in FIGURE 4 is not only good for residential purposes but with other building used in a typical village, subdivision or community as well. FIG.4A reveal a basic modular unit **13**, attached with adjunct modular units **14** on its front, rear and both sides and a cross pattern is formed suggesting a structure best for a chapel. A letter "H" is formed in FIG.4B suggesting the structure to become a health clinic. The present invention can also be built to function as a community hall, park gazebo, clubhouse, commercial center, livelihood center, school or youth center as shown in FIG.4C. But it does not necessarily require that each building use shall be the form of its first letter like in the illustrations shown, it can be simply be a row of units or a complex with single detached units. What matters most is that the present invention exhibited few of the many possibilities that can be built out of it for almost every different building use possible making it truly a multi-use invention.

To manifest the adaptability of the present invention to various irregular and sloping terrains and to evince the system behind it of how it is possible, FIGURE 5 displays sample illustrations. FIG.5A is an illustration of a sample section of a sloping terrain, specifically a mountain and a hill, exhibited with different examples of structures capable of the system of the present invention. As earlier stated, it is better to utilize un-fertile sloping land than flat fertile field for housing especially in housing projects wherein the land is only given to the recipients for free. Besides, the structures look more exciting giving more selection of interesting views to its occupants compared to views obstructed with other houses in a flat site type of housing. In FIG.5B, the adjustable connector **9** apparently reveals the solution for the system. It can be attached anywhere along the shaft of the structural pipe column **7** giving it a wide selection of height preference so that the structure can be adjusted to the existing site terrain. Pre-fab cantilevered beam **55** with pre-fab balcony railing **56** is also exhibited in the illustration as it is also shown in the illustrations in FIG.5A as view deck extensions of the modular structures or as a corridor in row housing. This feature of the present invention added extra options and benefits for the occupants of the structure.

Second Embodiment

FIGURE 6 apparently demonstrates the potential of the present invention to survive in calamities especially killer floods and save not only properties but also more importantly, lives. FIG.6A is showing a one-storey house submerged in a flood and also showing the limited option for its occupant to stay atop its roof for safety. In FIG.6B, a house on stilt or a two-storey shelter is shown demonstrating that it is safer if the house has an elevated area where the occupants can go safely. Say the house is situated near the riverbanks; what if the flood level submerged even the second floor? Houses with attic can still survive the flood thus, still not forcing the occupants to leave their home as shown in FIG.6C. Think a worse scenario; say the flood level submerged even the two-storey with attic residence,

what will be the occupant's solution? The present invention provides a solution through its boathouse capability, evidently displayed in FIG.6D. The modular loft **15** or the attic is optionally designed with a feature to float in flood like a boat but anchored by adjustable chains connected directly to the main framing system particularly the footing of the structure so that it will stay within the boundaries of its property line. The optional boat assembly structure shall double as a perimeter canopy if not in use thus not sacrificing the aesthetic façade of the house. Again, think the worst this time; what if due to La Niña, the flood level really reaches the unthinkable? FIG.6E evince the solution of the present invention for this extra ordinary situation by providing an option to quick-release the chain from attachment to enable the modular loft **15** to freely float and find a high dry land. The present invention is a clear solution for housing especially in locations prone to flood or near water bodies to simply adapt with it and not to immediately force the occupants to egress and abandon their treasured properties. Again, the present invention is not only designed to save properties but also more importantly, lives.

Third Embodiment

The modular impermanent housing system's building components and assembly method are apparently shown in FIGURES 7 to 16. Starting from FIG.7A, the floor plan of the present invention is revealed. Clearly, the size and dimension of the basic modular unit is the 3-meter beam length module. But a 6-meter beam length module or other lengths are also available to accommodate bigger requirement of areas. Noticeable in the plan are the pre-fab brackets **6**. They are not only brackets to keep the cubed structure perpendicularly squared on all angles but it is also a solution for natural light and ventilation for the structure especially if attached with other adjunct modular units. FIG.7B displays two samples of the structure's section: the left side is a typical two-storey house section and the right side is a section showing the options for loft, attic, and parapet in roof decks. An isometric or perspective view of the typical corner of the building system with its basic building components is exhibited in FIG.7C to show the principle for its easy assembly method.

Referring to FIG.8, the pre-fabricated and pre-engineered reinforced concrete (RC) footing **1** with anchor bolts dowels for abutment is exhibited. The RC footing **1** will be made using pre-engineered reinforced steel bars and concrete as shown in FIG.8A through pre-casting using metal or stainless steel forms. The special anchor bolts dowels will be placed strictly on exact locations with the footing before curing and checked for accuracy so that it cannot cause irregularities in the plumb and perpendicularity requirements of the modular system of the present invention. A sloping top surface shown in FIG.8B is unique to the footing's form that is intended for drainage system to avoid the accumulation of stagnant water submerging the steel members that may cause corrosion. FIG.8C displays the overall perspective view of the pre-eng, pre-fab RC footing.

Attributing to FIG.9, the two types or options of column pedestals are illustrated. First, in FIG.9A is the basic pre-engineered and pre-fabricated steel cylindrical pedestal pipe **2**. It is welded with steel plate with pre-punched bolt holes on both top and bottom ends for abutments. The second option or type is the modified pre-engineered and pre-fabricated steel cylindrical pedestal pipe with cubed plate capital **3** welded on top. It is also welded with steel base plate with pre-punched bolt holes on bottom end but this time, a pre-engineered, pre-fabricated welded cubed plates **4** is welded on its top end as shown in FIG.9B.

The multi-function pre-eng, pre-fab welded cubed plate connector **4** is demonstrated in FIG.10. It is composed of steel plates with pre-punched boltholes and forming a cube but left open on its top face to accommodate abutments for other related building components as apparently shown in FIG.10A. It can accommodate related building components on all of its face: pedestal pipes **2,3** and post pipes **7,8** on either top or bottom face and steel beams **5,55** on all side faces as shown in FIG.10B and FIG.10D. In FIG.10C, the cubed connector **4** comes also with a high tensile steel coil spring option inside and on its bolts to play with the load enforced by seismic or earthquake tremors.

Illustrated in FIG.11, specifically FIG.11A is the pre-eng and pre-fab structural steel beam sections **5,10** that are initially available in 4 and 6 meters length module. The beam, as shown in FIG.11C is welded on both ends with a square steel plate also with pre-punched boltholes for abutments to adjoining cubed plate connector **4**. The steel beam may vary in section and size depending on the computed load requirements but initially, for presentation purposes, the section shown in FIG.11B shall be generally used.

FIG.12 shows the pre-eng and pre-fab structural steel beam bracket sections **6,11** that keep the overall cubed structure sturdy and perpendicularly squared on all angles. These brackets **6,11** are basically with the same section, size and specifications with the steel beam sections **5,10** because they are usually coming from the left-over cut out materials from the beam **5,10**. These brackets **6,11** are welded in its web angled plate bracket connectors on both ends also with boltholes for abutment to the adjoining beams **5,10** for connection.

Drawn in FIG.13 are the two types or options of column posts **7,8**. Initially, in FIG.13A is the basic pre-engineered and pre-fabricated steel cylindrical column-post pipe **7**. It is welded with steel plate with pre-punched bolt holes on both top and bottom ends for abutments. The second option or type is the modified pre-engineered and pre-fabricated steel cylindrical column-post pipe with cubed plate capital **8** welded on top. It is also welded with steel base plate with pre-punched bolt holes on bottom end but this time, a pre-engineered, pre-fabricated welded cubed plates **4** is welded on its top end as shown in FIG.13B.

The pre-eng, pre-fab adjustable welded cubed plate connector **9** is demonstrated in FIG.14 and in FIG.5. It is composed of steel plates with pre-punched bolt holes and forming a cube but left open on its top or bottom face to

accommodate servicing for the abutments of other related building components as apparently shown in FIG.14A and FIG.14B. It is designed to connect to post pipes **7,8** in any portion within the shaft to accommodate sloping site terrains as shown in FIG.14C and FIG.5.

Last on the main framing system's building components is the pre-fab rafter holder **12** as displayed in FIG.15. The component, as shown in FIGS. 15A, 15B,15C, is a square steel base plate welded with two pre-cut steel plates with pre-punched boltholes designed to carry the roof framing system of the structure specifically the steel rafters for ensured direct to main-framing sturdy connection.

Apparent in FIG.16 is the simple sequence or the step-by-step procedure of erecting the system in an isometric view showing the connections of each building component as well as their available options. For the main framing system, STEP1: dig four holes and place the four footings **1** that will be positioned in a square plan pattern around 4 meters (or 6 meters) apart from each other for the simple building layout; STEP 2: the pedestals **2** will be attached to the footings **1** by fitting the holes of the pedestal's **2** base plate to the anchor bolt dowels of the footing **1** and locked by nuts using a simple adjustable wrench; STEP 3: Connect the beams **5** by nuts and bolts into the welded connector **4** capitals of the pedestals **2**; STEP 4: Fasten the brackets **6** into the four inside corners again by nuts and bolts to form a perfectly squared plan; STEP 5: Put over the capital connector **4** of the pedestals **2** the posts **7** with pre-welded capital connector **4** by nuts and bolts; STEP 6: Once again, connect the succeeding batch of beams **10** to the column **7** thru its pre-welded capital connector **4**; STEP 7: Fix the succeeding batch of brackets **11** to the inside corners of the beams **10**; STEP 8: Lastly, crown the rafter-holder plate **12** atop the connector **4** of the posts **7** and the structure is ready as an emergency impermanent basic shelter that can be dressed with temporary covering materials such as canvass, or is now ready to proceed to be installed by the sub-framing system and other system divisions of the present invention.

For the sub-framing system, generally by principle, STEP 1: Install the roof framing system and install the roofing materials and accessories; STEP 2: Install the floor framing system and the flooring materials and accessories together with the pre-fab T&B flooring; STEP 3: Install the exterior wall framing system and the wall panels and the pre-fab kitchen counter; STEP 4: Install the interior wall framing and the wall panels; STEP 5: and lastly, install the ceiling framing system and the ceiling panels. For the fenestration system, STEP 1: Install the pre-fab windows (FIG.18), hardware and accessories; STEP 2: Install the doors, hardware and accessories; STEP 3: Install the louver vents, if it is a part of the chosen model design. Proceed to the utility system, STEP 1: Install plumbing lines and fixtures; STEP 2: Install electrical lines and fixture; STEP 3: Install auxiliary lines and fixture, if any. Last but not the least, the architectural and finishing system; STEP 1: Paint-finish the structure; STEP 2: Install the pre-fab dining nook counter; STEP 3: Install the pre-fab bed; STEP 4: Install the pre-fab closet; Step 5 Install the pre-fab sofa. Finally, the unit is basically finished and ready for occupancy. The whole process can be done only within few hours.

I claim:

1. A modular impermanent housing system which includes a plurality of pre-cut, pre-engineered, pre-fabricated building system and building components and accessories, which is divided into five major divisions, comprising of: *the main structural framing system*, means for the basic framing and components of the modular unit**13** and adjunct modular units**14** as well as the modular loft**15** which includes, but not limited to: the footing**1**, the pedestals and parapets**2,3**, the cube-connector**4**, the adjustable cube-connector**9**, the beams**5,10**, the brackets**6,11**, and the roof-framing holder plate**12**; *the sub-framing enclosure system*, means for the enclosure of the structure which includes, but not limited to: the roofing and roof-framing system, the flooring and floor-framing system, the exterior wall and wall-framing system, the interior wall and wall-framing system, and the ceiling and ceiling-framing system; *the fenestration system*, means for access and egress, natural light and ventilation which includes, but not limited to: the modular doors, modular windows and modular louver vent slats; *the utility system*, means for provision of pre-computed electrical power, communication, and water supply and drainage system which includes, but not limited to: packaged modular plug-in electrical system, power, light and auxiliary fixtures and accessories, and packaged plug-in water supply and drainage system complete with fixtures and accessories; the *architectural finishing system*, means for finishing, furnishing, accessorizing, exterior and interior decorating the unit which includes, but not limited to: pre-fab modular balcony and canopy, pre-fab modular stairs and railing, pre-fab modular T&B floor, pre-fab modular kitchen counter, pre-fab modular dining nook counter, pre-fab modular cabinets and closets, built-in modular sofa and bed, built-in modular furniture, the pre-fab floating boat canopy, pre-fab attachable winch and pre-fab hook and eye both are for emergency anchorage of the unit to the ground.
2. A modular impermanent housing system in accordance with claim **1**, wherein from its modular building system and building components will be created a basic modular unit**13**, almost resembling the form of a cube, and which stands independently as means for a basic complete house, that can still be attached by identical adjunct modular units**14** means for expansion, on all of its sides or faces means for enabling the basic modular unit**13** transformed into multi-units when added by adjunct modular units**14** horizontally and means for multi-level when added by adjunct modular units**14** vertically, thus will create a means for diversity of options, which comprises: *the horizontal growth or multi-unit options*, means for single-detached, single-attached, duplex, double-attached or the row houses and the rear expansions; the *vertical growth or the multi-level options*, means for bungalow or one-storey, one-storey half-elevated by stilts, one-

storey with loft, one-storey with roof deck, split-level, two-storey, two-storey full-elevated by stilts, two-storey with attic, two-storey with roof deck, three-storey and so on; the *combined horizontal and vertical growth*, means for townhouses, tenements, medium-rise condominium, big residential, resort, commercial, institutional, religious buildings, and so on.

3. A modular impermanent housing system in accordance with claim **2**, wherein the basic modular unit**13** can be constructed initially as a basic easy-to-afford one-storey impermanent bungalow, but is means for growth wherein upgrade of materials is practically allowed through the system, and means for expansion wherein the structure is readily allowed, like means for extensions by attaching adjunct modular unit**14** horizontally to the basic modular unit**13,** or means for additions by adding adjunct modular units**14** atop the basic modular unit**13** which can be done by only adding necessary compatible pre-designed, pre-engineered, pre-fabricated building components of the invention and raising the whole roofing system, designed without damaging the basic structure during the process, that can be easily executed by ordinary people like its occupants or with the help of their neighbors that makes the present invention's system the system designed as means for growth and means for heroic community volunteerism spirit.

4. A modular impermanent housing system in accordance with claim **2**, wherein houses that will be created out from its building system and building components are means for the body of the *house-on-stilts* and means for the body of the futuristic *boat-house*, a type of shelter pre-designed to adapt and survive killer floods, wherein the basic modular unit13 is pre-designed to be capable of multiple survival options, which comprises: *house- on-stilts option*, means for a one-storey house that can be elevated and easily raised by stilts or pilotis by connecting additional pedestals**2,3** or posts**7,8** to the cube connectors**4** without damaging the basic structure in executing the process, which is readily compatible for the system; *additional floor option*, means for the basic one-storey house that can be added with additional floors by raising the roof**16** and attaching atop the basic modular structure**13** the adjunct modular structures**14** or the modular loft**15**; *anchored floating boat option*, means for the modular loft**15** designed to float in flood like a boat when disconnected from the main structure, but safely anchored by steel chains**18** that will run and pass through the hollow cylindrical post**7,8,** pedestals**2,3** and cube-connector**4** directly connected to the footing**1**; *free floating boat option*, means for the floating modular loft**15** to be detached from the anchored chains**18** to freely float in the flood water and can be maneuvered to find a high, dry and safer place.

5. A modular impermanent housing system in accordance with claim **1**, wherein a house that will be created out from its building system and components is means for the body of the *auto-house*, a type of a new and futuristic structure that enable a house to be treated like the way automobiles are treated in the market with a diversity of features, which comprises: means for a house like an automobile that have a designated model and type wherein it can be upgraded and changed for a later version each coming year; means for a house like an automobile that can be accessorized, modified, changed-parts, and upgraded with after-market parts and components that will be a trend or a hobby for the soon-to-be enthusiasts and can be an entry for trade

shows and exhibits; means for a house like an automobile that have a winch accessories that can be anchored in the ground or to any more stable things in case of floods and typhoons to ensure sturdy anchorage; means for a house like an automobile that can also be custom-built to conform to the taste and style of its owner; means for a house like an automobile that will make its earlier models the future vintage and classic models that can have a higher value; means for a house like an automobile that will be out in the market with different official model colors and editions like the auto's sports edition and limited edition or futuristic model versions; means for a house like an automobile that it can be all-power or fully automated with various features like security alarm, power window, remote controlled stereo, remote controlled door locks, auto power of air-conditioner, and so on; means for a house like an automobile that have its own independent electrical power and system that can be either solar-powered, battery powered, engine or motor powered; means for a house like an automobile that have its own plug-in type appliances and built-in type furniture that can be dressed by pre-made different fabric like leather; means for a house like an automobile that can be bought through installment terms like credit cards, auto-loan, bank financing complete with different insurance packages and can be easily bought and sold only through deeds of sale; means for a house like an automobile that can be manufactured as a whole self-running complete package unit in big volume and can be exported in other countries; means for a house like an automobile that can also give prestige to its owner.

6. A modular impermanent housing system in accordance with claim **2**, wherein from its multi-level capability and through its very flexible building component the adjustable cube-connector**9** which can slide variably either up or down within the length of the post pipe**7** shaft where it is connected, it is a modular framing system that is means for adapting to any kind of irregular terrain like sloping hills and mountain and means for combination option to create a split-level type of shelter.

7. A modular impermanent housing system in accordance with claim **1**, wherein individual new and improved types of pre-cut, pre-engineered and pre-fabricated modular building components are included, which comprises: *the B³pre-found***1**, means for the reinforced concrete footing**1** that varies in length, width and height and with four to eight built-in anchor bolts dowels that varies in diameter and length and a sloped top surface from the base plate square platform towards the top edge corners of the massing which are intended for the automatic drainage system; the *B³parastilt***3**, means for the structural steel cylindrical pipe parapet half-column, which is basically 900mm and 1000mm in length and have a variable diameter between 100mm to 200mm and a special 300mm and schedules starting from 20 then up, that is welded with a square steel plate at the bottom and top end with holes on the interior area occupied by the pipe placed on its center; the *B³pedestilt***2**, means for the structural steel cylindrical pipe column pedestal, which is basically the same specifications with the *B³parastilt***3** but pre-welded with a cubed-plate connector called the *B³connector***4**; the *B³connector***4**, means for the component responsible to make the connection of the basic modular unit**13** and adjunct modular unit**14** possible and responsible to connect the *B³pedestilt***2** and the *B³parastilt***3** to the

*B³postilt***7** and *B³beams***5,10** to other *B³beams***5,10**, which is composed of five equal-sized variable thickness plates welded together to form a cube, open at the top portion to accommodate the attaching base plate of the other building components, with pre-punched holes to accommodate the connector bolts that will pass through it, and an optional high-tensile coil spring shock absorber welded inside aligned with the posts and pedestal's holes; the *B³beams***5,10**, means for the plurality of batch of beam for the floor beam framing or roof beam framing using special steel beam sections that varies in shape and size, welded with square steel plates at both ends with pre-punched holes for bolt connections to the *B³connector***4**; *B³brackets***6,11**, means for the plurality of batch of brackets connected to the four inside corners of the squared beam formation to keep it perfectly perpendicular with each other and serve as a stiffener and the responsible that makes the floor plan and external appearance looks more exciting, which is basically the same size and shape with its adjoining beams, which also serve as a tie-beam wherein the wall is erected and diagonally intersects the walls erected on the adjoining beams, with angled plate welded on its web end on both ends also with pre-punched holes for bolts accommodation and connection to the beams; the *B³postilt***7**, means for the structural steel cylindrical pipe column, which is basically 2100mm and 3000mm in length and have a variable diameter between 100mm to 200mm and a special 300mm and schedules starting from 20 then up, that is welded with a square steel plate at the bottom and top end with holes on the interior area occupied by the pipe placed on its center, which also comes in another version which means for the *B³postilt***8**, which is basically similar with the *B³postilt***7**, but with a pre-welded column capital *B³connector***4** on the top end; the *B³adconn***9**, means for the adjustable version of the *B³connector***4**, but symmetrically sliced into two, with a built-in, welded centrally, half cylindrical pipe slightly bigger than the diameter of the post it is sandwiching or accommodating, and with reinforcing stiffener crossed flanges, and also with pre-punched variable holes on the four quadrant surface of the half-pipe intended for the peg-holder to fix the *B³adconn***9** firmly to the *B³postilt***8**; and the *B³carrplate***12**, means for the square base plate with two identical perpendicularly welded plate holder, all with pre-punched bolt holes, for abutment to the top plate of either the *B³pedestilt***2**, *B³postilt***7** or *B³postilt***8**, that firmly carries the roofing for the structure.

8. A modular impermanent housing system feature in accordance with claim **7**, wherein the 45 degrees angled *B³brackets***6** created a diagonally floor planned wall and automatically provided a space on its exterior which means for an instant source of natural light and ventilation for the enclosed space especially when at least four modular units are placed side by side and back to back with each other, forming in floor plan a diamond-shape air and light well on the center, and also wherein the walls erected in the diagonal *B³brackets***6**, can be provided with windows or a slot for exhaust system.

9. A modular impermanent housing system accessories in accordance with claim **1**, particularly in the fenestration system, wherein a new and improved type of modular window is means for the created house out of the system and components of the present invention, wherein the window, a swing-up, swing-out type with special multi-slot semi-circular adjustable plate hinge on both of its upper sides connected on the angle

bar framing of the window panel attached to the steel c-section jamb, which comes with a secondary panel, a glass and angle bar framed flat bar steel grills on either horizontal or checkered pattern, as means for sun screen louver when in an open window mode, and as a security grill on a closed mode, and also comes with a tertiary panel, a mosquito screen framed with aluminum angle section, that can be closed and locked even if the window panel and the secondary panel remain to be open.

10. A modular impermanent housing system in accordance with claim **1**, wherein most of the building components of the system are practically designed to be cut and divided evenly with zero wastage on materials, as derived from the available standard commercial sizes of building materials, examples comprises: the *plates*, means for zero wastage of materials, wherein the standard commercial size of a steel plate is 1200mm x 2400mm, which when divided into 4 along the 1200mm width and divided into 8 along the 2400mm length will produce an exactly 32 pieces of 300mm x 300mm individual plates, wherein a basic modular unit for a bungalow equally requires a total of 32 pieces of 300mm x 300 mm plates; the *pipes*, also means for zero wastage of materials, wherein the standard commercial lengths of steel pipe is 6000mm, wherein a basic modular unit for a bungalow requires 4-2100mm length pipes for its *B³postilt*7 which have a total of 8400mm length of pipe, plus, the bungalow also requires 4-900mm length pipes for its *B³pedestilt*2, which have a total length of 3600mm length of pipe, that when you add the post requirement of 8400mm with the pedestal requirement of 3600mm, the total will be 12000mm length of pipe and obviously reveals that a bungalow exactly needs 2 pieces of 6000mm length pipes without wastage; the *beams*, also means for zero wastage of materials, wherein the standard commercial lengths of steel beam section is 6000mm, wherein a basic modular unit for a bungalow requires a total length of 36000mm of steel beam and bracket section that reveals that a bungalow exactly needs 6 pieces of 6000mm length of steel beam section without wastage; the *footing*, also means for zero wastage, wherein the total volume of the footing for a bungalow unit is 0.40 cubic meter, which will only require exactly 4 bags of cement, also without any wastage making the present invention really designed to be very economical.

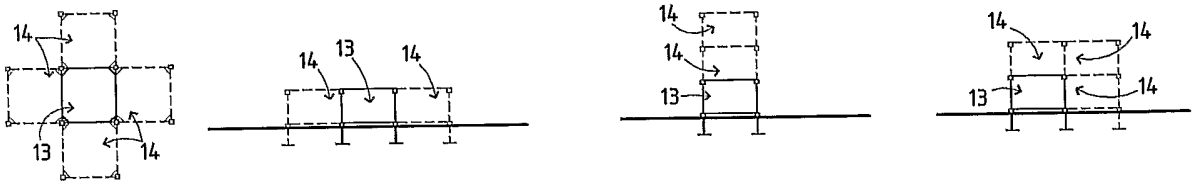


FIG.1A FIG.1B FIG.1C FIG.1D

FIGURE 1

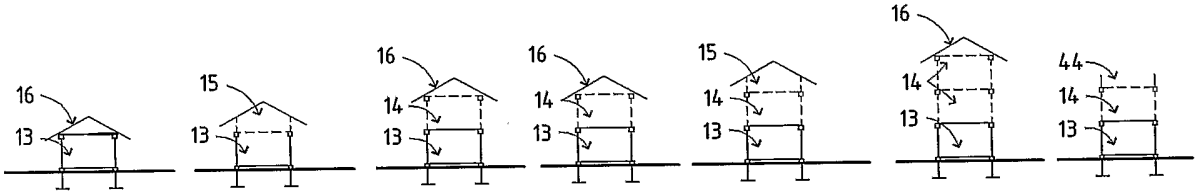


FIG.2A FIG.2B FIG.2C FIG.2D FIG.2E FIG.2F FIG.2G

FIGURE 2

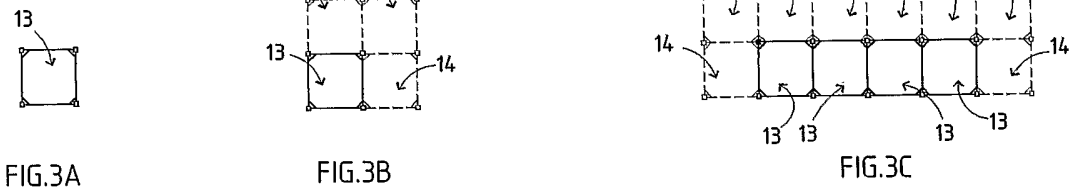


FIG.3A FIG.3B FIG.3C

FIGURE 3

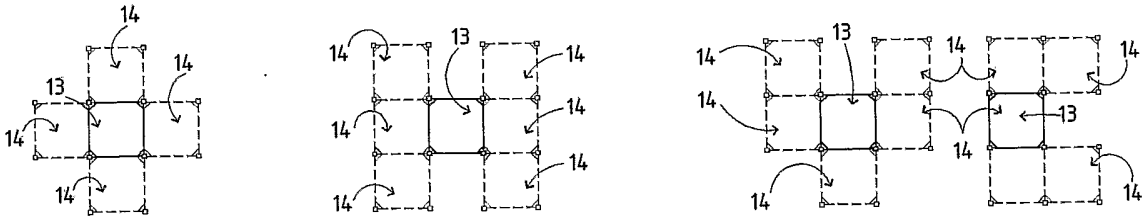


FIG.4A FIG.4B FIG.4C

FIGURE 4

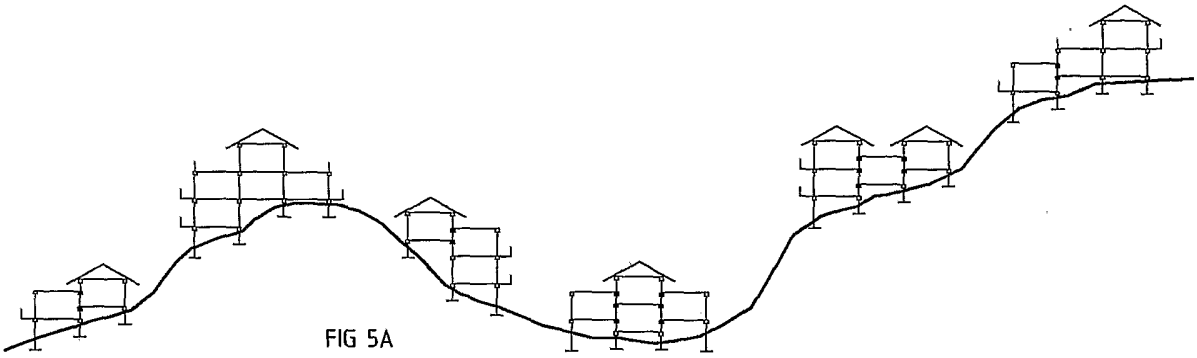

FIG 5A

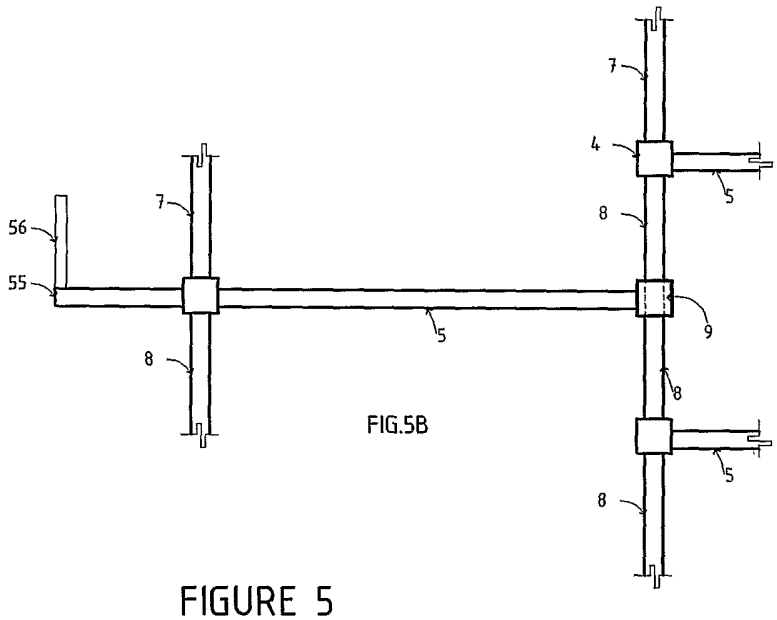


FIG.5B

FIGURE 5

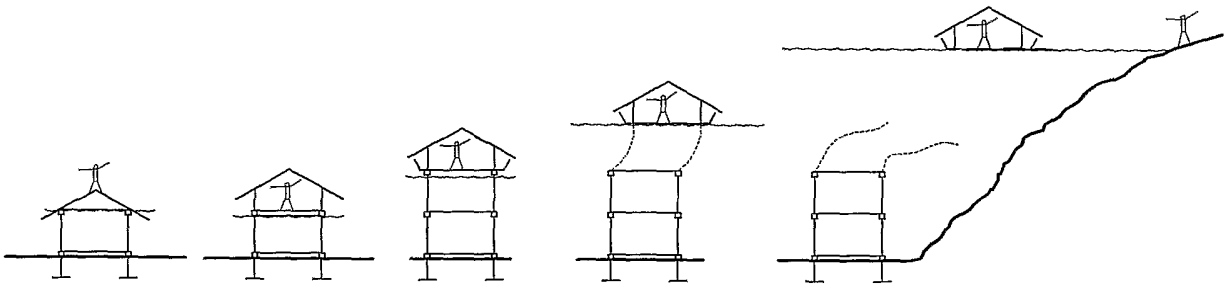

FIG.6A FIG.6B FIG.6C FIG.6D FIG.6E

FIGURE 6

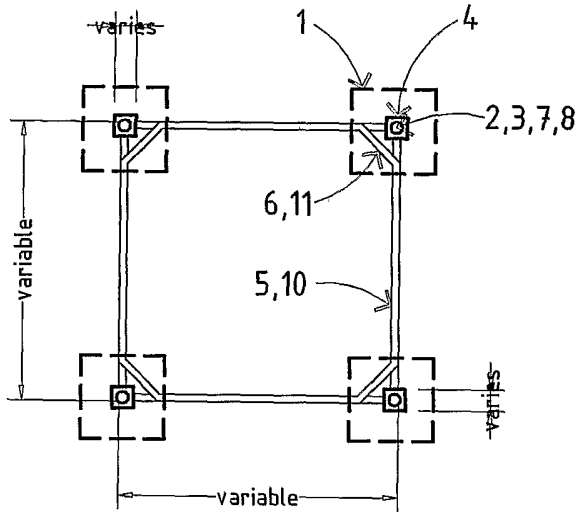


FIG.7A

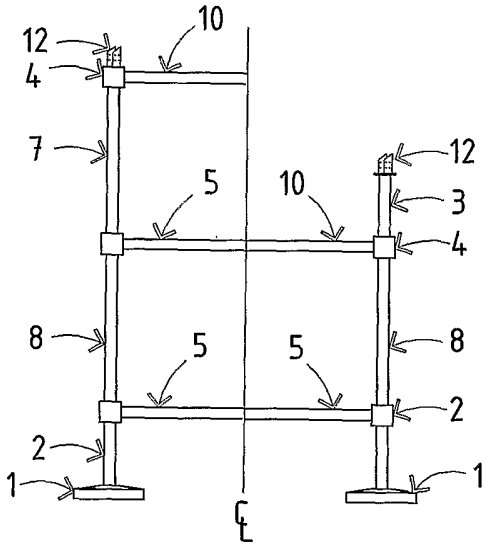


FIG.7B

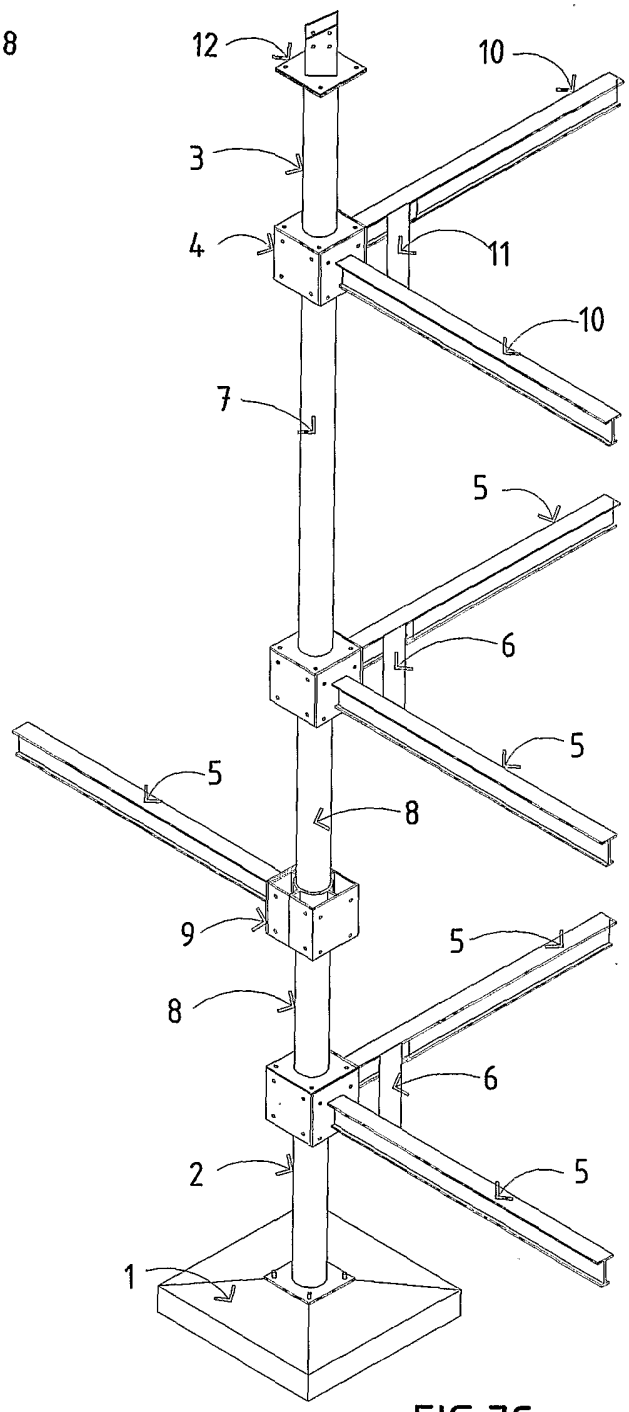


FIG.7C

FIG.7

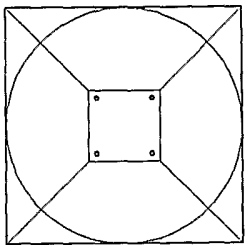

FIG.8A

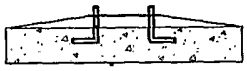

FIG.8B

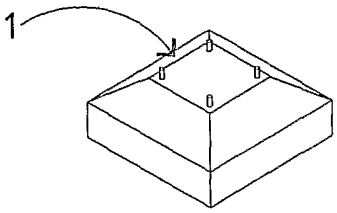


FIG.8C

FIGURE 8

FIG.9A

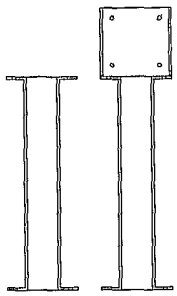

FIG.9B

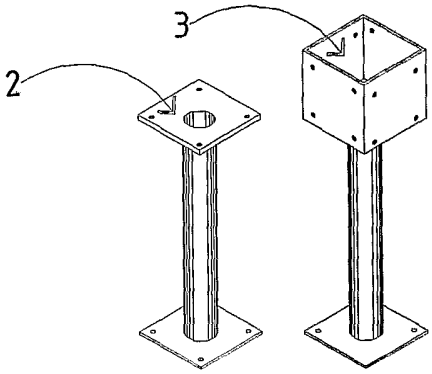


FIG.9C

FIGURE 9

FIG.10A

FIG.10B

FIG.10C

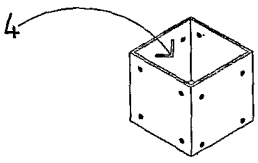


FIG.10D

FIGURE 10

FIG.11A

FIG.11B

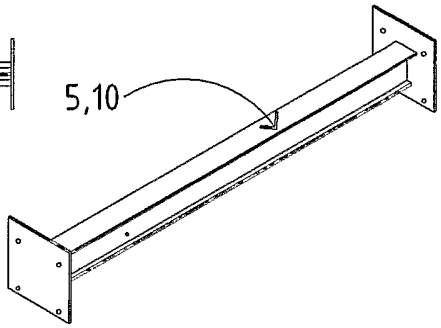


FIG.11C

FIGURE 11

FIG.12A

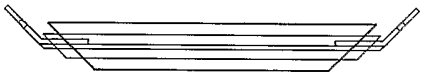

FIG.12B

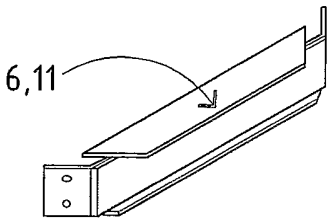


FIG.12C

FIGURE 12

FIG.13A

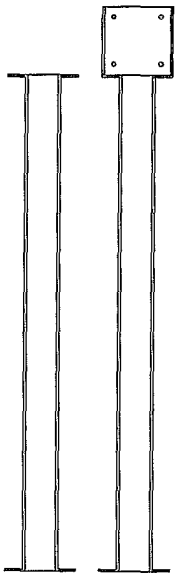

FIG.13B

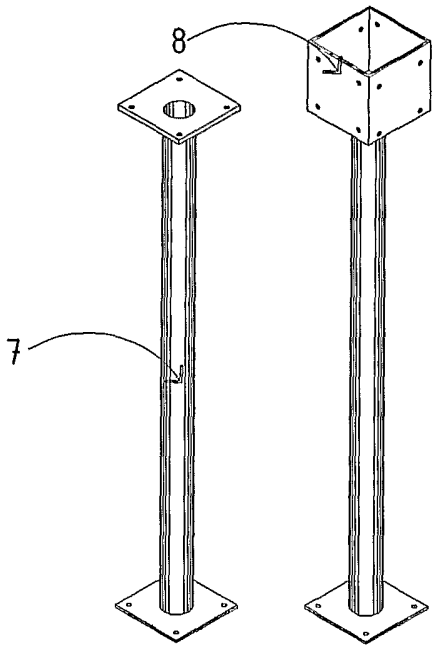


FIG.13C

FIGURE 13

FIG.14A

FIG.14B

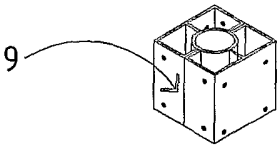


FIG.14C

FIGURE 14

FIG.15A

FIG.15B

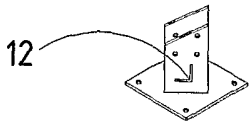


FIG.15C

FIGURE 15

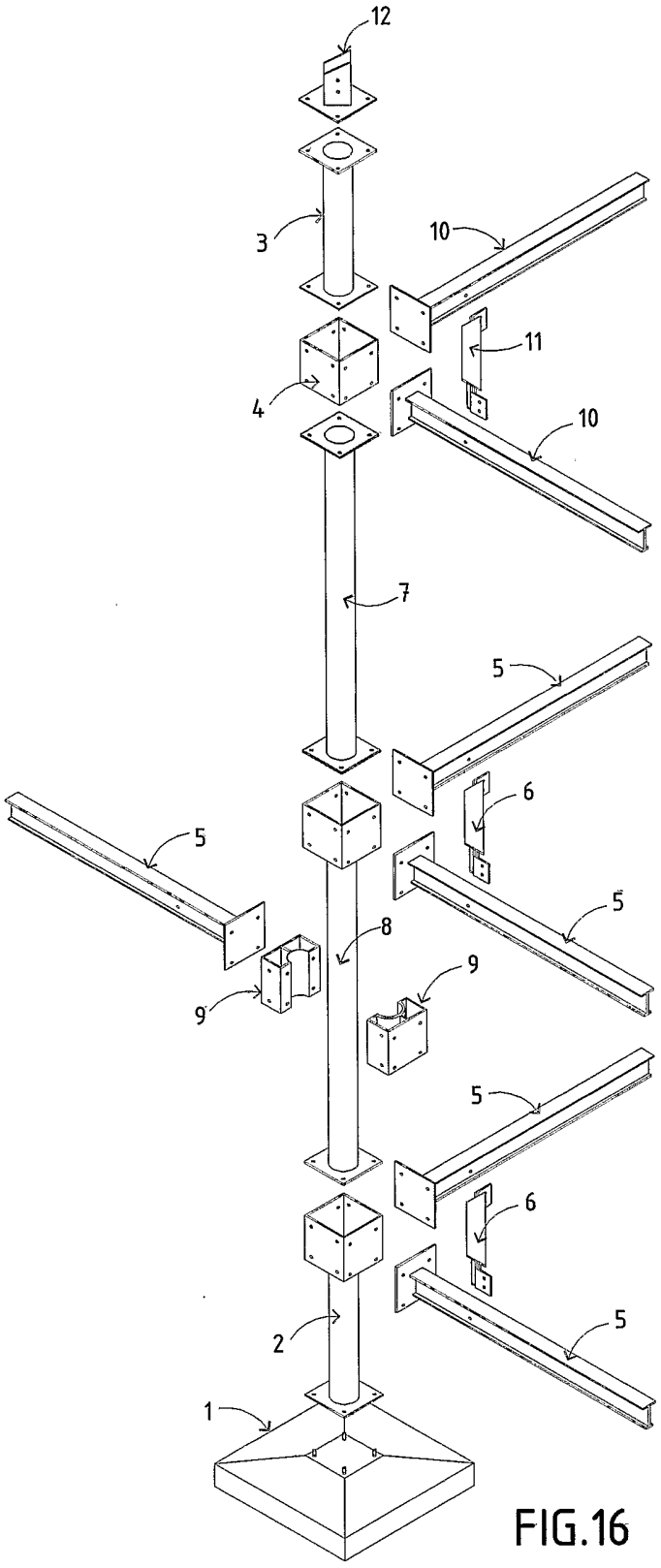


FIG.16

**Box No. VIII (v) DECLARATION: NON-PREJUDICIAL DISCLOSURES OR EXCEPTIONS TO LACK OF NOVELTY**

*The declaration must conform to the standardized wording provided for in Section 215; see Notes to Boxes Nos. VIII, VIII (i) to (v) (in general) and the specific Notes to Box No. VIII (v). If this Box is not used, this sheet should not be included in the request.*

Declaration as to non-prejudicial disclosures or exceptions to lack of novelty (Rules 4.17(v) and 51*bis*.1(a)(v)):

in relation to this international application,

PURINO, Philipp M. declares that the subject matter claimed in this international application was disclosed as follows:

(i) kind of disclosure:

(d) other: invention contest

(ii) date of disclosure:

September 30, 2005

(iii) title of disclosure:

2005 Luzon Invention Contest

(iv) place of disclosure:

Technology Application and Promotion Institute
DOST Compound, Gen. Santos Avenue
Bicutan, Taguig Metro Manila Philippines

(v) this declaration is made for the purposes of:

(a) all designations

☐ This declaration is continued on the following sheet, "Continuation of Box No. VIII (v)".

**INTERNATIONAL SEARCH REPORT**

International application No.
PCT/PH2005/000025

**A. CLASSIFICATION OF SUBJECT MATTER**

***E04H 1/12(2006.01)i***

According to International Patent Classification (IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)
IPC8 : E04H 1/12

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
KR, JP : IPC as above

Electronic data base consulted during the intertnational search (name of data base and, where practicable, search terms used)
eKIPASS(KIPO) : "boat", "emergency", "structure"

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

| Category* | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|---|---|---|
| A | US 6,286,269 B1 (G. MICHAEL MARCUM) 11 SEPTEMBER 2001<br>See Fig.7A,.7B, .8A | 1 |
| A | JP H14-85197 A (TEKIJOU MYOUSI) 26 MARCH 2002<br>See Fig.1,2 | 1 |
| A | JP H11-350760 A (SOKURI SINAE COOPERATIVE) 21 DECEMBER 1999<br>See Fig.1 | 1 |
| A | KR 88-19844 U (PARK, HO-JIN) 9 NOVEMBER 1988<br>See Fig.1 | 1 |

☐ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

* Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be of particular relevance
"E" earlier application or patent but published on or after the international filing date
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of citation or other special reason (as specified)
"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents,such combination being obvious to a person skilled in the art
"&" document member of the same patent family

| Date of the actual completion of the international search | Date of mailing of the international search report |
|---|---|
| 04 MAY 2006 (04.05.2006) | **04 MAY 2006 (04.05.2006)** |

| Name and mailing address of the ISA/KR | Authorized officer |
|---|---|
| Korean Intellectual Property Office<br>920 Dunsan-dong, Seo-gu, Daejeon 302-701,<br>Republic of Korea<br>Facsimile No. 82-42-472-7140 | CHOI, Byoung Suk<br>Telephone No. 82-42-481-5797 |

Form PCT/ISA/210 (second sheet) (April 2005)

**INTERNATIONAL SEARCH REPORT**

Information on patent family members

International application No.
PCT/PH2005/000025

| Patent document cited in search report | Publication date | Patent family member(s) | Publication date |
|---|---|---|---|
| US06286269 | 11.09.2001 | NONE | |
| JP14085197 | 26.03.2002 | NONE | |
| JP11350760 | 21.12.1999 | NONE | |
| KR2019880019844 | 29.11.1988 | KR9006854Y1 | 02.08.1990 |