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(54) ANCHORING AND ATTACHMENT ASSEMBLY FOR MODULAR CONSTRUCTIONS

(57) The present invention relates to an anchoring and attachment assembly for modular constructions, wherein said assembly allows anchoring factory-built modules to the foundation of the building, as well as attaching the modules forming same, thereby acquiring high strength and robustness of the modular construction, comprising a support (10), and preferably furthermore an interconnecting part (20), where both the support (10) and the interconnecting part (20) comprise projecting bodies (12, 22) outwardly projected in a perpendicular plane with respect to the respective metal plates (11, 21) thereof; said projecting bodies (12, 22) defining a closed and hollow enclosure, said projecting bodies (12, 22) being dimensionally adapted for the insertion thereof into a modular post (P).

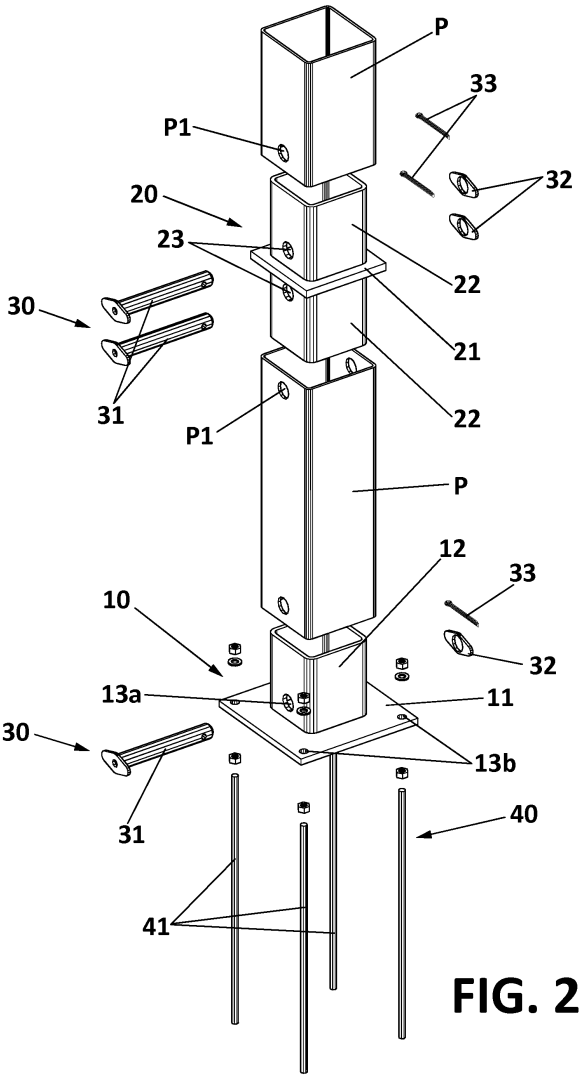

FIG. 2

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Description

Object of the Invention

[0001] The present invention belongs to the construction sector, and more specifically to the modular construction of factory-built buildings.

[0002] The object of the present invention is an assembly of anchoring and attachment elements for anchoring and attachment of factory-built modules to the foundation of the buildings and for anchoring and attachment between the modules, that is, both the contiguous modules and those modules located above and below each module, which prevents the allowances existing in current fastening systems and constitutes a more reliable, stronger and safer alternative.

Background of the Invention

[0003] Prefabricated modular buildings have become very widespread in the building sector today, where based on standard sections, it is possible to make buildings of any type at locations that are far away from their destination, generally in a factory or shop, to be subsequently taken to their final location, where they are finally mounted and assembled.

[0004] Standard "corner fittings", which are perhaps best known by the name isocorner, arranged in the corners of the prefabricated modules to facilitate module hoisting, loading and unloading tasks generally using large cranes or mechanical arms, are also known.

[0005] As can be seen in Figure 1, current fastening systems have been particularly designed with a small allowance (H) between the anchoring element (A) and the corner fitting (C) in question, this allowance bringing about certain relative movement of the upper module during the fastening and fitting thereof on a lower module. Even though fastenings of this type between modules with corner fittings do cover the need for hoisting and tying up the modules for shipping by sea, they are nevertheless limited and unfit for use in other applications, such as for building and construction, where they would not be safe at all.

[0006] Therefore, the technical issue that is raised herein is preventing the allowances (H) existing in fastening systems, as such allowances cannot be allowed in the anchoring of housing modules or prefabricated modules for buildings, mainly due to the fact that the attachments between two prefabricated modules must be rigid, sound and strong to prevent any relative movement between modules, in order to comply with strict building construction regulations.

[0007] On the other hand, US patent application US2011180558 A1 describing a part for transport applications that successfully prevents the aforementioned allowance is known. However, it has been found that this anchoring part continues to have several issues and drawbacks, such as:

- Due to the particular geometry of the anchoring part, it has come up against considerable difficulties for certification and homologation, specifically in reference to the laws in force for the construction of buildings.
- The preceding point furthermore has the direct consequence of a high cost for manufacturing and obtaining each anchoring part, furthermore taking into account the different embodiments and sizing thereof depending on each application.

Description of the Invention

[0008] The technical issue considered above is solved by means of the present invention by providing an anchoring and attachment assembly for modular constructions, particularly for the coupling thereof to posts of factory-built modules placed one on top of the other, and in addition to constituting a reliable and safe alternative, a greater strength and robustness of the modular building in question is obtained.

[0009] More particularly, the anchoring and attachment assembly of the invention comprises a support, in turn comprising a first metal plate and at least one hollow metal projecting body, where on one hand said support can be coupled to an upper and/or lower end of a modular post, and on the other hand it can be coupled to the roof of a modular construction. Furthermore, the anchoring and attachment assembly also preferably comprises an interconnecting part, which in turn comprises a second metal plate located in the intermediate position between at least one pair of projecting bodies located on one and the same vertical plane and in a symmetrical position with respect to said second metal plate.

[0010] The projecting bodies of the support and/or the interconnecting part are thereby outwardly projected in a plane perpendicular to that of the metal plates, and they define a closed and hollow enclosure dimensionally adapted for the insertion thereof into a modular post. Accordingly, the dimensions of the supporting projecting bodies and interconnecting part are smaller than the standard dimensions of modular posts for optimal coupling between same.

[0011] The projecting bodies of the support and/or of the interconnecting part preferably have through holes located in at least two of the facing side walls thereof, and in which through holes transverse screwing means are insertable. The projecting bodies and the modular posts are thereby fixed to one another in a quick and secure manner.

[0012] The possibility that the metal plate of the support can also have through holes in which longitudinal screwing means are insertable for fixing and anchoring the support to the floor of the modular construction in question has also been contemplated.

[0013] Furthermore, for the purpose of maximizing the strength, robustness and stability of the anchoring and attachment assembly herein described, it has been pro-

vided that the projecting bodies of the support and/or of the interconnecting part are preferably attached to the metal plates by means of welding, particularly through welding along the inner faces of the projecting bodies. This allows preventing any possible contact between the ends of the modular posts and the surfaces resulting from welding which generally protrude slightly outwardly and which could cause unwanted inclinations and allowances.

[0014] On the other hand, it has been provided that the anchoring and attachment assembly herein described may incorporate an auxiliary part particularly adapted for the coupling thereof to the support, where said auxiliary part is in the form of a corner fitting or isocorner for shipping by sea, or it has a plurality of wheels in the lower portion thereof such that the movement and/or shipment of the modular posts in the shop or factory in question is facilitated. The inclusion of an additional part that allows filling or covering the gap existing between two modular posts has also been provided.

Description of the Drawings

[0015] To complement the description that is being made and for the purpose of helping to better understand the features of the invention according to a preferred practical embodiment thereof, a set of drawings is attached as an integral part of said description in which the following has been depicted with an illustrative and non-limiting character:

Figure 1 shows a sectioned side view of the current fastening system for factory-built modules according to the current state of the art.

Figure 2 shows an exploded view of the anchoring and attachment assembly of the invention according to a first preferred embodiment for a single post.

Figure 3 shows a view of the anchoring and attachment assembly of Figure 2 once mounted and assembled.

Figure 4 shows a pair of perspective views of the support and the interconnecting part, respectively, in this case for anchoring a double post, according to a second preferred embodiment.

Preferred embodiment of the Invention

[0016] Several preferred embodiments that refer to the aforementioned drawings are described below, without this limiting or reducing the scope of protection of the present invention.

[0017] According to a first preferred embodiment shown in Figures 1 and 2 focusing on a modular structure of single posts (P), the anchoring and attachment assembly comprises:

- a support (10) in turn comprising a first metal plate (11) and at least one hollow metal projecting body (12), where on one hand said support (10) can be coupled to an upper and/or lower end of a modular post (P), and on the other hand it can be coupled to the floor of a modular construction;
- an interconnecting part (20), comprising a second metal plate (21) located in the intermediate position between at least one pair of projecting bodies (22) located on one and the same vertical plane and in a symmetrical position with respect to said second metal plate (21); and
- screwing means (30, 40) for fixing the support (10) and the interconnecting part (20) with the modular posts (P), as well as with the floor and/or roof of the modular construction in question.

[0018] However, according to a second preferred embodiment shown in Figure 4, it has been provided that the support (10) is configured for a double modular post (P), having two projecting bodies (12) to that end. Similarly, for this second embodiment focusing on double posts, it has been contemplated that the interconnecting part (20) may have two pairs of projecting bodies (22) attached to one and the same second metal plate (21). Therefore, although Figures 2-4 depict only those cases for single and double posts (P), it should be indicated that the anchoring and attachment assembly of the invention can likewise be adapted to factory-built modules with three, four or more posts, without this changing the spirit or essence of the invention.

[0019] In Figures 2 and 4, it can be seen that the projecting bodies (12, 22) of both the support (10) and the interconnecting part (20) are outwardly projected in a plane perpendicular to that of the metal plates (11, 21) and define a closed and hollow enclosure dimensionally adapted for the insertion thereof into a modular post (P). It can clearly be deduced from Figure 3 that the dimensions of the projecting bodies (12, 22) are respectively smaller than the perimetral dimensions of the posts (P) for the purpose of allowing the coupling between both elements.

[0020] Furthermore, it can be seen in said Figures 2 and 4 that the projecting bodies (12, 22) of both the support (10) and the interconnecting part (20) have through holes (13a, 23) located in two of their facing side walls, in which transverse screwing means (30) are insertable. Preferably, as shown in Figure 2, these transverse screwing means (30) comprise a bolt (31) with a welded washer constituting the head of the bolt (31), an auxiliary washer (32) and a pin (33), such that said bolt (31) has a through hole in the proximity of its distal end, in which the pin (33) is insertable. At this point it should be indicated and emphasized that the particular configuration of the washer of the head of the bolt (31) and of the auxiliary washer (32), which have a non-circular, elongated and flattened geometry in the form of an oval flange. This feature is neither trivial nor random, but rather has two well-identified objectives:

a) to constitute gripping means facilitating the mounting work for operators; and
b) to achieve a solution that does not run into or impact the metal plates (11, 21), because in that case the bolts (31) could not be introduced in their entirety into the corresponding through holes (13a, 23).

[0021] On the other hand, it can also be seen in Figures 2 and 4 that the metal plate (11) of the support (10) has through holes (13b) in which longitudinal screwing means (40) are insertable for the fixing and anchoring thereof to the floor of a modular construction, and which in this embodiment comprise corrugated anchor bolts (41) adapted for concrete, nuts and washers, shown in Figures 2 and 3.

[0022] In relation to the preceding, Figures 2 and 3 show that the metal plate (11) of the support (10) has length and/or width dimensions exceeding those of the metal plate (21) of the interconnecting part (20). This is primarily for two reasons:

c) The first of such reasons is to create a region for implementing those through holes (13b) of the metal plates (21) mentioned above;
d) The second of such reasons is to constitute a sufficient support and contact surface on the floor of the modular construction in question.

[0023] At this point it should be pointed out that even though the support (10) and the interconnecting part (20) in the embodiments of Figures 2 to 4 have quadrangular shapes or "square bar" shapes, it has nevertheless been provided that said elements can have circular shapes in both the metal plates (11, 21) and in their projecting bodies (12, 22), this case being applicable to cylindrical posts having an obviously circular section.

[0024] With respect to the attachment between the projecting bodies (12, 22) and the metal plates (11, 21), said attachment is preferably by welding, and more specifically welding along the inner faces of the projecting bodies (12,22). This particularity allows assuring the stiffness and strength of the entire assembly, while at the same time avoiding problems during the process of mounting and coupling with the modular posts (P). In fact, any type of inclination, mismatching or allowance as a result of the contact or interference between posts (P) and the ribs or surfaces resulting from the welding is thereby achieved.

Claims

1. Anchoring and attachment assembly for modular constructions, particularly for the coupling thereof to factory-built modular posts (P), said anchoring and attachment assembly being **characterized in that** it comprises a support (10), in turn comprising a first metal plate (11) and at least one hollow metal projecting body (12), where on one hand said support (10) is couplable to an upper and/or lower end of a modular post (P), and on the other hand it is couplable to the floor of a modular construction; and where the projecting body (12) is outwardly projected in a plane perpendicular to that of the metal plate (11) and defines a closed and hollow enclosure, such that said projecting body (12) is dimensionally adapted for the insertion thereof into a modular post (P).

2. Anchoring and attachment assembly according to claim 1, **characterized in that** it additionally comprises an interconnecting part (20), in turn comprising a second metal plate (21) located in the intermediate position between at least one pair of projecting bodies (22) located on one and the same vertical plane and in a symmetrical position with respect to said second metal plate (21).

3. Anchoring and attachment assembly according to claim 2, **characterized in that** the projecting bodies (22) of the interconnecting part (20) are likewise outwardly projected in a plane perpendicular to that of the second metal plate (21) and define a closed and hollow enclosure, said projecting bodies (22) being dimensionally adapted for the insertion thereof into respective modular posts (P).

4. Anchoring and attachment assembly according to claim 1 or 2, **characterized in that** the projecting bodies (12, 22) of the support (10) and/or of the interconnecting part (20) have through holes (13a, 23) located in at least two of the facing side walls thereof, and in which transverse screwing means (30) are insertable.

5. Anchoring and attachment assembly according to claim 4, **characterized in that** the transverse screwing means (30) comprise a bolt (31) with a welded washer constituting the head of the bolt (31), an auxiliary washer (32) and a pin (33), such that said bolt (31) has a through hole in the proximity of its distal end and in which the pin (33) is insertable.

6. Anchoring and attachment assembly according to claim 5, **characterized in that** the washer of the head of the bolt (31) as well as the auxiliary washer (32) have a non-circular, elongated and flattened geometry in the form of an oval flange.

7. Anchoring and attachment assembly according to claim 1, **characterized in that** the metal plate (11) of the support (10) has through holes (13b) in which longitudinal screwing means (40) are insertable for the fixing and anchoring thereof to the floor and/or roof of the modular construction.

8. Anchoring and attachment assembly according to claim 7, **characterized in that** the longitudinal

screwing means (40) comprise smooth anchor bolts (41) adapted for concrete, nuts and washers.

9. Anchoring and attachment assembly according to claim 1 or 2, **characterized in that** the projecting bodies (12, 22) of the support (10) and/or of the interconnecting part (20) are attached to the metal plates (11, 21) by welding, particularly along the inner faces of said projecting bodies (12,22).

10. Anchoring and attachment assembly according to claim 2, **characterized in that** the metal plate (11) of the support (10) has length and/or width dimensions exceeding those of the metal plate (21) of the interconnecting part (20).

11. Anchoring and attachment assembly according to claim 1 or 2, **characterized in that** the support (10) and/or the interconnecting part (20) have quadrangular shapes in both the metal plates (11, 21) thereof and the projecting bodies (12, 22) thereof.

12. Anchoring and attachment assembly according to claim 1 or 2, **characterized in that** the support (10) and/or the interconnecting part (20) has circular shapes in both the metal plates (11, 21) thereof and the projecting bodies (12, 22) thereof.

13. Anchoring and attachment assembly according to claim 1, **characterized in that** the support (10) is configured for a double modular post (P), having two projecting bodies (12) to that end.

14. Anchoring and attachment assembly according to claim 2, **characterized in that** the interconnecting part (20) is configured for a double modular post (P), having two pairs of projecting bodies (22) to that end attached to one and the same second metal plate (21).

15. Anchoring and attachment assembly according to any one of the preceding claims, **characterized in that** it additionally comprises an auxiliary part particularly adapted for the coupling thereof to the support (10); where said auxiliary part has a corner fitting or isocorner shape, or it has a plurality of wheels in the lower portion thereof.

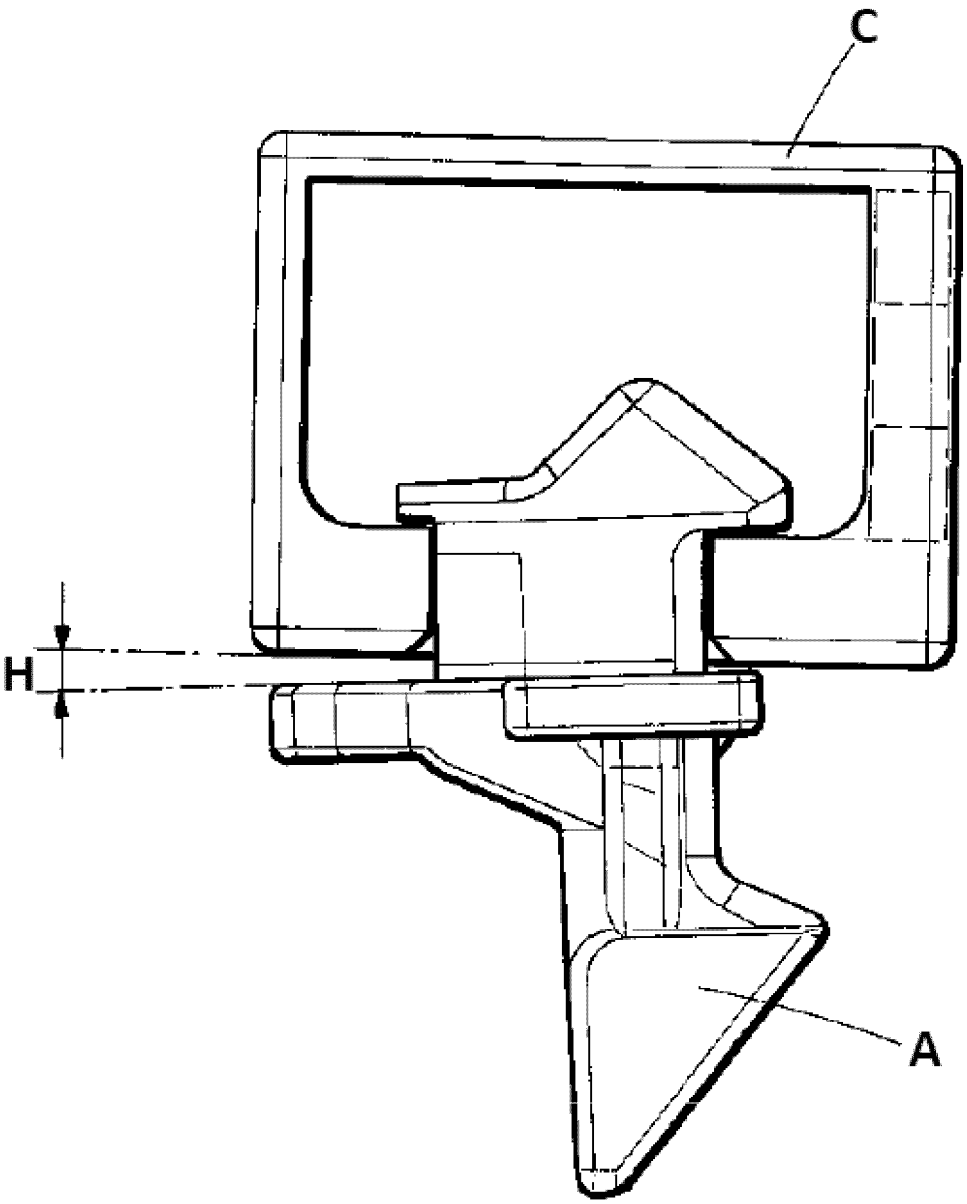

FIG. 1
STATE OF THE ART

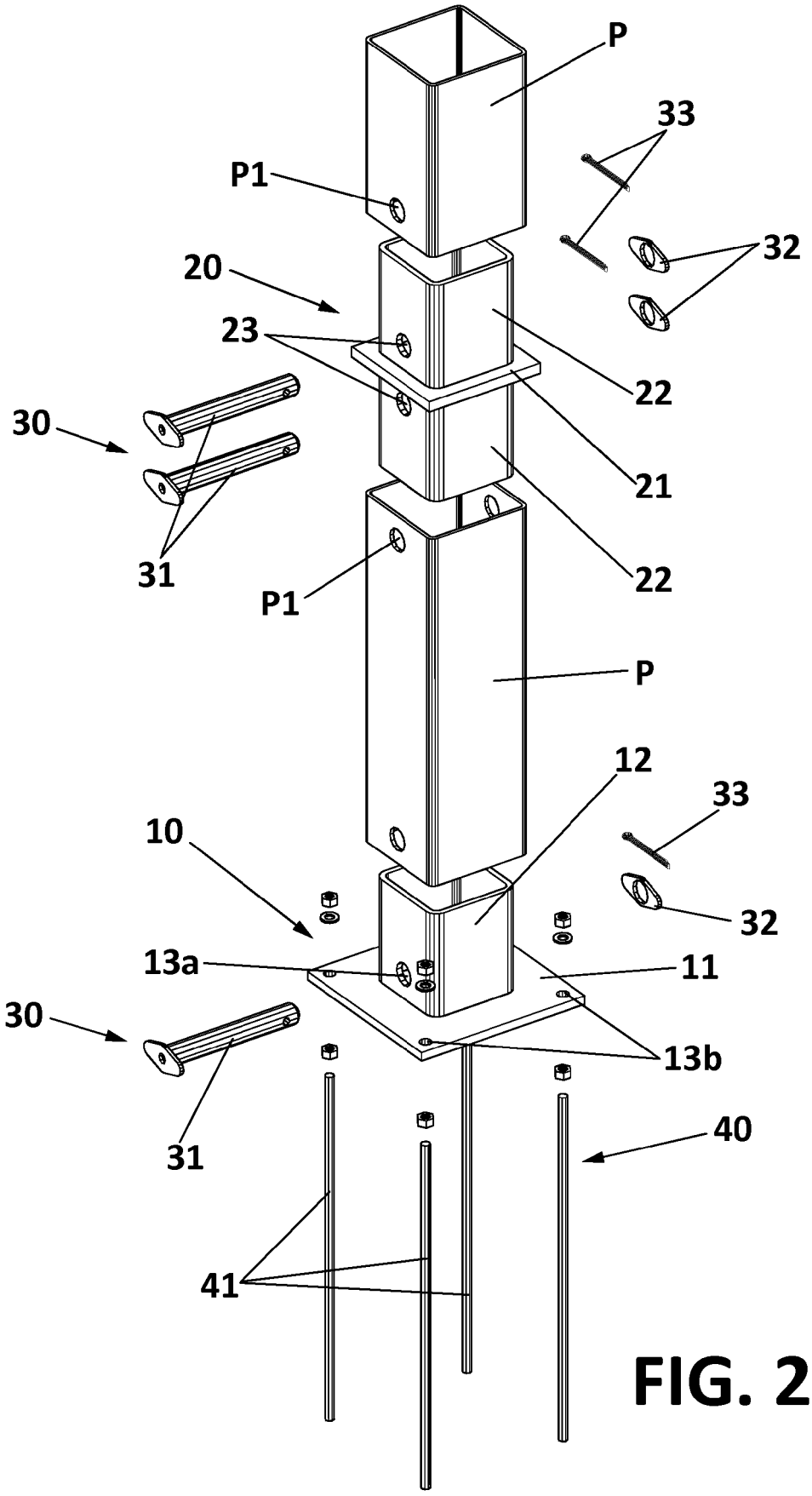

FIG. 2

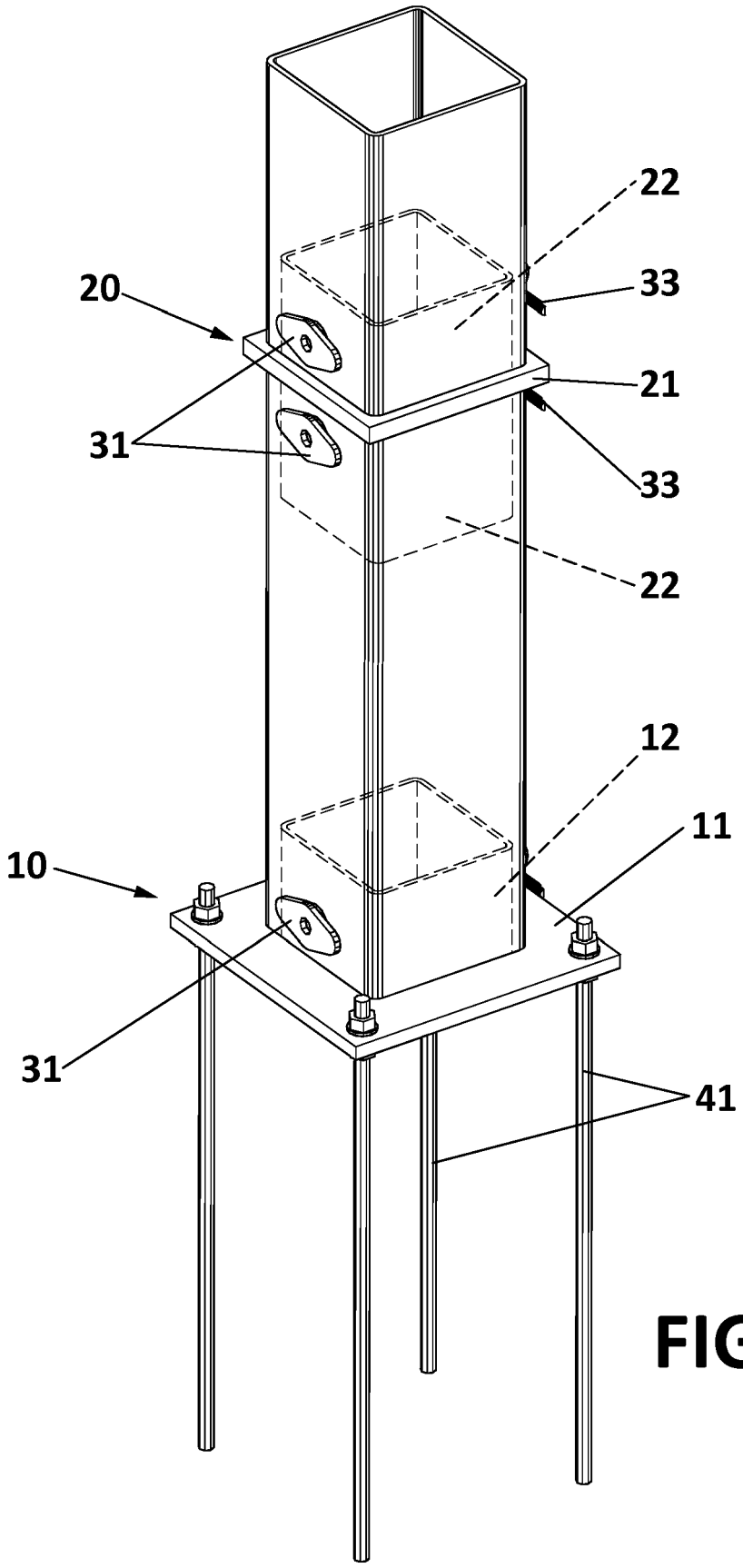

FIG. 3

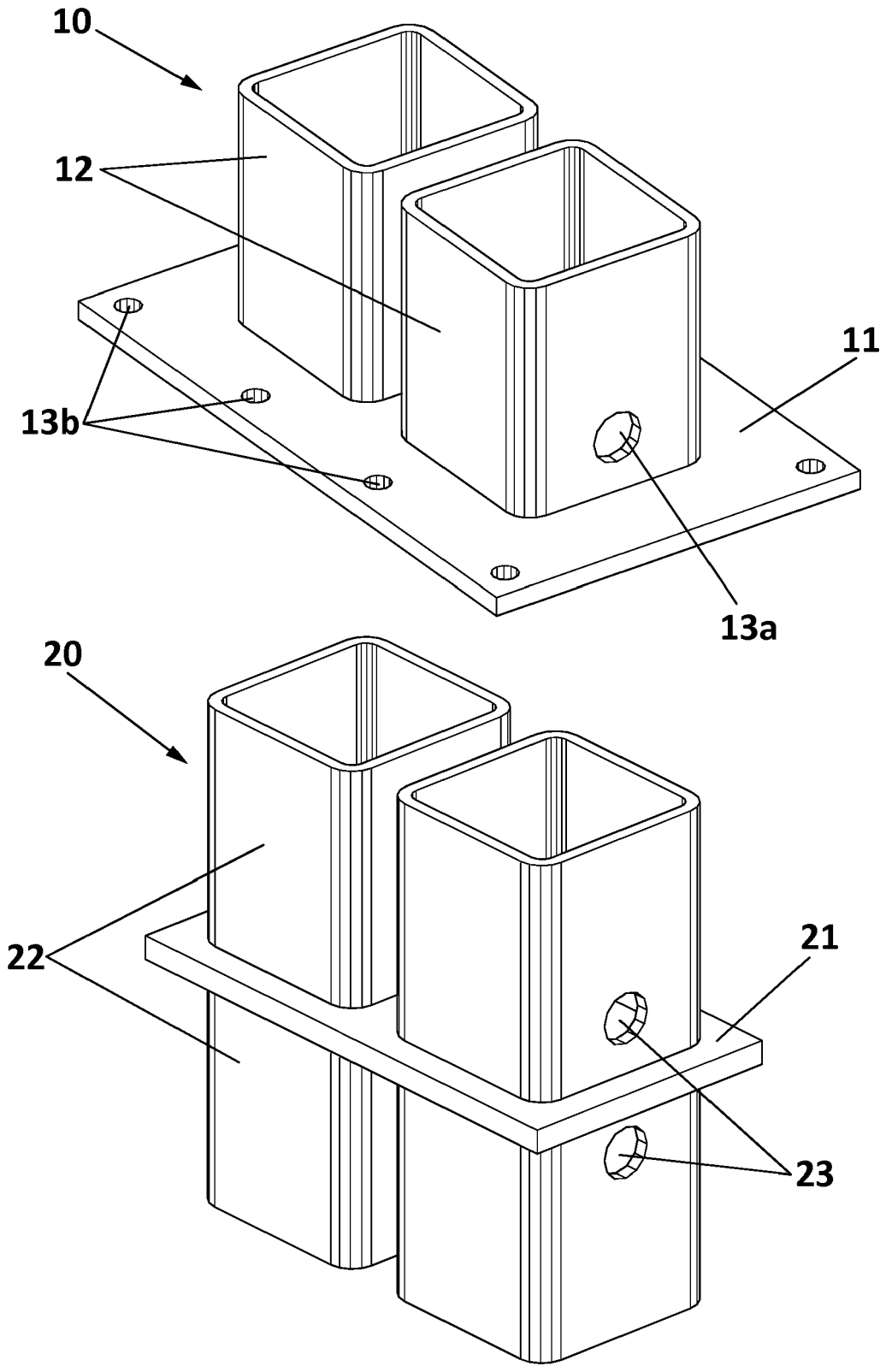

FIG. 4

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EUROPEAN SEARCH REPORT

Application Number
EP 17 38 2810

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
Y	JP 2006 104780 A (TAKENAKA KOMUTEN CO) 20 April 2006 (2006-04-20) * abstract; figures 1-12 *	1-15	INV. E02D5/74 E04B1/348 E04C3/30
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A	US 2009/217607 A1 (STARK DANIEL [US]) 3 September 2009 (2009-09-03) * the whole document *	1-15	

TECHNICAL FIELDS SEARCHED (IPC)

E02D
E04B
E04C

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	13 April 2018	Friedrich, Albert

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 17 38 2810

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13-04-2018

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REFERENCES CITED IN THE DESCRIPTION

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