(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 4 102 002 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
14.12.2022 Bulletin 2022/50

(21) Application number: **21213902.6**

(22) Date of filing: **10.12.2021**

(51) International Patent Classification (IPC):
E04B 1/26 *(2006.01)*

(52) Cooperative Patent Classification (CPC):
E04B 1/2604; E04B 2001/262; E04B 2001/266; E04B 2001/2672; E04B 2001/2676

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME
Designated Validation States:
KH MA MD TN

(30) Priority: **11.06.2021 EP 21179148**

(71) Applicant: **Urban Beta UG**
10243 Berlin (DE)

(72) Inventor: **The designation of the inventor has not yet been filed**

(74) Representative: **Schulz Junghans**
Patentanwälte PartGmbB
Großbeerenstraße 71
10963 Berlin (DE)

(54) **A BUILDING COMPONENT AND A BUILDING ASSEMBLY**

(57) The invention is related to a building component (1) configured to be repeatedly and removably connectable with a further building component (1), wherein the building component (1) comprises a central portion (30) extending along a first axis (A1) and a plurality of connection members (80, 80a, 80b, 80c, 80d, 80e, 80f, 80', 80") arranged at the central portion (30), wherein each connection member (80, 80a, 80b, 80c, 80d, 80e, 80f, 80', 80") of the plurality of connection members (80, 80a, 80b, 80c, 80d, 80e, 80f, 80', 80") comprises a receiving element (91) and a separate plug-in element (90). The plug-in element (90) and the receiving element (91) are shaped complementary to each other. The plug-in element (90) comprises a front end (112) of the plug-in element (90) facing away from the central portion (30) and the receiving element (91) comprises a front end (113) of the receiving element (91) facing away from the central portion (30). The front end (112) of the plug-in element (90) and the front end (113) of the receiving element (91) point in the same direction.

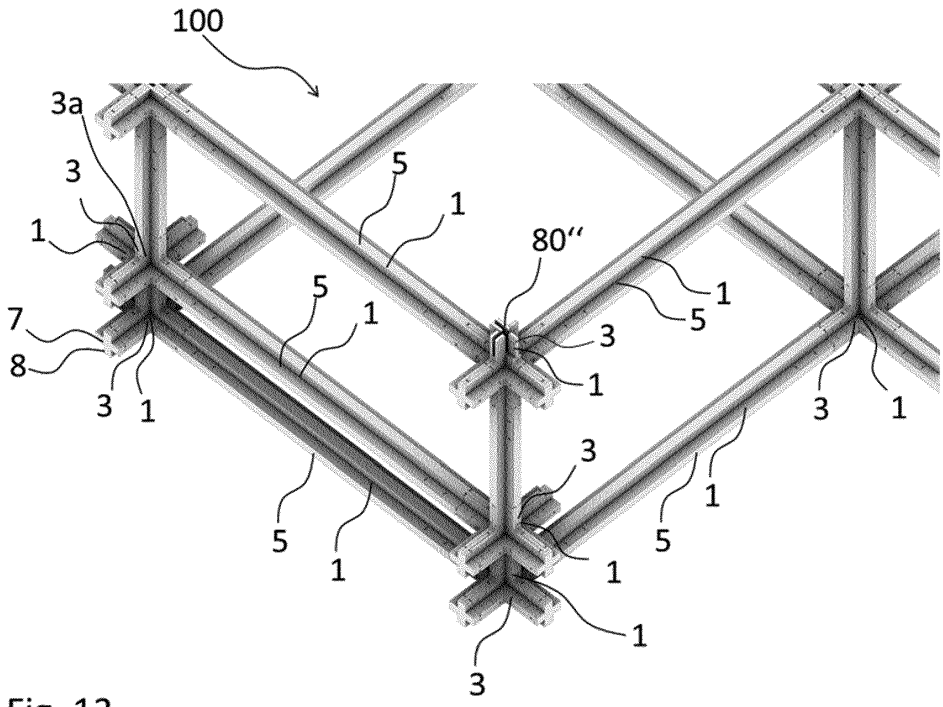

Fig. 13

EP 4 102 002 A1

Description

[0001] The invention is related to a building component and a building assembly comprising the building component according to the invention. The invention is further related to a method for the production of the building component.

[0002] In modern society, the demands for spaces change over time. This holds for permanent buildings including living space and public buildings whose utilisation may change over time, but also for temporary (non-permanent) spaces needed for a limited period of time, such as exhibition rooms. For temporary spaces, an easy assembly and disassembly is important as well as the stability, while maintaining a flexibility depending on the particular (maybe temporary) needs of the user, such as the size and/or the accessibility.

[0003] Spatial systems are of interest that are scalable and adaptable depending on the particular requirements. A building component is of interest providing a flexible extension and/or a flexible reduction of the building assembly. This problem is solved by the building component according to claim 1 and the building assembly according to claim 13. A method for the production of the building component is described in claim 15. Further embodiments of the invention are specified by the dependent claims and are described hereafter.

[0004] A first aspect of the invention relates to a building component configured to be repeatedly and removably connectable with a further building component. The building component comprises a central portion extending along a first axis and a plurality of connection members arranged at the central portion. Each connection member of the plurality of connection members comprises a receiving element and a separate plug-in element, wherein the plug-in element and the receiving element are shaped complementary to each other. The plug-in element comprises a front end of the plug-in element facing away from the central portion and the receiving element comprises a front end of the receiving element facing away from the central portion, wherein the front end of the plug-in element and the front end of the receiving element point in the same direction.

[0005] In the context of this application, the building component is also referred to as building unit or building element.

[0006] The building component is repeatedly connectable with the further building component. The building component can be repeatedly attached and/or detached with the further building component. The building component can be repeatedly assembled and/or disassembled with the further building component. The building component is removably connectable with the further building component. The building component can be removed from the further building component and can be connected with the further building component again (or another further building component). For instance, the building can be removed from the further building component for deconstruction of a building, such as an exhibition room, and can be reconnected with the further building component at another location.

[0007] The plurality of connection members can be attached to the central portion. The plurality of connection members can be connected with the central portion. The plurality of connection members can emanate from the central portion.

[0008] A first connection member and a second connection member can be arranged at opposing ends of the building component, particularly opposing ends with respect to the first axis.

[0009] The first axis can be a centre axis. In an embodiment, the first axis is an extension axis of the building component. The first axis can extend along a longitudinal extension direction of the building component, particularly when the building component has an elongated shape. The first axis can be a transverse axis.

[0010] Each connection member of the plurality of connection members can comprise one receiving element and one separate plug-in element.

[0011] The plug-in element can be a male connection element. The plug-in element can be a protrusion. The plug-in element can be a pin. The plug-in element can be a tongue.

[0012] The receiving element can be a female connection element. The receiving element can be a receptacle. The receiving element can be a recess. The receiving element can be a groove.

[0013] The plug-in element and the receiving element can be separated, complementary connection elements.

[0014] The separate plug-in element can be spatially distant to the receiving element. An entity of a connection member can either be comprised in the receiving element or in the separate plug-in element.

[0015] The receiving element can comprise an inner space. The inner space can comprise a hollow portion. The receiving element can comprise an entrance via that the inner space is accessible. The entrance can be an orifice.

[0016] The plug-in element can be complementary to the receiving element in terms of the shape and/or the size. The shape of the separate plug-in element can be complementary to the shape of the receiving element. The receiving element can be the negative form of the plug-in element.

[0017] The plug-in element can be complementary to the inner space of the receiving element in terms of the shape and/or the size. The shape of the separate plug-in element can be complementary to the shape of the inner space of the receiving element. The plug-in element can be complementary to the hollow portion of the receiving element in terms of the shape and/or the size.

[0018] The front end of the plug-in element can be a tip of the plug-in element. The front end of the plug-in element can be a distal end of the plug-in element. The front end of the receiving element can be a tip of the receiving element. The front end of the receiving element can be a distal end of the receiving element. The front end of the receiving element

can be the entrance of the receiving element via that the inner space of the receiving element is accessible. The front end of the receiving element can be the entrance of the receiving element via that the hollow portion is accessible.

[0019] The front end of the plug-in element and the front end of the receiving element point in the same direction, in particular such that the plug-in element and the receiving element are accessible from the same direction. The tip of the plug-in element and the entrance of the receiving element can point in the same direction.

[0020] An advantage is that each connection member is configured to be connectable with each other connection member. This advantageously increases the possible combinations of connection members. The flexibility is advantageously increased. An assembly is advantageously simplified.

[0021] According to an embodiment, the receiving element extends in a first extension direction of the receiving element parallel to the first axis, and the plug-in element extends in a first extension direction of the plug-in element parallel to the first axis, such that the receiving element and the plug-in element extend parallel to each other.

[0022] The plug-in element can have an elongated shape. The first extension direction of the plug-in element can be a longitudinal extension direction of the plug-in element.

[0023] Perpendicular to the first extension direction of the plug-in element, the plug-in element can have a circular shape. Perpendicular to the first extension direction of the plug-in element, the plug-in element can have a rectangular shape.

[0024] Along the first extension direction of the plug-in element, the plug-in element can extend equally.

[0025] The receiving element can have an elongated shape. The first extension direction of the receiving element can be a longitudinal extension direction of the receiving element.

[0026] The inner space of the receiving element can have an elongated shape. The first extension direction of the receiving element can be a longitudinal extension direction of the inner space of the receiving element.

[0027] Perpendicular to the first extension direction of the receiving element, the receiving element, particularly the inner space of the receiving element, can have a circular shape. Perpendicular to the first extension direction of the receiving element, the receiving element, particularly the inner space of the receiving element, can have a rectangular shape.

[0028] Along the first extension direction of the receiving element, the receiving element, particularly the inner space of the receiving element, can extend equally.

[0029] In an embodiment, the receiving element comprises two limiting elements delimiting a slot, and the plug-in element comprises a protrusion, wherein the slot and the protrusion are shaped complementary to each other.

[0030] The protrusion can be complementary to the slot in terms of the shape and/or the size, particularly in terms of the shape and the size.

[0031] The distal ends of the two limiting elements delimiting the slot can be considered as the front end of the receiving element. The portion of the slot delimited by the distal ends of the two limiting elements, particularly an entrance of the slot, can be considered as the front end of the receiving element. Via the entrance of the slot an inner space of the slot is accessible. Via the entrance of the slot the inner space of the slot is accessible.

[0032] In an embodiment, the two limiting elements extend parallel to each other.

[0033] In an embodiment, the two limiting elements are of equal length.

[0034] In an embodiment, the two limiting elements extend parallel to each other and the two limiting elements are of equal length.

[0035] The entrance of the slot can extend in a plane perpendicular to the first axis.

[0036] In an embodiment, the two limiting elements are arranged and configured such that they delimit a rectangular inner space. The two limiting elements can be arranged and configured such that they boarder two opposing sites of a rectangular inner space. The two limiting elements can be arranged and configured such that they boarder two opposing sites of a rectangular hollow portion. The entrance of the receiving element can be rectangular.

[0037] According to an embodiment, the plug-in element and the receiving element are arranged and configured such that the front end of the plug-in element and the front end of the receiving element are arranged in a front-end plane extending perpendicular to the first axis.

[0038] The front end of the plug-in element and the entrance of the receiving element can be arranged in the front-end plane.

[0039] In an embodiment, the front end of the plug-in element extends in a second extension direction of the plug-in element perpendicular to the first axis and the front end of the receiving element extends in a second extension direction of the receiving element perpendicular to the first axis, wherein the plug-in element and the receiving element are arranged such that the second extension direction of the plug-in element and the second extension direction of the receiving element are arranged radially with respect to the first axis.

[0040] According to an embodiment, in a circumferential direction of the connection member the plug-in element and the receiving element are arranged equidistant to each other.

[0041] In the circumferential direction of the connection member, the plug-in element and the receiving element can be arranged at an angle of 180° to each other.

[0042] According to an embodiment, in the circumferential direction of the connection member the plug-in element and the receiving element are arranged at an angle of 90° to each other.

[0043] In the front-end plane, the second extension direction of the plug-in element and the second extension direction of the receiving element can be arranged at an angle of 90° to each other. In the front-end plane, the second extension direction of the plug-in element and the second extension direction of the receiving element can be arranged at an angle of 180° to each other.

[0044] The circumferential direction of the connection member can be a circumferential direction of the building component. The circumferential direction of the connection member can extend in a plane perpendicular to the first axis.

[0045] In an embodiment, the plug-in element comprises a base of the plug-in element opposing the front end of the plug-in element and the receiving element comprises a base of the receiving element opposing the front end of the receiving element, wherein the plug-in element and the receiving element are arranged and configured such that the base of the plug-in element and the base of the receiving element are arranged in a base plane extending perpendicular to the first axis.

[0046] The base plane can extend parallel to the front-end plane.

[0047] In an embodiment, each connection member of the plurality of connection members comprises a plurality of receiving elements and a plurality of plug-in elements, particularly wherein a number of receiving elements of the plurality of receiving elements equals a number of plug-in elements of the plurality of plug-in elements.

[0048] In an embodiment, each connection member of the plurality of connection members comprises the equal number of receiving elements. In an embodiment, each connection member of the plurality of connection members comprises the equal number of plug-in elements.

[0049] The number of receiving elements can equal the number of plug-in elements.

[0050] In an embodiment, each connection member of the plurality of connection members comprises two receiving elements. In an embodiment, each connection member of the plurality of connection members comprises two plug-in elements.

[0051] In an embodiment, each connection member of the plurality of connection members comprises two receiving elements and one plug-in element. In an embodiment, each connection member of the plurality of connection members comprises one receiving element and two plug-in elements.

[0052] According to an embodiment, each connection member of the plurality of connection members comprises two receiving elements and two plug-in elements.

[0053] In an embodiment, in that the plurality of the receiving elements and the plurality of the plug-in elements are arranged such that perpendicular to the first axis, each front end of the plurality of plug-in elements and receiving elements forms a leg of a plus-sign.

[0054] The plurality of the receiving elements and the plurality of the plug-in elements can be arranged such that perpendicular to the first axis, each front end of the plurality of plug-in elements and receiving elements can form a leg of a cross.

[0055] The plurality of the receiving elements and the plurality of the plug-in elements can be arranged such that each front end of the receiving element and the plug-in element forms a leg of a plus-sign perpendicular to the first axis. The plurality of the receiving elements and the plurality of the plug-in elements can be arranged such that each front end of the receiving element and the plug-in element forms a leg of a plus-sign in the front-end plane.

[0056] In an embodiment, two receiving elements and two plug-in elements are radially arranged, wherein the two receiving elements and the two plug-in elements are arranged equidistantly.

[0057] According to an embodiment, in the circumferential direction of the connection member a multitude of the plurality of receiving elements adjoin each other and a multitude of the plurality of plug-in elements adjoins each other, particularly wherein the two receiving elements adjoin each other and the two plug-in elements adjoin each other.

[0058] In an embodiment, the plurality of the receiving elements and the plurality of the plug-in elements are arranged in the circumferential direction of the connection member in the sequence: first plug-in element, second plug-in element, first receiving element, second receiving element.

[0059] In an embodiment, the building component comprises a hollow channel extending along the first axis, establishing a through-opening passing through the building component.

[0060] The hollow channel can pass the central portion of the building component. The hollow channel can pass each connection member of the plurality of connection members. The hollow channel can establish a through-opening ranging from a first connection member to a second connection member via the central portion of the building component.

[0061] The hollow channel can comprise a first opening and a second opening. The fist opening can be arranged at the first connection member. The second opening can be arranged at the second connection member. The hollow channel can be accessible via the first opening. The hollow channel can be accessible via the second opening. With respect to the first axis, the first opening can be arranged opposite to the second opening.

[0062] The plug-in element, or the plurality of plug-in elements, can be arranged radially around the first opening. The plug-in element, or the plurality of plug-in elements, can be arranged radially around the second opening.

[0063] The receiving element, or the plurality of receiving elements, can be arranged radially around the first opening. The receiving element, or the plurality of receiving elements, can be arranged radially around the second opening.

[0064] The first opening can be arranged in the centre of the plus-sign formed by the plurality of plug-in elements and the plurality of receiving elements of the first connection member. The second opening can be arranged in the centre of the plus-sign formed by the plurality of plug-in elements and the plurality of receiving elements of the second connection member.

[0065] The hollow channel can be configured to receive a supply unit, particularly a plurality of supply units. The hollow channel can be configured to receive a mechanical, electrical and/or plumbing (MEP) unit (MEP unit), particularly a plurality of MEP units.

[0066] The hollow channel can be configured to receive a conduit, a wire, a power cable, a telephone line, a television cable and/or an internet cable. The hollow channel can be configured to receive a pipe.

[0067] The hollow channel can extend along a straight line along the first axis.

[0068] Perpendicular to the first axis, the hollow channel can have a rectangular cross section.

[0069] In an embodiment, the building component consists of a plurality of slices, wherein a first slice and a second slice are fixed to each other by a joining technique, particularly by glueing, plugging, by at least one mortise and tension joint, by at least one wooden pin and/or a metal strip comprising a hook.

[0070] In an embodiment, the building component consists of a plurality of slices, wherein adjoining slices are fixed to each other by a joining technique, particularly by glueing, plugging, by at least one mortise and tension joint, by at least one wooden pin and/or a metal strip comprising a hook.

[0071] The first slice can be a flat object. The first slice can have a flat surface. The first slice can have an upper surface and a lower surface. The first slice can comprise an edge. The edge of the first slice can connect the upper surface of the first slice and the lower surface of the first slice. The edge of the first slice can extend perpendicular to the upper surface of the first slice. The edge of the first slice can extend perpendicular to the lower surface of the first slice.

[0072] The second slice can be a flat object. The second slice can have a flat surface. The second slice can have an upper surface and a lower surface. The second slice can comprise an edge. The edge of the second slice can connect the upper surface of the second slice and the lower surface of the second slice. The edge of the second slice can extend perpendicular to the upper surface of the second slice. The edge of the second slice can extend perpendicular to the lower surface of the second slice.

[0073] The first slice can have an angular shape. The second slice can have an angular shape. The first slice can have a first shape. The second slice can have a second shape differing from the first shape. The second shape can be equal to the first shape.

[0074] In an embodiment, the first slice and the second slice have the same thickness. The thickness can be the extension the particular slice perpendicular to the surface of the particular slice.

[0075] The first slice can be joint to the second slice. The first slice can be joint to the second slice by fixing the lower surface of the fist slice to the upper surface of the second slice. A joint between surfaces of different slices is also referred to as surface-surface joint in the context of the application.

[0076] The lower surface of the fist slice can be glued to the upper surface of the second slice. The lower surface of the fist slice can be plugged to the upper surface of the second slice. The lower surface of the fist slice can be joined to the upper surface of the second slice by a mortise and tension joint, particularly a plurality of mortise and tension joints. The lower surface of the fist slice can be joined to the upper surface of the second slice by a wooden pin, particularly a plurality of wooden pins.

[0077] In an embodiment, the metal strip comprising the hook, particularly a plurality of hooks, is arranged between the lower surface of the fist slice and the upper surface of the second slice. The hook can be a barb. The metal strip metal strip can comprise a first hook and a second hook facing away from the first hook. In particular, the metal strip is arranged and configured such that at least a first hook penetrates the lower surface of the fist slice and at least a second hook penetrates the upper surface of the second slice. In particular, a plurality of first hooks can penetrate the lower surface of the fist slice. In particular, a plurality of second hooks can penetrate the upper surface of the second slice.

[0078] The first slice can be joint to the second slice by fixing the edge of the fist slice, particularly a joining portion of the edge of the fist slice, to the upper surface of the second slice. A joint between a surface and the edge of a different slice is also referred to as surface-edge joint in the context of the application.

[0079] The edge of the fist slice, particularly a joining portion of the edge of the fist slice, can be glued to the upper surface of the second slice. The edge of the fist slice, particularly a joining portion of the edge of the fist slice, can be plugged to the upper surface of the second slice. The edge of the fist slice, particularly a joining portion of the edge of the fist slice, can be joined to the upper surface of the second slice by a mortise and tension joint, particularly a plurality of mortise and tension joints. The edge of the fist slice, particularly a joining portion of the edge of the fist slice, can be joined to the upper surface of the second slice by a wooden pin, particularly a plurality of wooden pins.

[0080] In an embodiment, the metal strip comprising the hook, particularly a plurality of hooks, is arranged between the edge of the fist slice, particularly a joining portion of the edge of the fist slice, and the upper surface of the second

slice. The hook can be a barb. The metal strip metal strip can comprise a first hook and a second hook facing away from the first hook. In particular, the metal strip is arranged and configured such that at least a first hook penetrates the edge of the fist slice, particularly a joining portion of the edge of the fist slice, and at least a second hook penetrates the upper surface of the second slice. In particular, a plurality of first hooks can penetrate the edge of the fist slice, particularly a joining portion of the edge of the fist slice. In particular, a plurality of second hooks can penetrate the upper surface of the second slice.

[0081] A slice can be joint to a plurality of slices. The slice can be joint to a plurality of slices via a plurality of surface-surface joints. The first slice can be fixed to the second slice via a surface-surface joint. The first slice can be fixed to further slice via a surface-surface joint. A plurality of slices joined together via surface-surface joints can form a stack of slices.

[0082] The first slice can be fixed to the second slice via a surface-surface joint. The first slice can be fixed to further slice via a surface-edge joint.

[0083] Via a plurality of surface-surface joints, a pre-defined 3D shape of the building component can be obtained by a plurality of slices. Via a plurality of surface-edge joints, a pre-defined 3D shape of the building component can be obtained by a plurality of slices.

[0084] An advantage is that the generation of the building component is simplified. Even a complex 3-dimensional structure can be easily generated.

[0085] In an embodiment, the building component comprises or consists of wood, in particular glued-laminated timber or laminated veneer lumber, particularly wherein one slice of the plurality of slices, particularly each slice of the plurality of slices, comprises or consists of wood, in particular glued-laminated timber or laminated veneer lumber.

[0086] In an embodiment, the building component comprises or consists of timber. In an embodiment, the building component comprises or consists of lumber.

[0087] An advantage of laminated veneer lumber is its high structural stability.

[0088] In an embodiment, one slice of the plurality of slices, particularly each slice of the plurality of slices forms a part of one connection member, particularly forms a part of each of two different connection members.

[0089] The slice can form a part of a receiving element of a first connection member and a part of a plug-in element of a further connection member.

[0090] The slice can form a part of a receiving element of the first connection member and a part of a receiving element of the further connection member.

[0091] The slice can form a part of a plug-in element of the first connection member and a part of a plug-in element of the further connection member.

[0092] According to an embodiment, each receiving element is formed by a multitude of slices of the plurality of slices, particularly at least three slices of the plurality of slices, particularly an inner slice and two adjoining outer slices, particularly wherein the multitude of slices is arranged and configured such that the limiting elements comprises the outer slices and the base of the receiving element comprises the inner slice.

[0093] In an embodiment, each plug-in element is formed by a multitude of slices of the plurality of slices, particularly at least three slices of the plurality of slices, particularly an inner slice and two adjoining outer slices, particularly wherein the multitude of slices is arranged and configured such that the protrusion comprises the inner slices and the base of the plug-in element comprises the outer slices.

[0094] The inner slice can be arranged between the two adjoining outer slices.

[0095] In an embodiment, the central portion of the building component comprises an access-opening via that the hollow channel is accessible.

[0096] The access-opening can be a through-opening. The access-opening can be a recess. The access-opening can connect the hollow channel and a surface of the central portion. An opening of the access-opening can be delimited by the surface of the central portion. The access-opening can extend perpendicular to the first axis. The access-opening can extend perpendicular to the hollow channel.

[0097] The access-opening can be a supply access. The access-opening can be a maintenance access.

[0098] Via the access-opening the MEP unit and/or the supply unit arranged in the hollow channel is easily accessible. The installation of the MEP unit and/or the supply unit in the hollow channel is advantageously simplified. The maintenance of the MEP unit and/or the supply unit is advantageously simplified.

[0099] In an embodiment, the building component is a beam extending along the first axis, wherein a first connection member of the plurality of connection members of the beam faces away from a second connection member of the plurality of connection members of the beam, such that the front end of the plug-in element of the first connection member and the front end of the receiving element of the first connection member face away from the front end of the plug-in element of the second connection member and the front end of the receiving element of the second connection member.

[0100] In an embodiment, the beam comprises glued-laminated timber.

[0101] The beam can comprise the access-opening.

[0102] In an embodiment, each connection member of the plurality of connection members of the beam comprises

two receiving elements and one plug-in element. In an embodiment, each connection member of the plurality of connection members of the beam comprises one receiving element and two plug-in elements.

[0103] Each connection member of the plurality of connection members of the beam can comprise two receiving elements and two plug-in elements.

[0104] According to an embodiment, the building component is a connection node configured for a multi-directional connection, wherein the central portion comprises a first section extending along the first axis and a second section extending along a second axis, wherein the second axis is arranged in an angle to the first axis, particularly wherein the second axis is arranged perpendicular to the first axis.

[0105] The connection node can comprise a connection member of the first axis arranged along the first axis and a connection member of the second axis arranged along the second axis. The connection member of the first axis can be arranged perpendicular to the connection member of the second axis.

[0106] The connection node can be configured to provide connections in different orientations, particularly along the first axis and along the second axis.

[0107] The connection node can be a T-joint.

[0108] In an embodiment, the central portion further comprises a third section extending along the third axis, wherein the third axis is arranged in an angle to the first axis and in an angle to the second axis, particularly wherein the third axis is arranged perpendicular to the first axis and to the second axis.

[0109] The connection node can comprise a connection member of the first axis arranged along the first axis, a connection member of the second axis arranged along the second axis, and a connection member of the third axis arranged along the third axis. The connection member of the first axis can be arranged perpendicular to the connection member of the second axis. The connection member of the first axis can be arranged perpendicular to the connection member of the third axis. The connection member of the second axis can be arranged perpendicular to the connection member of the third axis.

[0110] The connection node can be configured to provide connections in different orientations, particularly along the first axis, along the second axis and along the third axis.

[0111] In an embodiment, the node comprises laminated veneer lumber.

[0112] According to an embodiment, the building component comprises between two and six connection members.

[0113] The beam can comprise two connection members, particularly wherein the two connection members arranged along the first axis, facing away from each other.

[0114] The node can comprise three connection members. In an embodiment, a first connection member and a second connection member are arranged along the first axis, facing away from each other. A third connection member can be arranged along the second axis, particularly extending perpendicular to the first axis.

[0115] The node can comprise four connection members. In an embodiment, a first connection member and a second connection member are arranged along the first axis, facing away from each other. A third connection member and a fourth connection member can be arranged along the second axis, particularly extending perpendicular to the first axis, facing away from each other.

[0116] The node can comprise four connection members. In an embodiment, a first connection member and a second connection member are arranged along the first axis, facing away from each other. A third connection member can be arranged along the second axis, particularly extending perpendicular to the first axis. A fourth connection member can be arranged along the third axis, particularly extending perpendicular to the first axis.

[0117] The node can comprise five connection members. In an embodiment, a first connection member and a second connection member are arranged along the first axis, facing away from each other. A third connection member and a fourth connection member can be arranged along the second axis, particularly extending perpendicular to the first axis, facing away from each other. A fifth connection member can be arranged along the third axis, particularly extending perpendicular to the first axis.

[0118] The node can comprise six connection members. In an embodiment, a first connection member and a second connection member are arranged along the first axis, facing away from each other. A third connection member and a fourth connection member can be arranged along the second axis, particularly extending perpendicular to the first axis, facing away from each other. A fifth connection member and a sixth connection member can be arranged along the third axis, particularly extending perpendicular to the first axis, facing away from each other.

[0119] In an embodiment, a first connection member of the plurality of connection members of the connection node is arranged at the first section of the central portion and a second connection member of the plurality of connection members of the connection node is arranged at the second section of the central portion, such that the first connection member of the plurality of connection members of the connection node and the second connection member of the plurality of connection members of the connection node face angled to each other, particularly perpendicular to each other.

[0120] In an embodiment, the first connection member and the second connection member are configured and arranged such that the front end of the plug-in element of the first connection member and the front end of the plug-in element of the second connection member face angled to each other, particularly perpendicular to each other.

[0121] In an embodiment, the first connection member and the second connection member are configured and arranged such that the front end of the receiving element of the first connection member and the front end of the receiving element of the second connection member face angled to each other, particularly perpendicular to each other.

[0122] In an embodiment, the first connection member and the second connection member are configured and arranged such that the front end of the plug-in element of the first connection member and the front end of the receiving element of the second connection member face angled to each other, particularly perpendicular to each other.

[0123] In an embodiment, the first connection member and the second connection member are configured and arranged such that the front end of the receiving element of the first connection member and the front end of the plug-in element of the second connection member face angled to each other, particularly perpendicular to each other.

[0124] The first connection member and the second connection member can be configured and arranged such that the front-end plane related to the first connection member and the front-end plane related to the second connection member are arranged angled to each other, particularly perpendicular to each other.

[0125] In an embodiment, further a third connection member of the plurality of connection members of the connection node is arranged at the third section of the central portion, such that the third connection member of the plurality of connection members of the connection node and the first connection member of the plurality of connection members of the connection node and the second connection member of the plurality of connection members of the connection node face angled to each other, particularly perpendicular to each other.

[0126] In an embodiment, the first connection member and the third connection member are configured and arranged such that the front end of the plug-in element of the first connection member and the front end of the plug-in element of the third connection member face angled to each other, particularly perpendicular to each other.

[0127] In an embodiment, the first connection member and the third connection member are configured and arranged such that the front end of the receiving element of the first connection member and the front end of the receiving element of the third connection member face angled to each other, particularly perpendicular to each other.

[0128] In an embodiment, the second connection member and the third connection member are configured and arranged such that the front end of the plug-in element of the second connection member and the front end of the plug-in element of the third connection member face angled to each other, particularly perpendicular to each other.

[0129] In an embodiment, the second connection member and the third connection member are configured and arranged such that the front end of the receiving element of the second connection member and the front end of the receiving element of the third connection member face angled to each other, particularly perpendicular to each other.

[0130] In an embodiment, the first connection member, the second connection member and the third connection member are configured and arranged such that the front end of the plug-in element of the first connection member, the front end of the plug-in element of the second connection member and the front end of the plug-in element of the third connection member face angled to each other, particularly perpendicular to each other.

[0131] In an embodiment, the first connection member, the second connection member and the third connection member are configured and arranged such that the front end of the receiving element of the first connection member, the front end of the receiving element of the second connection member and the front end of the receiving element of the third connection member face angled to each other, particularly perpendicular to each other.

[0132] The first connection member and the third connection member can be configured and arranged such that the front-end plane related to the first connection member and the front-end plane related to the third connection member are arranged angled to each other, particularly perpendicular to each other.

[0133] The second connection member and the third connection member can be configured and arranged such that the front-end plane related to the second connection member and the front-end plane related to the third connection member are arranged angled to each other, particularly perpendicular to each other.

[0134] The first connection member, the second connection member and the third connection member can be configured and arranged such that the front-end plane related to the first connection member, the front-end plane related to the second connection member and the front-end plane related to the third connection member are arranged angled to each other, particularly perpendicular to each other.

[0135] The connection node can be configured to provide connections in different orientations, particularly along the first axis and along the second axis. The connection node can be configured to provide connections in different orientations, particularly along the first axis, along the second axis and along the third axis.

[0136] In an embodiment, the hollow channel comprises a first channel portion extending along the first axis and a second channel portion extending along the second axis.

[0137] According to an embodiment, the hollow channel comprises a third channel portion extending along the third axis.

[0138] The first channel portion can be connected with the second channel portion. The first channel portion can be connected with the third channel portion. The second channel portion can be connected with the third channel portion.

[0139] The first channel portion and the second channel portion can be connected via a common channel hub. The first channel portion, the second channel portion and the third channel portion can be connected via a common channel hub.

[0140] A second aspect of the invention relates to a building assembly comprising the building component and a further building component according to the invention, wherein the building component and the further building component are repeatedly and removably connectable.

[0141] The building component can be a connection node. The building component can be a beam.

[0142] The further building component can be a connection node, The further building component can be a beam.

[0143] A first connection node and a second connection node can be repeatedly and removably connectable. A first beam and a second beam can be repeatedly and removably connectable.

[0144] A connection node and a beam can be repeatedly and removably connectable.

[0145] In an embodiment, each connection member of the building component comprises the equal number of plug-in elements. In an embodiment, each connection member of the building component comprises the equal number of receiving elements. The arrangement of the plug-in elements and the receiving elements can be equal in each connection member of the building component.

[0146] According to an embodiment, in an assembled state, a receiving element of a selected connection member of the building component receives a respective plug-in element of a selected connection member of the further building component, and a plug-in element of the selected connection member of the building component is arranged in a respective receiving element of the selected connection member of the further building component, particularly wherein in the assembled state, the particular plug-in element is almost completely inserted in the respective receiving element, such that the building component and the further building component are positively coupled and/or friction locked.

[0147] In an embodiment, in an assembled state, each receiving element of a selected connection member of the building component receives a respective plug-in element of a selected connection member of the further building component, and each plug-in element of the selected connection member of the building component is arranged in a respective receiving element of the selected connection member of the further building component, particularly wherein in the assembled state, the particular plug-in element is almost completely inserted in the respective receiving element, such that the building component and the further building component are positively coupled and/or friction locked.

[0148] In the assembled state, the building component and the further building component can be positively coupled and/or friction locked.

[0149] The plug-in element can be almost completely inserted in the inner space of the respective receiving element.

[0150] In an embodiment, in the assembled state, the tip of the plug-in element of the selected connection member of the building element adjoins the base of the receiving element of the selected connection member of the further building element. The base of the plug-in element of the selected connection member of the building element can adjoin the front end of the receiving element of the selected connection member of the further building element.

[0151] According to an embodiment, the building component and the further building component are arranged and configured such that, in the assembled state, the hollow channel of the building component adjoins the hollow channel of the further building component, establishing an integrated channel passing through both the building component and the further building component.

[0152] The first opening of the hollow channel of the building component can adjoin a first opening of the hollow channel of the assembled further building component.

[0153] In an embodiment, the building component comprises the access-opening via that the hollow channel of the building component is accessible, wherein the building component and the further building component are arranged and configured such that, in the assembled state, the hollow channel of the further building component is accessible via the access-opening and the hollow channel of the building component.

[0154] In an embodiment, the access-opening via that the hollow channel is accessible is arranged at the beam. The hollow channel of an assembled connection node is accessible via the access-opening and the hollow channel of the beam adjoining the hollow channel of an assembled connection node.

[0155] The hollow channel of the connection node can be easily accessible via the access-opening of the assembled beam. The installation and/or maintenance of a supply unit and/or a MEP unit is advantageously simplified even in the assembled state.

[0156] In an embodiment, the building assembly comprises a plurality of connection nodes and a plurality of beams, particularly wherein each connection member of each beam of the plurality of beams is assembled with a respective connection member of a connection node of the plurality of connection nodes.

[0157] The beam can be arranged between two connection nodes. Each beam can be arranged between each two connection nodes.

[0158] A further aspect of the invention is related to of the production of the building component according to the invention. The method comprises the steps of:

- providing a plurality of slices,

- forming a stack of slices by fixing together a first slice of the plurality of slices and a second slice of the plurality of

slices by a joining technique, particularly by glueing, plugging, by establishing at least one mortise and tension joint, by at least one wooden pin and/or a metal strip comprising a hook,

- forming a further stack of slices by fixing together a further first slice of the plurality of slices and a further second slice of the plurality of slices by a joining technique, particularly by glueing, plugging, by establishing at least one mortise and tension joint, by at least one wooden pin and/or a metal strip comprising a hook,

- forming the building component by fixing together the first stack of slices and the further stack of slices by a joining technique, particularly by glueing, plugging, by establishing at least one mortise and tension joint, by at least one wooden pin and/or a metal strip comprising a hook.

[0159] In the following, further features, advantages and embodiments of the present invention are explained with reference to the Figures, wherein

Fig. 1	shows an embodiment of the plurality of slices configured to form a beam according to the invention,
Fig. 2	shows a sectional view of an embodiment of a beam,
Fig. 3	shows an embodiment of the plurality of slices configured to form a connection node according to the invention,
Fig. 4 and Fig. 5	illustrate steps of an embodiment of the formation of an exemplary connection node,
Fig. 6	illustrates a step an embodiment of the formation of a further embodiment of a connection node,
Fig. 7A	shows a perspective view of an embodiment of a connection member,
Fig. 7B	illustrates a section of an embodiment of a building component,
Fig. 7C	illustrates a section of an embodiment of a building component,
Fig. 7D	illustrates a front view of an embodiment of a connection member,
Fig. 8	shows a perspective view of an embodiment of a connection node,
Fig. 9	shows a perspective view of an embodiment of a connection node and embodiments of six beams in a disassembled state,
Fig. 10	shows a perspective view of an embodiment of a connection node and embodiments of six beams in an assembled state,
Fig. 11	illustrates an embodiment of the hollow channel of the assembly shown in Fig. 10,
Fig. 12	shows an embodiment of a connection node with one connected beam,
Fig. 13	shows a perspective view of a portion of an embodiment of a building assembly, and
Fig. 14	shows a side view of a portion of an embodiment of a building assembly,
Fig. 15	shows different embodiments of a connection node, and
Fig. 16	shows a plurality of building components.

[0160] Fig. 1 shows a plurality of slices 10. The slices 10 can be fixed to each other such that a beam 5 (Fig. 2) is formed. The slices 10 can have different shapes.

[0161] A slice 10 can comprise a connection member portion 24. A slice can comprise a central portion part 26. When fixed together forming a beam 5, the connection member portion 24 of the slice 10 can be a portion of a connection member 80 of the beam. In the connection member portion 24, a slice 10 can comprise a recess 28, particularly a plurality

of recesses 28. The recess 28 can be configured to receive a fixing element, particularly a fixing element to stabilise a connection between a building component and a further building component.

[0162] In an embodiment, the connection member portion 24 can comprise a more resilient material than the central portion part 26. In an embodiment, the connection member portion 24 can comprise a more durable material than the central portion part 26. In an embodiment, the material of the connection member portion 24 equals the material of the central portion part 26.

[0163] In Fig. 2, a sectional view of an embodiment of the beam 5 is shown.

[0164] The beam 5 can extend along a first axis A1. The longitudinal extension direction L1 of the beam 5 can extend along the first axis A1.

[0165] The beam 5 can comprise an outer surface 50. The beam 5 can comprise a hollow channel 60. The hollow channel 60 can extend along the first ais A1.

[0166] In the present embodiment, the beam 5 comprises an access-opening 70. The access-opening 70 can be arranged in a central portion 30 of the beam 5. The access-opening 70 can extend perpendicular to the first axis A1. The access-opening 70 can extend perpendicular to the extension direction of the hollow channel 60. The access-opening 70 can extend perpendicular to the extension direction of the beam L1.

[0167] The access-opening 70 can be a through-opening, connecting the hollow channel 60 and the outer surface 50 of the beam 5. An opening 71 of the access-opening 70 is delimited by the outer surface 50 of the beam 5. A closure 72 can be arranged at the opening 71. A cover 73 can be arranged at the opening 71.

[0168] The beam 5 can comprise a plurality of access-openings 70. Each access-opening 70 can be covered by an individual cover 73. Each access-opening 70 can extend perpendicular to the first axis A1.

[0169] The hollow channel 60 can be configured to receive a supply unit, particularly a plurality of supply units. The hollow channel 60 can be configured to receive a MEP unit, particularly a plurality of MEP units. Via the access-opening 70, the supply unit and/or the MEP unit can be accessible from the outside.

[0170] Fig. 3 shows a top view of a plurality of slices 10. A slice 10a, 10b, 10c, 10d, ... of the plurality of slices 10 can have an angular shape. The shape can differ between different slices 10a, 10b, 10c, 10d, ... A multitude of slices can have the same shape. The size can differ between different slices 10a, 10b, 10c, 10d, ...

[0171] A slice 10a, 10b can comprise a recess 12 (12a, 12b) of the particular slice 10a, 10b. The recess 12, 12a, 12b can be a through-opening ranging from an upper surface 14, 14a, 14b of the slice 10, 10a, 10b to an opposing lower surface of the slice 10, 10a, 10b.

[0172] The recess 12, 12a, 12b can be configured such that, when the slices 10 are fixed together to generate a stack 11 of slices 10, the recesses 12, 12a, 12b align with each other to form the hollow channel 60, particularly a section of the hollow channel 60 (also see Figs 4-6).

[0173] The recess 12, 12a, 12b can be configured such that, when the slices 10 are fixed together to generate the building component 1, the recesses 12, 12a, 12b align with each other to form the hollow channel 60, particularly a section of the hollow channel 60 (also see Figs 4-6).

[0174] Figs 4 and 5 show different stages during the assembly of an embodiment of a building component, particularly an embodiment of a connection node. Fig 6. illustrates in intermediate stage of the assembly of another embodiment of a building component, particularly a further embodiment of a connection node.

[0175] A multitude of slices 10 can be fixed together to form a stack 11, 11a, 11b, 11c of slices 10. In particular, a multitude of slices 10 can be fixed together via surface-surface connections to generate the stack 11, 11a, 11b, 11c of slices 10. The stack 11, 11a, 11b, 11c of slices 10 can comprise or consist of at least three slices 10.

[0176] The stack 11, 11a, 11b, 11c of slices 10 can comprise an outer slice 10', particularly two outer slices 10', and an inner slice 10" arranged between the outer slices 10'. The stack 11, 11a, 11b, 11c can comprise a plurality of inner slices 10". In the present embodiment the plurality of inner slices 10" of a second stack 11b and a third stack 11c comprises two inner slices 10" arranged in a common plane. Each inner slice 10" can be fixed to each of the outer slices 10' via a surface-surface-connection.

[0177] The inner slices 10" can be arranged distant to each other, generating a section of the hollow channel 60 (Fig. 5).

[0178] The plurality of stacks 11 can be fixed together to generate the connection node 3. In an embodiment, the plurality of stacks 11 is glued together. In an embodiment, two stacks 11 are fixed together by a mortise and tension joint. particularly a plurality of mortise and tension joints (Fig. 6). In particular, when fixing together two stacks 11 via a surface-edge-connection, the upper surface 14 of the outer slice 10' can comprise a recess 20 of the mortise and tension joint and an edge 16 of slice 10 of the connecting stack 11 can comprise a protrusion 22 of the mortise and tension joint configured to be insertable in the respective recess 20.

[0179] Fig. 7A shows a section of an embodiment of a connection node 3 (node 3). In particular, a perspective view of an example of a connection member 80 is given. In Figs. 7B and 7C, schematic sections of embodiments of building components 1 are shown. An exemplary embodiment of a connection member 80 is illustrated in Fig. 7D.

[0180] The connection member 80 can be arranged at the central portion 30, particularly at the first section 31 of the central portion 30. The first section 31 of the central portion 30 can extend along the first axis A1 (Figs 7A, 7B, 7C).

[0181] A circumferential direction C1 of the connection member extends perpendicular to the first axis A1 (Figs 7A, 7D).

[0182] The connection member 80 can comprise two plug-in elements 90. A plug-in element 90 can be a protrusion 92. The plug-in element 90 can comprise a tip 110 of the plug-in element 90. The tip 110 of the plug-in element 90 can be the front-end 112 of the plug-in element 90. The plug-in element 90 can comprise a base 114 of the plug-in element 90 opposing the tip 110 of the plug-in element 90 (Figs 7A - 7D).

[0183] The connection member 80 can comprise two receiving elements 91. A receiving element 91 can comprise an inner space 95. The inner space 95 can be accessible via an orifice 96, particularly along the first axis A1. The receiving element 91 can comprise a slot 93. The slot 93 can be delimited by a set of delimiting elements 94a, 94b. The receiving element 91 can comprise a tip 111 of the receiving element 91. The tip 111 of the receiving element 91 can be the front-end 113 of the receiving element 91. The tip 111 of the receiving element 91 can be an edge of the delimiting elements 94a, 94b of the slot 93. The orifice 96 can be the tip 111 of the receiving element 91. The receiving element 91 can comprise a base 115 of the receiving element opposing the tip 111 of the receiving element 91 (Figs 7A - 7D).

[0184] The front ends 112 of the plug-in elements 90 of the connection member 80 and the front-end 113 of the receiving element 91 of the connection member 80 can point towards the same direction. The front ends 112 of the plug-in elements 90 of the connection member 80 and the front-end 113 of the receiving element 91 of the connection member 80 can be arranged in a common front-end plane P1 (Fig. 7B, 7C).

[0185] The bases 114 of the plug-in elements 90 of the connection member 80 and the bases 115 of the receiving element 91 of the connection member 80 can be arranged in a common base plane P2. The base plane P2 can extend parallel to the front-end plane P1. The front-end plane P1 can extend perpendicular to the first axis A1 (Fig. 7B, 7C).

[0186] The plug-in element 90 is separated from the receiving element 91. The delimiting elements 94a, 94b of the receiving element 91 are separated from the protrusion 92 of the plug-in element 90 (Figs 7A, 7D).

[0187] The longitudinal extension direction of a plug-in element 90 can extend parallel to the first axis A1. The longitudinal extension direction of a receiving element 91 can extend parallel to the first axis A1.

[0188] Perpendicular to the first axis A1, the plug-in element 90 can extend along a second extension direction L2 of the plug-in element 90. Perpendicular to the first axis A1, the receiving element 91 can extend along a second extension direction L3 of the receiving element 91. The plug-in element 90 and the receiving element 91 can be arranged such that the second extension direction L2 of the plug-in element 90 and the second extension direction L3 of the receiving element 91 are arranged radially with respect to the first axis A1 (Figs 7A, 7D).

[0189] In the front-ends 112 of the plug-in elements 90 and the front ends 113 of the receiving elements 91 can form a plus in the front-end plane P1 (Figs 7B, 7C).

[0190] The plug-in elements 90 and the receiving elements 91 can be arranged around an opening 64 of the hollow channel 60, particularly of the opening 64 of the first channel portion 61 of the hollow channel 60. The plug-in elements 90 and the receiving elements 91 can be arranged radially with respect to the first axis A1. The plug-in elements 90 and the receiving elements 91 can be arranged radially with respect to the opening 64 of the hollow channel 60 (Fig. 7A, 7D).

[0191] In Fig. 8, an embodiment of a building component 1, particularly a connection node 3 is presented. The connection node 3 can be a full node 3a, comprising six connection members 80. In Fig. 9, the node 3 illustrated in Fig. 8 is shown indicating how six beams 5 might be assembled with the node 3, 3a. Fig. 10 shows a corresponding building assembly 100, particularly an assembled state of the node 3, 3a and the six beams 5. In Fig. 11, the hollow channel 60 of the building assembly 100 according to Fig 10 is illustrated.

[0192] The embodiment of the full node 3a comprises a central portion 30. The central portion 30 can comprise a first section 31. The first section 31 of the central portion 30 can extend along the first axis A1. The central portion 30 can comprise a second section 32. The second section 32 of the central portion 30 can extend along a second axis A2. The second axis A2 can extend perpendicular to the first axis A1. The central portion 30 can comprise a third section 33. The third section 33 of the central portion 30 can extend along a third axis A3. The third axis A3 can extend perpendicular to the first axis A1. The third axis A3 can extend perpendicular to the second axis A2. In the presented embodiment the third axis A3 extends perpendicular to the first axis A1 and perpendicular to the second axis A2 (Fig. 8).

[0193] The connection node 3 can comprise a plurality of connection members 80. In the present embodiment the node 3 comprises six connection members 80, 80a, 80b, 80c, 80d ....The connection members 80, 80a, 80b, 80c, 80d ... can be arranged at the central portion 30. The plurality of connection members 80, 80a, 80b, 80c, 80d ... can be arranged such that each connection member of the plurality of connection members faces away from the central portion 30.

[0194] In particular, two selected connection members 80a, 80b can be arranged at the first section 31 of the central portion 30. Two further selected connection members 80c, 80d can be arranged at the second section 32 of the central portion 30. Two further selected connection members 80e, 80f can be arranged at the third section 33 of the central portion 30.

[0195] Fig. 9 shows partial views of beams 5 (each partial view comprising only one of the two connection members 80 of a beam 5) that can be assembled with the node 3. In an embodiment, the beam 5 comprises a connection member 80 comprising two receiving elements 91 and two plug-in elements 90.

[0196] In an assembled state, the plug-in elements 90 of the node 3 can be completely inserted in the respective

receiving elements 91 of the assembled beams 5. In an assembled state, the plug-in elements 90 of the assembled beams 5 can be completely inserted in the respective receiving elements 91 of the node 3 (Figs 10, 11, 12).

[0197] In Fig. 11, an embodiment of the hollow channel 60 of a building assembly 100 comprising the node 3 with assembled beams 5 is shown. The node 3 and the beams 5 are indicated in light grey. Fig. 11B illustrates an embodiment of the hollow channel 60 of the node 3.

[0198] The hollow channel 60 of the node 3 can comprise a first channel portion 61 extending along the first axis A1. The hollow channel 60 of the node 3 can comprise a second channel portion 62 extending along the second axis A2. The hollow channel 60 of the node 3 can comprise a third channel portion 63 extending along the third axis A3.

[0199] The first channel portion 61 and the second channel portion 62 can be connected via a channel hub 66. The first channel portion 61, the second channel portion 62 and the third channel portion 63 can be connected via a channel hub 66. The channel hub 66 can be arranged in the centre of the node 3.

[0200] When connected with a beam 5 comprising a hollow channel 60, the hollow channel 60 of the node 3 and the hollow channel 60 of the beam 5 can form an integrated channel 68 passing through both, the node 3 and the beam 5. When connected with a plurality of beams 5 each comprising a hollow channel 60, the hollow channel 60 of the node 3 and the hollow channels 60 of the plurality of beams 5 can form an integrated channel 68 passing through the node 3 and the plurality of beams 5. In particular, the hollow channel 60 of the node 3 and the hollow channels 60 of all connected beams 5 can form an integrated channel 68 passing through the node 3 and the connected beams 5.

[0201] Fig. 12 shows a building assembly 100 comprising two building components 1, particularly a node 3 and a beam 5. The beam 5 comprises an access-opening. The access-opening can be covered by a cover 73. The access-opening can be covered by a closure 72. Via the access-opening 70 of the beam 5, the hollow channel of the beam 5 and the hollow channel of the assembled node 3 can be accessible.

[0202] Fig. 13 shows a perspective view of a section of a building assembly 110. Fig. 14. shows a side view of a section of a building assembly 110. A building assembly can comprise a plurality of building components 1. A building assembly 110 can comprise a plurality of nodes 3 and/or a plurality of beams 5.

[0203] A node 3 can be connected with a beam 5 (see also Figs. 10 - 12). A node 3 can be connected with a further node 3 (Fig. 13). A full node 3a can be connected with a further node 3.

[0204] A beam 5 can be connected with two nodes 3. The beam 5 can be arranged between two nodes 3. A beam 5 can be a support. A beam 5 can be bar.

[0205] In the shown embodiment, a connection member 80 of a node 3 is not connected with a further building component. This can be an available connection member 80". Via such an available connection member 80", the building assembly 100 can be easily expanded (Fig. 13).

[0206] The building assembly 100 can be easily assembled. The building assembly can be easily disassembled.

[0207] Fig. 15 shows different embodiments of nodes 3.

[0208] In Fig 15 A, an embodiment of a connection node 3 comprising three connection members 80 is shown. The connection node 3 can have a shape of a T-joint 3b.

[0209] In the presented embodiment, the node 3, 3b comprises a central portion 30 and a first section 31 extending along the first axis A1. Two selected connection members 80, 80a, 80b can be arranged at the first section 31 of the central portion 30. The node 3, 3b can comprise a second section 32 of the central portion 30, extending along the second axis A2. A connection member 80, 80c can be arranged at the second section 32 of the central portion 30.

[0210] The connection members 80, 80a, 80b, 80d can be arranged such that each connection member 80, 80a, 80b, 80d faces away from the central portion 30, particularly such that the particular front-ends of the plug-in elements and the receiving elements face away from the central portion 30.

[0211] In Fig 15 B, an embodiment of a node 3 comprising five connection members 80 is shown. The connection node 3 can have a shape of a double-T-joint 3c.

[0212] In the presented embodiment, the node 3, 3c comprises a central portion 30 and a first section 31 extending along the first axis A1. Two selected connection members 80, 80a, 80b can be arranged at the first section 31 of the central portion 30.

[0213] The node 3, 3c can comprise a second section 32 of the central portion 30, extending along the second axis A2. One connection member 80, 80c can be arranged at the second section 32 of the central portion 30.

[0214] The node 3, 3c can comprise a third section 33 of the central portion 30, extending along the third axis A3. Two connection members 80, 80e, 80f can be arranged at the third section 33 of the central portion 30.

[0215] The connection members 80, 80a, 80b, 80c, 80e, 80f can be arranged such that each connection member 80, 80a, 80b, 80c, 80e, 80f faces away from the central portion 30, particularly such that the particular front-ends of the plug-in elements and the receiving elements face away from the central portion 30.

[0216] In Fig. 15C, an embodiment of a full node 3a comprising six connection members, 80, 80a-80f is shown.

[0217] Fig 16 shows a plurality of building components 1, comprising two full nodes 3, 3a and two connection nodes 3 of the shape of a double-T-joint 3c. The plurality of building components 1 comprises three beams 5. In the presented example two longer beams 5 and one shorter beam are shown, differing in the extension along the extension direction

L1 of the beam 5 (along the first axis A1).

[0218] In the embodiment presented in Fig. 16, a plurality of caps 7 are shown. A cap 7 comprises one connection member 80 attached to a plain cover plate 8. The cover plate 8 can have the shape of a plus-sign.

[0219] In a connected position, the cap 7 can be connected with a connection member 80 which is not connected with a connection member of a further building component 1 (see also Fig. 13). The cap 7 can be repeatedly and removably connectable. The cap 7 can be easily removed such that the connection member of the building component 1 can be an available connection member 80" such that an easy extension of the assembly 100 can be established.

Claims

1. A building component (1) configured to be repeatedly and removably connectable with a further building component (1), wherein the building component (1) comprises a central portion (30) extending along a first axis (A1) and a plurality of connection members (80, 80a, 80b, 80c, 80d, 80e, 80f, 80', 80") arranged at the central portion (30),

   wherein each connection member (80, 80a, 80b, 80c, 80d, 80e, 80f, 80', 80") of the plurality of connection members (80, 80a, 80b, 80c, 80d, 80e, 80f, 80', 80") comprises a receiving element (91) and a separate plug-in element (90),
   wherein the plug-in element (90) and the receiving element (91) are shaped complementary to each other,
   wherein the plug-in element (90) comprises a front end (112) of the plug-in element (90) facing away from the central portion (30) and the receiving element (91) comprises a front end (113) of the receiving element (91) facing away from the central portion (30),
   characterised in that
   the front end (112) of the plug-in element (90) and the front end (113) of the receiving element (91) point in the same direction.

2. The building component (1) according to claim 1, **characterised in that** the receiving element (91) extends in a first extension direction (L5) of the receiving element (91) parallel to the first axis (A1) and the plug-in element (90) extends in a first extension direction (L4) of the plug-in element (90) parallel to the first axis (A1), such that the receiving element (91) and the plug-in element (90) extend parallel to each other.

3. The building component (1) according to one of the claims 1 or 2, **characterised in that** the receiving element (91) comprises two limiting elements (94a, 94b) delimiting a slot (93), and the plug-in element (90) comprises a protrusion (92), wherein the slot (93) and the protrusion (92) are shaped complementary to each other, particularly wherein the two limiting elements (94a, 94b) extend parallel to each other and/or the two limiting elements (94a, 94b) are of equal length.

4. The building component (1) according to one of the claims 1 to 3, **characterised in that** the plug-in element (90) and the receiving element (91) are arranged and configured such that the front end (112) of the plug-in element (90) and the front end (113) of the receiving element (91) are arranged in a front-end plane (P1) extending perpendicular to the first axis (A1), and/or **in that** the front end (112) of the plug-in element (90) extends in a second extension direction (L2) of the plug-in element (90) perpendicular to the first axis (A1) and the front end (113) of the receiving element (91) extends in a second extension direction (L3) of the receiving element (91) perpendicular to the first axis (A1), wherein the plug-in element (90) and the receiving element (91) are arranged such that the second extension direction (L2) of the plug-in element (90) and the second extension direction (L3) of the receiving element (91) are arranged radially with respect to the first axis (A1), and/or **in that** in a circumferential direction (C1) of the connection member (80, 80a, 80b, 80c, 80d, 80e, 80f, 80', 80") the plug-in element (90) and the receiving element (91), are arranged equidistant to each other or arranged at an angle of 90° to each other.

5. The building component (1) according to one of the claims 1 to 4, **characterised in that** the plug-in element (90) comprises a base (114) of the plug-in element (90) opposing the front end (112) of the plug-in element (90) and the receiving element (91) comprises a base (115) of the receiving element (91) opposing the front end (113) of the receiving element (91), wherein the plug-in element (90) and the receiving element (91) are arranged and configured such that the base (114) of the plug-in element (90) and the base (115) of the receiving element (91) are arranged in a base plane (P2) extending perpendicular to the first axis (A1).

6. The building component (1) according to one of the claims 1 to 5, **characterised in that** each connection member (80, 80a, 80b, 80c, 80d, 80e, 80f, 80', 80") of the plurality of connection members (80, 80a, 80b, 80c, 80d, 80e, 80f,

80', 80") comprises a plurality of receiving elements (91) and a plurality of plug-in elements (90), particularly wherein a number of receiving elements (91) of the plurality of receiving elements (91) equals a number of plug-in elements (90) of the plurality of plug-in elements (90), and/or **characterised in that** each connection member (80, 80a, 80b, 80c, 80d, 80e, 80f, 80") of the plurality of connection members (80, 80a, 80b, 80c, 80d, 80e, 80f, 80") comprises two receiving elements (91) and two plug-in elements (90), particularly wherein the plurality of the receiving elements (91) and the plurality of the plug-in elements (90) are arranged such that perpendicular to the first axis (A1), each front end (112) of the plurality of plug-in elements (90) and receiving elements (91) forms a leg of a plus-sign, particularly and/or wherein in the circumferential direction (C1) of the connection member (80, 80a, 80b, 80c, 80d, 80e, 80f, 80") a multitude of the plurality of receiving elements (91) adjoins each other and a multitude of the plurality of plug-in elements (90) adjoin each other, particularly wherein the two receiving elements (91) adjoin each other and the two plug-in elements (90) adjoin each other.

7. The building component (1) according to one of the claims 1 to 6, **characterised in that** the building component (1) comprises a hollow channel (60) extending along the first axis (A1), establishing a through-opening passing through the building component (1).

8. The building component (1) according to one of the claims 1 to 7, **characterised in that** the building component (1) consists of a plurality of slices (10, 10a, 10b, 10c, 10d ..., 10', 10"), wherein a first slice (10, 10a, 10b, 10c, 10d ..., 10', 10") and a second slice (10, 10a, 10b, 10c, 10d ..., 10', 10") are fixed to each other by a joining technique, particularly by glueing, plugging, by at least one mortise and tension joint, by at least one wooden pin and/or a metal strip comprising a hook, and/or **in that** the building component (1) comprises or consists of wood, in particular glued-laminated timber or laminated veneer lumber, particularly wherein one slice (10, 10a, 10b, 10c, 10d ..., 10', 10") of the plurality of slices (10, 10a, 10b, 10c, 10d ..., 10', 10"), particularly each slice (10, 10a, 10b, 10c, 10d ..., 10', 10") of the plurality of slices (10, 10a, 10b, 10c, 10d ..., 10', 10"), comprises or consists of wood, in particular glued-laminated timber or laminated veneer lumber.

9. The building component (1) according to claim 8, **characterised in that** one slice (10, 10a, 10b, 10c, 10d ..., 10', 10") of the plurality of slices (10, 10a, 10b, 10c, 10d ..., 10', 10"), particularly each slice (10, 10a, 10b, 10c, 10d ..., 10', 10") of the plurality of slices (10, 10a, 10b, 10c, 10d ..., 10', 10") forms a part of one connection member (80, 80a, 80b, 80c, 80d, 80e, 80f, 80', 80"), particularly forms a part of each of two different connection members (80, 80a, 80b, 80c, 80d, 80e, 80f, 80', 80"), particularly wherein each receiving element (91) is formed by a multitude of slices (80, 80a, 80b, 80c, 80d, 80e, 80f, 80', 80") of the plurality of slices (80, 80a, 80b, 80c, 80d, 80e, 80f, 80', 80"), particularly at least three slices (80, 80a, 80b, 80c, 80d, 80e, 80f, 80', 80") of the plurality of slices (80, 80a, 80b, 80c, 80d, 80e, 80f, 80', 80"), particularly an inner slice (10") and two adjoining outer slices (10'), particularly wherein the multitude of slices (80, 80a, 80b, 80c, 80d, 80e, 80f, 80', 80") is arranged and configured such that the limiting elements (94a, 94b) comprise the outer slices (10') and the base (115) of the receiving element (91) comprises the inner slice (10"), and/or particularly wherein each plug-in element (90) is formed by a multitude of slices (80, 80a, 80b, 80c, 80d, 80e, 80f, 80', 80") of the plurality of slices(80, 80a, 80b, 80c, 80d, 80e, 80f, 80', 80"), particularly at least three slices (80, 80a, 80b, 80c, 80d, 80e, 80f, 80', 80") of the plurality of slices(80, 80a, 80b, 80c, 80d, 80e, 80f, 80', 80"), particularly an inner slice (10") and two adjoining outer slices (10'), particularly wherein the multitude of slices (80, 80a, 80b, 80c, 80d, 80e, 80f, 80', 80") is arranged and configured such that the protrusion (92) comprises the inner slices (10") and the base (114) of the plug-in element (90) comprises the outer slices. (10').

10. The building component (1) according to one of the claims 1 to 9, **characterised in that** the central portion (30) of the building component (1) comprises an access-opening (70) via that the hollow channel (60) is accessible.

11. The building component (1) according to one of the claims 1 to 10, **characterised in that** the building component (1) is a beam (5) extending along the first axis (A1), wherein a first connection member (80, 80a, 80b, 80c, 80d, 80e, 80f, 80', 80") of the plurality of connection members (80, 80a, 80b, 80c, 80d, 80e, 80f, 80', 80") of the beam (5) faces away from a second connection member (80, 80a, 80b, 80c, 80d, 80e, 80f, 80', 80") of the plurality of connection members (80, 80a, 80b, 80c, 80d, 80e, 80f, 80', 80") of the beam (5), such that the front end (112) of the plug-in element (90) of the first connection member (80, 80a, 80b, 80c, 80d, 80e, 80f, 80', 80") and the front end (113) of the receiving element (91) of the first connection member (80, 80a, 80b, 80c, 80d, 80e, 80f, 80', 80") face away from the front end (112) of the plug-in element (90) of the second connection member (80, 80a, 80b, 80c, 80d, 80e, 80f, 80', 80") and the front end (113) of the receiving element (91) of the second connection member (80, 80a, 80b, 80c, 80d, 80e, 80f, 80', 80").

12. The building component (1) according to one of the claims 1 to 10, **characterised in that** the building component

(1) is a connection node (3, 3a, 3b, 3c) configured for a multi-directional connection, wherein the central portion (30) comprises a first section (31) extending along the first axis (A1) and a second section (32) extending along a second axis (A2), wherein the second axis (A2) is arranged in an angle to the first axis (A1), particularly wherein the second axis (A2) is arranged perpendicular to the first axis (A1), particularly wherein a first connection member (80, 80a, 80b, 80c, 80d, 80e, 80f, 80', 80") of the plurality of connection members (80, 80a, 80b, 80c, 80d, 80e, 80f, 80', 80") of the connection node (3, 3a, 3b, 3c) is arranged at the first section (31) of the central portion (30) and a second connection member (80, 80a, 80b, 80c, 80d, 80e, 80f, 80', 80") of the plurality of connection members (80, 80a, 80b, 80c, 80d, 80e, 80f, 80', 80") of the connection node (3, 3a, 3b, 3c) is arranged at the second section (32) of the central portion (30), such that the first connection member (80, 80a, 80b, 80c, 80d, 80e, 80f, 80', 80") of the plurality of connection members (80, 80a, 80b, 80c, 80d, 80e, 80f, 80', 80") of the connection node (3, 3a, 3b, 3c) and the second connection member (80, 80a, 80b, 80c, 80d, 80e, 80f, 80', 80") of the plurality of connection members (80, 80a, 80b, 80c, 80d, 80e, 80f, 80', 80") of the connection node (3, 3a, 3b, 3c) face angled to each other, particularly perpendicular to each other, and/or particularly wherein the hollow channel (60) comprises a first channel portion (61) extending along the first axis (A1) and a second channel portion (62) extending along the second axis (A2).

13. A building assembly (100) comprising the building component (1) and a further building component (1) according to one of the claims 1 to 12, wherein the building component (1) and the further building component (1) are repeatedly and removably connectable.

14. The building assembly (100) according to claim 13, **characterised in that** in an assembled state, each receiving element (91) of a selected connection member (80, 80a, 80b, 80c, 80d, 80e, 80f, 80', 80") of the building component (1) receives a respective plug-in element (90) of a selected connection member (80, 80a, 80b, 80c, 80d, 80e, 80f, 80', 80") of the further building component (1), and each plug-in element (90) of the selected connection member (80, 80a, 80b, 80c, 80d, 80e, 80f, 80', 80") of the building component (1) is arranged in a respective receiving element (91) of the selected connection member (80, 80a, 80b, 80c, 80d, 80e, 80f, 80', 80") of the further building component (1), particularly wherein in the assembled state, the particular plug-in element (90) is almost completely inserted in the respective receiving element (91), such that the building component (1) and the further building component (1) are positively coupled and/or friction locked, and/or **in that** the building component (1) and the further building component (1) are arranged and configured such that, in the assembled state, the hollow channel (60) of the building component (1) adjoins the hollow channel (60) of the further building component (1), establishing an integrated channel (68) passing through both the building component (1) and the further building component (1), particularly wherein the building component (1) comprises the access-opening (70) via that the hollow channel (60) of the building component (1) is accessible, wherein the building component (1) and the further building component (1) are arranged and configured such that, in the assembled state, the hollow channel (60) of the further building component (1) is accessible via the access-opening (70) and the hollow channel (60) of the building component (1).

15. Method of the production of the building component (1) according to one of the claims 1 to 12 comprising the steps of:

- providing a plurality of slices (10, 10a, 10b, 10c, 10d ..., 10', 10"),
- forming a stack (11, 11a, 11b, 11c) of slices (10, 10a, 10b, 10c, 10d ..., 10', 10") by fixing together a first slice (10, 10a, 10b, 10c, 10d ..., 10', 10") of the plurality of slices (10, 10a, 10b, 10c, 10d ..., 10', 10") and a second slice (10, 10a, 10b, 10c, 10d ..., 10', 10") of the plurality of slices (10, 10a, 10b, 10c, 10d ..., 10', 10") by a joining technique, particularly by glueing, plugging, by establishing at least one mortise and tension joint, by at least one wooden pin and/or a metal strip comprising a hook,
- forming a further stack (11, 11a, 11b, 11c) of slices (10, 10a, 10b, 10c, 10d ..., 10', 10") by fixing together a further first slice (10, 10a, 10b, 10c, 10d ..., 10', 10") of the plurality of slices (10, 10a, 10b, 10c, 10d ..., 10', 10") and a further second slice (10, 10a, 10b, 10c, 10d ..., 10', 10") of the plurality of slices (10, 10a, 10b, 10c, 10d ..., 10', 10") by a joining technique, particularly by glueing, plugging, by establishing at least one mortise and tension joint, by at least one wooden pin and/or a metal strip comprising a hook,
- forming the building component (1) by fixing together the first stack (11, 11a, 11b, 11c) of slices (10, 10a, 10b, 10c, 10d ..., 10', 10") and the further stack (11, 11a, 11b, 11c) of slices (10, 10a, 10b, 10c, 10d ..., 10', 10") by a joining technique, particularly by glueing, plugging, by establishing at least one mortise and tension joint, by at least one wooden pin and/or a metal strip comprising a hook.

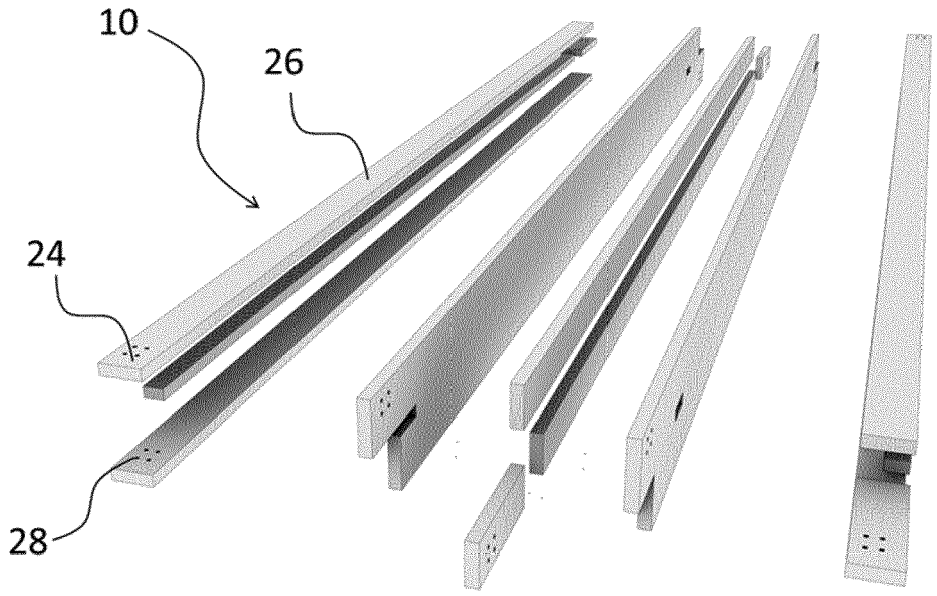

Fig. 1

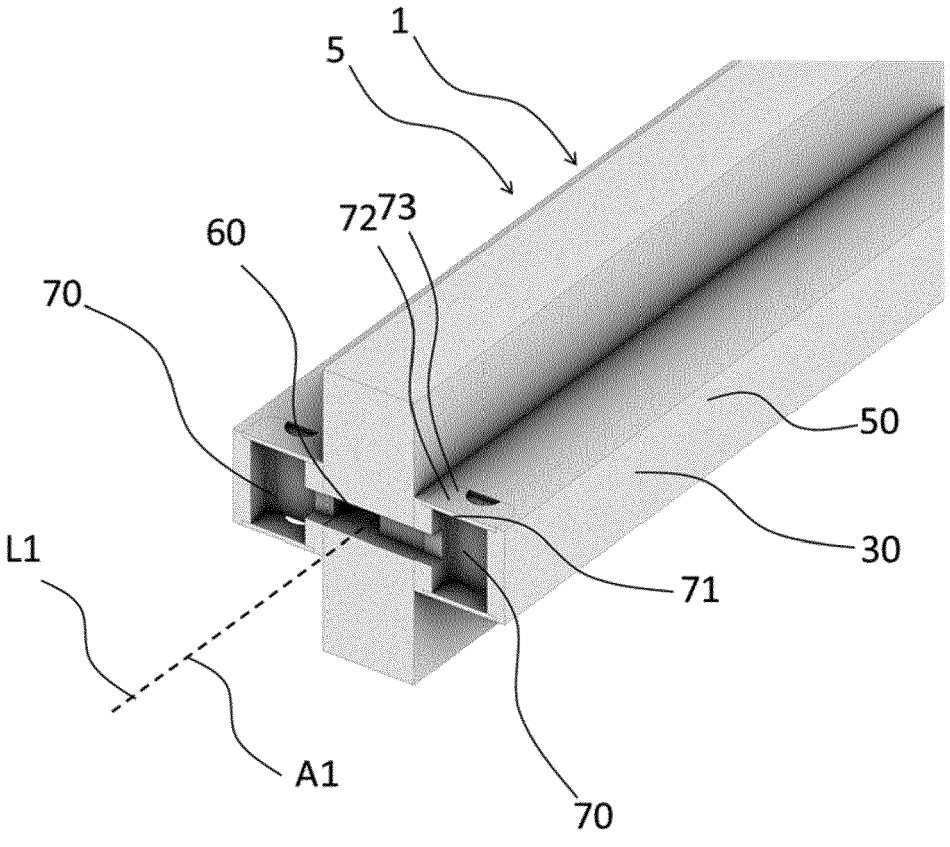

Fig. 2

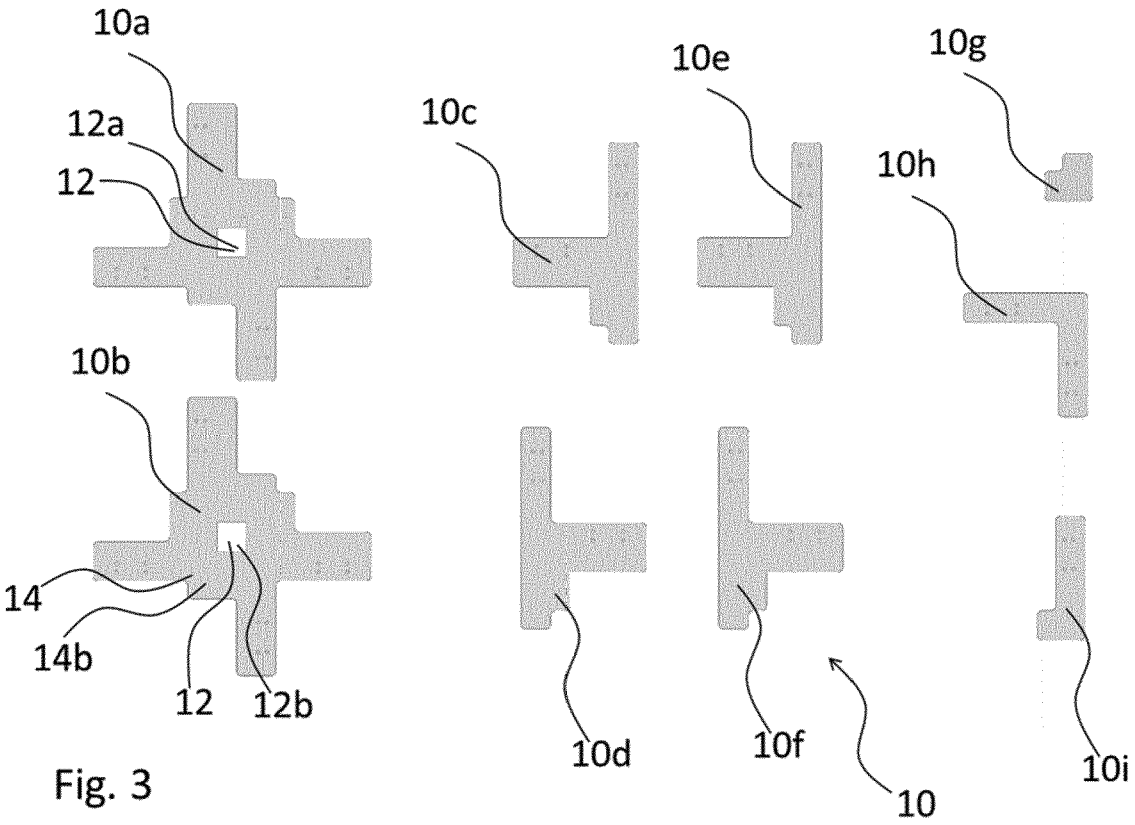
10a
12a
12
10b
14
14b
12
12b
10c
10e
10g
10h
10d
10f
10
10i

Fig. 3

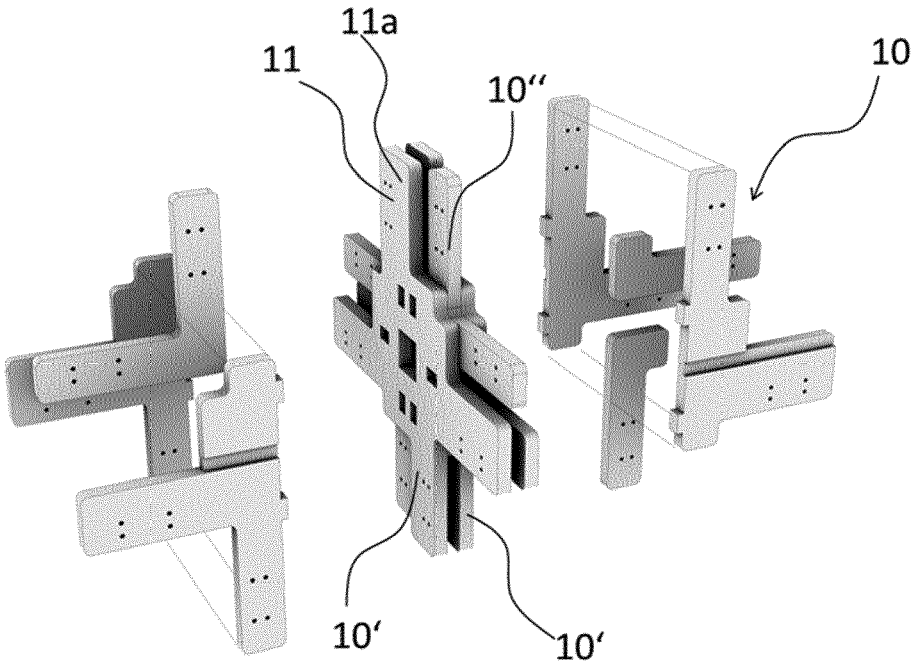
11a
11
10''
10
10'
10'

Fig. 4

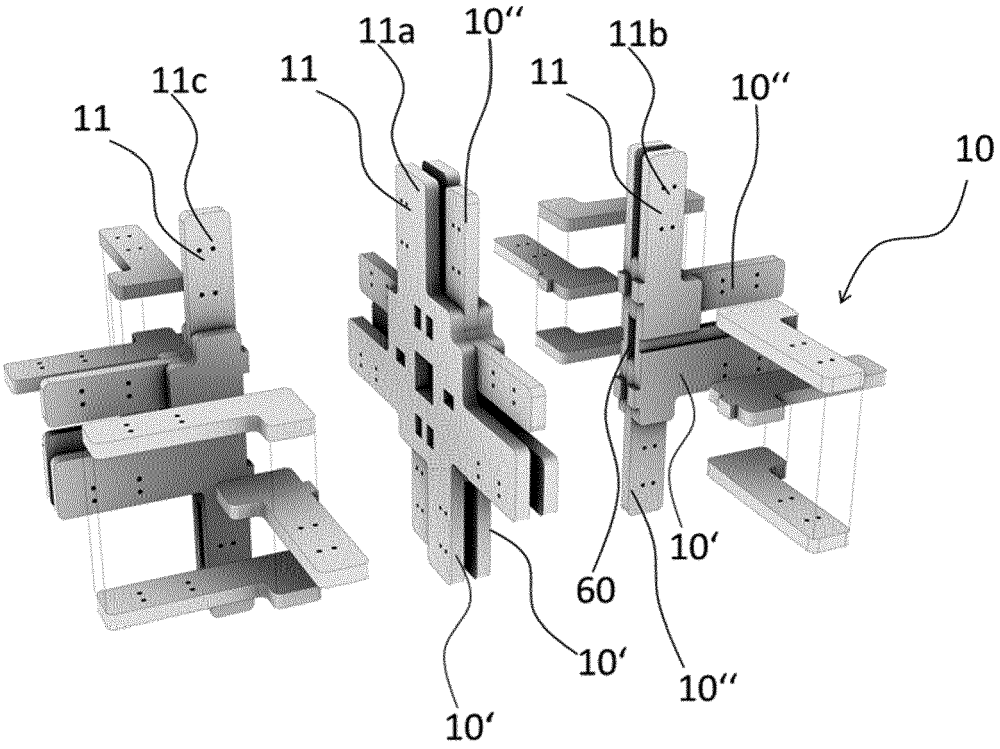

Fig. 5

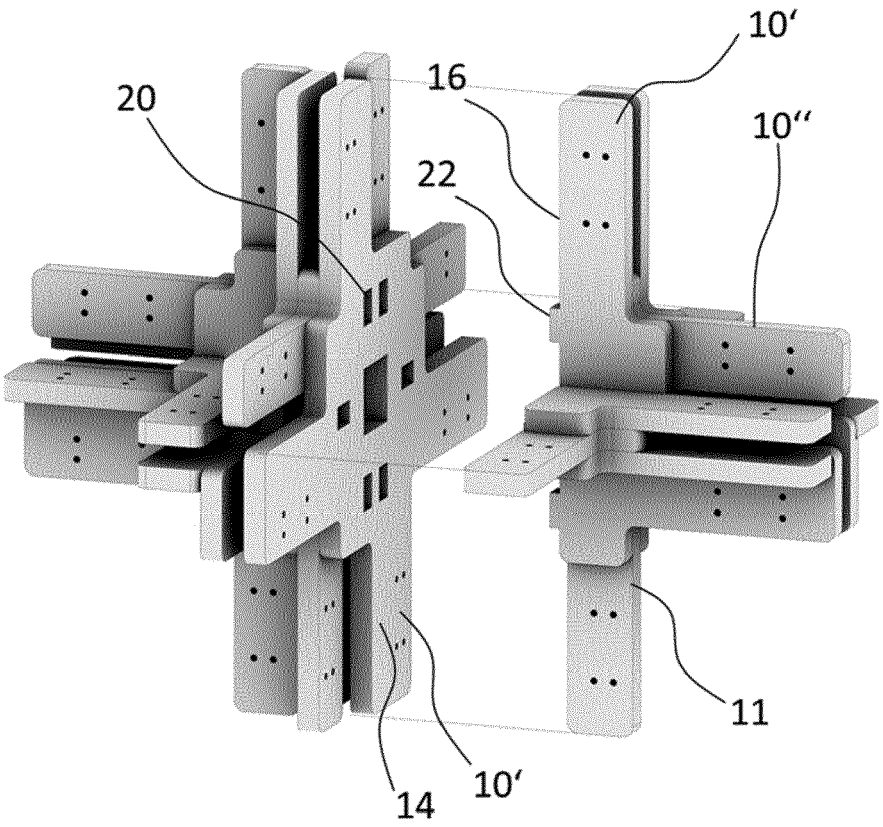

Fig. 6

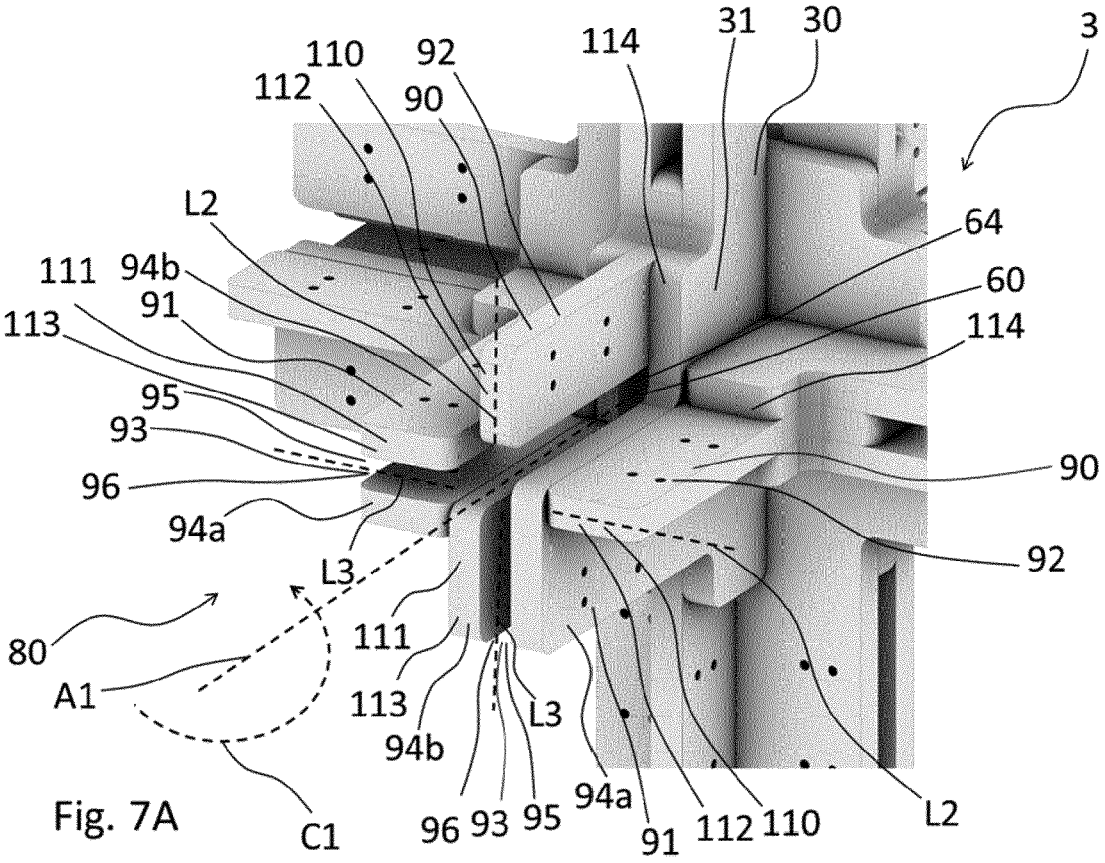
3
31
30
114
110
92
112
90
L2
64
60
111
94b
91
113
95
93
96
94a
L3
80
A1
C1
111
113
94b
96
93
95
L3
94a
91
112
110
L2
92
90

Fig. 7A

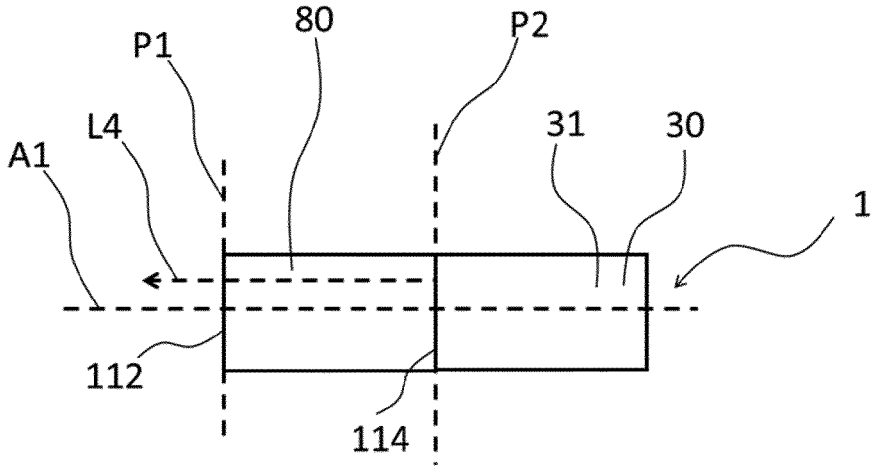
80
P1
P2
L4
A1
31
30
1
112
114

Fig. 7B

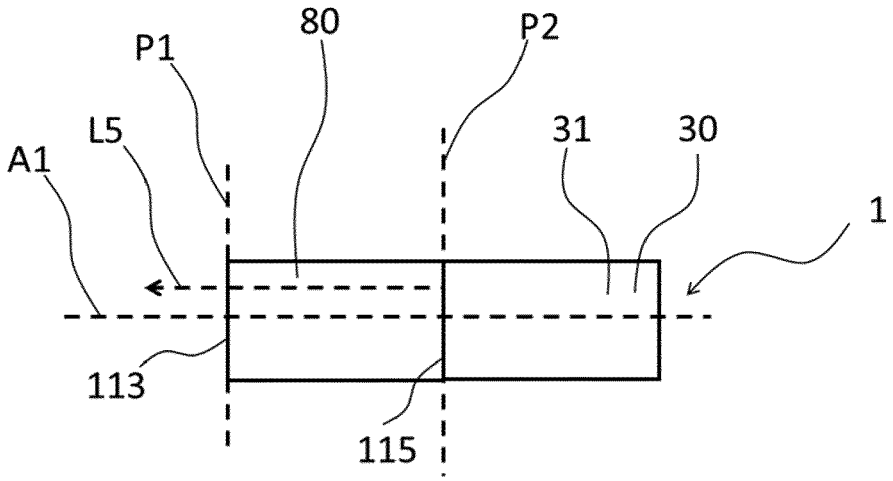

Fig. 7C

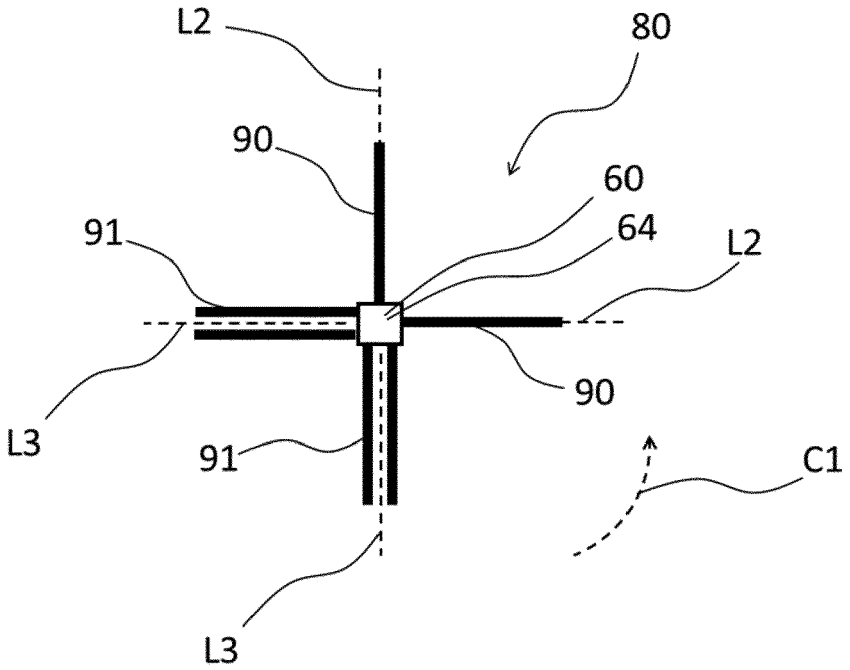

Fig. 7D

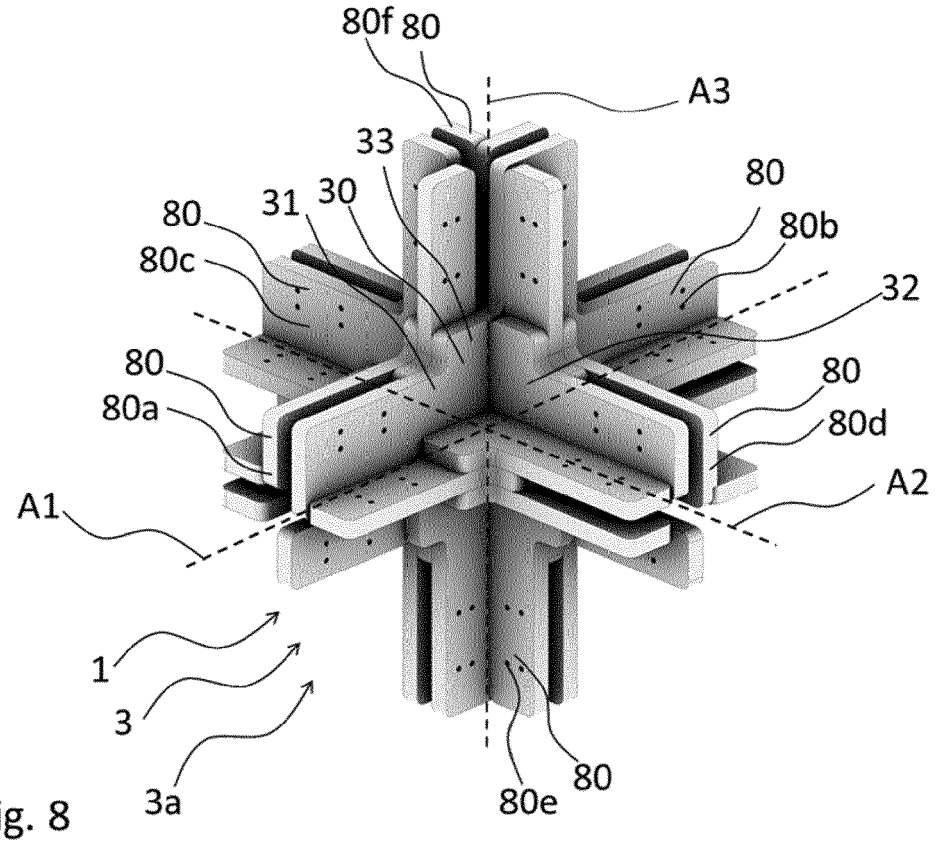
80f
80
A3
33
80
31
30
80b
80
80c
32
80
80
80a
80d
A2
A1
1
3
3a
80e
80

Fig. 8

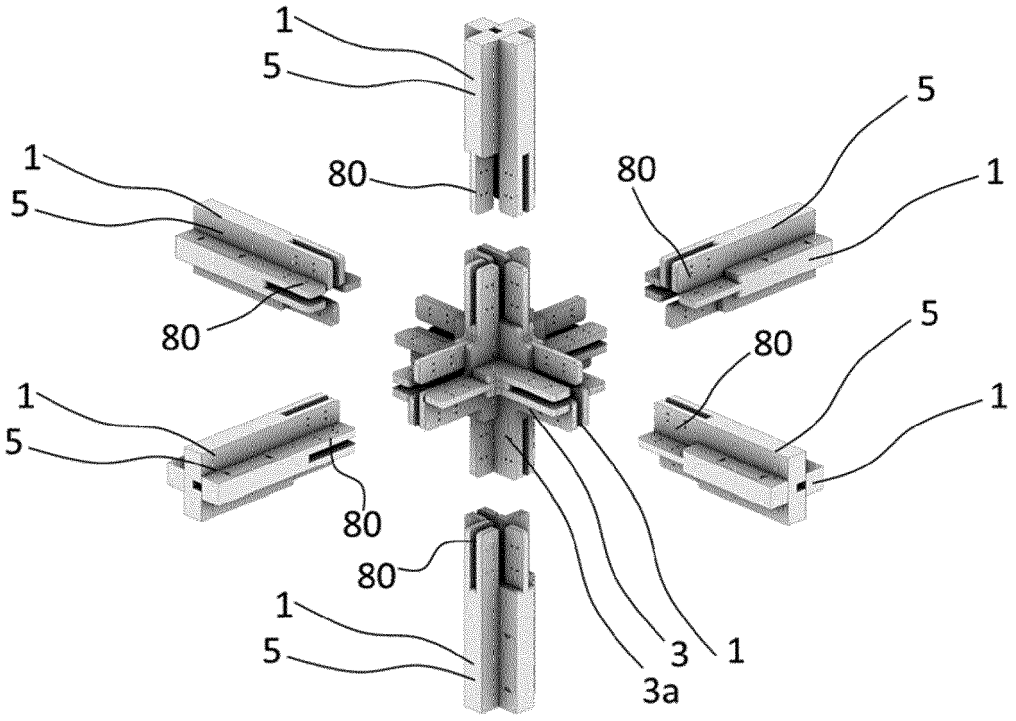
1
5
5
1
80
80
1
5
80
5
80
1
1
5
80
5
1
80
80
1
5
3
1
3a

Fig. 9

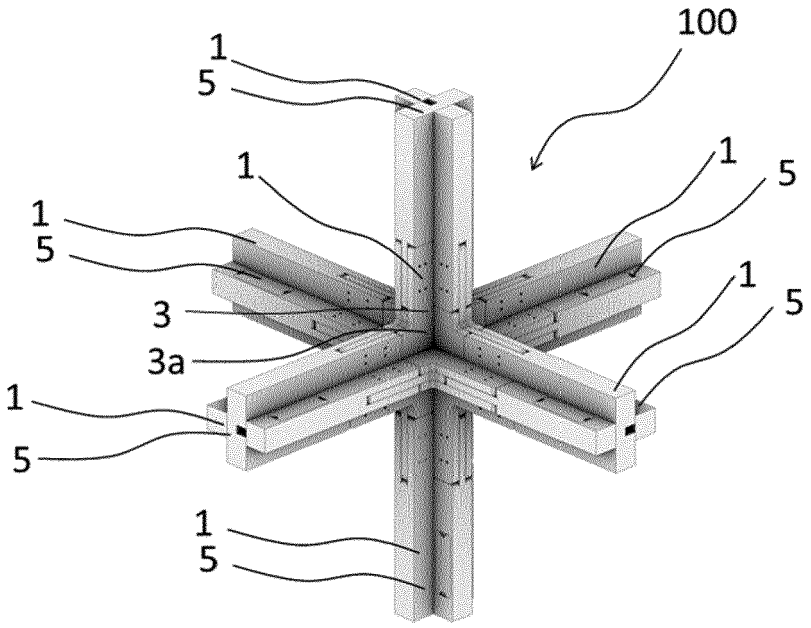

Fig. 10

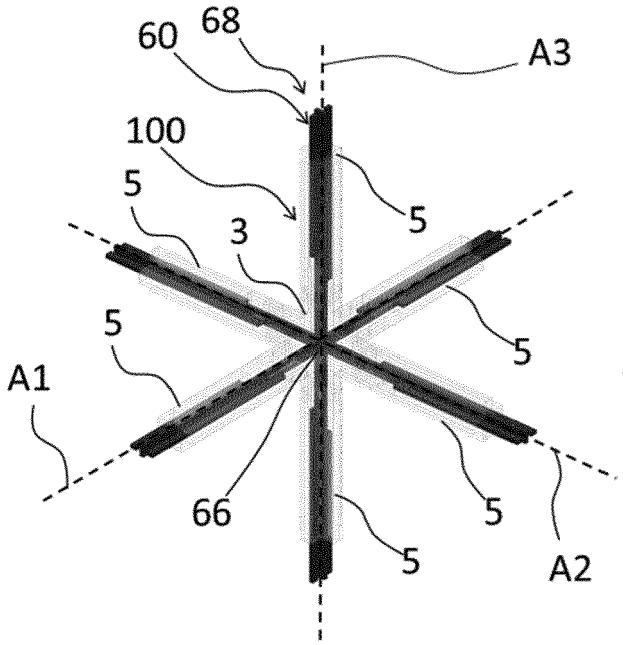

Fig. 11A

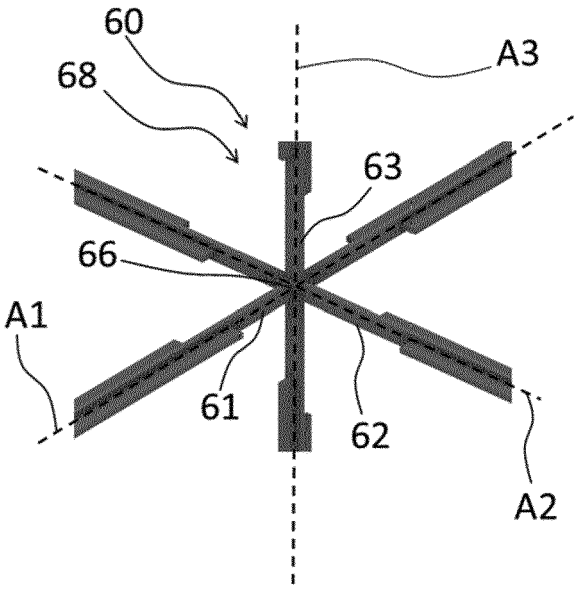

Fig. 11B

Fig. 11

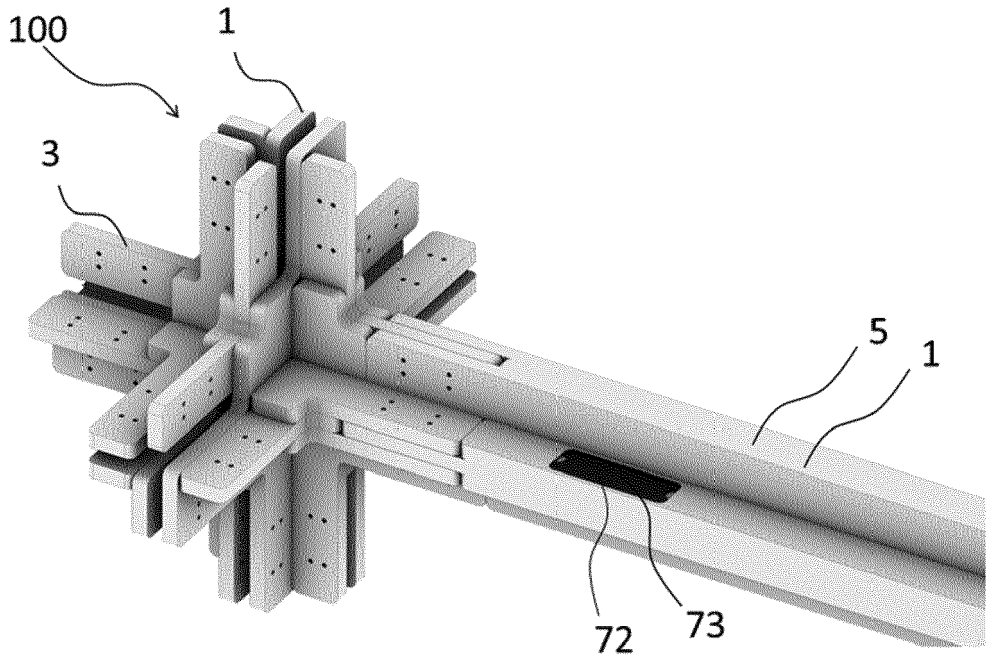

Fig. 12

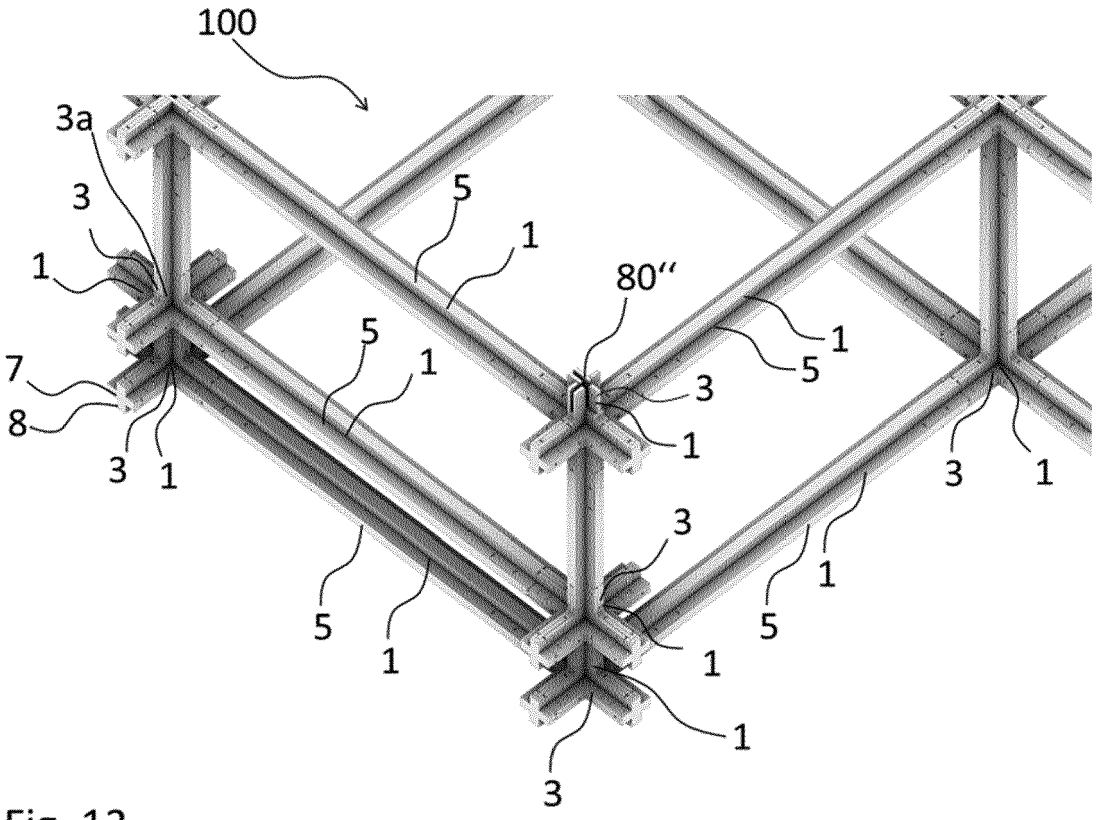

Fig. 13

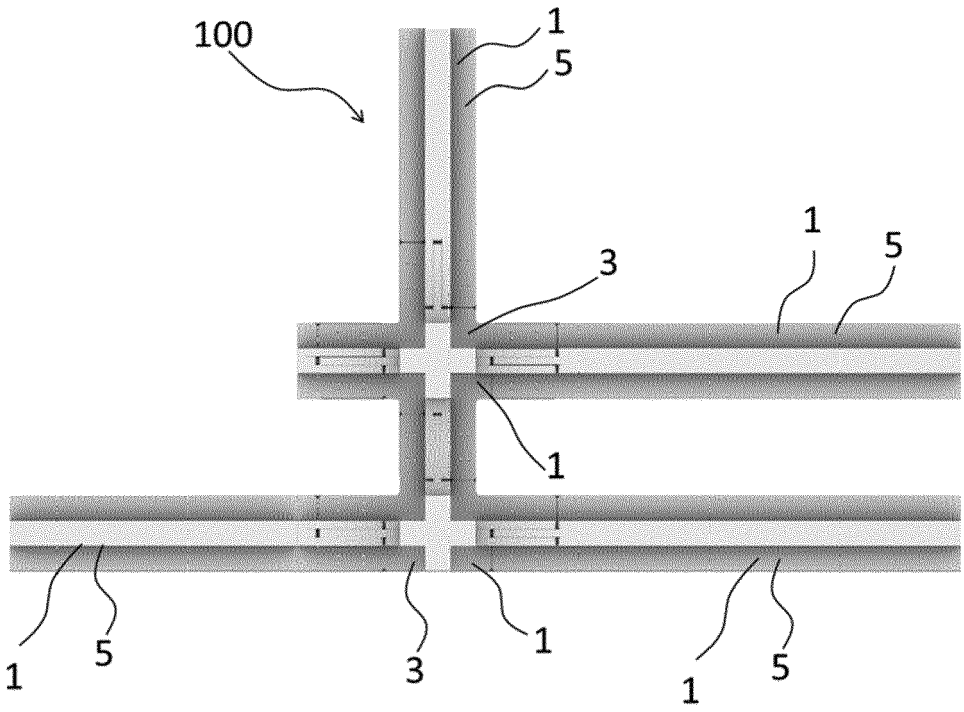

Fig. 14

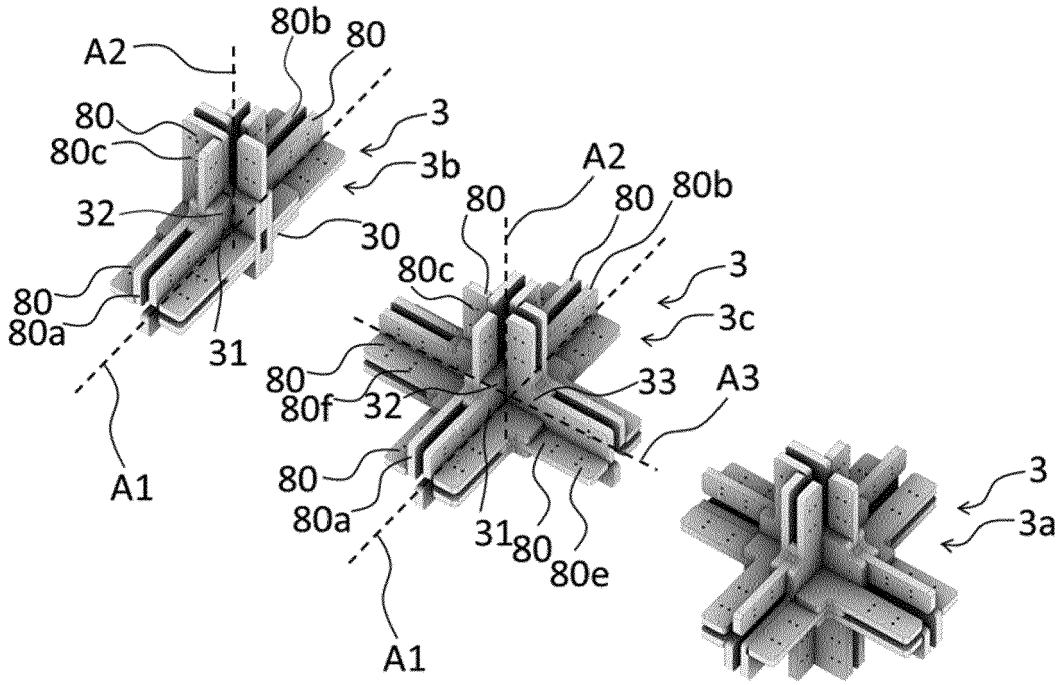

Fig. 15A Fig. 15B Fig. 15C

Fig. 15

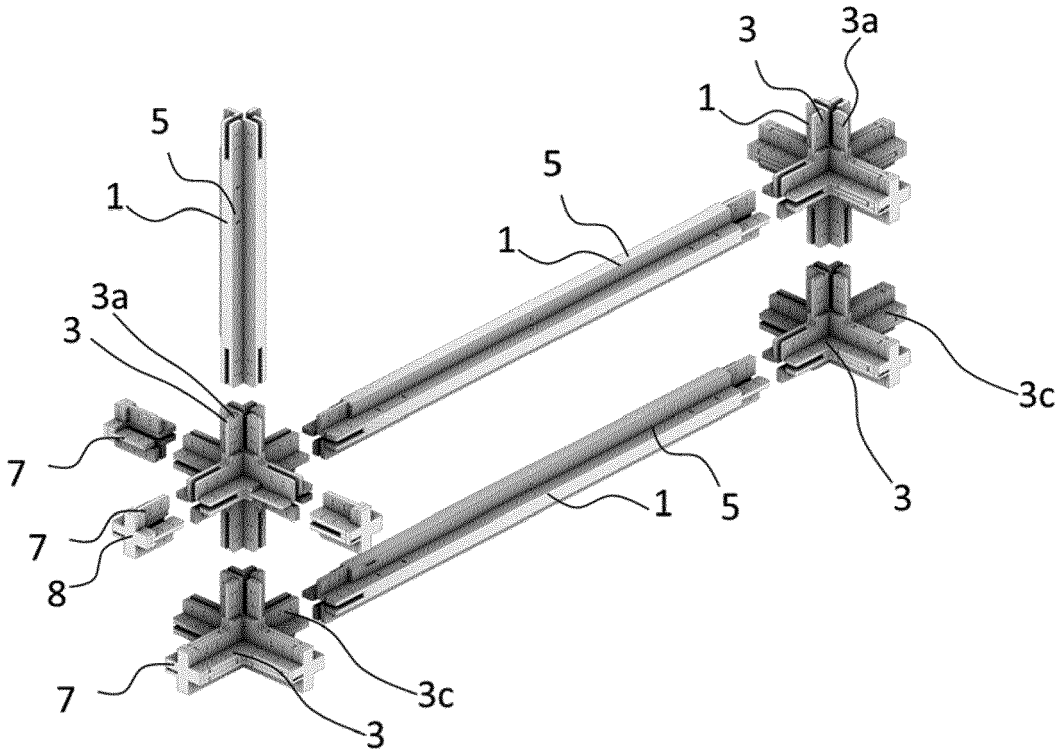

Fig. 16

Europäisches Patentamt
European Patent Office
Office européen des brevets

EUROPEAN SEARCH REPORT

Application Number
EP 21 21 3902

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	EP 2 432 947 A1 (FUSARO NICOLA [IT]) 28 March 2012 (2012-03-28) * paragraph [0037] - paragraph [0082]; figures 4-15 *	1-15	INV. E04B1/26
X	US 3 866 371 A (FALCONER JOHN PAUL RUTHERFORD) 18 February 1975 (1975-02-18) * column 1, line 46 - column 4, line 57; figures 1-9 *	1-15	
X	US 2014/053481 A1 (LEAHY CHARLES H [US]) 27 February 2014 (2014-02-27) * paragraph [0068]; figure 3A *	1-3	
			TECHNICAL FIELDS SEARCHED (IPC)
			E04B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	11 May 2022	Melhem, Charbel

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

EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 21 21 3902

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

11-05-2022

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 2432947 A1	28-03-2012	EP 2432947 A1	28-03-2012
		IT 1394582 B1	05-07-2012
		WO 2010134033 A1	25-11-2010
US 3866371 A	18-02-1975	CA 1008633 A	19-04-1977
		GB 1450870 A	29-09-1976
		JP S49126131 A	03-12-1974
		PH 10501 A	17-05-1977
		US 3866371 A	18-02-1975
US 2014053481 A1	27-02-2014	NONE	

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82