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(54) **SPACE LIGHT STEEL FRAME CONCRETE BUILDING AND CONSTRUCTION METHOD THEREOF**

(57) A spatial light steel frame concrete building and a method for constructing the same are provided. The building comprises: a wall spatial light steel frame; a floor slab spatial light steel frame connected to the wall spatial light steel frame to form a building unit spatial light steel frame; and concrete poured in the building unit spatial light steel frame. The wall spatial light steel frame and the floor slab spatial light steel frame each comprise a

welded mesh reinforcement, and a plurality of trellis profile steels spaced apart from each other and each having a plurality of stretching holes. Each trellis profile steel comprises two wing edges parallel to each other and a plurality of web members between the wing edges which are integrally formed, the stretching holes are defined by the web members, and the web members and the stretching holes are formed by stretching the wing edges.

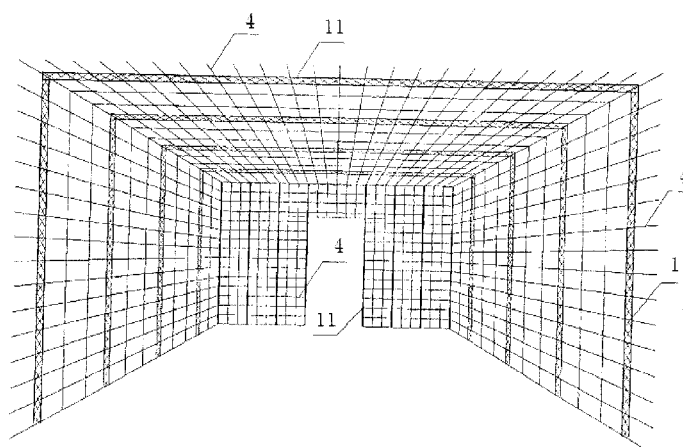


Fig. 3

Description

CROSS REFERENCE TO RELATED APPLICATION

[0001] This application claims priority and benefits of Chinese Patent Application No. 201010104259.2, filed with State Intellectual Property Office, P. R. C. on January 29, 2010, the entire content of which is incorporated herein by reference.

FIELD

[0002] Embodiments of the present disclosure generally relate to a building and a method for constructing the same, more particularly, to a spatial light steel frame concrete building and a method for constructing the same.

BACKGROUND

[0003] In the field of construction technology, a concrete structure may apply to not only a low-rise and multi-storey building, but also a high-rise building, and consequently has been widely used.

[0004] For a cast-in-situ concrete structure, reinforcing steel bars may need to be assembled in situ, and formworks may need to be mounted or removed in situ, which may cause heavy in-situ labor and long construction period.

[0005] A pre-cast reinforced concrete shear wall structure is that components are produced in a factory and assembled in situ. However, in order to solve problems of integral connection between pre-cast components and water seepage at a joint between pre-cast components, the construction cost may be high.

[0006] A Chinese Patent application (Publishing No. CN1958984A) discloses a steel mesh frame concrete composite building and a method for constructing the same, in which a cold-formed thin-walled steel is used to make a steel skeleton, and a conventional wood or steel formwork is replaced by a steel mesh. A steel mesh skeleton is made in a factory and assembled into a steel mesh frame in situ, and then concrete is cast in situ to form a concrete seismic wall structure. However, this structure still has the following defects.

[0007] Firstly, a trellis profile steel used in the steel mesh frame is a cold-formed trellis profile steel component with a thickness of 1.0mm to 4.0mm and a C-shaped, U-shaped or Z-shaped cross section, holes are formed and arranged uniformly in a web member between two wing edges parallel to each other, a reinforcing hemming is formed on a periphery of each hole, and the reinforcing hemming between two adjacent holes forms a U-shaped web member. The production process of this trellis profile steel is relatively complicated, holes need to be formed in a thin steel sheet by a punch, and then bending is performed on a cold-formed device. Depending on different porosities, based on the total weight of the trellis profile steel, the amount of scrap steel sheets

may be about 10wt% to about 15wt%, which may cause waste. Moreover, a special trellis profile steel production line may need to be constructed, which may result in high investment and high production cost.

[0008] Secondly, the steel mesh used in the steel mesh frame is a fish scale mesh formed by cold forming a galvanized steel sheet with a thickness of 0.3mm to 0.6mm, convex strip-like ribs arranged parallel to each other and spaced apart from each other by a predetermined distance are formed on the fish scale mesh, and the steel mesh is fixed on the surface of the steel skeleton by the convex portions of the strip-like ribs. The steel mesh does not play a part in structure stress, but is merely used as a formwork, which may cause high construction cost and increase the steel amount of a building. After the concrete is cast, wet plastering may also need to be performed on the surface of the steel mesh to flatten the surface of the steel mesh, thus increasing working procedures and wasting labor.

[0009] Another Chinese Patent application (Publishing No. CN101654925A) discloses a spatial solid mold truss concrete building and a method for constructing the same. However, in the method, non-removal formworks are used, and consequently may not be reused, which may increase the construction cost. In addition, because the formworks may not be removed, the density of the concrete after cast may not be detected conveniently.

SUMMARY

[0010] Embodiments of the present disclosure seek to solve at least one of the problems existing in the prior art to at least some extent. Accordingly, a spatial light steel frame concrete building is provided. The frame of the spatial light steel frame concrete building may be simple to process, the labor cost and investments on apparatuses may be reduced, and steels may be saved. Furthermore, a method for constructing the spatial light steel frame concrete building is also provided.

[0011] According to embodiments of a first broad aspect of the present disclosure, there is provided a spatial light steel frame concrete building. The spatial light steel frame concrete building comprises: a wall spatial light steel frame; a floor slab spatial light steel frame connected to the wall spatial light steel frame to form a building unit spatial light steel frame; and concrete poured in the building unit spatial light steel frame, in which each of the wall spatial light steel frame and the floor slab spatial light steel frame comprises a welded mesh reinforcement and a plurality of trellis profile steels, the plurality of trellis profile steels are spaced apart from each other and each has a plurality of stretching holes, the welded mesh reinforcement is welded to the trellis profile steels so as to connect the plurality of trellis profile steels together, each trellis profile steel comprises two wing edges parallel to each other and a plurality of web members connected between the two wing edges, the two wing edges and the plurality of web members are integrally formed, the

plurality of stretching holes are defined by the plurality of web members between the two wing edges, and the plurality of web members and the plurality of stretching holes are formed by stretching the two wing edges.

[0012] According to embodiments of a second broad aspect of the present disclosure, there is provided a method for constructing a spatial light steel frame concrete building. The method for constructing the spatial light steel frame concrete building comprises steps of:

- (1) connecting a plurality of trellis profile steels which are spaced apart from each other and each having a plurality of stretching holes together by a welded mesh reinforcement to form a wall spatial light steel frame and a floor slab spatial light steel frame respectively, in which each trellis profile steel comprises two wing edges parallel to each other and a plurality of web members connected between the two wing edges, the two wing edges and the plurality of web members are integrally formed, the plurality of stretching holes are defined by the plurality of web members between the two wing edges, and the plurality of web members and the plurality of stretching holes are formed by stretching the two wing edges;
- (2) fixing a lower end of the wall spatial light steel frame on a foundation, and connecting the wall spatial light steel frame and the floor slab spatial light steel frame together to form a building unit spatial light steel frame;
- (3) mounting removable formworks onto the building unit spatial light steel frame to form a concrete pouring chamber in the building unit spatial light steel frame; and
- (4) pouring concrete in the concrete pouring chamber and selectively removing the formworks to form an integral building unit.

[0013] With the spatial light steel frame concrete building and the method for constructing the same according to embodiments of the present disclosure, the wall spatial light steel frame and the floor slab spatial light steel frame are formed by welding the welded mesh reinforcement and the plurality of trellis profile steels each having a plurality of stretching holes respectively, such that the trellis profile steels may be simple to process, materials may be saved, and the cost, investments on production apparatuses, the time and the effort may be reduced. Moreover, the formworks may be removed to be reused, thus further reducing the cost.

[0014] Additional aspects and advantages of embodiments of present disclosure will be given in part in the following descriptions, become apparent in part from the following descriptions, or be learned from the practice of the embodiments of the present disclosure.

BRIEF DESCRIPTION OF THE DRAWINGS

[0015] These and other aspects and advantages of

embodiments of the present disclosure will become apparent and more readily appreciated from the following descriptions made with reference to the accompanying drawings, in which:

Fig. 1 is a schematic plan view of a wall spatial light steel frame of a spatial light steel frame concrete building according to an embodiment of the present disclosure;

Fig. 2 is a sectional view of the spatial light steel frame concrete building along a line A-A in Fig. 1;

Fig. 3 is a perspective view of a building unit spatial light steel frame formed by a wall spatial light steel frame and a floor slab spatial light steel frame according to an embodiment of the present disclosure;

Fig. 4 is a schematic view of a trellis profile steel having a plurality of stretching holes in a wall spatial light steel frame and a floor slab spatial light steel frame according to an embodiment of the present disclosure;

Fig. 5 is a schematic view of a welded mesh reinforcement in a wall spatial light steel frame and a floor slab spatial light steel frame according to an embodiment of the present disclosure;

Fig. 6 is a schematic perspective view of an insulation board of a spatial light steel frame concrete building according to an embodiment of the present disclosure; and

Fig. 7 is a flow chart of a method for constructing a spatial light steel frame concrete building according to an embodiment of the present disclosure.

DETAILED DESCRIPTION

[0016] Reference will be made in detail to embodiments of the present disclosure. The embodiments described herein with reference to drawings are explanatory, illustrative, and used to generally understand the present disclosure. The embodiments shall not be construed to limit the present disclosure. The same or similar elements and the elements having same or similar functions are denoted by like reference numerals throughout the descriptions.

[0017] In the specification, unless specified or limited otherwise, relative terms such as "central", "longitudinal", "lateral", "front", "rear", "right", "left", "inner", "outer", "lower", "upper", "horizontal", "vertical", "above", "below", "up", "top", "bottom" as well as derivative thereof (e.g., "horizontally", "downwardly", "upwardly", etc.) should be construed to refer to the orientation as then described or as shown in the drawings under discussion. These relative terms are for convenience of description and do not require that the present disclosure be constructed or operated in a particular orientation.

[0018] Terms concerning attachments, coupling and the like, such as "connected" and "interconnected", refer to a relationship in which structures are secured or attached to one another either directly or indirectly through

intervening structures, as well as both movable or rigid attachments or relationships, unless expressly described otherwise.

[0019] The spatial light steel frame concrete building according to an embodiment of the present disclosure will be described below with reference to the drawings.

[0020] As shown in Figs. 1-5, the spatial light steel frame concrete building according to an embodiment of the present disclosure comprises a wall spatial light steel frame 1, a floor slab spatial light steel frame 2 and concrete.

[0021] As shown in Fig. 3, the floor slab spatial light steel frame 2 is connected to the wall spatial light steel frame 1 to form a building unit spatial light steel frame. The concrete is poured in the building unit spatial light steel frame. It should be appreciated that removable formworks 3 are mounted onto the building unit spatial light steel frame before the concrete is poured, and the formworks 3 are selectively removed after the concrete is solidified, thus reusing the formworks 3.

[0022] It would be appreciated that the fact that "the formworks 3 are selectively removed after the concrete is solidified" means that whether the formworks 3 are removed may depend on requirements. For example, in one embodiment, the formwork 3 at an outer side of the wall spatial light steel frame 1 forming an outer wall of the spatial light steel frame concrete building may not be removed, but may be permanently reserved, and consequently an insulation board 8 may be attached to the formwork 3 at the outer side of the wall spatial light steel frame 1 forming the outer wall of the spatial light steel frame concrete building. That is, an insulation layer is disposed on the outer wall of the spatial light steel frame concrete building, thus enhancing the thermal insulation performance of the building. However, the formworks 3 under the floor slab spatial light steel frame 2 and the formworks 3 on the wall spatial light steel frame 1 which do not form the outer wall of the spatial light steel frame concrete building may be removed. Certainly, in another embodiment, all the formworks 3 may be removed.

[0023] Each of the wall spatial light steel frame 1 and the floor slab spatial light steel frame 2 comprises a welded mesh reinforcement 4 and a plurality of trellis profile steels 11, the plurality of trellis profile steels 11 are spaced apart from each other and each has a plurality of stretching holes 113, and the welded mesh reinforcement 4 is welded to the trellis profile steels 11 so as to connect the plurality of trellis profile steels 11 together.

[0024] Each trellis profile steel 11 comprises two wing edges 111 parallel to each other and a plurality of web members 112 connected between the two wing edges 111, the two wing edges 111 and the plurality of web members 112 are integrally formed, the plurality of stretching holes 113 are defined by the plurality of web members 112 between the two wing edges 111, and the plurality of web members 112 and the plurality of stretching holes 113 are formed by stretching the two wing edges 111.

[0025] With the spatial light steel frame concrete building according to an embodiment of the present disclosure, the wall spatial light steel frame 1 and the floor slab spatial light steel frame 2 are formed by welding the welded mesh reinforcement 4 and the plurality of trellis profile steels 11 together respectively, and the plurality of web members 112 and the plurality of stretching holes 113 are formed by stretching the two wing edges 111, such that the trellis profile steels 11 may be simple to manufacture, materials may be saved, and investments on production apparatuses, the labor cost and the construction cost may be reduced.

[0026] In some embodiments, the spatial light steel frame concrete building may be a multistorey building, as shown in Fig. 2. As an example, an eight-storey building is shown. Each storey of the spatial light steel frame concrete building is formed by one storey of integral building unit, and each integral building unit is formed by horizontally arranging one or more building units. For example, in the embodiment shown in Figs. 1-2, one integral building unit is formed by 10 building units.

[0027] Each building unit is formed by pouring the concrete in one building unit spatial light steel frame formed by one wall spatial light steel frame 1 and one floor slab spatial light steel frame 2, and a plurality of integral building units are sequentially stacked upwardly to form the multistorey spatial light steel frame concrete building, in which the wall spatial light steel frame 1 of an upper storey of integral building unit is fixed on the wall spatial light steel frame 1 of a lower storey of integral building unit adjacent thereto. For example, the wall spatial light steel frame 1 of the upper storey of integral building unit may be connected to the wall spatial light steel frame 1 of the lower storey of integral building unit adjacent thereto by a connection member. A lower end of the wall spatial light steel frame 1 of a bottom storey of integral building unit is fixed on a foundation 13. An upper end of the wall spatial light steel frame 1 of a top storey of integral building unit is connected to the floor slab spatial light steel frame 2 as a roof.

[0028] In some embodiments, the floor slab spatial light steel frame 2 may be connected to the wall spatial light steel frame 1 by welding to form the building unit spatial light steel frame. Alternatively, the floor slab spatial light steel frame 2 may be connected to the wall spatial light steel frame 1 by a connection member.

[0029] In an alternative embodiment, as mentioned above, the formwork 3 may be permanently disposed onto the outer side of the wall spatial light steel frame 1 forming the outer wall of the spatial light steel frame concrete building. In other words, after the concrete is solidified, the formwork 3 at the outer side of the wall spatial light steel frame 1 forming the outer wall of the spatial light steel frame concrete building may not be removed, and the insulation board 8 may be attached to the formwork 3, thus enhancing the thermal insulation effect of the building.

[0030] In one example, as shown in Fig. 4, for example,

each trellis profile steel 11 in the wall spatial light steel frame 1 and the floor slab spatial light steel frame 2 may be formed by using one steel sheet, forming a plurality of slits extended between the two wing edges 111 in a longitudinal direction (i.e., a left and right direction in Fig. 4) of the two wing edges 111 and then stretching the two wing edges 111 in a transversal direction (i.e., an up and down direction in Fig. 4) of the two wing edges 111, such that the plurality of web members 112 and the plurality of stretching holes 113 defined by the plurality of web members 112 are formed between the two wing edges 111. Therefore, the trellis profile steels 11 may be very simple to process, materials may be saved, and the time and the effort may be reduced.

[0031] It would be appreciated that the structure of the wall spatial light steel frame 1 is substantially the same as the structure of the floor slab spatial light steel frame 2, except that: before the concrete is poured, removable formworks 3 are mounted onto two sides of the wall spatial light steel frame 1, while removable formworks 3 are merely mounted onto a bottom surface of the floor slab spatial light steel frame 2.

[0032] In some embodiments, a window and a door of the building may be designed according to practical requirements. For this reason, a door opening and a window opening are reserved in portions of the wall spatial light steel frame 1 respectively so as to form the window and the door of the building respectively. A plurality of edge members 6 are disposed at two sides of the door opening and the window opening which are reserved in portions of the wall spatial light steel frame 1 in a horizontal direction respectively. Each edge member 6 comprises longitudinal reinforcing steel bars and horizontal stirrups or comprises vertical reinforcing steel bars, vertical profile steels and horizontal stirrups. In addition, a plurality of connection beams 7 are disposed above the door opening and the window opening. Each connection beam 7 comprises horizontal reinforcing steel bars and vertical stirrups. A stairwell opening may be previously formed in the floor slab spatial light steel frame 2 according to design requirements.

[0033] As shown in Fig. 5, the welded mesh reinforcement 4 may be formed by welding reinforcing steel bars 41 arranged horizontally and reinforcing steel bars 41 arranged vertically. The welded mesh reinforcement 4 is welded to the plurality of trellis profile steels 11, which are spaced apart from each other and each having a plurality of stretching holes 113, to form the wall spatial light steel frame 1 and the floor slab spatial light steel frame 2 respectively.

[0034] In some embodiments, the insulation board 8 disposed on the outer wall of the spatial light steel frame concrete building may be a composite insulation board. As shown in Fig. 6, the insulation board 8 comprises a polybenzene or rockwool insulation layer 801, an anti-crack mortar or board protection layer 802 and a decoration surface layer 803 from inside to outside.

[0035] The method for constructing the spatial light

steel frame concrete building according to an embodiment of the present disclosure will be described below with reference to Fig. 7. The method for constructing the spatial light steel frame concrete building according to an embodiment of the present disclosure comprises steps of:

- (1) connecting a plurality of trellis profile steels 11 which are spaced apart from each other and each having a plurality of stretching holes 113 together by a welded mesh reinforcement 4 to form a wall spatial light steel frame 1 and a floor slab spatial light steel frame 2 respectively, in which each trellis profile steel 11 comprises two wing edges 111 parallel to each other and a plurality of web members 112 connected between the two wing edges 111, the two wing edges 111 and the plurality of web members 112 are integrally formed, the plurality of stretching holes 113 are defined by the plurality of web members 112 between the two wing edges 111, and the plurality of web members 112 and the plurality of stretching holes 113 are formed by stretching the two wing edges 111;
- (2) fixing a lower end of the wall spatial light steel frame 1 on a foundation 13, and connecting the wall spatial light steel frame 1 and the floor slab spatial light steel frame 2 together to form a building unit spatial light steel frame;
- (3) mounting removable formworks 3 onto the building unit spatial light steel frame to form a concrete pouring chamber in the building unit spatial light steel frame; and
- (4) pouring concrete in the concrete pouring chamber and selectively removing the formworks 3 to form an integral building unit, in which each storey of the spatial light steel frame concrete building is formed by one storey of integral building unit.

[0036] When the spatial light steel frame concrete building is a multistorey building, steps (1) to (4) are repeated to form multiple storeys of the integral building units, in which a lower end of the wall spatial light steel frame 1 of an upper storey of integral building unit is fixed on the wall spatial light steel frame 1 of a lower storey of integral building unit adjacent thereto, for example, by a steel connection member, so as to form a multistorey spatial light steel frame concrete building. Each integral building unit may be formed by horizontally arranging one or more building units, each building unit is formed by pouring the concrete in one building unit spatial light steel frame formed by one wall spatial light steel frame 1 and one floor slab spatial light steel frame 2, and a plurality of integral building units are sequentially stacked upwardly to form the multistorey spatial light steel frame concrete building. The floor slab spatial light steel frame 2 may be connected to the wall spatial light steel frame 1 by welding or by a connection member.

[0037] As mentioned above, each trellis profile steel

11 is formed by forming a plurality of slits extended between the two wing edges 111 in a longitudinal direction of the two wing edges 111 and then stretching the two wing edges 111 in a transversal direction of the two wing edges 111.

[0038] In one embodiment, the method for constructing the spatial light steel frame concrete building further comprises: disposing an insulation board 8 on an outer wall of the spatial light steel frame concrete building, in which the formwork 3 at an outer side of the wall spatial light steel frame 1 forming the outer wall of the spatial light steel frame concrete building is permanently reserved, and the insulation board 8 is attached to the formwork 3 at the outer side of the wall spatial light steel frame 1 forming the outer wall of the spatial light steel frame concrete building.

[0039] With the method for constructing the spatial light steel frame concrete building according to an embodiment of the present disclosure, the trellis profile steels 11 forming the wall spatial light steel frame 1 and the floor slab spatial light steel frame 2 may be simple to process, materials may be saved, and the cost, investments on production apparatuses, the time and the effort may be reduced. Moreover, the formworks 3 may be removed to be reused, thus further reducing the cost.

[0040] Reference throughout this specification to "an embodiment," "some embodiments," "one embodiment," "another example," "an example," "a specific example," or "some examples," means that a particular feature, structure, material, or characteristic described in connection with the embodiment or example is included in at least one embodiment or example of the present disclosure. Thus, the appearances of the phrases such as "in some embodiments," "in one embodiment," "in an embodiment," "in another example," "in an example," "in a specific example," or "in some examples," in various places throughout this specification are not necessarily referring to the same embodiment or example of the present disclosure. Furthermore, the particular features, structures, materials, or characteristics may be combined in any suitable manner in one or more embodiments or examples.

[0041] Although explanatory embodiments have been shown and described, it would be appreciated by those skilled in the art that the above embodiments can not be construed to limit the present disclosure, and changes, alternatives, and modifications can be made in the embodiments without departing from spirit, principles and scope of the present disclosure.

Claims

1. A spatial light steel frame concrete building, comprising:

a wall spatial light steel frame;
a floor slab spatial light steel frame connected

to the wall spatial light steel frame to form a building unit spatial light steel frame; and
concrete poured in the building unit spatial light steel frame,

wherein each of the wall spatial light steel frame and the floor slab spatial light steel frame comprises a welded mesh reinforcement and a plurality of trellis profile steels, the plurality of trellis profile steels are spaced apart from each other and each has a plurality of stretching holes, the welded mesh reinforcement is welded to the trellis profile steels so as to connect the plurality of trellis profile steels together, each trellis profile steel comprises two wing edges parallel to each other and a plurality of web members connected between the two wing edges, the two wing edges and the plurality of web members are integrally formed, the plurality of stretching holes are defined by the plurality of web members between the two wing edges, and the plurality of web members and the plurality of stretching holes are formed by stretching the two wing edges.

2. The spatial light steel frame concrete building according to claim 1, wherein the spatial light steel frame concrete building is a multistorey building, each storey of the spatial light steel frame concrete building is formed by one storey of integral building unit, each integral building unit is formed by horizontally arranging one or more building units, each building unit is formed by pouring the concrete in one building unit spatial light steel frame, and a plurality of integral building units are sequentially stacked upwardly to form the multistorey spatial light steel frame concrete building, in which the wall spatial light steel frame of an upper storey of integral building unit is fixed on the wall spatial light steel frame of a lower storey of integral building unit adjacent thereto.
3. The spatial light steel frame concrete building according to claim 1, wherein the floor slab spatial light steel frame is connected to the wall spatial light steel frame by welding or by a connection member.
4. The spatial light steel frame concrete building according to claim 1, wherein a formwork is permanently disposed onto an outer side of the wall spatial light steel frame forming an outer wall of the spatial light steel frame concrete building, and an insulation board is attached to the formwork.
5. The spatial light steel frame concrete building according to claim 1, wherein each trellis profile steel is formed by forming a plurality of slits extended between the two wing edges in a longitudinal direction of the two wing edges and then stretching the two wing edges in a transversal direction of the two wing edges.

6. The spatial light steel frame concrete building according to claim 1, further comprising:

a plurality of edge members disposed at two sides of a door opening and a window opening which are reserved in portions of the wall spatial light steel frame in a horizontal direction respectively; and

a plurality of connection beams disposed above the door opening and the window opening, wherein each edge member comprises longitudinal reinforcing steel bars and horizontal stirrups or comprises vertical reinforcing steel bars, vertical profile steels and horizontal stirrups; and each connection beam comprises horizontal reinforcing steel bars and vertical stirrups.

7. A method for constructing a spatial light steel frame concrete building, comprising steps of:

(1) connecting a plurality of trellis profile steels which are spaced apart from each other and each having a plurality of stretching holes together by a welded mesh reinforcement to form a wall spatial light steel frame and a floor slab spatial light steel frame respectively, in which each trellis profile steel comprises two wing edges parallel to each other and a plurality of web members connected between the two wing edges, the two wing edges and the plurality of web members are integrally formed, the plurality of stretching holes are defined by the plurality of web members between the two wing edges, and the plurality of web members and the plurality of stretching holes are formed by stretching the two wing edges;

(2) fixing a lower end of the wall spatial light steel frame on a foundation, and connecting the wall spatial light steel frame and the floor slab spatial light steel frame together to form a building unit spatial light steel frame;

(3) mounting removable formworks onto the building unit spatial light steel frame to form a concrete pouring chamber in the building unit spatial light steel frame; and

(4) pouring concrete in the concrete pouring chamber and selectively removing the formworks to form an integral building unit.

8. The method according to claim 7, wherein each trellis profile steel is formed by forming a plurality of slits extended between the two wing edges in a longitudinal direction of the two wing edges and then stretching the two wing edges in a transversal direction of the two wing edges.

9. The method according to claim 7, wherein the floor slab spatial light steel frame is connected to the wall

spatial light steel frame by welding or by a connection member.

10. The method according to claim 7, further comprising:

repeating steps (1) to (4) to form multiple storeys of the integral building units so as to form a multistorey spatial light steel frame concrete building, wherein each storey of the spatial light steel frame concrete building is formed by one storey of integral building unit, each integral building unit is formed by horizontally arranging one or more building units, each building unit is formed by pouring the concrete in one building unit spatial light steel frame, and a plurality of integral building units are sequentially stacked upwardly to form the multistorey spatial light steel frame concrete building, in which the wall spatial light steel frame of an upper storey of integral building unit is fixed on the wall spatial light steel frame of a lower storey of integral building unit adjacent thereto.

11. The method according to claim 10, wherein the wall spatial light steel frame of the upper storey of integral building unit and the wall spatial light steel frame of the lower storey of integral building unit adjacent thereto are connected together by a steel connection member.

12. The method according to claim 7, wherein the formwork at an outer side of the wall spatial light steel frame forming an outer wall of the spatial light steel frame concrete building is permanently reserved, and an insulation board is attached to the formwork at the outer side of the wall spatial light steel frame forming the outer wall of the spatial light steel frame concrete building.

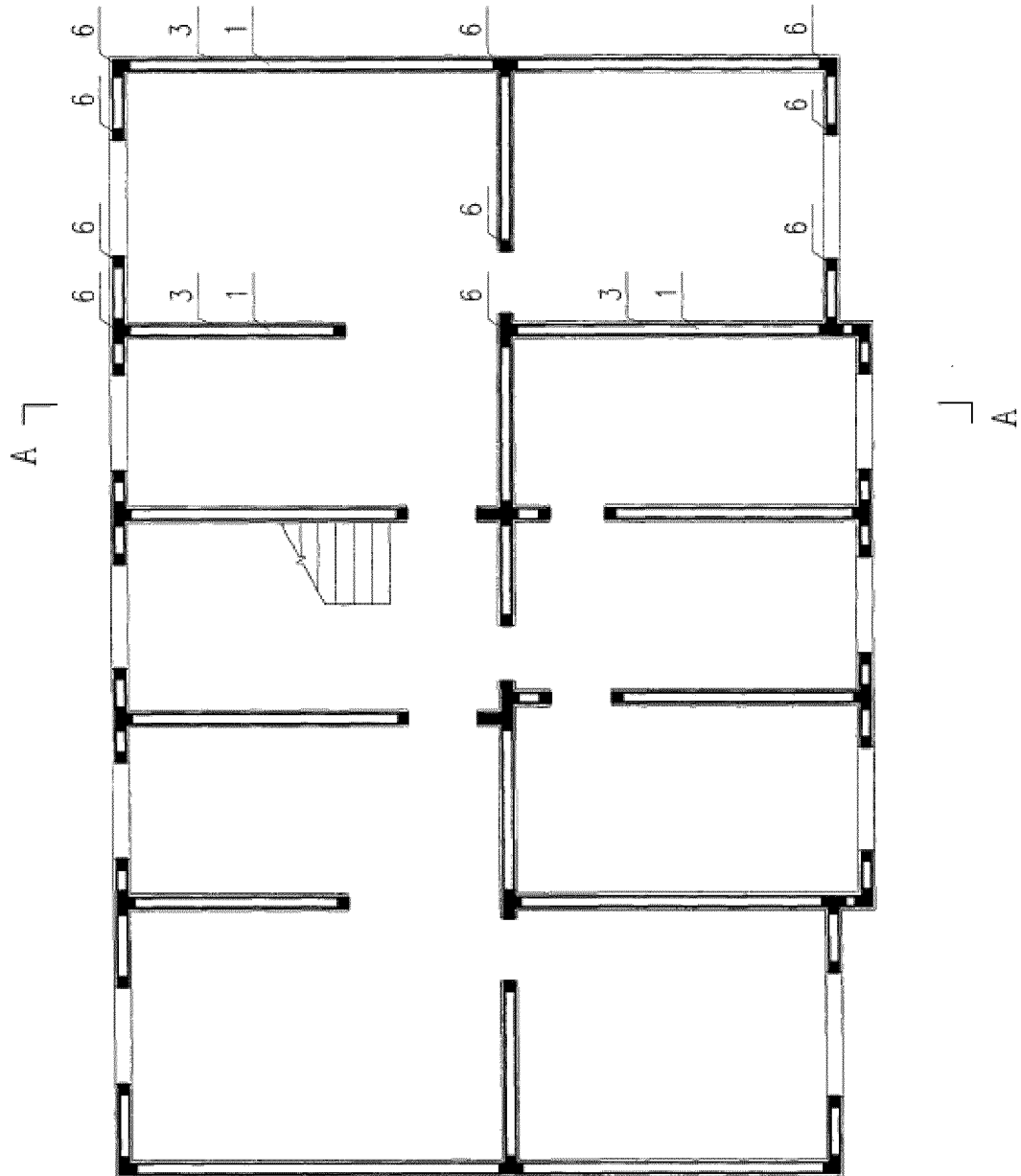


Fig. 1

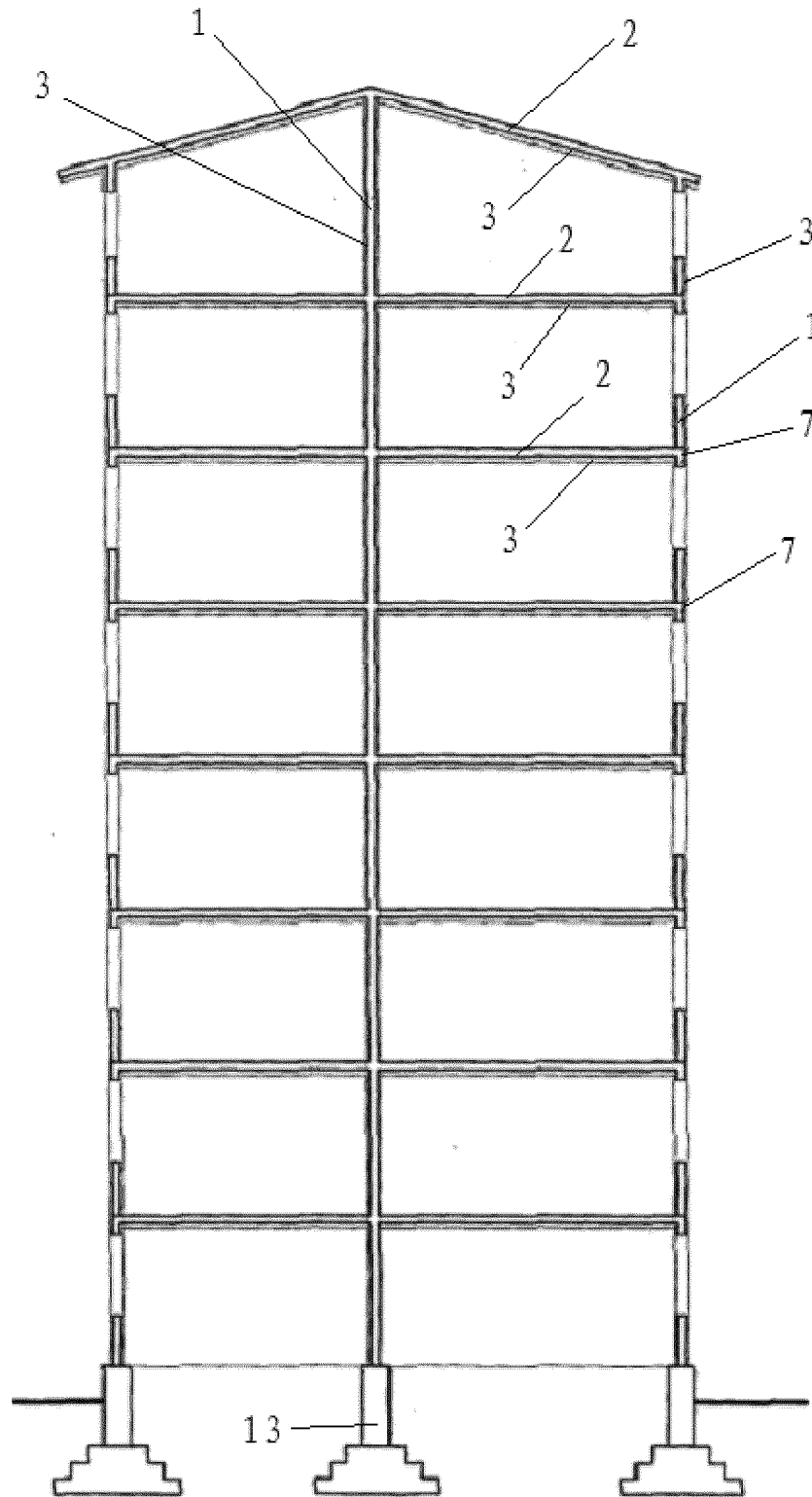


Fig. 2

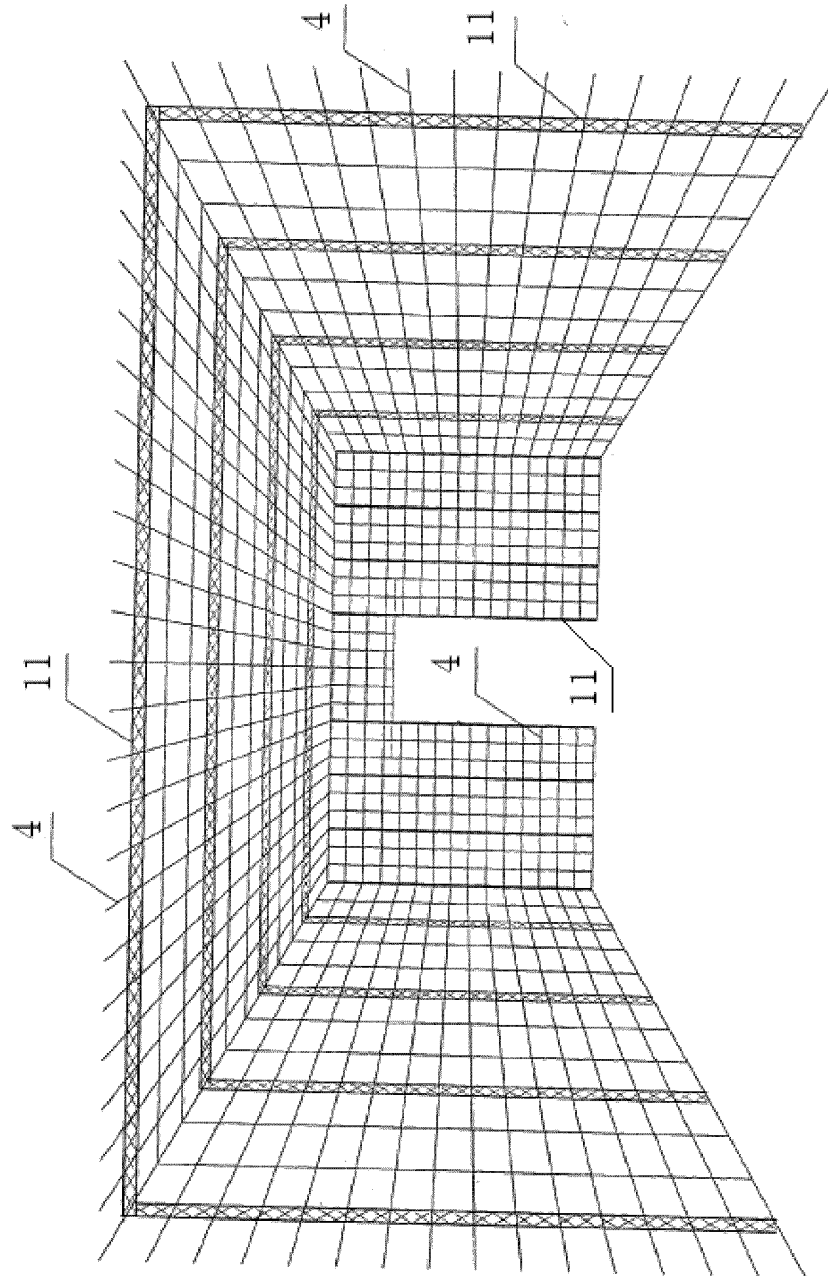


Fig. 3

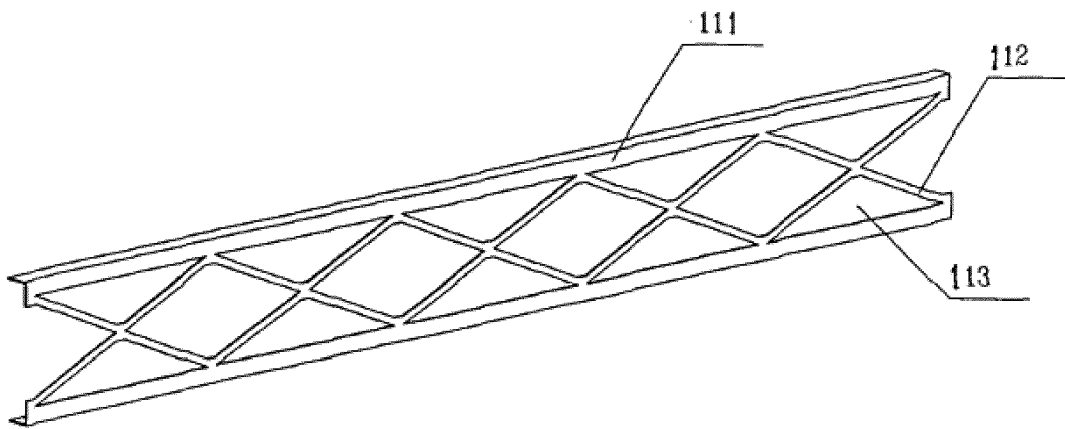


Fig. 4

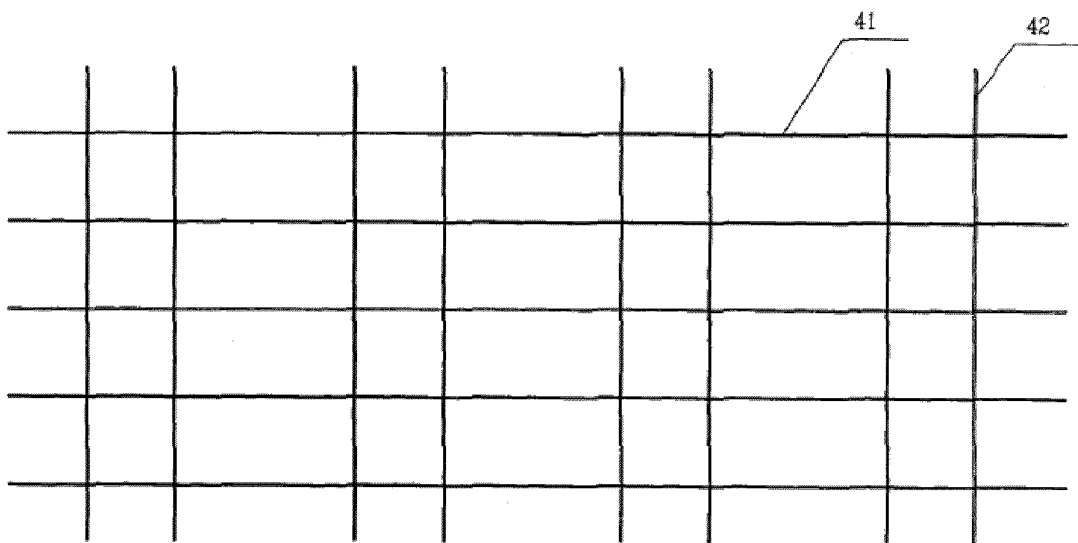


Fig. 5

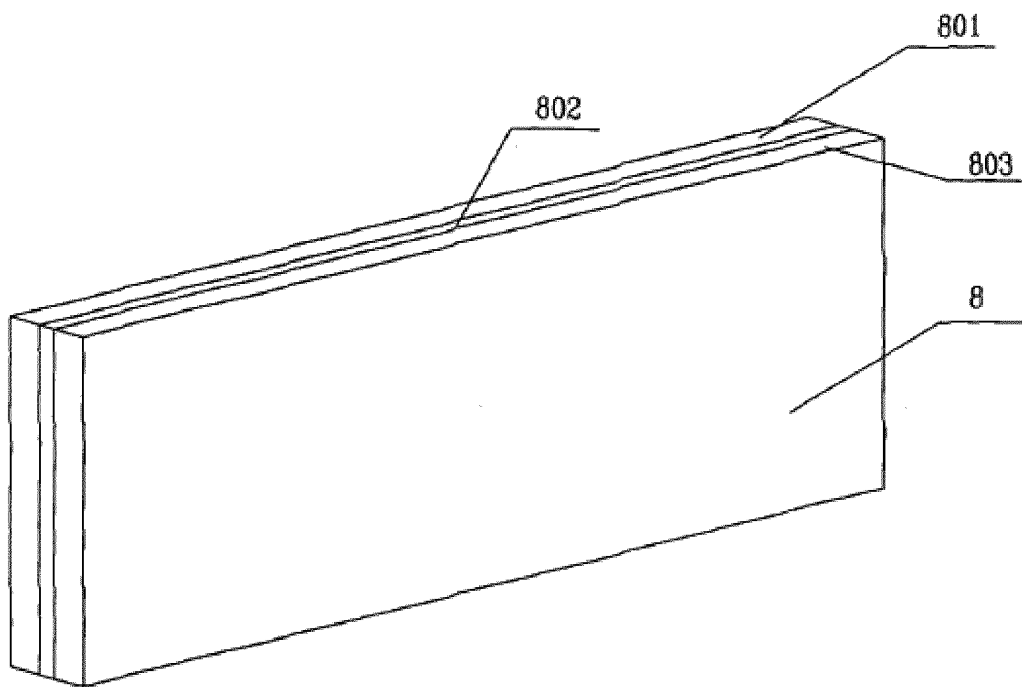


Fig. 6

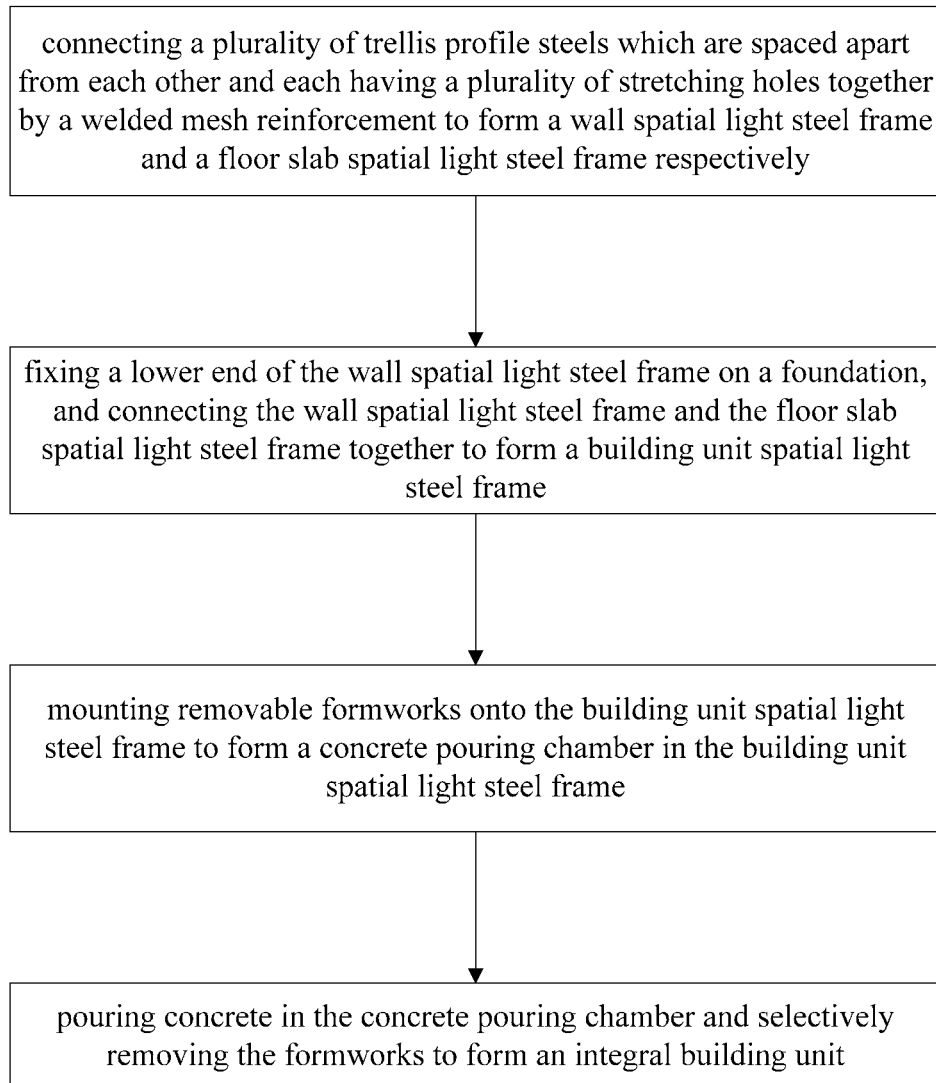


Fig. 7

INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2011/070772

A. CLASSIFICATION OF SUBJECT MATTER

see extra sheet

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)

IPC: E04B1/19, E04B1/30, E04B1/-, E04B5/21, E04B5/-, E04C3/04, E04C3/-

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 practicable, search terms used)

CNPAT, CNKI, WPI, EPODOC: light w steel, grid, profile w steel, frame, weld+, stretch+, hole?, aperture?, bore?, opening?, flange?

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
PX	CN101736809A (ARCHITECTURAL DESIGN AND RESEARCH INSTITUTE OF TSINGHUA UNIVERSITY) 16 Jun. 2010 (16.06.2010) the whole document	1-12
A	WO2007/085076A1 (GREINER, Waldemar H.) 02 Aug. 2007 (02.08.2007) figures 1-15	1-12
A	CN1587560A (DALIAN AITE STEEL BUILDING IND CO., LTD.) 02 Mar. 2005 (02.03.2005) the whole document	1-12
A	US5220765A (KUBIK, Leszek A. et al.) 22 Jun. 1993 (22.06.1993) the whole document	1-12
A	US4974387 (DUFOUR, Karl) 04 Dec. 1990 (04.12.1990) the whole document	1-12
A	WO96/25565A1 (RAUTARUUKKI OY) 22 Aug. 1996 (22.08.1996) the whole document	1-12
A	US2008/0178551A1 (PORTER, William H.) 31 Jul. 2008 (31.07.2008) the whole document	1-12

☐ Further documents are listed in the continuation of Box C.
 ☒ See patent family annex.

* Special categories of cited documents:	"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
"A" document defining the general state of the art which is not considered to be of particular relevance	"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
"E" earlier application or patent but published on or after the international filing date	"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
"L" document which may throw doubts on priority claim (S) or which is cited to establish the publication date of another citation or other special reason (as specified)	"&" document member of the same patent family
"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	

 Date of the actual completion of the international search
 08 Apr. 2011 (08.04.2011)

 Date of mailing of the international search report
05 May 2011 (05.05.2011)

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INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.

PCT/CN2011/070772

Patent Documents referred in the Report	Publication Date	Patent Family	Publication Date
CN101736809A	16.06.2010	None	
WO2007/085076A1	02.08.2007	None	
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Form PCT/ISA /210 (patent family annex) (July 2009)

INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2011/070772

A. CLASSIFICATION OF SUBJECT MATTER

E04B 1/19 (2006.01) i

E04B 1/30 (2006.01) i

REFERENCES CITED IN THE DESCRIPTION

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