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(54) **SPACER ELEMENT FOR FORMWORK**

(57) The spacer element for a building structure comprises a body (1) shaping a central portion (2) which extends along a longitudinal direction (A) and two respec-

tive end portions (3). Each end portion (3) forms a coupling means (4) to a respective reinforcement element (6).

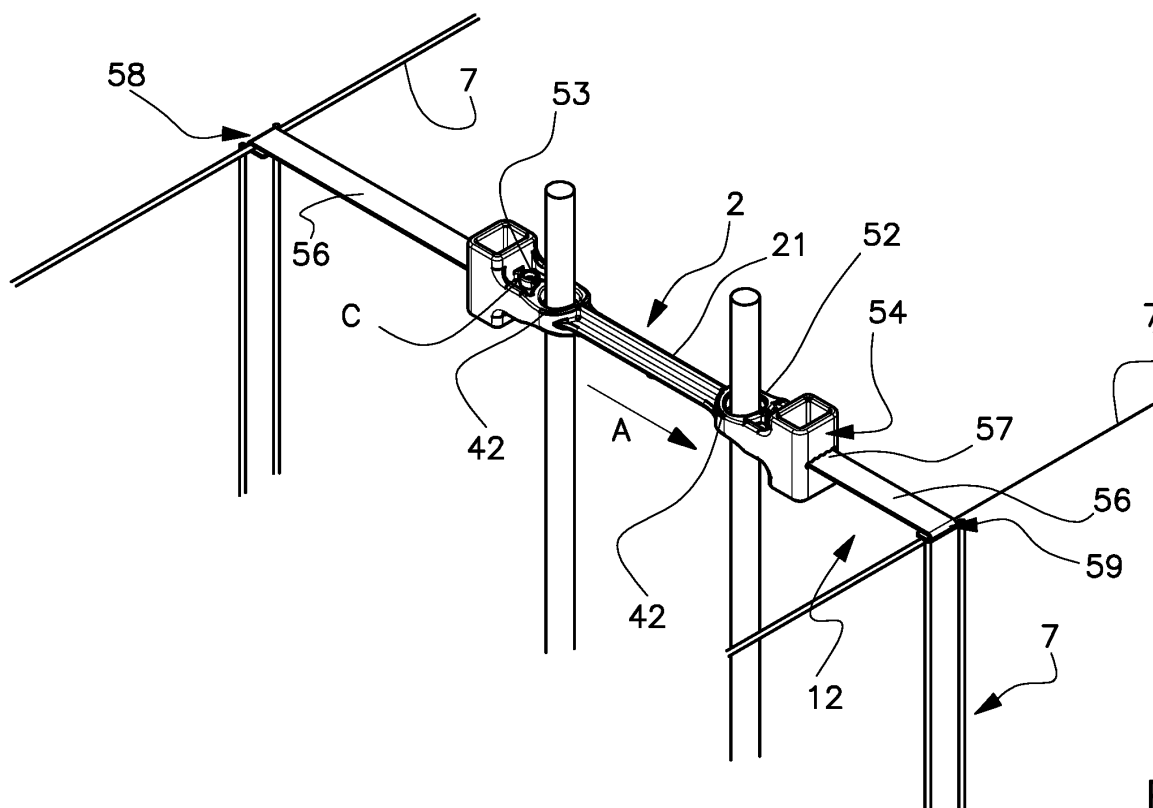


Fig.2

Description

Technical field

[0001] The present invention relates to a construction system for building, which may be used to create load-bearing structures in reinforced concrete and to create cladding of existing frames.

Background of the invention

[0002] Construction systems are currently known which allow the construction of reinforced concrete structures on site. These systems provide for a casing (so-called formwork) to contain fluid concrete during casting. In particular, types of formwork made by means of opposing modular panels, between which the concrete is cast are known. Before the concrete is cast, the metal reinforcement elements necessary for the construction of the structure are also arranged between the panels. The panels are supported by a cage made up of metal nets, spaced apart and joined by special means of connection (so-called straps). When the solidified concrete is able to stay upright, the panels are removed and eliminated, and the result is a monolithic structure. The construction of the formwork plays a particularly important role in the construction of building works, as a suitable structural linearity in the building work derives from a correct alignment of the panels and the metal cage.

[0003] The strap is in particular constituted by a longitudinal metal element, interposed between a pair of side-by-side panels ensuring their mutual distance.

[0004] An example of known type of strap is illustrated in patent application EP 06425413.9. In particular, this application describes a support element consisting of a metal core and two ends which are inserted between side-by-side panels and keep the same panels stably positioned. According to the invention, when the concrete is solidified and the panels are removed, the strap protrudes outside the volume occupied by the solidified concrete.

[0005] This solution has the drawback of having to remove the protruding ends of the strap from the solidified concrete, an operation which involves a considerable waste of time and labor. Furthermore, the removal of the ends of the strap involves the formation of aesthetic imperfections or surface damage to the structure. The removal operation therefore requires a surface finish by using, for example, putty with a consequent waste of time and labor.

[0006] Utility model application KR 20180001037 illustrates a metal strap comprising an external profile and a removable internal profile. In use, the strap is positioned alongside the formwork panels without protruding externally with respect to them.

[0007] When the concrete cast in the formwork solidifies the panels are removed and the ends of the straps protrude from the surface of the solidified concrete. Ac-

cording to this invention, the external profile of the straps is removed allowing a part of the material to be recovered.

[0008] This solution solves the problem of surface imperfections, since the surface of the concrete structure is not damaged by the removal of the ends of the strap. However, the problem of creating thermal bridges is complained, as the internal profile of the metal strap, remaining inside the solidified concrete, causes a non-homogeneity of the material which locally decreases the thermal resistance of the erected structure.

[0009] Furthermore, the problem of the prior art is the difficulty in positioning the metal cage. The metal cage is only placed on the straps that space the panels and therefore a high level of precision in positioning is not guaranteed.

Disclosure

[0010] The object of the present invention is to solve the aforementioned problems, devising a spacer element for building construction which allows to erect a formwork for the buildings, in particular ensuring precision in the positioning of the structure.

[0011] Within this aim, a further object of the invention is to provide a spacer element which is capable of avoiding the onset of thermal bridges.

[0012] Another object of the invention is to provide a spacer element which allows the construction of a structure without surface imperfections.

[0013] A further object of the invention is to provide a spacer element which ensures ease and precision of insertion of supporting metal structures such as for example a metal construction cage.

[0014] A further object of the present invention is to provide a spacer element which allows the construction of a highly stable structure against earthquakes.

[0015] An additional object of the invention is to provide a spacer element which allows rapid construction of the structure.

[0016] A further object of the invention is to provide a spacer element which enables easy positioning of one or more reinforcement elements.

[0017] A further object of the invention is to provide a spacer element which allows the construction of a structure with high acoustic insulation.

[0018] Another object of the invention is to provide a spacer element that acts as a "concrete cover", giving the erected structure a greater fire resistance.

[0019] A further object of the invention is to provide a spacer element for the building industry with great constructive and functional simplicity, having certainly reliable operation, which is versatile in use, as well as relatively cheap.

[0020] The aforementioned objects are achieved, according to the present invention, by the spacer element for building construction according to claim 1.

[0021] According to a first aspect of the invention, the spacer element for a building structure comprises a body

forming a central portion which extends along a longitudinal direction and two respective end portions.

[0022] Preferably each said end portion forms a means for coupling to a respective reinforcement element, and forms as well, externally to said coupling means, abutment means comprising a flat face.

[0023] Preferably, said flat face is substantially orthogonal to said longitudinal direction, and is suitable for receiving in support a corresponding flat surface of a panel.

[0024] Conveniently, each said end portion also comprises a locking means, projecting from said face, so as to secure said panel against said face.

[0025] Preferably, said central portion of said body has at least one longitudinal rib in relief with respect to at least one face of said body.

[0026] Preferably said central portion is made of a first material.

[0027] Preferably, said locking means is made of a second material.

[0028] Preferably said first material is different from said second material.

[0029] Conveniently said body is made of plastic material and said locking means is made of metal material.

[0030] Advantageously, said locking means comprise a lamina which forms a coupling end facing said abutment means and a coupling end for anchoring to a metal net.

[0031] Preferably, in use, said lamina is suitable for being arranged, on a substantially horizontal plane.

[0032] Preferably, said lamina has a width substantially corresponding to the width of said central portion.

[0033] Preferably, said coupling end is shaped like a hook.

[0034] Preferably, said coupling end is bent inwards, forming a U-shape in section.

[0035] Preferably, said coupling means comprise a sleeve structure provided with a through hole.

[0036] Conveniently, said through hole has an axis orthogonal to said longitudinal direction of the spacer element.

[0037] According to a preferred embodiment, said face has an input channel communicating with an area for inserting said coupling end.

[0038] Preferably, said abutment means form an external surface facing the central portion.

[0039] More preferably, from the said external surface facing the central portion a connection extends, which joins the sleeve structure.

[0040] Preferably the sleeve structure has a larger diameter than the width of the central portion.

[0041] According to a preferred embodiment of the invention, the sleeve structure has a surface connected to respective longitudinal edges of the central portion.

[0042] Advantageously, the central portion, the end portion and the coupling means is made as a monolithic component.

[0043] According to an embodiment, the abutment means has a pair of opposing concavities.

[0044] Preferably each concavity has prismatic shape.

[0045] Advantageously, the concavities have an axis substantially orthogonal with respect to the longitudinal direction of said central portion.

[0046] Preferably said input channel comprises or consists of a slot.

[0047] Conveniently, at said area, fixing means are positioned to constrain the position of the said coupling end of the said locking means.

[0048] According to a further aspect of the invention, a construction system is provided for building construction comprising:

[0049] at least one spacer element according to the first aspect of the invention;

[0050] at least a pair of panels and a pair of nets spaced apart, opposed and joined by said at least one spacer element, so as to create an interspace suitable for receiving a concrete casting.

[0051] Preferably, said locking means comprise a lamina which forms a coupling end facing said abutment means and a hook-shaped coupling end for anchoring to a metal net.

[0052] According to an alternative embodiment, said body is made of composite material.

[0053] Preferably, said longitudinal ribs of said central portion are positioned in such a way that said central portion has a cross-sectional shape.

Description of drawings

[0054] The details of the invention will become more evident from the detailed description of a preferred embodiment of the spacer element for building construction, illustrated by way of example in the accompanying drawings, where:

Figure 1 shows a side view of the spacer element; Figures 2 and 3 show the spacer element in use.

Best mode

[0055] With particular reference to Figure 1, the spacer element for building construction according to the invention is generally indicated with reference number 1. The spacer element 1 comprises a central portion 2 and two respective end portions 3.

[0056] In particular, the central portion 2 extends longitudinally along a direction A, presenting a substantially uniform profile along its entire extension. Preferably, the central portion 2 has a flattened shape, so as to form two opposite faces, in use, an upper face 22 and a lower face 23. More preferably, the upper face 22 and the lower face 23 have respective longitudinal reinforcement ribs 21, so that the central portion 2 has a cross shape in cross-section.

[0057] On the sides of the central portion 2 there are respective end portions 3.

[0058] Each end portion 3 forms a coupling means 4 to a reinforcement element 6, for example a metal rod.

Preferably, the coupling means 4 comprise a through hole 41, suitable for receiving the metal rod 6. The through hole 41 has an axis B orthogonal to the direction A, so that in use, the axis B is arranged in a substantially vertical direction.

[0059] Preferably, the hole 41 has a circular section. Around the hole 41, the spacer element 1 forms a sleeve structure 42, preferably having an external diameter greater than the width of the central portion 2. Preferably, the sleeve 42 has an external surface connected to respective longitudinal edges of the central portion 2.

[0060] Each end portion 3 also forms an abutment means 5 externally to the sleeve 42. The abutment means 5 comprise a prismatic, preferably hollow structure, which forms a flat face 54, substantially orthogonal to the longitudinal direction A. The flat face 54 is capable of receiving in support a corresponding flat surface of a panel 9, of the type known to the person skilled in the art. The prismatic structure also forms an external surface 51, facing the central portion 2. In particular, a junction 52 extends from the external surface 51, which joins the sleeve 42 in such a way as to delimit, with the sleeve 42, an area C. Furthermore, the flat face 54 has an input channel 55, preferably a slot. The slot 55 enables the insertion of locking means 56 in the end portion 3, which protrude from the face 54, so as to fix the panel 9 against the same face 54. Furthermore, the abutment means 5 has a pair of concavities 50, for example with a prismatic shape, positioned opposite to the slot 55 and with an axis substantially orthogonal with respect to the direction A. The locking means 56 comprises a lamina, preferably made of metal. The lamina 56 forms a coupling end 57 facing the abutment means 5 and a hook-shaped coupling end 58, protruding externally with respect to the flat face 54. The end 57 is inserted in the slot 55, and secured to the respective end portion 3 of the spacer element 1 at the area C, by means of fastening means 53, for example screw means. The opposite coupling end 58 enables the connection of the lamina 56 to a metal net 7.

[0061] The metal net 7 is a structure comprising a plurality of single meshes 8 identified by an intertwining of suitably positioned rods. In particular, a mesh 8 of the net 7 cooperates with the spacer element 1 to support and keep at least one panel 9 in position. The panel 9 is a solid with a prismatic shape comprising an external face 10 which is flat and substantially orthogonal to the direction A which, in use, faces the net 7. The panel 9 comprises an internal face 11 that is flat and substantially parallel to the face 54 of the abutment means 5. In particular, each panel 9 is positioned with the perimeter of the external face 10 at the perimeter formed by one or more meshes 8 of the net 7. Furthermore, the volume between the net 7 and the face 54 defines an insertion space 12, so that, in use, the distance between the net 7 and the face 54 substantially corresponds to the depth of the panel.

[0062] The operation of the spacer element for construction is easily understandable from the above de-

scription.

[0063] Initially, the lamina 56 is inserted into the slot 55 until the end 57 is placed inside the area C in correspondence with the fastening means 53 so that in use, the latter firmly holds the lamina 56 in the inserted position.

[0064] Subsequently, at least two nets 7 are positioned substantially parallel and mutually opposite each other so that the coupling ends 58 are coupled with the nets 7 by means of the hook shape of the coupling portion 58. In particular, each coupling portion 58 is inserted into one side of a single mesh 8, allowing the spacer element to be anchored to the nets 7.

[0065] Each panel 9 is positioned in the insertion space 12, in particular in such a way that the external face 10 of the same panel 9 rests on at least one mesh 8 of the net 7 while the internal face 11 of the panel 9, opposite to the internal face 10, reaches in abutment with the same face 54.

[0066] Conveniently, in use, the coupling end 58 does not protrude externally with respect to the external face 10 of the panel but remains coupled to one side of the mesh 8 of the net 7 in a substantially coplanar way with the same external face 10.

[0067] Subsequently, it is possible to insert respective reinforcement elements, for example metal rods, in the holes 41, if the structural characteristics to be made require it.

[0068] According to the invention, several panels 9 may be placed side by side or superimposed in a modular way to erect structures that are more extended in length or height.

[0069] The building system, object of the invention, differs from the prior art due to the synergistic effect offered by the cooperation between the locking means 56 and the face 54.

[0070] In particular, according to the invention, the panel 9, in use, is housed so as to rest simultaneously on both the locking means 56 and on the face 54. This solution is new and advantageous.

[0071] Said diversifying feature solves the technical problem of providing a spacer element for building construction that may be positioned in a precise and easy manner.

[0072] The constructive system described by way of example is subject of numerous changes according to the various requirements.

[0073] In the practical implementation of the invention, the materials used, as well as the shape and dimensions, may change according to the requirements.

[0074] Should the technical features mentioned in any claim be followed by reference signs, such reference signs were included strictly with the aim of enhancing the understanding of the claims and hence they shall not be deemed restrictive in any manner whatsoever on the scope of each element identified for exemplifying purposes by such reference signs.

Claims

prising:

1. A spacer element for a building structure, comprising
a body (1) shaping a central portion (2), which ex-
tends along a longitudinal direction (A) and two re-
spective end portions (3), **characterized in that**
each said end portion (3) shapes a means (4) for
coupling to a respective reinforcement element (6),
and also shapes, externally to said coupling means
(4), an abutment means (5) comprising a flat face
(54), substantially orthogonal to said longitudinal di-
rection (A), capable of receiving in support a corre-
sponding flat surface of a panel (9); each said end
portion (3) also comprising locking means (56), pro-
truding from said face (54) so as to fix said panel (9)
against said face (54). 5 10 15
2. A spacer element as in claim 1, **characterized in
that** said central portion (2) of said body (1) has at
least one longitudinal rib (21), which is in relief with
respect to at least one face (22, 23) of said body (1). 20
3. A spacer element as in any one of the preceding
claims, **characterized in that** said body (1) is made
of plastic material and said locking means (56) is
made of metal material. 25
4. A spacer element as in any one of the preceding
claims, **characterized in that** said locking means
(56) comprises a lamina which shapes a coupling
end (57) facing said abutment means (5) and a cou-
pling end (58) shaped like a hook for anchoring to a
metal net (7). 30
5. A spacer element as in any one of the preceding
claims, **characterized in that** said coupling means
(4) comprise a sleeve structure (42) provided with a
passing hole (41). 35
6. A spacer element as in claim 5 **characterized in
that** said passing hole (41) has an axis (B) orthog-
onal to said direction A. 40
7. A spacer element as in any one of claims from 4 to
6, **characterized in that** said face (54) has an input
channel (55) communicating with an area (C) for the
insertion of said coupling end (57). 45
8. A spacer element as in any one of claims from 4 to
7, **characterized in that** said input channel (55)
comprises or consists of a slot. 50
9. A spacer element as in claim 7 **characterized in
that** at said area (C) a fixing means (53) is positioned
to secure the position of said coupling end (58) of
said locking means (56). 55
10. A construction system for building construction com-

at least one spacer element (1) as in any one of
the preceding claims;
at least one pair of panels (9) and a pair of
spaced apart, opposite nets (7), which are joined
by said at least one spacer element (1), so as
to create an interspace suitable for receiving a
concrete casting.

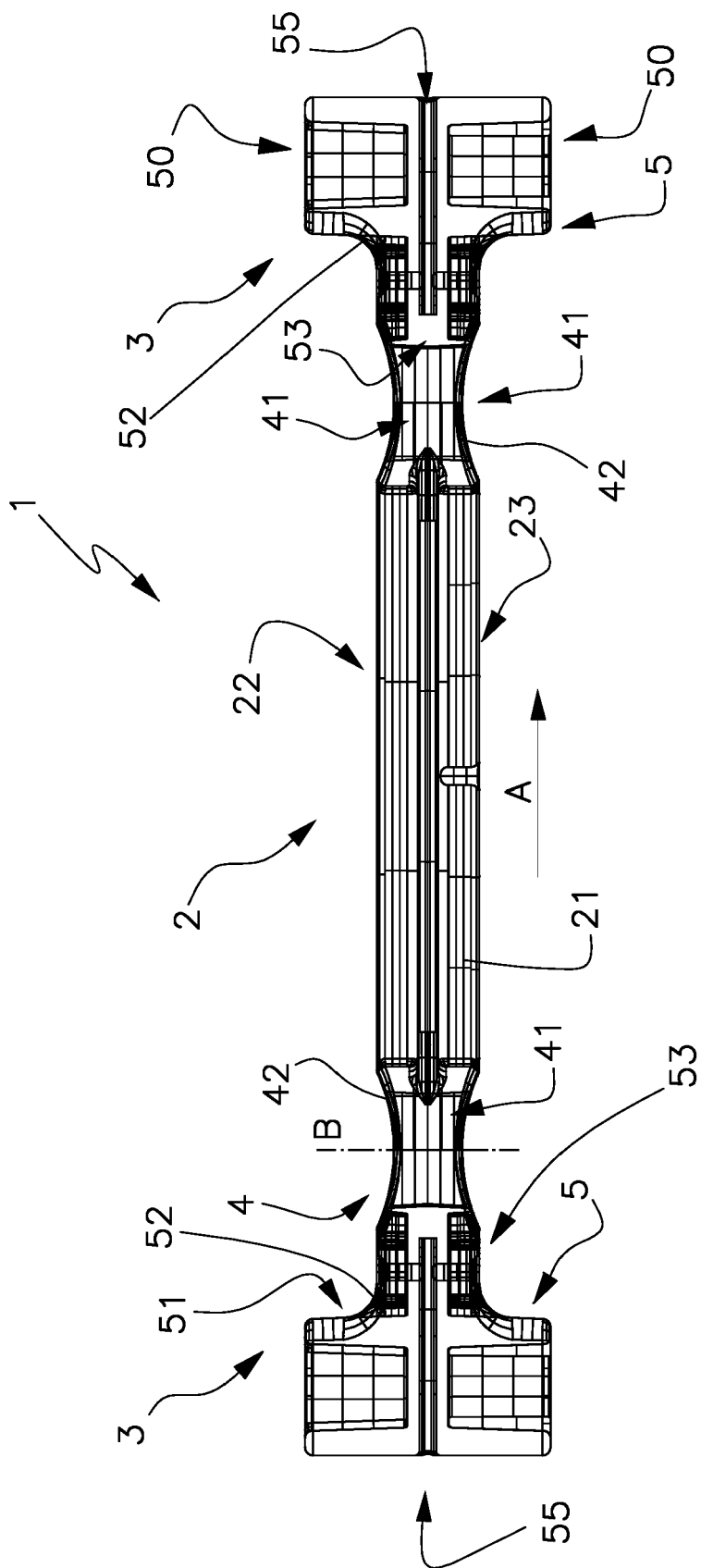


Fig. 1

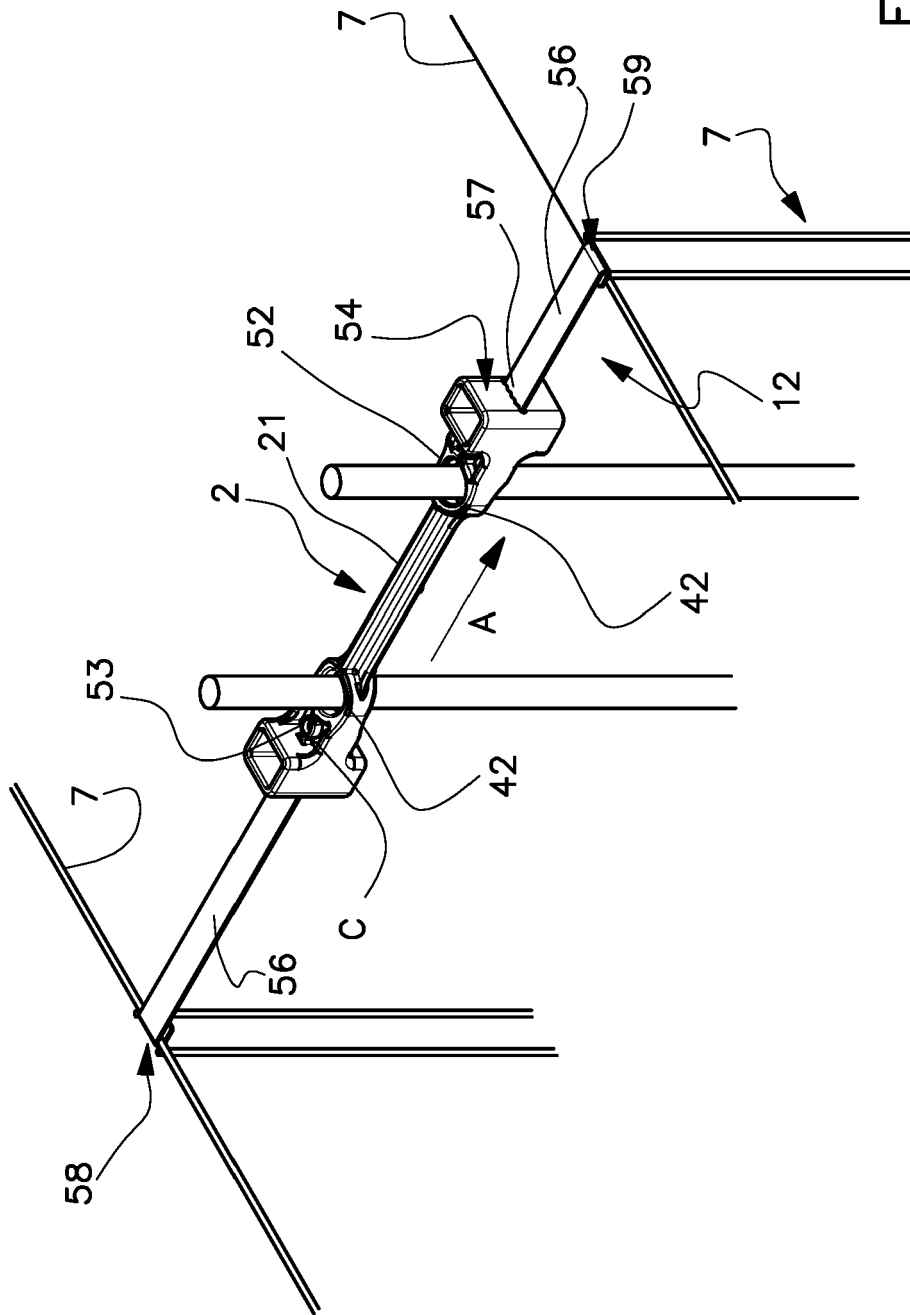


Fig. 2

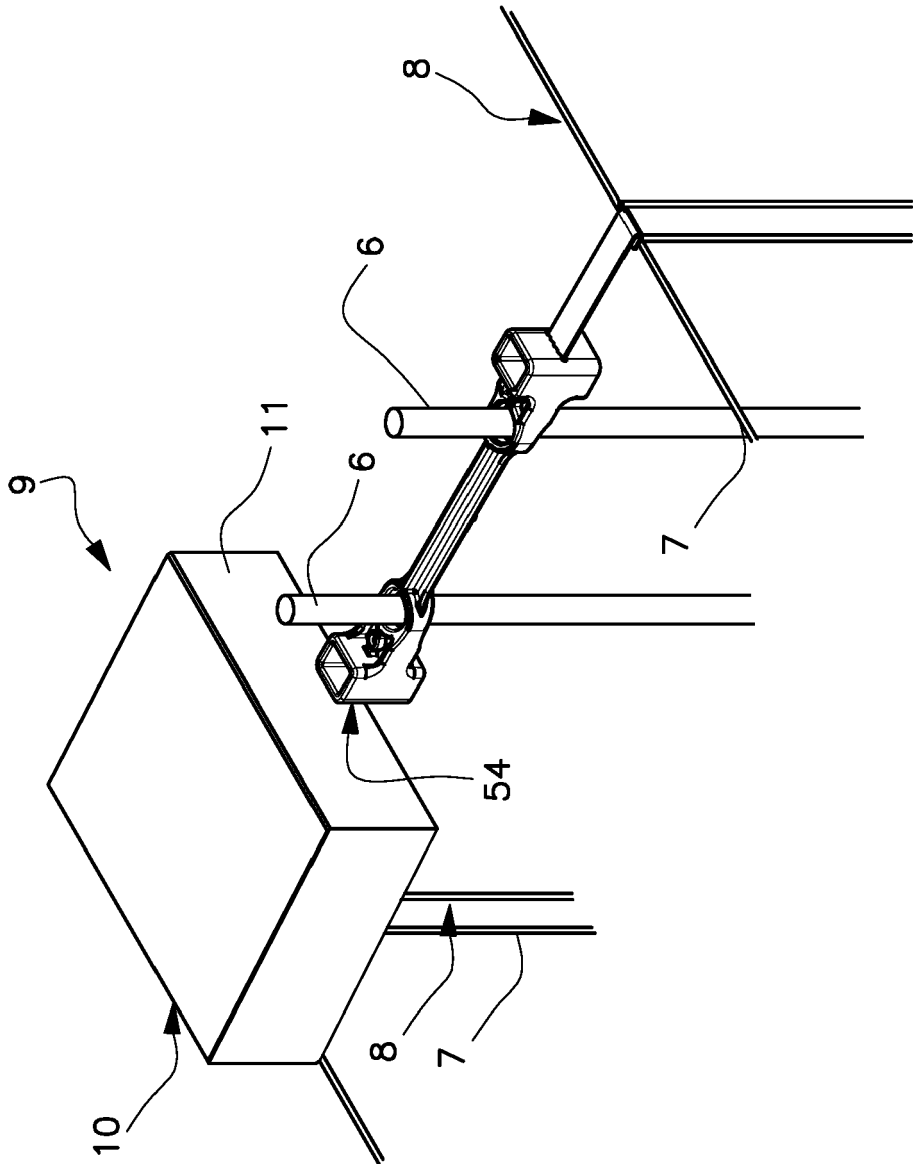


Fig.3



EUROPEAN SEARCH REPORT

Application Number
EP 20 18 3278

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			TECHNICAL FIELDS SEARCHED (IPC)
			E04G E04B
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 30 October 2020	Examiner Garmendia Irizar, A
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

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**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 20 18 3278

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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
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