(54) Title: HANGED BUILDINGS TO SAFEGUARD FROM EARTHQUAKES AND TERRORISM

(57) Abstract: Construction method for a building from top to bottom (from top floor down to lower floor) to safeguard from earthquakes and terrorism, by constructing four periphery columns, fixing two intersectional steel -wire cables on top of them, hanging from these two steel -wire cables five installation columns, a central (core) one on the intersection between the two wires, and the other four between the intersection point of the steel -wire cables and the respective periphery columns where in the installation columns are used for installing, and hanging top floor's roof beams, whereas after finishing the roof installation, the roof is to be strapped from its four corners to the four periphery columns using steel -wire cables, the next step is installing top floor's columns, then repeating these steps up to the finish level, whereas the lower floor of the finish level is rested on ground.
HANGED BUILDINGS TO SAFEGUARD FROM EARTHQUAKES AND TERRORISM

Technical Field

An innovative method for buildings construction by building from top to bottom (from top floor down to lower floor), by constructing four periphery columns, fixing two intersectional steel-wire cables on top of them, and hanging from these two wires, five installation columns, a central one on the intersection between the two wires, and a four terminal ones, where these columns will be used for installing, and hanging top floor's roof beams, after finishing roof installation, this roof to be stringed from its four corners to the four land corners' columns using steel-wire cables, the next step is installing top floor's columns, then in the same way coming down to finish level after level till finishing the lower floor, taking into consideration lower level's ground will be rested on land.

Background Art

Conventional methods of buildings construction that available now a day's depends on constructing buildings from bottom/base of the building coming up to the top of the building, which mainly based in construction using reinforced concrete bases, steel and reinforced concrete columns after soil excavation and surface preparation, by building from bottom/base level of the building level/floor by level up to the top level of the building, which means that the main fixation of the buildings is the reinforced concrete base in the land.

Disclosure of Invasion

- Technical Problem

The conventionally constructed buildings when subjected to a terrorist bombing or earthquake can lead to loosening of the soil that is installed by the bases of the building where they are exposed to sever shear forces, which occurs collapse of these bases installed by the building and thus breaks down the
building in whole or in part by the degree of destruction of these bases, leading to significant losses of life and property.

- **Solution to problem**

The idea of the innovative construction method is to rely on the construction contrary to all the conventional methods; which is building from top to bottom (i.e. from the top floor and down to the basement), where the idea is very simply to create a number four columns of steel / concrete in the four corners of the land to be building this building on it and installs on the top of these columns an intersectional two steel-wire cables, such as those used in the installation of bridges outstanding such as Salam Mubarak Bridge spanning the Suez Canal, then hanging on these two steel-wire cables a five steel columns; a central (core) construction column installed at the intersection of the two steel-wire columns and a four terminal construction columns, that will be the hanging and the installation of steel beams components for the roof of the upper floor of the building, then after the completion of installation sectors of steel components of the roof of the upper floor, this constructed roof will be stringed from its four corners with four steel-wire cables to the four corner columns surrounding the land of the building, then the columns of the top floor to be installed at lower part of the constructed top floor's roof, and so the same way down to the basement is the completion of the construction of the building so that the base of the basement anchored on the surface of the flat land.

- In case of any terrorist attack with explosive chargers on any of the four corner columns surrounding the land or the four corner columns once, leading to the collapse of one of these columns or the four columns at once, however, does not happen the collapse of the building where the weight of this building makes it rested on the surface of the land even after the collapse of these columns, where after the completion of building construction on land surface; the building doesn't depend in its standing on any of these columns or even like other conventional methods on reinforced concrete bases, and the damages will be
limited to only in the strength of the wave explosiveness and its impact on the facades of the building that are in any way with limited impact.

- As well as, when the building subjected to earthquakes, where there is severe disturbance of the land does not affect the building even if it led to the collapse of the corner columns surrounding the building land because the building is not installed by reinforced concrete bases into the land like the conventionally built buildings.

- Thus achieving the goal of this innovative method with the protection against terrorism, earthquakes, without the need for any significant increase in the cost of construction from conventional methods.

- Also this method can be used to build over water surfaces particularly in countries that suffer from a lack of land areas as Japan does.

**Brief Description of Drawings**

- **Fig. 1:** A plan view for limits of the land to be built upon
  - **Item no. 1** Steel / Reinforced concrete column

- **Fig. 2:** An isometric view on 45 degree angle for the steel / concrete columns with the steel-wire cables installed
  - **Item no. 1** Steel / Reinforced concrete column
  - **Item no. 2** Steel-wire cable

- **Fig. 3:** Elevation view for starting-construction steel columns
  - **Item no. 1** Steel beam
  - **Item no. 2** Steel end plate
  - **Item no. 3** Lifting lug steel plate

- **Fig. 4:** An isometric view on 45 degree angle for the hanging view of the starting construction columns
  - **Item no. 1** Steel Shackle
  - **Item no. 2** Central starting construction column
Item no. 3  Terminal starting construction column
Item no. 4  Steel-wire cable

- Fig. 5:   An isometric view on 45 degree angle for the upper floor's roof after completion of its assembly, hanging and stringing
Item no. 1  Steel beams of upper floor's roof
Item no. 2  Steel-wire cable

- Fig. 6:   An isometric view on 45 degree angle for the upper floor after its assembly, hanging and stringing
Item no. 1  Steel columns of upper floor
Item no. 2  Upper floor's roof
Item no. 3  Upper floor's base
Item no. 4  Steel-wire cable

- Fig. 7:   An isometric view on 45 degree angle for the building after the completion of construction, hanging and stringing

- Fig. 8:   A plan view illustrating how to build the complex, consisting of four buildings
Item no. 1  Building number 1
Item no. 2  Building number 2
Item no. 3  Building number 3
Item no. 4  Building number 4
Item no. 5-13  Peripheral columns

- Fig. 9:   A plan view illustrating how to build a large area building using large area building construction method
Item no. 1  Central starting construction column
Item no. 2-5  Terminal starting construction column
Item no. 6-9  Terminal additional starting construction column

- Fig. 10: A plan view illustrating how to build as large area building using circular reinforced concrete columns

Item no. 1  A circular cross-section reinforced concrete column
Item no. 2  Side steel-wire cable
Item no. 3  Intersectional steel-wire cables
Item no. 4  Hanged starting construction columns
Item no. 5  Side (corner) hanging steel-wire cables

- Fig. 11: An isometric view on 45 degree angle for the building after the completion of construction, hanging and stringing

- Fig. 12: A plan view illustrating how to build the complex, consisting of four buildings

Item no. 1  Building number 1
Item no. 2  Building number 2
Item no. 3  Building number 3
Item no. 4  Building number 4

- Fig. 13: A plan view illustrating how to build using this innovative method

Item no. 1  Steel / Reinforced concrete column
Item no. 2  Side steel-wire cable
Item no. 3  Intersectional steel-wire cables
Item no. 4  Hanged starting construction column
Item no. 5  Side of one the building floors
- **Fig. 14:** An isometric view on 45 degree angle for the building after the completion of construction, hanging and stringing

- **Fig. 15:** A plan view illustrating how to build the complex, consisting of four buildings

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**Industrial Applicability**

**Basic Method**

1 - Create a number of four columns of steel / concrete (fig. 1 - item no. 1) on the borders (corners) of the land intended for construction where these columns to be oriented with 45 degrees rotation from the vertical level to withstand the tension forces, and bending moments and any other forces resulting from the lift and load of the building during construction by steel-wire cables as shown in fig.1 with a plan view for limits of the land to be built upon.

2 - Installation of two steel-wire cables (fig. 2 - item no. 2), such as that used in the establishment of hanged bridges, intersectional at the highest point of the four steel / concrete corner columns (fig. 2 - item no. 1) on the borders of the land, so bear weight of the four steel columns that will be used in the installation and the hanging of the top floor's roof of the building, and also bear the weight of the roof of the upper floor of the building as shown in fig. 2 with an isometric view on 45 degree angle for the steel / concrete columns with the steel-wire cables installed.

3 - Fabrication of five (starting-construction) steel columns required for hanging the roof of the top floor and thus start the installation of the building, these columns are fabricated from steel beams (fig. 3 - item no. 1) terminated by steel end plates (fig. 3 - item no. 2) welded to it with also a welded lifting lugs to the
end plates (fig. 3 - item no.3) as shown in fig. 3 with elevation view for starting-construction steel columns.

4 - Steel Shackles (fig. 4 - item no.1) are used to hang the five construction steel-columns; the central construction column (fig. 4 - item no.2) and the other four terminal construction columns (fig. 4 - item no.3), to the intersectional steel-wire cables (fig. 4 - item no. 4) in preparation to start the installation and hanging of the upper floor's roof as shown in fig. 4 with an isometric view on 45 degree angle for the hanging view of the starting construction columns.

5 - Steel beams (fig. 5 - item no. 1) forming the roof of the upper floor to be installed by the central starting construction column which hanged from the intersection of the steel-wire cables and with also the other hanged four terminal construction columns, after the completion of assembly and tighten of upper floor's roof steel beams, the roof to be hanged and stringed from its four corners to the four corner (border) steel / concrete columns with steel-wire cables (fig. 5 - item no.2) as shown in fig. 5 with an isometric view on 45 degree angle for the upper floor's roof after completion of its assembly, hanging and stringing.

6 - Central starting construction column after its installation at the intersection of the steel-wire cables then it is now governed and thus there is no chance of it to slip on the steel-wire cables making it as the keeper of the distance between it and the terminal starting construction columns and thus preserves the spaces at the installation of the beams of upper floor's roof, also is regarded as the core of the building began with it then to every floor's central core column of the building as will be seen later.

7 - The next step is the installation of the steel columns of the upper floor (fig. 6 - item no. 1) in the lower part of upper floor's roof (fig. 6 - item no.2) then fixing the floor (base) of the upper floor to these columns (fig. 6 - item no. 3) where this floor is also the roof of the next floor from the top, then hanging and stringing the installed floor (base) with steel-wire cables (fig. 6 - item no.4) as has been done for the roof as explained in the fifth paragraph and also as shown
in fig. 6 with an isometric view on 45 degree angle for the upper floor after its assembly, hanging and stringing.

8 - Similarly as the preceding two paragraphs the rest of the building construction completed down to the basement so that the base of the building to be exactly resting on land surface as shown in fig. 7 with an isometric view on 45 degree angle for the building after the completion of construction, hanging and stringing.

9 - The cost of construction using this method became a minimum when building a group of buildings adjacent to each other as the number of at least four buildings, where they construct the same way one after the other in the form box (fig. 8 - item numbers from 1 to 4), so that requires to build these four buildings, only a number of (9) peripheral columns (fig. 8 - item numbers from 5 to 13) as shown in fig. 8 with a plan view illustrating how to build the complex, consisting of four buildings.

Additional methods:

Other innovative methods of construction according to the needs, as an example when the need of large area buildings as will be illustrated in the next additional methods:

1 - The first method: The construction of the building by central starting construction column which is installed at the intersection of the two steel-wire cables (fig. 9 - item no.1) and the four terminal starting construction column (fig. 9 - item numbers from 2 to 5) as well as four additional columns (fig. 9 - item numbers from 6 to 9), which means that building with this method by using nine starting construction column, which helps to build a large area buildings as needed as shown in fig. 9 with a plan view illustrating how to build a large area building using this method.

2 - The second method: In this method the corner columns at land boundaries to be made from reinforced concrete with a circular cross section (fig. 10 - item no.1) so that a steel-wire cables to be fixed to the columns from three sides and so that hanging a four-side steel-wire cables on the top of the four corner
columns (fig. 10 - item no.2) then hanging from these four cables, a two intersectional steel-wire cables (fig. 10 - item no.3) used for hanging the five starting construction steel columns (fig. 10 - item no.4) and also along the concrete columns length a side steel-wire cables to be installed (fig. 10 - item no.2) to fix into it the peripheral steel-wire cables (fig. 10 - item no.3) used for stringing every floor of the building in addition to hanging the building from its four corners with steel-wire cables (fig. 10 - item no.5) from the corner columns as shown in fig. 10 with a plan view illustrating how to build a large area building using circular reinforced concrete columns.

After building completion the building will be as shown in fig. 11 with an isometric view on 45 degree angle for the building after the completion of construction, hanging and stringing.

In the case of the desire to build a group of buildings adjacent to each other (fig. 12 - item numbers from 1 to 4) is that as described in fig. 12 with a plan view illustrating how to build the complex, consisting of four buildings.

3 - The third method: Create a number of four columns of steel / concrete (fig. 13 - item no.1) on the borders (corners) of the land intended for construction where these columns to be oriented with 0 degrees rotation from the vertical level and unlike the previous innovative methods, where in this method a four steel-wire cables to be stringed from the center of the sides of the corner columns (fig. 13 - item no.2) then an intersectional steel-wire cables to be hanged from the side cables (fig. 13 - item no.3) which required for hanging the five starting construction columns (fig. 13 - item no.4) and also along the corner columns length a side steel-wire cables to be installed to fix into it the peripheral steel-wire cables used for stringing and hanging every floor of the building (fig. 13 - item no.3) from the four sides of every floor (fig. 13 - item no.5) as shown in fig. 13 with a plan view illustrating how to build using this innovative method.
The building shape after construction completion is as shown in fig. 14 with an isometric view on 45 degree angle for the building after the completion of construction, hanging and stringing.

In the case of the desire to build a group of buildings (fig. 15 - item numbers from 1 to 4) adjacent to each other is that as shown in fig. 15 with a plan view illustrating how to build the complex, consisting of four buildings.

**It is clear from the above in this innovative method of building the following:**
- The building constructed by this innovative method for its fixation does not depend on reinforced concrete bases fixed in land, so when the building exposed to an earthquake or explosive charges occur loosening the soil does not lead to the collapse of the building.
- When a destruction occurs to any of the corner columns or the whole four corner columns by an earthquake or explosion also does not make any collapse of the building, where the building settled by the weight on the land surface without the occurrence of the collapse of the building, which preserves the life and property as is the purpose of this innovative method.
- This innovative method of building is by all standards a coup in the world of modern construction and will lead to changing the perception of the world, especially for leading countries in the method of securing life and property especially in the embassies and consulates, government buildings, without relying on as it exists currently for the secure in force and military equipment, which led to overheating in the race of armaments.
Claims

- **Claim 1:**
The innovative building method from top to bottom (i.e. from the top floor and down to the basement) using a central (core) starting construction column in addition to the terminal starting construction columns to become outstanding buildings for the prevention from earthquakes and terrorism, which includes four innovative building methods according to the previously discussed building details in this document at the Solution to Problem and Industrial Applicability section.

- **Claim 2:**
The four innovative construction methods by constructing four periphery columns, fixing two intersectional steel-wire cables on top of them, and hanging from these two wires, five installation columns, a central (core) one on the intersection between the two wires, and a four terminal ones, where these columns will be used for installing, and hanging top floor's roof beams, after finishing roof installation, this roof to be stringed from its four corners to the four land corners' columns using steel-wire cables, the next step is installing top floor's columns, then in the same way coming down to finish level after level till finishing the lower floor, taking into consideration lower level's ground will be rested on land.
- Claim 1:
The Prior art for hanged buildings and structures when the central structure or pylons suffered from earthquakes, terrorist attacks and tsunami waves, whole or part of the building or structure will be destroyed. Unlike the prior art this claimed method of constructing buildings safeguards from these risk, as this method of constructing hanged buildings comprising a plurality of floors and buildings complex using multi axes columns hanged from steel-wire cables which form the hanging support for the different floor levels and each floor is strapped to peripheral columns.

- Claim 2:
A method of construction according to Claim 1 wherein constructing four periphery columns, fixing two intersectional steel-wire cables on top of them, hanging from these two steel-wire cables five installation-axes columns, a central column on the intersection between the two wires, and four terminal columns, the respective five installation columns are used for installing, and hanging top floor's roof beams, whereas after finishing the roof installation, the roof is to be strapped from its four corners to the four periphery columns using steel-wire cables, the next step is installing top floor's columns, then repeating the last three steps forming the different floor levels from top to bottom, whereas the lower floor of the finish level is rested on ground, this method used for construction of single building or building complex shared in the periphery columns.

- Claim 3:
A method of construction according to Claim 2 for large area buildings using nine installation-axes columns instead of five columns hanging from the intersectional steel-wire cables in order to expand the span between hanging columns to install a large area floors.
- **Claim 4:**
A method of construction according to Claim 1 for large area buildings using four circular cross-section reinforced concrete periphery columns with 45° angle apart three steel-wire cables fixed on the top of each column forming a two intersectional steel-wire cables and other four steel-wire cables forming a rectangle around the periphery columns, then hanging another two intersectional steel-wire cables but now from the middle of the four prior steel-wire cables, where the two pairs of intersectional steel-wire cables will be used for hanging a long span nine starting construction steel columns used for hanging the building in addition to strapping each installed floor from the corners to the periphery columns and also to the four sides steel-wire cables which forming a rectangle around the periphery columns, at each floor level, the next step is installing top floor's columns, then repeating the last three steps forming the different floor levels from top to bottom, whereas the lower floor of the finish level is rested on ground, this method used for construction of single building or building complex shared in the periphery columns and the side steel-wire cables.

- **Claim 5:**
A method of construction according to Claim 4 also for large area buildings using rectangular cross-section periphery columns instead of circular cross-section also five starting construction columns instead of nine, hanged from single pair of intersectional steel-wire cables which hanged from the middle of the four sides steel-wire cables instead of two pairs of intersectional steel-wire cables, and each floor to be strapped only to the four sides steel-wire cables, this method used for construction of single building or building complex shared in the periphery columns and the side steel-wire cables.
INTERNATIONAL SEARCH REPORT

International application No
PCT/EG2011/00006

A. CLASSIFICATION OF SUBJECT MATTER

INV. E04B1/34 E04H9/02
ADD.

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)
E04B E04H

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category* Citation of document, with indication, where appropriate, of the relevant passages Relevant to claim No.

A GB 809 626 A (CORNELIUS JAN DUSSEL; JACOBUS PIETER VAN EESTEREN)
25 February 1959 (1959-02-25)
claim 1; figures 1,2
2

A US 2 622 546 A (FRITZ KRAMRISCH)
23 December 1952 (1952-12-23)
figures 1-4
2

A DE 16 09 500 AI (SUSPENDED STRUCTURES INC [US]; HENKEL G DR PHIL [DE]; HENKEL W-D DR; K) 10 September 1970 (1970-09-10)
figures 1,2,4,5,17
2

A FR 1 321 618 A (MAYMONT)
22 March 1963 (1963-03-22)
figures 5,6,13-15
2

Further documents are listed in the continuation of Box C.

* 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 document 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 another document, or any 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

"Z" document member of the same patent family

Date of the actual completion of the international search Date of mailing of the international search report
1 August 2011 28/09/2011

Name and mailing address of the ISA/
European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016

Authorized officer
Decker, Robert

Form PCT/ISA/210 (second sheet) (April 2006)
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| A        | US 3 396 502 A (JOHN CONTEVITA)  
13 August 1968 (1968-08-13)  
figures 1,12-17              | 2                   |
**INTERNATIONAL SEARCH REPORT**

**Box No. II**  Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. Claims Nos.: because they relate to subject matter not required to be searched by this Authority.

2. Claims Nos.: (completely) ; (partially) because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

   See FURTHER INFORMATION sheet PCT/ISA/210

3. Claims Nos.: because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 64(a).

**Box No. III**  Observations where unity of Invention is lacking (Continuation of Item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

1. As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.

2. As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of additional fees.

3. As only some of the required additional search fees were timely paid by the applicant, this international search report only covers claims Nos.:

4. No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

**Remark on Protest**

- The additional search fees were accompanied by the applicant’s protest and, where applicable, the payment of a protest fee.
- The additional search fees were accompanied by the applicant’s protest but the applicable protest fee was not paid within the time limit specified in the invitation.
- No protest accompanied the payment of additional search fees.
Continuation of Box II.2

Claims Nos.: 1 (completely); 2 (partially)

Claim 1 does not meet the requirements of Article 6 PCT in that the matter for which protection is sought is not clearly defined. The claim attempts to define the subject-matter with references to the description and the drawings (see claim 1, the last four lines) without mentioning any technical features of the claimed method, contrary to the Rule 6.2 PCT. Claim 2 is not clear because it is not clear at all which "four inventive methods" are claimed. The attention of the Applicant is drawn to the fact that, within one claim, just one construction method or, if alternative ways to this method are encompassed within this claim, a clear distinction between the alternative methods is to be made, e.g. by the use of the terms "and/or" in between the different method steps which characterize the method. Claims 1 and 2 contain expressions in parentheses other than reference signs. This renders the subject-matter of the claims unclear, because it is not clear if the features in parentheses do form part of the claimed subject-matter or not.

The applicant’s attention is drawn to the fact that claims relating to inventions in respect of which no international search report has been established need not be the subject of an international preliminary examination (Rule 66.1(e) PCT). The applicant is advised that the EPO policy when acting as an International Preliminary Examination Authority is normally not to carry out a preliminary examination on matter which has not been searched. This is the case irrespective of whether or not the claims are amended following receipt of the search report or during any Chapter II procedure. If the application proceeds into the regional phase before the EPO, the applicant is reminded that a search may be carried out during examination on before the EPO (see EPO Guideline C-VI, 8.2), should the problems which led to the Article 17(2) declaration be overcome.
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