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(54) **COUPLING ELEMENT FOR BUILDING PANELS**

(57) In one aspect, there is provided a coupling element 1 configured for assembling a first building panel 10 and a second building panel 20. The coupling element 1 comprising:
a primary coupling portion extending along a primary axis Z1 and being configured to engage with a parallel first edge 11 of the first building panel 10 for locking displacement of the coupling element 1 along a tertiary axis Y1 and preferably a secondary axis X1 being orthogonal the primary axis Z1; and
a secondary coupling portion extending in a direction along the tertiary axis X1 and being configured to engage with a second edge 22 of the second building panel 20.

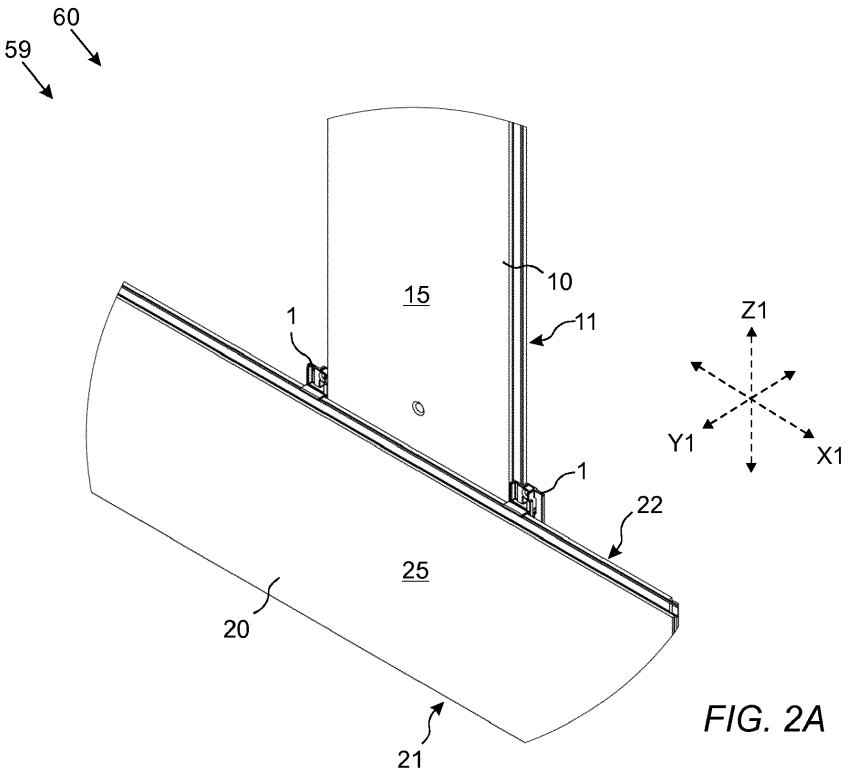

FIG. 2A

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Description

FIELD OF INVENTION

[0001] The present inventive concept pertains to a coupling element for assembling building elements, in particular crossing building panels arranged in displaced planes.

BACKGROUND OF INVENTION

[0002] Known systems for assembling building panels typically comprise various types fastening rails mounted to a fixed structure, such as a wall or like. Wall panels to be assembled are typically arranged to extend transverse the rails. A mounting device or like is fixedly attached to the rail or to the wall panel and provides a link between the rails and the wall panel.

[0003] Known systems are however associated with a number of drawbacks; typically, the rails comprise uniquely designed elements for the particular system and use and are adapted to cooperate exclusively with corresponding unique mounting device of the particular system. This design results in shortcomings in terms of flexibility of the system and which is time consuming and tedious to assemble. As such, there is room for improvements in the technical field.

SUMMARY

[0004] It is an object of certain embodiments of the present inventive concept to provide improvements over the above described techniques and known art.

[0005] It is a further object of certain embodiments of the present inventive concept to facilitate ease and/or speed of coupling building panels.

[0006] It is a still further object of certain embodiments of the present inventive concept to provide a device for coupling of building panels which is cost efficient and easy to produce.

[0007] It is another objected of certain embodiments of the present inventive concept to provide a coupling element which allows thermal expansion of coupled panels, such as a wall.

[0008] It is further objected of certain embodiments of the present inventive concept to provide a coupling element which facilitates improved economy of space.

[0009] At least some of these objects and other objects and advantages that will be apparent from the description have been achieved by the invention set forth in the independent claims. Further advantages being described below and in the appended dependent claims.

[0010] In a first aspect, there is provided a coupling element configured for assembling a first building panel and a second building panel. The coupling element comprising:

a primary coupling portion extending along a primary axis and configured to obtain an engaged state with a first edge of the first building panel for locking displacement of the coupling element along a tertiary axis and preferably a secondary axis being orthogonal the primary axis; and

a secondary coupling portion extending in a direction along the tertiary axis and configured to engage with a second edge of the second building panel.

[0011] This configuration brings about the advantage that expansion and/or contraction of the panels may be accommodated, e.g. due to moisture or thermal expansion. Thanks to the coupling element being displaceable in a direction along the primary axis and the second panel being displaceable along the secondary axis, a wall assembled by the coupling element according to embodiments of the inventive concept may be a floating wall, i. e. the wall may displace in the direction of the primary axis and in the direction of the secondary axis.

[0012] In addition, the wall may be self-supportive in a direction along the primary axis i.e. neither the first panel nor the coupling element may have to carry any load.

[0013] Further, the thickness of the wall comprised of the assembled panels may correspond to the aggregated thickness of the first and second panel, which may thus be minimized by selecting panels of a desired thickness.

[0014] Still further, by means of the coupling element according to the inventive concept, a wall may be assembled using identically formed panels.

[0015] Also, the coupling element according to the inventive concept may be used to assemble a wall comprising visible panels arranged in either of a laying or standing orientation without modification of the coupling element.

[0016] The primary coupling portion may be configured to obtain an engaged state with a parallel first edge of the first building panel.

[0017] In one embodiment, the primary coupling portion may comprise a locking element extending in a direction along the tertiary axis, which may correspond to a direction normal the primary plane towards the secondary plane.

[0018] The first edge of the panel and preferably a second edge of the first panel may comprise a locking element extending along the tertiary axis when the first panel is in an engaged state with the coupling element.

[0019] In a further embodiment, the first edge of the first panel may be arranged between a first main surface and an opposite second main surface of the first panel.

[0020] The first main surface of the first panel may be arranged in a primary plane and a corresponding first main surface of the second panel may arranged in a parallel secondary plane displaced from the primary plane in a respective engaged state of the first and/or second panel.

[0021] The primary coupling portion may be arranged between the first main surface and the second main surface of the first panel in engaged state of the first panel.

The aggregated thickness of the assembled panels may thereby be minimized.

[0022] In a still further embodiment, the locking element of the primary coupling portion may be arranged between the first main surface and the second main surface of the first panel in engaged state of the first panel.

[0023] By providing the coupling element with a primary coupling portion extending along a primary axis and a secondary coupling portion extending along a tertiary axis, a first edge of the first panel may be coupled to a second edge of a crossing second panel, to thereby lock the second panel in a direction along tertiary axis.

[0024] By providing the coupling element with a primary coupling portion in a primary plane and a secondary coupling portion in a secondary plane, a first edge of the first panel may be coupled to a second edge of a crossing second panel, to thereby lock the second panel in the secondary plane.

[0025] The primary coupling portion may be configured to facilitate displacement of the coupling element along the primary axis in engaged state of the first panel.

[0026] In one embodiment, the primary coupling portion is configured to engage with the first edge and/or second edge of the first panel by means of a folding or pivoting displacement of the coupling element about the primary axis. By configuring the coupling element to engage with an edge of a building panel, such such as the first edge of the first panel, by means of a folding or pivoting displacement of the coupling element in an engagement direction, the coupling element may engage with the edge portion in a releasable manner, i.e. releasably engaged. Consequently, the coupling element may be disengaged by a folding displacement opposite the engagement direction. Further, the coupling element may engage in a non-invasive manner i.e. the outer surface of the entity of the coupling element may be arranged completely external the outer surface of the entity of the first panel in engaged state; the coupling element may engage with the edge portion while being arranged external the edge and/or building panel. Thus, the assembling of panels by means of the coupling element may not cause permanent marks or damage to the panels. In addition, a step of engaging and disengaging the coupling element and the edge s made easy and fast.

[0027] The folding or pivoting displacement may comprise folding about the primary axis. By configuring the coupling element to engage with the edge by means of a folding displacement about the primary axis, which may be arranged parallel the first edge in engaged state, it may be facilitated that the coupling element is displaceable along the first edge while engaging with the edge portion. This configuration may facilitate that the coupling element may be configured in engagement with an edge of a panel, such as the first or second edge of the first panel and simultaneously be displaced along the primary axis. This configuration may facilitate that the coupling element can be configured in an engage state with an edge of a panel in the primary plane, and then displaced along the first edge and/or the primary axis and/or in the primary plane to the extent that a secondary coupling portion engages with an edge of a second panel in the secondary plane displaced from the primary plane in a direction of the tertiary axis, to thereby lock the second panel from pivoting, such as locking the second panel in the second plane and/or lock the second edge of the second panel in a direction along the tertiary axis away from the coupling element.

[0028] In one embodiment, the primary coupling portion may be configured to cooperate a locking element of the first edge for locking displacement of the coupling element along the secondary axis.

[0029] The engaging of the coupling element with the first edge of the first panel may comprise the locking element of the primary coupling portion and the locking element of the first panel being configured to extend in opposite directions along the tertiary axis and mutually overlap in engaged state of the first panel.

[0030] In one embodiment, the first panel and/or the second panel may comprise a mechanical locking system for mechanical locking of one or more of similar adjacent panels in a direction of the plane of the first and/or second main surface. By providing panels with an integrated mechanical locking system, such as for horizontal locking in a direction of the plane of the first and/or second main surface and/or vertical locking normal the plane of the first and/or second main surface, the panels may be adapted to be laid as a floor, such as a floating floor, with the mechanical locking system functioning as a horizontal locking system, and/or as a wall, such as a floating wall, with the mechanical locking system functioning as a vertical locking system.

[0031] The coupling element may be configured to cooperate with the mechanical locking system of the first and/or second panel. By configuring the coupling element to cooperate with the inherent or integrated mechanical locking system of a panel, such as the first panel and/or the second panel and/or the third panel, the coupling element may utilize the mechanical locking system of panels to be coupled, to couple said panels. Thus, the coupling element may be adapted to cooperate with the applicable mechanical locking system. The coupling element, in particular the primary coupling portion and/or the secondary coupling portion may be adapted to cooperate with the applicable mechanical locking system by being formed to correspond to one or more of the edges of the mechanical locking system, such as the first edge and/or the second edge of the first and/or second panel.

[0032] In one embodiment, the locking element of the first and/or second panel may form part of the mechanical locking system of the respective panel.

[0033] The first panel and said second panel may comprise two essentially identically formed panels, such as panels suitable to be laid as a floor.

[0034] In one embodiment, the first secondary coupling portion may be configured to cooperate with a second edge portion of the second panel for locking the sec-

ond edge of the second panel in the secondary plane and/or locking the second edge portion in a direction along the tertiary axis. By configuring the coupling element to cooperate with the integrated mechanical locking system of a panel, such as the first panel and/or the second panel, the coupling element may utilize the mechanical locking system of panels to be coupled, to couple said panels. Thus, the coupling element may be adapted to cooperate with the applicable mechanical locking system. The coupling element, in particular the primary coupling portion and/or the secondary coupling portion may be adapted to cooperate with the applicable mechanical locking system by being formed to correspond to one or more of the edges of the mechanical locking system, such as the first edge and/or the second edge of the first and/or second panel.

[0035] The pivoting or folding of the coupling element may comprise pivoting about the primary axis.

[0036] In one embodiment, the coupling element may be configured such that it cannot engage with the first edge of the first panel by linear displacement exclusively in a direction along the secondary axis, such as in a direction transverse the first edge and straight towards the first edge.

[0037] In one embodiment, the primary coupling portion may comprise a shape corresponding to a second edge of the first panel and/or a first edge of the second panel.

[0038] The secondary coupling portion may be pivotably arranged relative the primary coupling portion.

[0039] The coupling element may be is configured to be arranged external the first and/or second panel, preferably at an intersection between the first or second edge of the first panel and the second edge of the second panel. This configuration brings about the advantage that the first and second panels may abut, in particular the second main surface of the second panel may abut the first main surface of the first panel. Thereby the thickness of the wall of assembled panels may be minimized and the economy of space improved.

[0040] One of the first edge or second edge of at least one of the first and/or second panel may comprise a locking tongue and the other of the first edge or second edge of the first or second panel may comprise a corresponding tongue groove for receiving a corresponding locking tongue.

[0041] In one embodiment, a primary coupling portion may comprise the said corresponding locking tongue.

[0042] A primary coupling portion may comprise a corresponding tongue groove.

[0043] By providing a primary coupling portion with a corresponding locking tongue or tongue groove, the primary coupling portion may establish locking engagement, such as locking in a horizontal plane, with an edge of the first panel comprising the tongue groove, such as the first edge of the first panel.

[0044] The secondary coupling portion may be configured to cooperate with a mechanical locking system of a first edge of a further second building panel.

[0045] The secondary coupling portion may be configured to cooperate with a shelf provided in a locking element of first edge of a further second building panel.

[0046] In one embodiment, the primary coupling portion may comprise the said corresponding tongue groove. By providing a primary coupling portion with a corresponding tongue groove, the primary coupling portion may establish locking engagement, such as locking in a horizontal plane, with an edge of the first panel comprising the locking tongue, such as the second edge of the first panel.

[0047] Thereby, the coupling element may be configured to engage exclusively with the first edge or exclusively with the second edge or both the first and second edge by comprising two coupling portions, preferably disposed on opposite sides of the coupling element, as will be further explained herein.

[0048] The secondary coupling portion may be configured to engage with a mechanical locking system of a first edge portion of a third building panel extending in a direction along the secondary axis. By forming a secondary coupling portion which cooperates, e.g. mates, receives, hooks on to an edge of the second panel in the secondary plane, thereby the second panel may be locked from pivoting, such as locked from rotation in the second plane. In other words, the second edge of the second panel may be locked from displacement in a direction along the tertiary axis.

[0049] In one embodiment, the coupling element may further comprise attachment means, preferably in shape of a through-hole, for attachment of the coupling element to a substrate.

[0050] The secondary coupling portion may be pivotably arranged relative the primary coupling portion. By arranging a secondary coupling portion pivotal relative the primary coupling portion, the coupling element may be adapted to the angle of crossing of the first and second panel, i.e. the first edge of the first edge of the first panel and the second edge of the second panel, as will be further elucidated herein.

[0051] In one embodiment, the secondary coupling portion comprises an extent parallel with or with an angle relative the secondary axis, such as a 45-degee angle, is engaged state of the first panel.

[0052] In one embodiment, the secondary coupling portion may extend in a direction in the plane of the primary axis and secondary axis having a right-angle or a 45-degree angle or an acute angle relative the primary coupling portion extending in a direction along the primary axis. By arranging the primary and secondary coupling portion to extend with a relative angle, the engagement element may be adapted to various intended patterns of the panels of a wall. For example, if the first panel is arranged to extend vertically i.e. the primary plane is a vertical plane, such as when assembling a wall, and the second panel in the parallel secondary plane is intended to be arranged with its long sides in the secondary plane

i.e. in a lying manner, and thus crossing the first panel with a right-angle, then the first and second coupling portions of the coupling element may be provided with a right-angle to facilitate coupling of the first and second panel.

[0053] A further second secondary coupling portion may be configured to be received in one or more longitudinally extending grooves provided at a second main surface, such as a back side of the second panel and/or a further second panel facing the first panel in assembled state. By providing further secondary coupling portions configured to be received in one or more longitudinally extending grooves on a respective back side of the second panel and the third panel facing the primary panel in assembled state, the coupling element provides for an improved coupling. Optionally, the coupling element may also couple the second panel to the third panel.

[0054] In one embodiment, the coupling element is provided in shape of a clip.

[0055] In a second aspect, there is provided a coupling element for coupling a first building panel in a primary plane to a crossing second building panel in a parallel secondary plane, comprising:

one or more primary coupling portions configured to establish a primary engagement in the primary plane with a first edge of the first building panel; and
one or more secondary coupling portions extending in a direction transverse the primary plane for establishing a secondary engagement in the secondary plane with a second edge of said second building panel.

[0056] Embodiments of the second aspect are generally analogous with embodiments of the first aspect, whereby reference is made to the above.

[0057] In a third aspect, the inventive concept pertains to a system for assembling building panels. The system comprising a plurality of building panels provided with respective first and second edges and one or more coupling elements according to the first or second aspect.

[0058] In a fourth aspect, there is provided a wall comprising the coupling element according to any one of the first or second aspects.

[0059] In a fifth aspect, there is provided a method of assembling building panels, in particular to form a wall. The method comprising one or more of the following steps:
providing a first building panel comprising a first edge;
providing a coupling element comprising a primary coupling portion extending in a direction along a primary axis and a secondary coupling portion extending in a direction along a tertiary axis being orthogonal the primary axis;
engaging the coupling element with the first edge of the first building panel such that the first edge of the first panel extends in a direction along the primary axis;
providing a second building panel having a second edge extending with an angle relative the primary axis;
optionally, displacing the coupling element along the first edge;
engaging the coupling element with the second edge of the second panel.

[0060] In one embodiment, the step of engaging the coupling element with the first edge may comprise folding or pivoting of the coupling element about the primary axis.

[0061] The step of engaging the coupling element with the first edge may comprise a locking element of the coupling element engaging with a locking element of the first panel. One or more of the locking elements may extend in a direction substantially along the tertiary axis when the first panel and/or second panel are in assembled state with the coupling element.

[0062] In a sixth aspect, the inventive concept pertains to a clip configured to couple a first building panel to a second building panel.

[0063] In one embodiment, the clip comprises a locking tongue configured to engage with a tongue groove of an edge, preferably an outer edge, of the first building panel.

[0064] In one embodiment, the clip comprises a tongue groove configured to engage with a locking tongue of an edge, preferably an outer edge, of the first building panel.

[0065] In one embodiment, the clip comprises a hook or hitch comprised of a first portion extending in a direction along the tertiary axis and a second portion extending in a direction along the primary axis and being configured to engage with an edge, preferably an outer edge, of the second building panel.

BRIEF DESCRIPTION OF DRAWINGS

[0066] The present inventive concept will by way of example be described in more detail with reference to the appended schematic drawings, which show several embodiments of the inventive concept.

FIG.1 is a schematic view of a system and a device according to embodiments of the inventive concept.
FIG.2A is perspective view of a system according to an embodiment.
FIG.2B is perspective view of a system according to an embodiment.
FIG.3A is top view of details of the embodiment of FIG.2A.
FIG.3B is another top view of details of the embodiment of FIG.2A.
FIG.4A is a side view of details of the embodiment of FIG.2A.
FIG.4B shows details of a system according to an embodiment.
FIG.4C is side view of details of the system of FIG. 4B.
FIG.5A is an isometric view of a coupling element according to an embodiment.
FIG.5B is another isometric view of the embodiment of FIG.5A.
FIG.5C is top view of the embodiment of FIG.5A.
FIG.6A is a top view of a coupling element according

to an embodiment.

FIG.6B is a top view of a coupling element according to an embodiment.

FIG.7A is an isometric view of a coupling element according to an embodiment.

FIG.7B is a front view of the embodiment of FIG.7A.

FIG.8A is a top view of a system comprising the embodiment of FIG.7A in assembled state.

FIG.8B is a top view of a system comprising the embodiment of FIG.7A in assembled state.

FIG.9A is a side view of a system comprising the embodiment of FIG.7A in assembled state.

FIG.9B is another side view of a system comprising the embodiment of FIG.7A in assembled state.

FIG.10 is a diagrammatic representation of a method according to an embodiment.

FIG.11 shows details of a system according to an embodiment.

FIG.12A-C show views of a ceiling mould according to an embodiment.

FIG.13A-B shown isometric views of a coupling element according to an embodiment.

FIG.14A shows a front view of a coupling element according to an embodiment.

FIG.14B shows a perspective view of the coupling element of FIG.14A.

FIG.14C shows a side view of the embodiment of FIG.14A.

DETAILED DESCRIPTION

[0067] FIGS 1 and 2A-B show a coupling element 1 and a system 60 comprising panels and the coupling element 1. The system 60 may comprise a plurality of building panels, such as a first building panels 10, 10', 10" and one or more second building panels 20, 20'. The first building panel 10 and the second building panel 20 may comprise identically formed or similar panels. In FIGS.1 and 2A-B, the system 60 is arranged as a wall 59 on a floor 42 with the second panels 20, 20' arranged with their respective longitudinal L axes extending along a horizontal plane H, however other configurations are possible within the scope of the inventive concept.

[0068] The first building panel 10 may be arranged in a primary plane V1 and the second panel 20 may be arranged in a secondary plane V2 as illustrated in FIG. 3A. In particular, a respective front surface 15, 26 of the first and second panel 10, 20 may be arranged in parallel displaced planes V1, V2 in assembled state, as shown for instance in FIG. 4A. More in particular, the first main surface 15 of the first panel 10 may be arranged in the primary plane V1 when in assembled state and the first main surface 25 of the second panel 20 may be arranged in the secondary plane V2 when in assembled state, such as when coupled by means of the coupling element 1. The first panel 10 and the second panel 20 may be arranged with a relative angle between the respective longitudinal axis thereof, such as transverse each other, as shown in FIGS 1 and 2A-B.

[0069] The coupling element 1 may be configured to engage with the first panel 10 to obtain an engaged state therewith. The coupling element 1 may be further configured to engage with the second panel 20 to obtain an engaged state therewith. When at least one coupling element 1 is configured in engaged state with a building panel, such as the first panel 10 and/or the second building panel 20, the said building panel may be referred to as configured in assembled state. Assembled state and engaged state may be used synonymous herein.

[0070] The coupling element 1 may be configured to couple two crossing building panels, such as the first building panel 10 and the second building panel 20 as depicted in FIG.1 where the second building panel 20 is arranged with and angle relative the first building panel 10, such as transverse the first building panel 10 as shown in the exemplary embodiment of FIG1.

[0071] In this context it should be appreciated that an arbitrary building panel, as explained above, which is arranged in the primary plane V1 is arranged in engaged state with the coupling element 1 may be referred to as a first panel 10. Also, it should be appreciated that an arbitrary panel, as explained above, which is arranged in the secondary plane V2 in engaged state with the coupling element 1 may be referred to as a second panel. This is because in some embodiments, such as when the first and second panels are identically shaped, the first panel and the second panel may be interchangeable.

[0072] Typically, at least the second panels 20, 20' constitute the visible panels of a wall 59 assembled by means of the system 60, i.e. the second panels 20, 20' are configured to be visible. For example, the second panels 20 may comprise a decorative layer.

[0073] The primary coupling portion 2, 6 may extend along a portion of the first edge 11 in assembled state of the first panel 10.

[0074] The primary coupling portion 2, 6 may be configured to engage with a portion of the first edge 11 extending along the primary axis Z1, Z1'.

[0075] The coupling element 1 may comprise a generally rectangular shape, such as substantially quadratic.

[0076] A first primary coupling portion 2 and a second primary coupling portion 6 may be constitute two opposite edges of the coupling element 1.

[0077] The first primary coupling portion 2 may comprise a locking edge 55 configured to extend along the primary axis Z1 and the tertiary axis Y1. The locking edge 55 may extend with a right-angle from the locking tongue 52, i.e. form a right-angle with the locking tongue 52. The locking edge may extend in a direction opposite the locking element 51 of the first primary coupling portion 2.

[0078] The locking edge 55 may be configured to abut a portion of the first edge 11 of the first panel 10 such as to prevent rotation of the coupling element 1 about an axis parallel the tertiary axis Y1 when the first panel 10 is configured in assembled state.

[0079] The locking edge 55 may be configured to abut

a portion of the first edge 11 of the first panel 10 such as to prevent displacement of the coupling element 1 in a direction along the secondary axis X1 towards the first panel 10, when the first panel is configured in assembled state.

[0080] The tongue groove 62 of the second secondary coupling portion 6 may be formed by a further locking edge 65 disposed between a protrusion 64 and a locking strip 66. The protrusion 64 may facilitate locking the coupling element 1 from folding about an axis being parallel the primary axis Z1 by engaging with the locking tongue 121 of the second edge 12 of the second panel 20. The protrusion 64 and the locking strip 66 may extend from opposite sides, preferably opposite sides seen along the secondary axis Y1, of the further locking edge 65 in a direction along the secondary axis X1. The locking element 61 of the second primary coupling portion 6 may be provided at an end-portion of the locking strip 66.

[0081] The further locking edge 65 may extend along the primary axis Z1 and the tertiary axis Y1.

[0082] The locking edge 65 may be configured to abut a portion of the second edge 12 of the first panel 10 such as to prevent rotation of the coupling element 1 about an axis parallel the tertiary axis Y1 when the first panel 10 is configured in assembled state.

[0083] The locking edge 65 may be configured to abut a portion of the second edge 12 of the first panel 10 such as to prevent displacement of the coupling element 1 in a direction along the secondary axis X1 towards the first panel 10, when the first panel is configured in assembled state.

[0084] In assembled state, the locking edges 55, 65 of the coupling element 1, may extend in a direction along the tertiary axis Y1 and may for example extend from the locking tongue 52 towards the secondary plane V2 to be arranged at least flush with the first main surface 25 of the second panel 20 and/or the primary plane V1, as shown for instance in FIGS 3A-B, 4A, 5C, 8B. Thereby, the second panel 20 and/or a further second panel 20' may be biased outwards from the coupling element 1 in a direction along the tertiary axis Y1 in assembled state of the second panel 20 and optionally the further second panel 20'.

[0085] This configuration may provide for an improved engagement between the secondary coupling portion 4 and the second panel 20 because the said biasing may result in tensioning of the secondary coupling portion 4, in particular the second portion 42 of the secondary coupling portion 4.

[0086] In addition, thanks to the configuration of the locking edges 55, 65 as explained above, the coupling element 1 may be arranged as a spacer interspaced between a substrate 45, such as a building stud, and a second panel 20 absent a first panel 10 for providing a spacer between the stud and the second panel 20 and/or for locking the second edge 22 of the second panel 20 in a direction transverse the substrate, such as along the tertiary axis Y1.

[0087] The second edge 22 of the second panel 20 may constitute an upper edge of the second panel 20 in assembled state of the second panel 20, as illustrated in FIG.1.

[0088] The first edge 21 of the second panel 20 may constitute a lower edge of the second panel 20 in assembled state of the second panel 20.

[0089] The first edge 11 of the first panel 10 may constitute a right-hand edge or a left-hand edge of the first panel 10 in assembled state of the first panel 10.

[0090] The second edge 12 of the first panel 10 may constitute a right-hand edge or a left-hand edge of the first panel 10 in assembled state of the first panel 10.

[0091] The panels of the system 60, such as the first panel 10 and the second panel 20, which may be identical panel in terms of the shape thereof, may be provided with a mechanical locking system 70 for locking two similar panels, such as the first panel 10 and the second panel 20, in a plane, such as a horizontal plane H or a vertical plane V.

[0092] It has however been contemplated that the first panel 10 may comprise a first mechanical locking system and the second panel 20 comprises a second mechanical locking system for locking two similar second panels 20, 20'. As derivable from FIG.1, it may suffice that the first and/or second edge 11, 12 of the first panel 10 is configured to engage with the primary coupling portion 2, 6 of the coupling element 1.

[0093] It is however preferable that the coupling element 1 is configured to engage with the locking system of both the first panel 10 and the locking system of the second panel 20.

[0094] It is further preferable that the second panels 20, 20' are provided with a locking system for locking to panels similar or identical shape to the second panel 20 in order to assemble the wall 59.

[0095] It is also preferable that the first and second panels 10, 20 comprise the same locking system such that the first panel 10 is interchangeable with the second panel 20. It is thereby achieved that the first and second panels 10, 20 may be manufactured by substantially the same or the same manufacturing steps and that the wall 59 may be erected using a single type of panel.

[0096] As mentioned, the panels, such as the first and second panels 10, 20 may have a respective first main surface 15, 25 and second main surface 16, 26. The first main surface may be a top or front surface. The front surface may be a surface intended to be visible when the panel is configured as part of a wall or floor. The front surface may be a decorative surface and may comprise a decorative layer, such as a veneer layer intended to be visible.

[0097] The second main surface 16, 26 may be a back surface. The back surface may be a surface which is not intended to be visible when the panel is configured as part of a wall or floor. The back surface may comprise a balancing layer to account for movements in the first main surface 15, 25.

[0098] The first main surface 15 of the first panel 10 may be arranged in the primary plane V1 in assembled state, such as when the first panel 10 is engaged with the primary coupling portion 2, 6 of the coupling element 1.

[0099] The first main surface 16 of the second panel 20 may be arranged in the secondary plane V2 in assembled state, such as when the second panel 20 is engaged with the secondary coupling portion 4 of the coupling element 1.

[0100] The panels 10, 20 may comprise a core made of any suitable material, such as wood, MDF, HDF, foam, wood, polymers, thermoplastic, thermosetting, PVC or any suitable material.

[0101] The panels of the system 60, such as the first 10 and/or second panel 20, may each have an extension in a longitudinal direction L, such as the longest side or long side, and in a transverse direction T, such as the shortest side or short side, as illustrated in FIG.1. Further, the panels may each have thickness extension in the thickness direction D as illustrated in FIG.2B. In assembled state of the first and second panels 10, 20, the thickness of the respective panels 10, 20 may extend in along a tertiary axis Y1 as derivable from FIG.4.

[0102] The mechanical locking system 70 of the first 10 and/or second panel 20 may comprise edges for locking of one or more similar panels, such as a further first panel 10' and/or a further second panel 20', in the plane of the first main surface 15, 25 and/or the second main surface 16, 26.

[0103] In the exemplary embodiment of FIG.1 and 2A-B, a first edge 11 of the first panel 10 may constitute an edge extending in the longitudinal direction of the first panel 10, which may be parallel a primary axis Z1 in assembled state of the first panel. Generally, the term "edge" as used herein may be an outer edge of a panel, such as the first 10 and/or the second panel 20.

[0104] A second edge 12 of the first panel 10 may constitute an edge opposite the first edge 11 and extending in the longitudinal direction of the first panel 10, which may be parallel a primary axis Z1 in assembled state of the first panel 10.

[0105] In the exemplary embodiment of FIG.1 and 2A-B, a first edge 21 of the second panel 10 may constitute an edge extending in the longitudinal direction of the second panel 20.

[0106] A second edge 22 of the second panel 20 may constitute an edge opposite the first edge 21 and extending in the longitudinal direction of the second panel 20.

[0107] In the exemplary embodiment of FIG.1 and 2, the first edge 21 and second edge 22 are arranged transverse the primary axis Z1 in assembled state of the second panel 20, however, other configurations are possible within the scope of the inventive concept. For example, the first 21 and/or second edge 22 may extend with about a 45-degree angle relative the primary axis Z1, such as if the second panels 20, 20' are assembled in a fishbone pattern.

[0108] The first edge 11 of the first panel 10 may be configured to cooperate with an edge of the second panel 20, such as the second edge 22 of the second panel 20 for locking the first and second panel 10, 20 in a plane, such a plane of the primary axis Z1 and the secondary axis X1, which may be a vertical plane.

[0109] Correspondingly, the second edge 12 of the first panel 10 may be configured to cooperate with an edge of the second panel 20, such as the first edge 21 of the second panel 20 for locking the first and second panel 10, 20 in a plane, such as a plane of the primary axis Z1 and the secondary axis X1, which may be a vertical plane V.

[0110] The coupling element 1 may be configured to cooperate with an edge, such as a first edge 11, a second edge 12, a third edge 13, a fourth edge14 of the first panel and/or a first edge 21, a second edge 22, a third edge 23, a fourth edge 24 of the second panel of the system 60. The respective edges 11, 12, 13, 14, 21, 22, 23, 24 may be disposed between the respective first main surface 15, 25 and the respective second main surface 16, 26 of the first 10 and second panel 20. The edge 11, 12, 13, 14, 21, 22, 23, 24 may extend between the respective first main surface 15, 25 and the respective second main surface 16, 26 of the first 10 and second panel 20. The edge 11, 12, 13, 14, 21, 22, 23, 24 may extend along the tertiary axis Y1 between the respective first main surface 15, 25 and the respective second main surface 16, 26 of the first 10 and second panel 20 in the assembled state of the respective first 10 and second panel 20.

[0111] One or more coupling portions of the coupling element 1 may comprise a shape or edge profile corresponding to one or more of the edges 11, 12, 13, 14, 21, 22, 23, 24 of a panel, such as the first 10 and/or second panel 20.

[0112] The coupling element 1 may be made of any suitable material such as metal, composite, preferably plastic, for example polymer-based material, polyacrylate, polyamide, POM, PP, a thermosetting material or thermoplastic material, vinyl, PVC or the like. The coupling element 1 may be rigid yet resilient.

[0113] The coupling element may be manufactured by mean of any suitable process, for example injection moulding.

[0114] The coupling element may be formed as a single entity, i.e. an element.

[0115] The coupling element 1 may comprise one or more coupling portions corresponding to one or more of the edges 11, 12, 13, 14, 21, 22, 23, 24 of the building panels such as the first building panel 10 and/or the second building panel 20. This entails that the coupling element 1 may lock to a building panel, such as the first building panel 10, in a plane, such as the primary plane V1 and be locked in a direction transverse the applicable edge of the panel, preferably in a direction away from the panel. In other words, this entails that the coupling element 1 may engage with an edge 11, 12, 13, 14, 21, 22, 23, 24 of a building panel, such as the first building panel

10, and be locked from displacing in at least one direction, such as along the tertiary axis Y1 and preferably the secondary axis X1.

[0116] FIGS 3A and 3B show detailed top views of the embodiment of FIG.1. In particular, FIG.3A shows the first coupling element 1 in engagement with the first edge of the first panel 10. FIG.3B shows a second coupling element 1 in an engaged state with the second edge 12 of the first panel 10. The first coupling element 1 and the second coupling element 1 may be identical.

[0117] As shown in FIGS 3A-B and FIG. 4, the coupling element 1 may comprise one or more primary coupling portions 2, 6 configured to establish locking engagement to a panel, such as the first panel 10.

[0118] In the embodiment shown in FIG.3A and 3B, the coupling elements 1 comprises the first primary coupling portion 2 configured to engage with the first edge 11 of the first panel 10. As derivable from FIG.3A, the first primary coupling portion 2 may comprise a profile corresponding to the second edge 12 of the first panel 10. The first primary coupling portion 2 or the second primary coupling portion 6 may comprise a locking element 51 and tongue 52 as shown in FIGS 5A and 5B.

[0119] The locking element 51 of the first primary coupling portion 2 may cooperate with the locking element 110 of the first edge 11 of first panel 10. As derivable from FIG.3A, the locking elements 51 and 110 may extend in substantially opposite directions to facilitate locking of the coupling element 1 along the secondary axis X1. Also, the locking elements 51 and 110 may extend in a direction along the tertiary axis Y1 in assembled state of the first panel 10. Further, the locking elements 51 and 110 may overlap each other and/or hook on each other and/or form a labyrinth seal or lock.

[0120] Referring again to FIG.3A, the first edge 11 may comprise a tongue groove 111 for receiving a locking tongue 52 of the first primary coupling portion 2 of the coupling element 1. Further, the first edge 11 may comprise a locking element 110 which facilitates locking of the coupling element 1 in a direction along the secondary axis X1. This may correspond to locking in a plane, such as the primary plane V1, in a direction transverse the first edge 11.

[0121] Thanks to the locking tongue 52 and tongue groove 111, displacement of the coupling element 1 in a direction along the tertiary axis Y1 is locked. This may include directions transverse the first primary plane V1.

[0122] The tongue groove 111 of the first edge 11 of the first panel 10 may be arranged inboard of the locking element 110 of the first panel 10 as shown in FIG.3A.

[0123] The first edge 11 edge of the first panel 10 may be formed to at least partially envelope the first primary coupling portion 2 of the coupling element 1, as shown in FIGI.3A.

[0124] The locking element 110 of the first edge 11 may extend in a direction substantially transverse or transverse the first main surface 15, such as in the direction of the normal of the first main surface 15 of the first panel 10.

[0125] Shown in FIGS 3A-B is a first pair of locking surfaces 53, 112 configured to engage with each other for locking of the coupling element 1 in a direction along the secondary axis X1, X1' when the coupling element 1 is engaged to the first edge 11 of the first panel 10 by means of the first primary coupling portion 2, and optionally a second pair of locking surfaces 63, 122 configured to engage with each other for locking of the coupling element 1 in a direction along the secondary axis X1, X1' when the coupling element 1 is engaged to the second edge 12 of the first panel 10 by means of the second primary coupling portion 6.

[0126] A first locking surface 53 extending substantially in a direction along the tertiary axis Y1 is provided by the locking element 51 of the first primary coupling portion 2.

[0127] A second locking surface 112 extending substantially in a direction along the tertiary axis Y1 when the first panel 10 is in assembled state, is provided by the locking element 110 of the first edge 11 of the first panel 10.

[0128] A third locking surface 63 extending substantially in a direction along the tertiary axis Y1 is provided by the locking element 61 of the second primary coupling portion 6.

[0129] A fourth locking surface 122 extending substantially in a direction along the tertiary axis Y1 when the first panel 10 is in assembled state, is provided by the locking element 120 of the second edge 12 of the first panel 10.

[0130] The locking element 61 of the second primary coupling portion 6 may cooperate with the locking element 120 of the second edge 12 of first panel 10. As derivable from FIG.3B, the locking elements 61 and 120 may extend in substantially opposite directions to facilitate locking along the secondary axis X1. Also, the locking elements 61 and 120 may extend in a direction along the tertiary axis Y1 in assembled state of the first panel 10. Further, the locking elements 61 and 120 may overlap each other and/or hook on each other and/or form a labyrinth seal or lock.

[0131] The second primary coupling portion 6 may be formed to at least partially envelope the locking element 120 of the second edge 12, as shown in FIG.3A.

[0132] The locking elements 51, 61 and 110, 120 may be disposed between the first main surface 15 and the second main surface 16 in assembled state of the first panel 10, as shown in FIGS 3A-B.

[0133] The second edge 12 of the first panel 10 may comprise a locking tongue 121 configured to be received in a corresponding tongue groove 62 of the second primary coupling portion 6 of the coupling element 1. The locking tongue 121 may be integrally formed with the locking element 120 of the second edge 22. Thanks to the locking tongue 121 and tongue groove 62 of the second primary coupling portion 6 of the coupling element 1, displacement of the coupling element 1 in directions

transverse the first primary plane V1 is prevented. Thus, displacement of the coupling element 1 along the tertiary axis Y1 is locked.

[0134] The locking element 61 of the second primary coupling portion 6 of the coupling element 1 may be formed outboard the tongue groove 62 of the second primary coupling portion 6.

[0135] The second primary coupling portion 6 may be formed to at least partially envelope the locking element 120 of the second edge 12 of the first panel 10.

[0136] It may thereby be achieved that the coupling element 1 is locked from displacement along the secondary axis X1 and tertiary axis Y1 while being displaceable along the primary axis Z1. Typically, the first and second edges 11, 12 extend substantially along the entire, or along the entire longitudinal L length of the panel 10.

[0137] This configuration facilitates that the coupling element 1 may be configured in an engaged state with the first panel 10 some distance apart from the second panel 20, and then displaced along the primary axis Z1 to the extent that the secondary coupling portion 4 engages with an edge, such as the second edge 22 of the second panel, to thereby obtain an engaged state with the second panel 20 and thus the second panel 20 is configured in assembled state, as shown in FIG.4.

[0138] As explained above, the coupling element 1 may be arranged in an engaged state where it is coupled to the mechanical locking system 70 of a panel, such as the first panel 10.

[0139] Thanks to the coupling element 1 being displaceable in a direction parallel first and second edges 11, 12 of the first panel 10 in the engaged state, the coupling element 1 may alternatively be threaded on to the first or second edge 11, 12 at the short side of the first panel 10, i.e. at the third edge 13 or fourth edge 14.

[0140] Preferably, the coupling element 1 obtains the engaged state by a pivoting or folding displacement of the coupling element 1. In particular, the pivoting displacement may comprise pivoting about the primary axis Z1, Z1' for example when being parallel the first edge 11 and/or second edge 12 of the first panel 10 in assembled state, as shown in FIGS 5A-B. Preferably, the pivot point of the pivoting or folding is an axis Ax, Ax' extending in a direction along the primary axis Z1, Z1', preferably the respective axes Ax, Ax' are positioned between the primary coupling portion 2, 6 and the first edge 11 or the second edge 12 of the first panel 10 as schematically illustrated in FIGS 3A-B.

[0141] It may be appreciated that alternatively, the first panel 10 may be folded about an axis being parallel the primary axis Z1 in order for the first panel 10 to obtain an engaged state with the coupling element 1. However, typically as explained, the first panel 10 is stationary and instead the coupling element 1 folded to engage with the first panel 10.

[0142] Referring to FIGS 4A-C, 5A-C and FIGS 7A-B, the coupling element 1 may comprise secondary coupling portions 4, 8 for engaging with an edge 22 of a second panel 20 arranged in the secondary plane V2 in assembled state. The first secondary coupling portion 4 may comprise a first portion 41 extending in a plane transverse the primary plane V1 towards the secondary plane V2 in assembled state of the second panel 20. The first portion 41 may extend in a direction along the tertiary axis Y1.

[0143] The first secondary coupling portion 4 may comprise a groove 43 and/or a hook-shaped profile 44 configured to receive a portion of an edge of the second panel 20, such as the second edge 22 of the second panel 20. The second edge 22 of the second panel may be identically shaped the first as the edge 11 of the first panel 10. The hook-shaped profile 44 and/or the groove 43 may comprise the first portion 41 and a hitch 42 extending in a direction along the primary axis Z1.

[0144] The hitch 42 may thereby lock the second edge 22 of the second panel 20 from displacing in a direction along the tertiary axis Y1. The locking element may engage with the locking element 210 of the second edge 22 of the second panel 20, which may correspond to the locking element 110 of the second edge 12 of the first panel 10.

[0145] FIGS 4B-C illustrate a locking element 210 of the first edge 21 of the second panel 20 provided with a shelf 210'. The shelf 210' may preferably be provided in a portion of the locking element 210 adjacent the secondary coupling portion 4 which extends with its first portion 41 and optionally the second portion 42 jammed between the second edge 22 of the second panel 20 and a first edge 21' of a further second panel 20'. The shelf 210' may thus provide a void for accommodating the second portion 42 of the secondary coupling portion 4. This configuration brings about the technical advantage that the extension of the locking element 210 of the second panel 20, such as in a direction of the tertiary axis Y1, does not have to be reduced to accommodate the secondary coupling portion 4, and thus provides an improved more secure locking function.

[0146] An alternative way of accommodating the second portion 42 of the secondary coupling portion 4 may be that the thickness Yt of the second edge 22 of the second panel 20 adjacent the locking element 210, such as the distance Yt between the second main surface 26 and the extension Ye of the locking element 210' along the tertiary axis Y1 is reduced to provide a void for accommodating the second portion 42. However, this may have the consequence that the construction of the second edge 22 of the second panel 20 is weakened. The provision of the shelf 210' mitigates this problem since the thickness Yt may not have to be reduced.

[0147] A further alternative way of accommodating the second portion 42 of the secondary coupling portion 4 may be that the smallest thickness Yt' of the first edge 21' of the further second panel 20' may be reduced to provide a void for accommodating the second portion 42. The smallest thickness Yt' being disposed opposite and adjacent the locking element 210 in engaged state of the

second panel 20 and the further second panel 20' as shown in FIG.4C. However, this may have the consequence that the construction of the first edge 21 of the further second panel 20' is weakened and thus the joint between the second panel 20 and the further second panel 20' may be weakened. The provision of the shelf 210' mitigates this problem since the thickness Yt' may not have to be reduced.

[0148] FIGS 6A-B show two exemplary embodiments of the coupling element 1 featuring single primary coupling portions; FIG.6A showing an embodiment provided with the first primary coupling portion 2 and the secondary coupling portion 4, as described above in relation to the embodiment of FIG.3A. FIG.6B showing an embodiment provided with the second primary coupling portion 6 and the secondary coupling portion 4, as described above in relation to the embodiment of FIG.3A.

[0149] FIGS 7A-B show a further exemplary embodiment of the inventive concept which in addition to the embodiment of FIGS 3A-B comprises further secondary coupling portion 8, 8'. The further secondary coupling portion 8, 8' may comprise one or more protrusions extending in the same direction as the first secondary coupling portion 4 i.e. in a direction along the tertiary axis Y1. The protrusions may be provided on opposite sides of the secondary coupling portion 4 and be adapted to mate with or be received in longitudinally extending grooves 46, 46' respectively provided at the second main surface 26 of a second panel 20 and at the second main surface 26' of a further second panel 20' arranged in engagement with the second edge 22 of the second panel 20, as shown in FIGS 9A-B.

[0150] This configuration brings about the technical effect that the coupling element 1 may follow the displacement of the second panel 20 and/or the further second panel 20', such as due to thermal expansion. For example, a vertical displacement of the second panel 20 upwards in the direction of the primary axis Z1 may push the coupling element 1 upwards by exerting force on the secondary coupling portion 4.

[0151] A vertical displacement of the second panel 20 downwards in a direction of the primary axis Z1 may pull the coupling element 1 downwards by exerting a pulling force on the further secondary coupling portion 8 engaging with the grooves 46 of the second panel 20.

[0152] Also, a vertical displacement upwards in the direction of the primary axis Z1 of the further second panel 20' will pull the coupling element 1 upwards by exerting force on the further secondary coupling portion 8' engaging with the grooves 46' of the further second panel 20'.

[0153] It should be appreciated that the configuration above may function mutatis mutandis if the second panels 20, 20' are arranged standing and the said displacements are lateral instead of vertical.

[0154] FIG.8A shows a top view of the coupling element 1 of FIG.7 configured in engaged state with the first edge 11 of the first panel 10. As derivable from FIG.8A, the first primary coupling portion 2 is received in a portion of the first edge 11, in particular the locking tongue 52 of the first primary coupling portion 2 is received in the tongue groove 18 of the first edge 11. Further, the locking element 51 of the first primary coupling portion 2 engage with the locking element 110 of the first edge 11 for locking displacement of the coupling element 1 in a direction along the secondary axis X1, such as away from the first edge 11.

[0155] FIG.8B shows a top view of the coupling element 1 of FIG.7 configured in engaged state with the second edge 12 of the first panel 10. As derivable from FIG.8B, a portion 120, 121 of the second edge 12 of the first panel 10 is received in the second coupling portion 6, in particular the locking tongue 121 of the second edge 12 is received in the tongue groove 62 of the second edge 12. Further, the locking element 61 of the second primary coupling portion 6 engages with the locking element 120 of the second edge 12 for locking displacement of the coupling element 1 in a direction along the secondary axis X1, such as away from the second edge 12.

[0156] FIG.9A-B shows a system comprising of embodiment shown in FIGS 7A-B wherein a coupling element 1 is in engaged state with the first edge 11 of the first panel 10, a second panel 20 and further second panel 20' of the system 60.

[0157] The further secondary coupling portions 8, 8' may facilitate an improved locking function.

[0158] FIG.10 is a diagrammatic representation of a method 100 according to aspects of the inventive concept. Building panels, such as a first 10 and second panel 20 may be assembled by means of the method 100. The method 100 may comprise one or more of: step 101 of providing a first building panel 10 comprising a first edge 11; step 102 of providing a coupling element 1 comprising a primary coupling portion 2, 6 extending in a direction along a primary axis Z1 and a secondary coupling portion 4 extending in a direction along a tertiary axis Y1 being orthogonal the primary axis Z1, Z1'; step 103 of engaging the coupling element 1 with the first edge 11 of the first building panel 10 such that the first edge 11 extends in a direction along the primary axis Z1, Z1'; step 104 of providing a second building panel 20 having a second edge 22 extending with an angle relative the primary axis Z1, Z1'; an optional step 105 of displacing the coupling element 1 along the first edge 11; and step 106 of engaging the coupling element 1 with the second edge 22.

[0159] The step 103 of engaging the coupling element 1 with the first edge 11 may comprise folding or pivoting of the coupling element 1 about the primary axis Z1.

[0160] The step 103 of engaging the coupling element 1 with the first edge 11 may comprise a locking element 51, 61 of the coupling element 1 engaging with a locking element 110, 120 of the first panel 10.

[0161] One or more of the locking elements 51, 61, 110, 120 may extend in a direction substantially along the tertiary axis Y1 when the first panel 10 and/or second panel 20 are in assembled state with the coupling element 1.

[0162] FIG.11 shows an example of the secondary coupling portion 4 of the coupling element 1 cooperating with a locking system 70 of a second panel 20 and a further second panel 20'. As seen from FIG.10, the first edge 21' of the further second panel 20' comprises a locking tongue 121 which is received in a tongue groove 111 of the first edge 21 of the second panel 20 for locking of the second panel 20 and the further second panel 20' in a direction along the primary axis Z1. The said locking of the panels 20 and 20' may involve folding of the further second panel 20'. In this particular example the locking system 70 comprises a water-tight joint 71 formed by the first edge 21' of the further second panel 20' and the second edge 22 of the second panel 20. As derivable from FIG.11, the water tight joint 71 comprises a groove 26 provided between a locking element 121 and the first main surface 26' of the further second panel 20'. The groove 26 may be configured to receive a corresponding protrusion 26 provided between a tongue groove 111 of the first edge 21 of the second panel 20 for sealing engagement therewith. This embodiment may be particularly advantageous for applications in wet spaces, such as bathrooms, kitchens etc.

[0163] FIG.12A-C show a moulding 80 suitable for use with the system 60, for example when assembled to form a wall 59. In particular, the moulding 80 may be used in proximity of a ceiling whereby a further moulding 83, such as a decorative moulding may be attached to a front side 82 of the batten 80.

[0164] The moulding 80 may be configured to engage with the third edge 13 of the first panel 10, such as a short side as shown in FIG.12D. In this particular example the third edge 13 comprises a flexible tongue 13' adapted to cooperate with a groove 81 of the moulding 80 for locking, such as by means of a snap-in function, the moulding 80 to the third edge 13 of the first panel 10.

[0165] FIG.13 shows a further embodiment of the inventive concept configured for assembling a wall of panels, where the first edge 11 of the first panel 10 and the second edge 22 of the second panel extend with a relative angle, such as when the second panels 20, 20' are arranged in a fishbone pattern i.e the second panel 20 and the further second panel 20' may be arranged transverse each other, and each of the second panel and the further second panel 20' being arranged with a 45-degree angle relative the first panel 10.

[0166] FIG.14A-C shows a further embodiment of the inventive concept configured for assembling a wall of panels, where the panels are arranged in a fishbone pattern. The coupling element comprising a primary coupling portion 2, 2' 6, 6' extending along a primary axis Z1, Z1' and configured to obtain an engaged state with a parallel first edge 11 of the first building panel 10 for locking displacement of the coupling element 1 along the secondary axis X1, X1' and preferably the tertiary axis Y1 being orthogonal the primary axis Z1, Z1'; and

a secondary coupling portion 4 extending along the tertiary axis Y1 and configured to engage with a second edge 22 of said second building panel 20.

[0167] Wherein the second edge 22 of the second panel 20 is provided with an angle Φ, such as 45-degree angle or 135-degree angle, relative the first edge 11 of the first panel 10.

[0168] The secondary coupling portion 4 may be configured to extend along and engage with a portion of the second edge 22 of the second panel 20.

[0169] As seen from FIGS 14A-C, in this embodiment the coupling element 1 comprises four coupling primary portions 2, 6, 2',6', each extending along an edge of the coupling portion 1. The first and third primary coupling portions 2, 2' may correspond to the first coupling portion of the embodiment of for example FIGS 3A-B and the second and fourth coupling portions 6, 6' may correspond to the second secondary coupling portion of the embodiment of for example FIGS 3A-B.

[0170] The coupling element 1 may comprise a general rectangular shape, such as substantially quadratic.

[0171] Two adjacent edges may comprise the first 2 and third 2' primary coupling portions and two diagonally opposite adjacent edges may comprise the second 6 and fourth 6' primary coupling portions.

[0172] This configuration brings about the technical advantage that the coupling element 1 may engage with the first 11 or second edge 12 of the first panel 10 and simultaneously engage with the second edge 22 of the first panel 20 arranged with an angle Φ (Fi), such as 45-degrees, relative the first 11 or second edge 12 of the first panel 10, alternatively, relative the primary axis Z1, Z1'.

[0173] Although the present inventive concept has been described and illustrated in detail, it is clearly understood that the same is by way of illustration and example only and is not to be taken by way of limitation, the spirit and scope of the present inventive concept being limited only by the terms of the appended claims.

ITEMS

[0174]

Item 1. A coupling element 1 configured for assembling a first building panel 10 and a second building panel 20, comprising:

a primary coupling portion 2, 6 extending along a primary axis Z1, Z1' and being configured to obtain an engaged state with a first edge 11 of said first building panel 10 for locking displacement of the coupling element 1 along a secondary axis X1, X1' and a tertiary axis Y1 being orthogonal the primary axis Z1; and

a secondary coupling portion 4 extending along the tertiary axis Y1 and being configured to engage with a second edge 22 of said second building panel 20.

Item 2. Coupling element according to item 1, wherein said primary coupling portion 2, 6 comprises a locking element 51, 61 extending in a direction along the tertiary axis Y1.

Item 3. Coupling element according to any one of items 1 or 2, wherein said first edge 11 and preferably a second edge 12 of said first panel 10 comprises a locking element 110, 120 extending in a direction along the tertiary axis Y1 when the first panel 10 is configured in a engaged state with the coupling element 1.

Item 4. Coupling element according to any one of the preceding items 1 to 3, wherein said first edge 11 of said first panel 10 is disposed between a first main surface 15 and an opposite second main surface 16 of said first panel 10.

Item 5. Coupling element according to item 4, wherein said first main surface 15 of the first panel 10 is arranged in a primary plane V1 and a corresponding first main surface 25 of the second panel 20 is arranged in a parallel secondary plane V2 displaced from the primary plane V1 in a respective engaged state of the first and/or second panel 10, 20.

Item 6. Coupling element according to any one of items 4 or 5, wherein said primary coupling portion is 2, 6 is arranged between said first main surface 15 and said second main surface 16 of the first panel 10 in engaged state of the first panel 10.

Item 7. Coupling element according to one of the preceding items 4 to 6, wherein said locking element 51, 61 of said primary coupling portion is 2, 6 is arranged between said first main surface 15 and said second main surface 16 in engaged state.

Item 8. Coupling element according to any one of the preceding items 1 to 7, wherein said primary coupling portion 2, 6 is configured to facilitate displacement of the coupling element 1 along the primary axis Z1, Z1' in engaged state of the first panel 10.

Item 9. Coupling element according to any one of the preceding items, wherein said primary coupling portion 2, 6 is configured to engage with said first edge 11 of said first panel 10 by means of a folding displacement of said coupling element 1 about an axis being parallel the primary axis Z1, Z1'.

Item 10. Coupling element according to any one of the preceding items, wherein said primary coupling portion 2, 6 is configured to cooperate with said locking element 110, 120 of said first edge 11 of said first panel 10 for locking displacement of the coupling element 1 along the secondary axis X1.

Item 11. Coupling element according to the preceding item 10, wherein said engaging of the coupling element 1 to said first edge 11 of said first panel 10 comprises said locking element 51, 61 of said primary coupling portion 2, 6 and said locking element 110, 120 of said first panel 10 being configured to extend in opposite directions along the tertiary axis Y1 and overlap in engaged state of the first panel 10.

Item 12. Coupling element according to any one of the preceding items, wherein said first panel 10 and/or said second panel 20 comprises a mechanical locking system for mechanical locking of one or more of similar panels in the plane of the first and/or second main surfaces 15, 16.

Item 13. Coupling element according to any one of the preceding items, wherein said first panel 10 and said second panel 20 comprises two essentially identically formed panels, such as panels suitable to be laid as a floor.

Item 14. Coupling element according to any one of the preceding items, wherein primary coupling portion 2, 6 comprises a shape corresponding to a second edge 12 of the first panel 10 or a first edge 21 of the second panel 20.

Item 15. Coupling element according to any one of the preceding items, wherein one of the first edge 11, 21 or second edge 12, 22 of at least one of the first and/or second panel 10, 20 comprises a locking tongue 121 and the other of the first edge 11, 21 or second edge 12, 22 of said first or second panel 10, 20 comprises a corresponding tongue groove 111 for receiving a corresponding locking tongue.

Item 16. Coupling element according to the preceding item 15, wherein one of said primary coupling portions 2 comprises said corresponding locking tongue 52.

Item 17. Coupling element according to one of the preceding items 15 to 16, wherein one of said primary coupling portions 6 comprises a corresponding tongue groove 62.

Item 18. Coupling element according to any one of the preceding items, wherein said secondary coupling portion 4 is configured to engage with a mechanical locking system of a first edge 21' of a further second building panel 20'.

Item 19. Coupling element according to any one of the preceding items, further comprising attachment means, preferably comprising a through-hole 5, for attachment of said coupling element 1 to a substrate 45.

Item 20. Coupling element according to any one of the preceding items, wherein a secondary coupling portion 4 is pivotably arranged relative the primary coupling portion 2, 6.

Item 21. Coupling element according to any one of the preceding items, wherein the secondary coupling portion 4, 8 comprises an extension parallel with or with an angle Φ1 relative the secondary axis X1, X1', such as a 45-degree angle, in engaged state of the first panel 10.

Item 22. Coupling element according to any one of the preceding items, wherein one or more secondary coupling portions 8 are configured to be received in one or more longitudinally L extending grooves 46 provided on the second main surface 26, 26' of the second panel 20 and/or a further second panel 20' facing the first panel 10.

Item 23. Coupling element according to any one of the preceding items 1 to 22, wherein the coupling element 1 is configured to be arranged external said first and/or second panel 10, 20, preferably at an intersection between said first 11 or second edge 12 of said first panel 10 and said second edge 22 of said second panel 22.

Item 24. A wall 59, such as a decorative wall, comprising the coupling element 1 according to anyone of the preceding items.

Item 25. A system 60 for assembling building panels, comprising a plurality of building panels 10, 20 provided with respective first 11, 21 and second edges 12, 22 and one or more coupling elements 1 as claimed in any one of items 1 to 24.

Item 26. Method 100 of coupling building panels 10, 20, 20':

- providing a first building panel 10 comprising a first edge 11;
- providing a coupling element 1 comprising a primary coupling portion 2, 6 extending in a direction along a primary axis Z1, Z1' and a secondary coupling portion 4 extending in a direction along a tertiary axis Y1 being orthogonal the primary axis Z1, Z1';
- engaging said coupling element 1 with said first edge 11 of said first building panel 10 such that said first edge 11 extends in a direction along the primary axis Z1, Z1';
- providing a second building panel 20 having a second edge 22 extending with an angle relative the primary axis Z1, Z1';
- optionally, displacing the coupling element (1) along said first edge (11);
- engaging said coupling element 1 with said second edge 22.

Item 27. Method according to the previous item 26, wherein the step of engaging said coupling element 1 with said first edge 11 comprises folding of the coupling element 1 about an axis being parallel the primary axis Z1, Z1'

Item 28. Method according to any one of the preceding items 26 to 27, wherein the step of engaging said coupling element 1 with said first edge 11 comprises a locking element 51, 61 of the coupling element 1 engaging with a locking element 110, 120 of the first panel 10, said locking elements 51, 61, 110, 120 extending in a direction substantially along the tertiary axis Y1 when the first panel 10 and/or second panel 20 are in engaged state with the coupling element 1.

Item 29. Method according to any one of the preceding items 26 to 28, further comprising the step of aligning the primary coupling portion 2, 6 with the first edge 11 or the second edge 12 of the first panel 10, prior the step of pivoting or folding the coupling element 1.

Item 30. Method according to any one of the preceding items 26 to 29, further comprising the step of bringing a portion of the primary coupling portion 2, 6 in close proximity of, preferably in contact with the first edge 11 or the second edge 12 of the first panel 10, prior the step of pivoting or folding the coupling element 1.

Item 31. Method according to any one of the preceding items 26 to 30, wherein the step of providing a first panel 10 comprises providing a plurality of first panels 10, 10', 10", preferably arranged parallel each other.

Item 31. Method according to any one of the preceding items 26 to 31, wherein the step of providing a second panel 20 comprises providing a plurality of second panels 20, 20', 20", preferably arranged parallel or transverse each other.

Claims

1. A coupling element (1) configured for assembling a first building panel (10) and a second building panel (20), comprising:

   a primary coupling portion (2, 6) extending along a primary axis (Z1, Z1') and being configured to obtain an engaged state with a first edge (11) of said first building panel (10) for locking displace-

ment of the coupling element (1) along a secondary axis (X1, X1') and a tertiary axis (Y1) being orthogonal the primary axis (Z1); and
a secondary coupling portion (4) extending along the tertiary axis (Y1) and being configured to engage with a second edge (22) of said second building panel (20).

2. Coupling element according to claim 1, wherein said primary coupling portion (2, 6) comprises a locking element (51, 61) extending in a direction along the tertiary axis (Y1).

3. Coupling element according to any one of claims 1 or 2, wherein said first edge (11) and preferably a second edge (12) of said first panel (10) comprises a locking element (110, 120) extending in a direction along the tertiary axis (Y1) when the first panel (10) is configured in a engaged state with the coupling element (1).

4. Coupling element according to any one of the preceding claims 1 to 3, wherein said first edge (11) of said first panel (10) is disposed between a first main surface (15) and an opposite second main surface (16) of said first panel (10).

5. Coupling element according to claim 4, wherein said first main surface (15) of the first panel (10) is arranged in a primary plane (V1) and a corresponding first main surface (25) of the second panel (20) is arranged in a parallel secondary plane (V2) displaced from the primary plane (V1) in a respective engaged state of the first and/or second panel (10, 20).

6. Coupling element according to any one of claims 4 or 5, wherein said primary coupling portion is (2, 6) is arranged between said first main surface (15) and said second main surface (16) of the first panel (10) in engaged state of the first panel (10).

7. Coupling element according to one of the preceding claims 4 to 6, wherein said locking element (51, 61) of said primary coupling portion is (2, 6) is arranged between said first main surface (15) and said second main surface (16) in engaged state.

8. Coupling element according to any one of the preceding claims 1 to 7, wherein said primary coupling portion (2, 6) is configured to facilitate displacement of the coupling element (1) along the primary axis (Z1, Z1') in engaged state of the first panel (10).

9. Coupling element according to any one of the preceding claims, wherein said primary coupling portion (2, 6) is configured to engage with said first edge (11) of said first panel (10) by means of a folding displacement of said coupling element (1) about an axis being parallel the primary axis (Z1, Z1').

10. Coupling element according to any one of the preceding claims, wherein said primary coupling portion (2, 6) is configured to cooperate with said locking element (110, 120) of said first edge (11) of said first panel (10) for locking displacement of the coupling element (1) along the secondary axis (X1).

11. Coupling element according to any one of the preceding claims, wherein said first panel (10) and/or said second panel (20) comprises a mechanical locking system (70) for mechanical locking of one or more of similar panels in the plane of the first and/or second main surfaces (15, 16).

12. Coupling element according to any one of the preceding claims, wherein the secondary coupling portion (4, 8) comprises an extension parallel with or with an angle (Φ1) relative the secondary axis (X1, X1'), such as a 45-degree angle, in engaged state of the first panel (10).

13. Coupling element according to any one of the preceding claims, wherein one or more secondary coupling portions (8) are configured to be received in one or more longitudinally (L) extending grooves (46) provided on the second main surface (26, 26') of the second panel (20) and/or a further second panel (20') facing the first panel (10).

14. A system (60) for assembling building panels, comprising a plurality of building panels (10, 20) provided with respective first (11, 21) and second edges (12, 22) and one or more coupling elements (1) as claimed in any one of claims 1 to 13.

15. Method (100) of coupling building panels (10, 20, 20'):

- providing a first building panel (10) comprising a first edge (11);
- providing a coupling element (1) comprising a primary coupling portion (2, 6) extending in a direction along a primary axis (Z1, Z1') and a secondary coupling portion (4) extending in a direction along a tertiary axis (Y1) being orthogonal the primary axis (Z1, Z1');
- engaging said coupling element (1) with said first edge (11) of said first building panel (10) such that said first edge (11) extends in a direction along the primary axis (Z1, Z1');
- providing a second building panel (20) having a second edge (22) extending with an angle relative the primary axis (Z1, Z1');
- optionally, displacing the coupling element (1) along said first edge (11);

- engaging said coupling element (1) with said second edge (22).

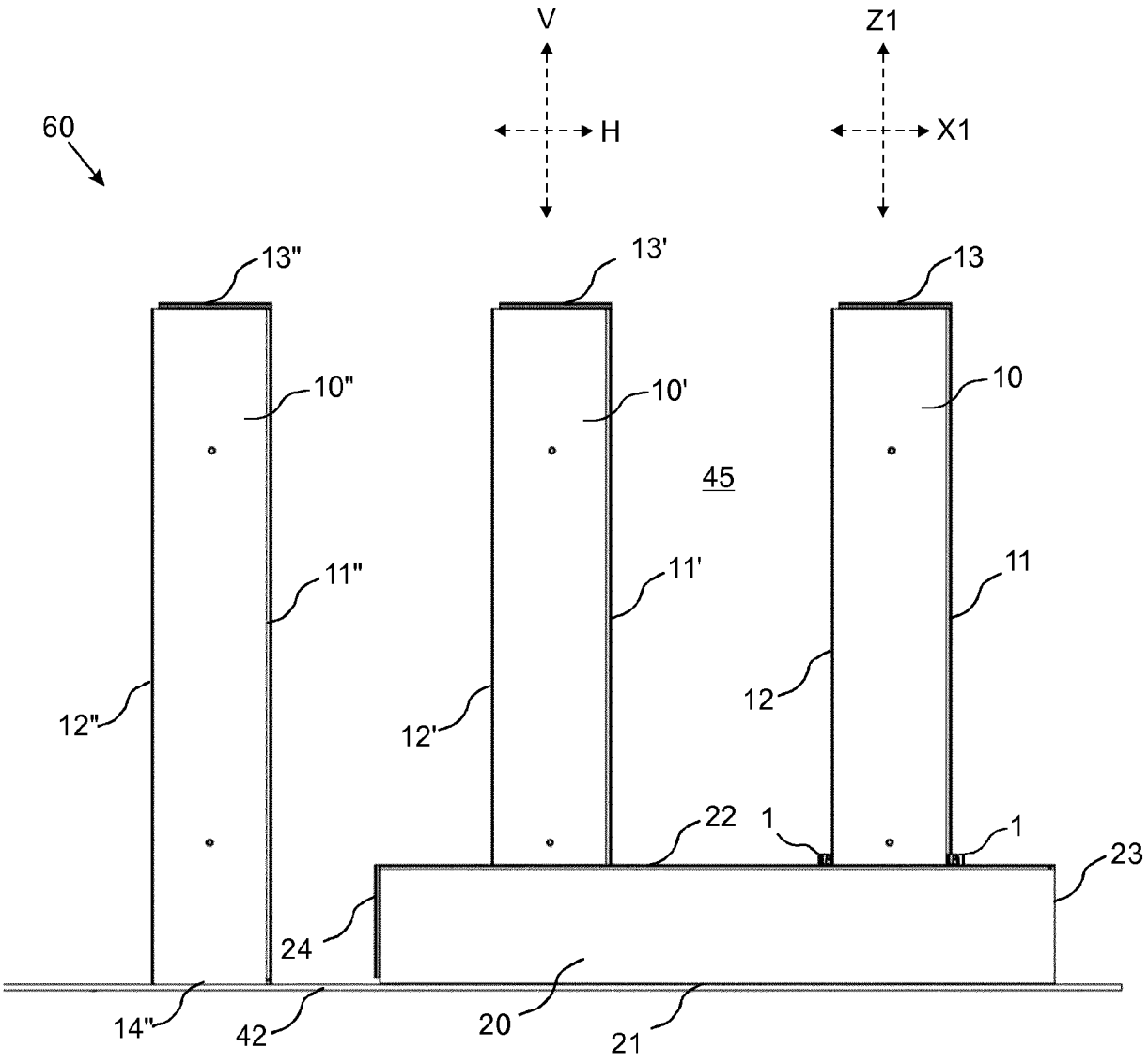

60
V
H
Z1
X1
13"
13'
13
10"
10'
10
45
11"
11'
11
12"
12'
12
22
1
1
23
24
14"
42
20
21

FIG. 1

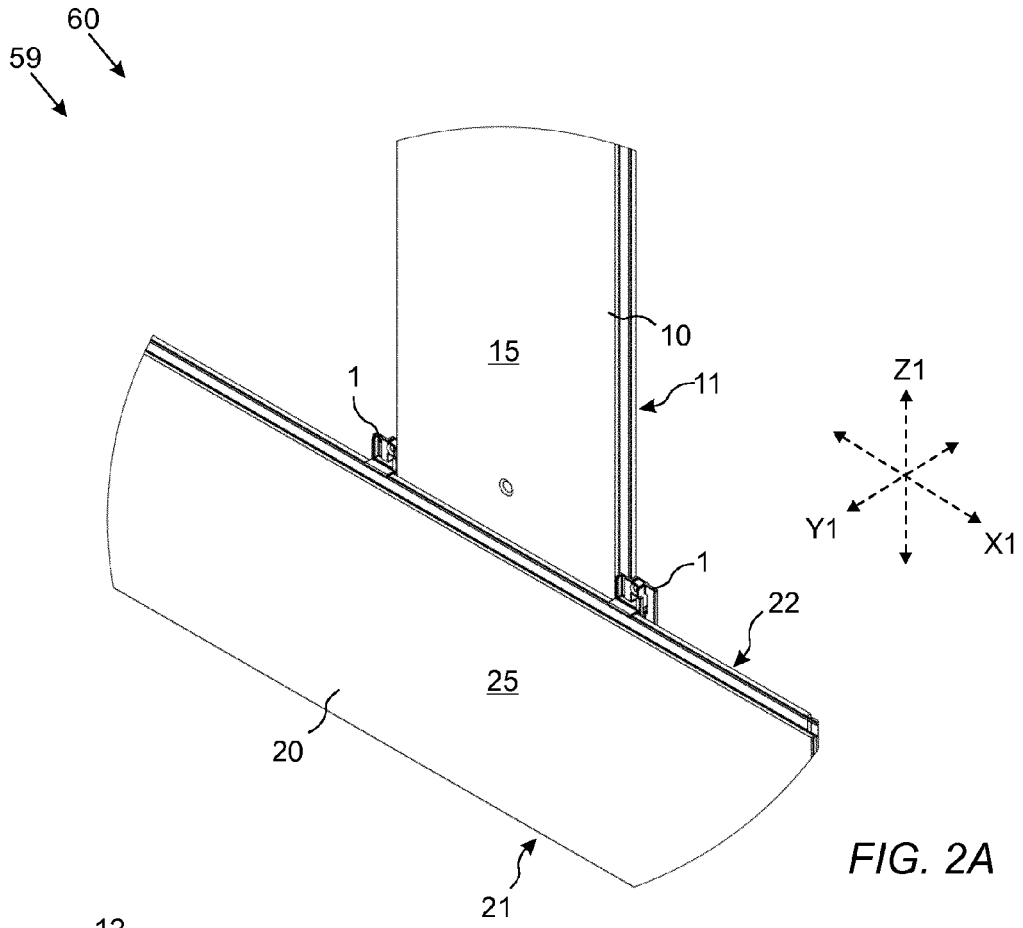

60
59
15
10
11
1
1
22
25
20
21
Z1
Y1
X1

FIG. 2A

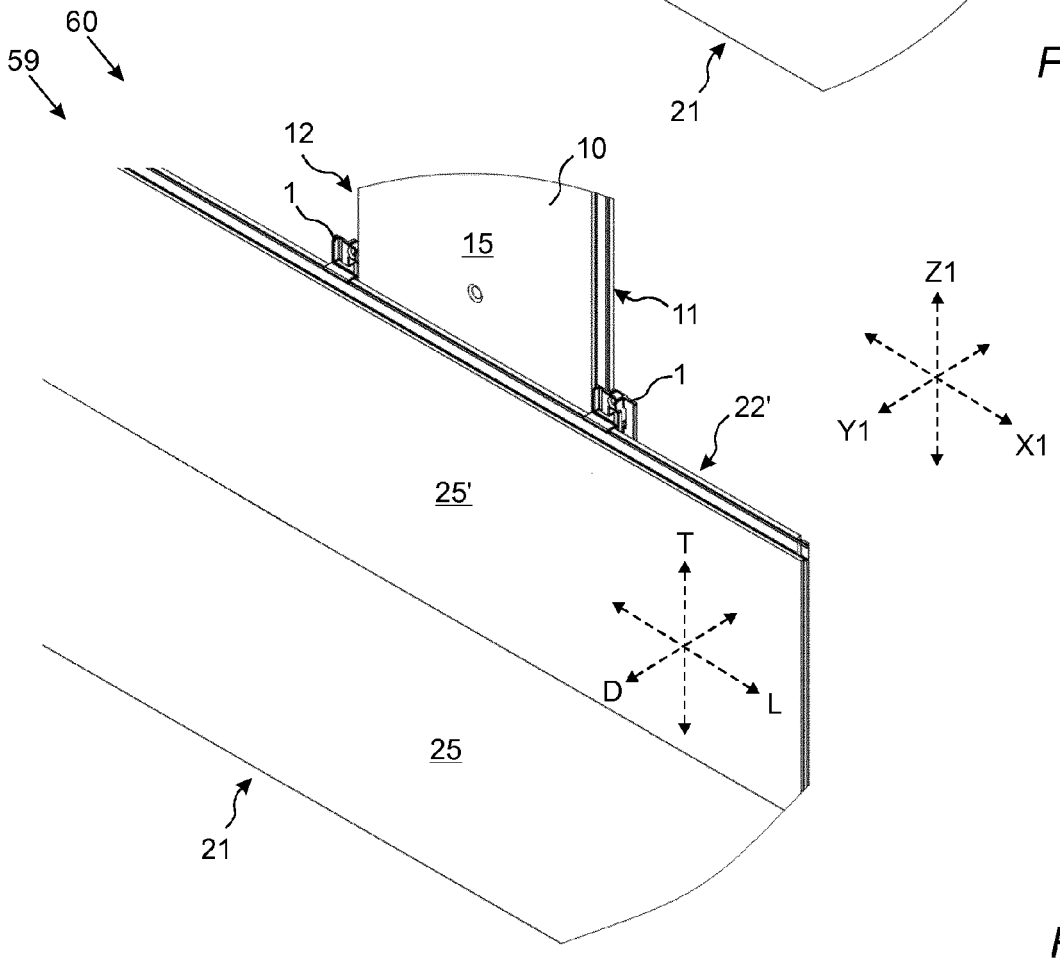

60
59
12
1
15
10
11
1
22'
25'
T
D
L
25
21
Z1
Y1
X1

FIG. 2B

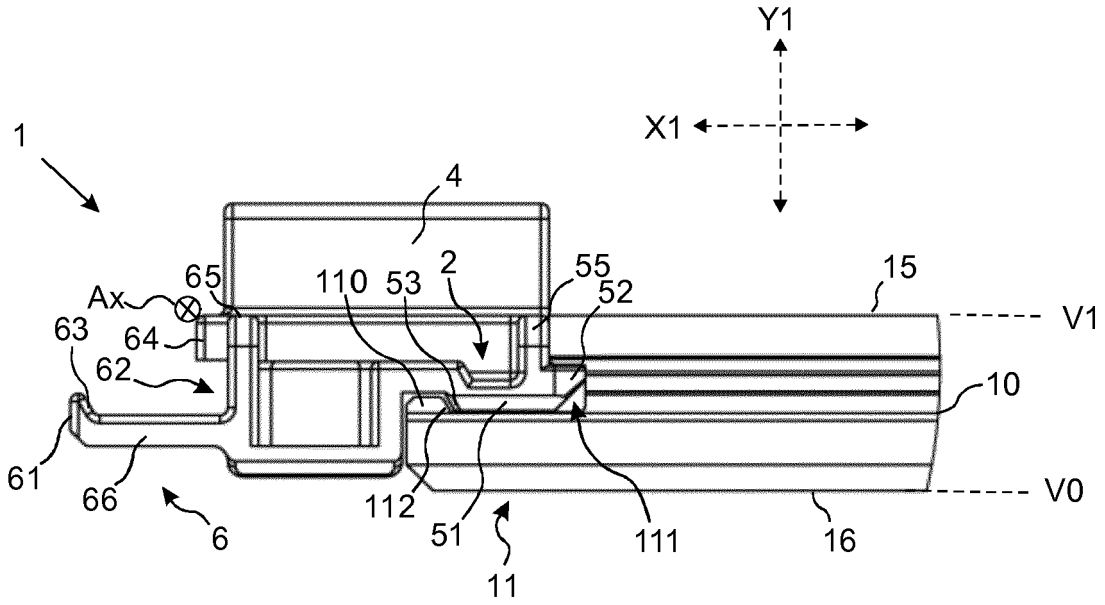

Y1
X1
1
4
Ax
65
110
53
2
55
52
15
V1
63
64
62
10
61
66
6
112
51
111
16
V0
11

FIG. 3A

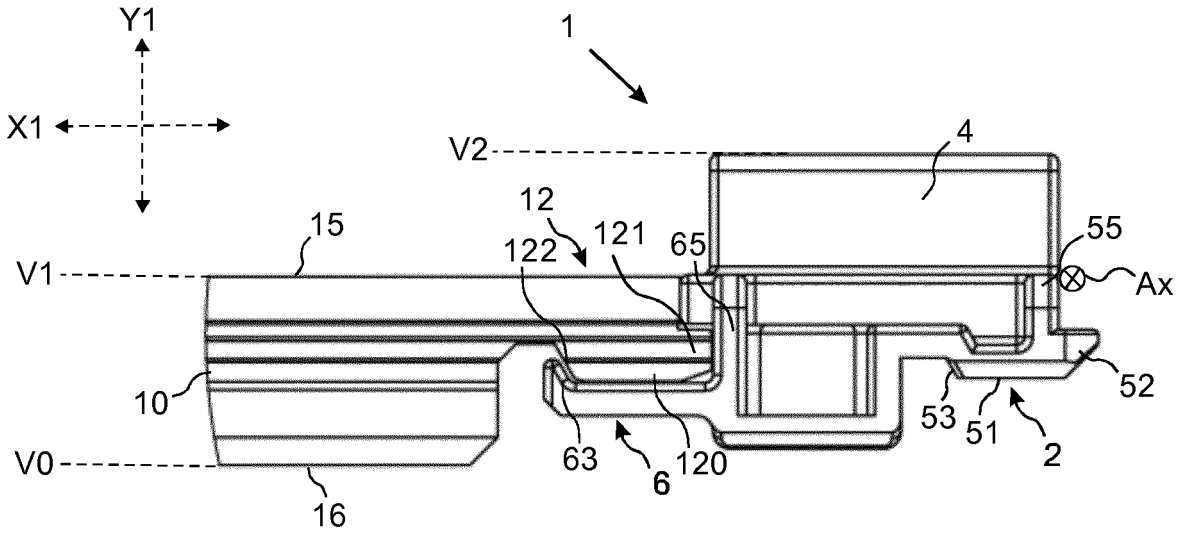

Y1
X1
1
V2
4
12
121
122
65
55
Ax
15
V1
10
52
53
51
2
V0
63
120
6
16

FIG. 3B

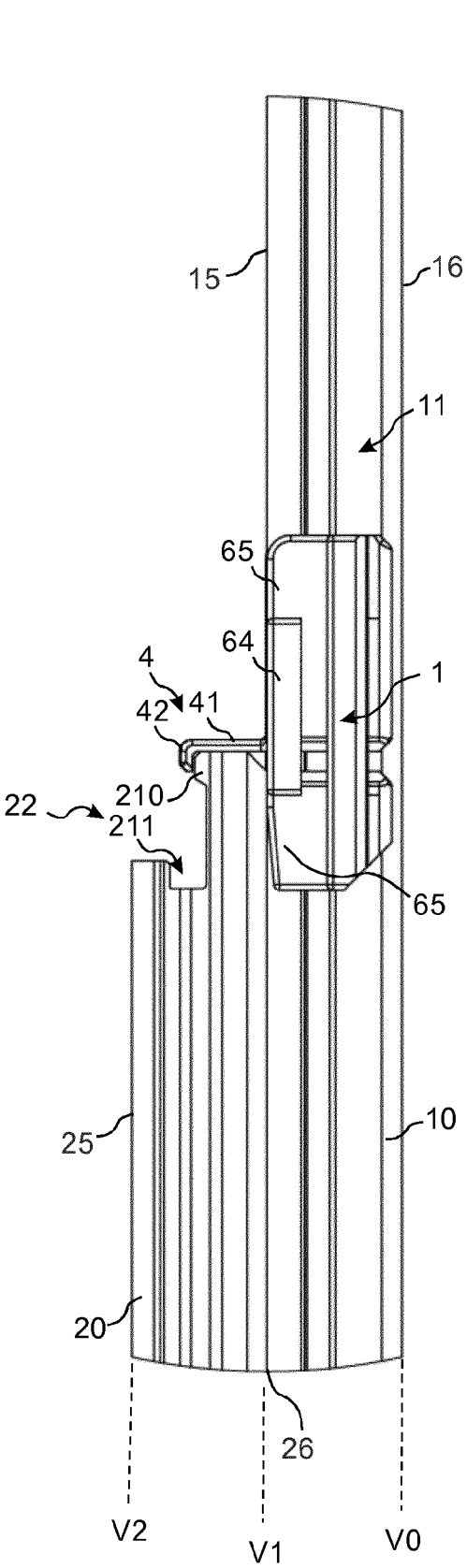


FIG. 4A

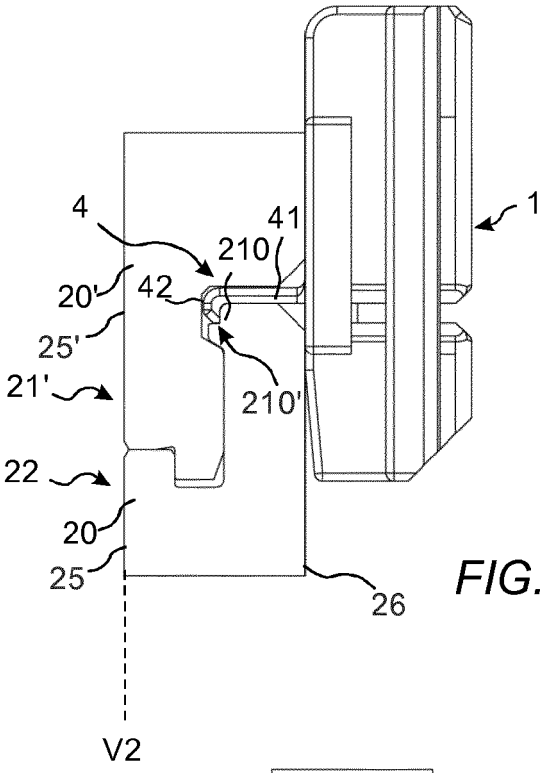


FIG. 4B

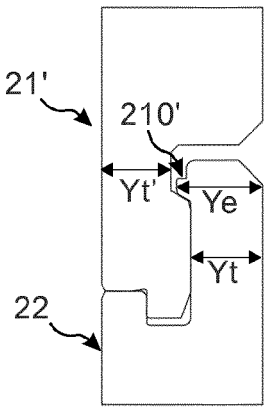


FIG. 4C

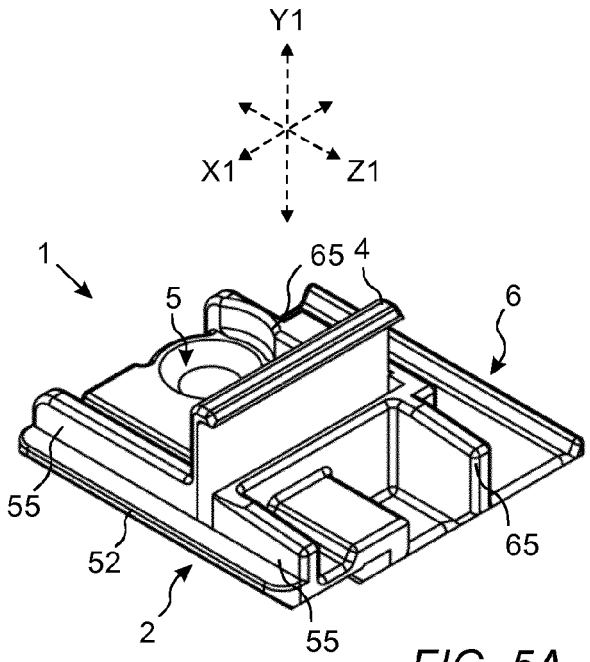


FIG. 5A

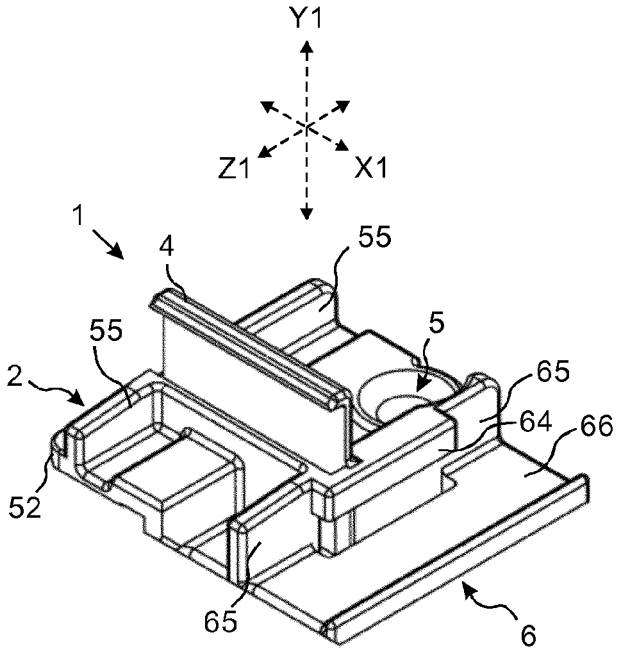


FIG. 5B

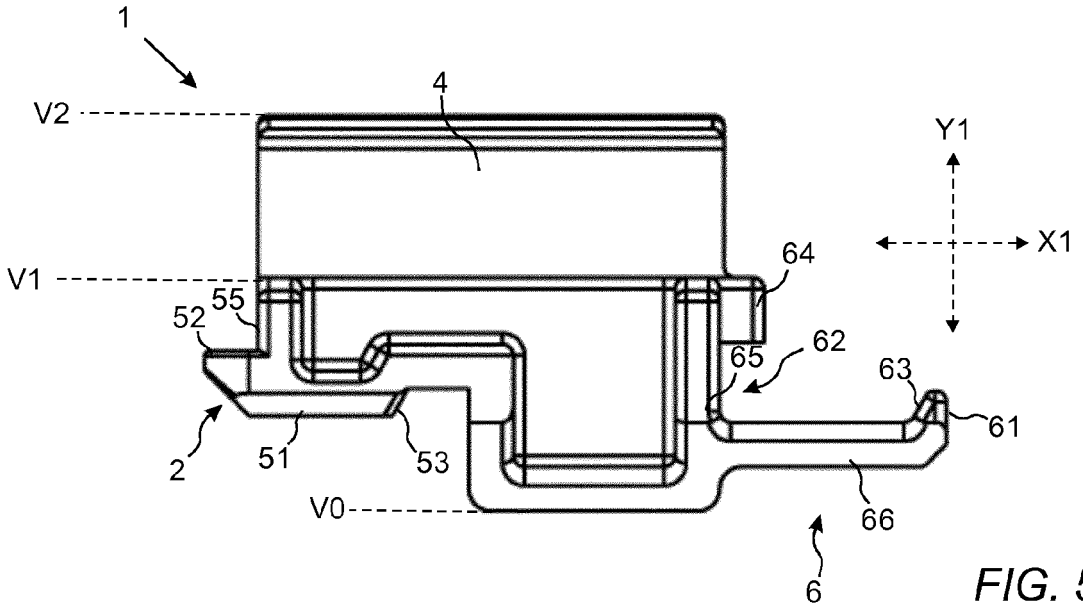


FIG. 5C

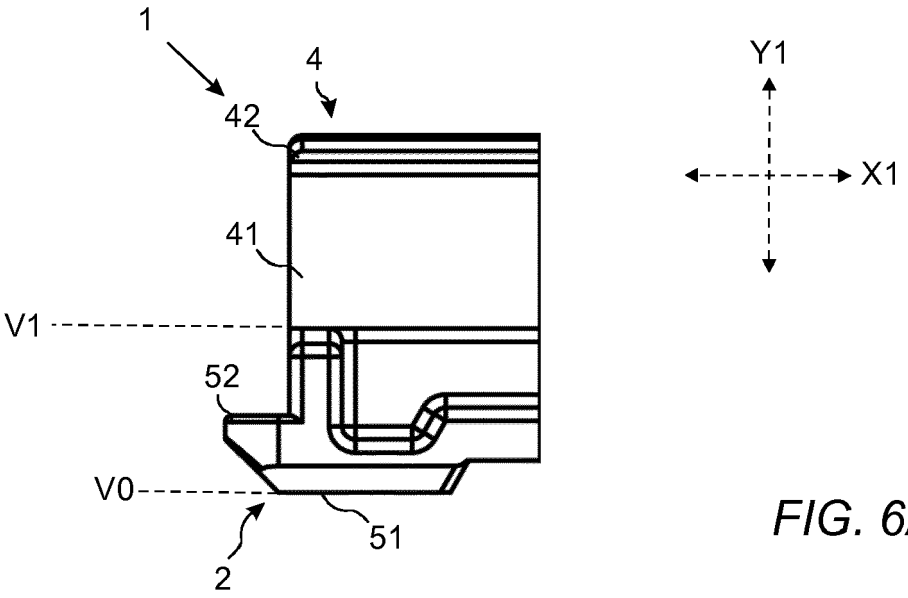


FIG. 6A

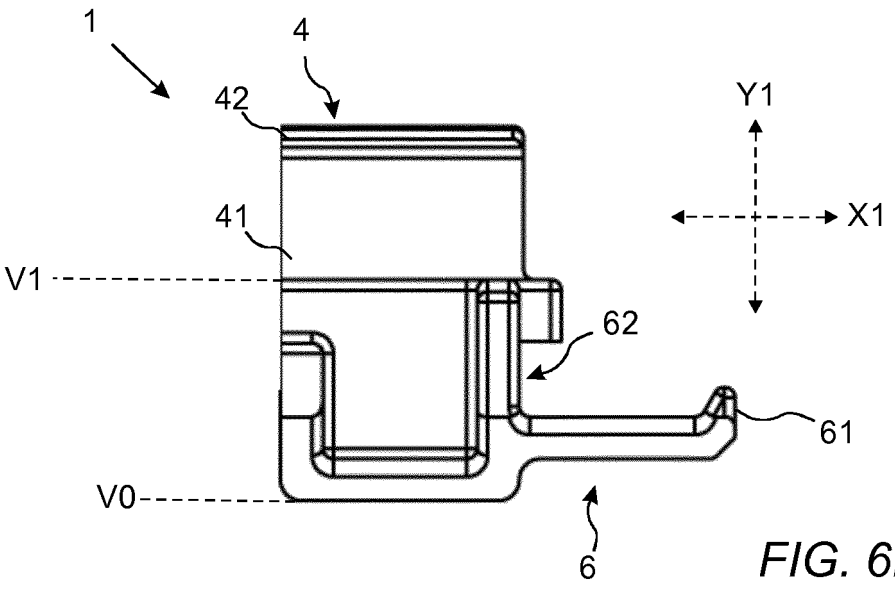
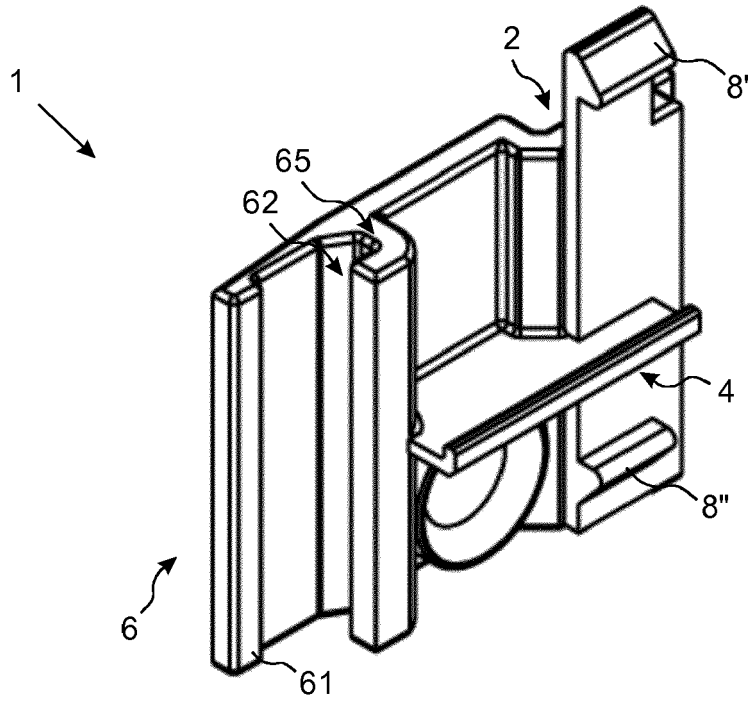


FIG. 6B



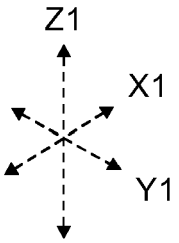
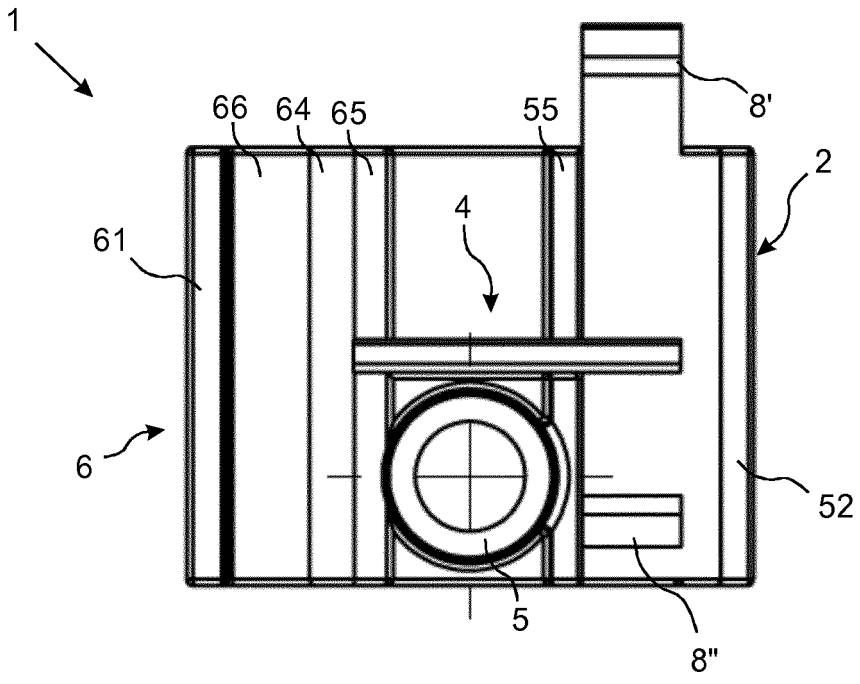


FIG. 7A



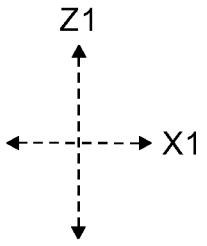


FIG. 7B

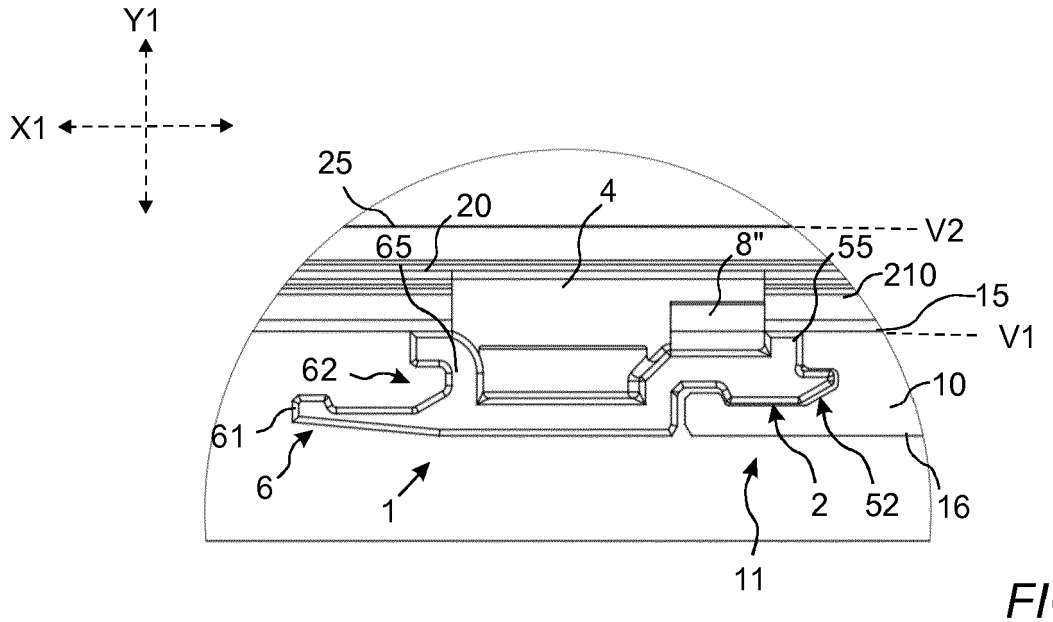

Y1
X1
25
20
4
65
8"
55
V2
210
15
V1
62
10
61
6
1
2
52
16
11

FIG. 8A

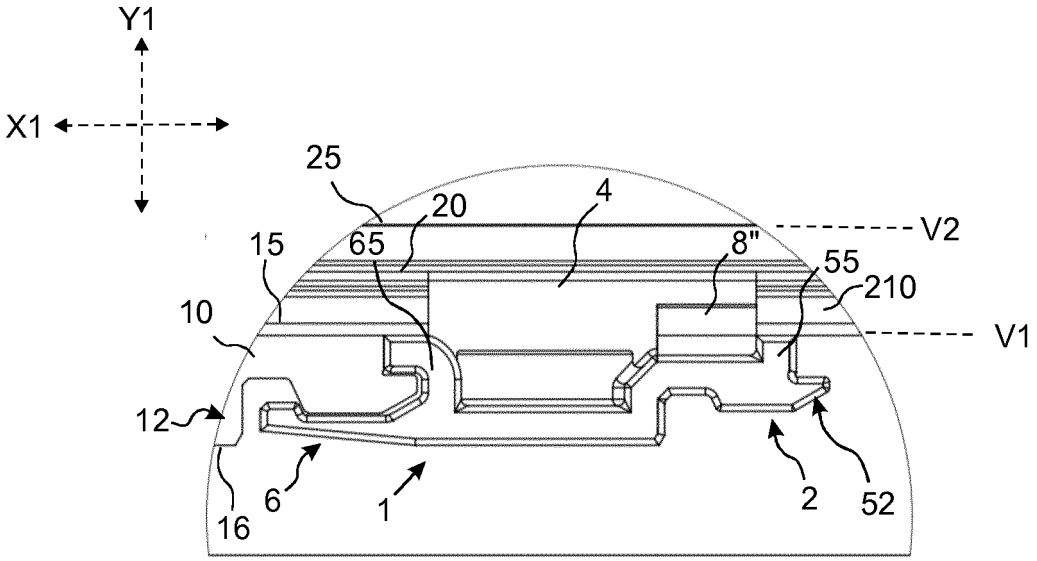

Y1
X1
25
20
4
15
65
8"
55
V2
210
10
V1
12
6
1
2
52
16

FIG. 8B

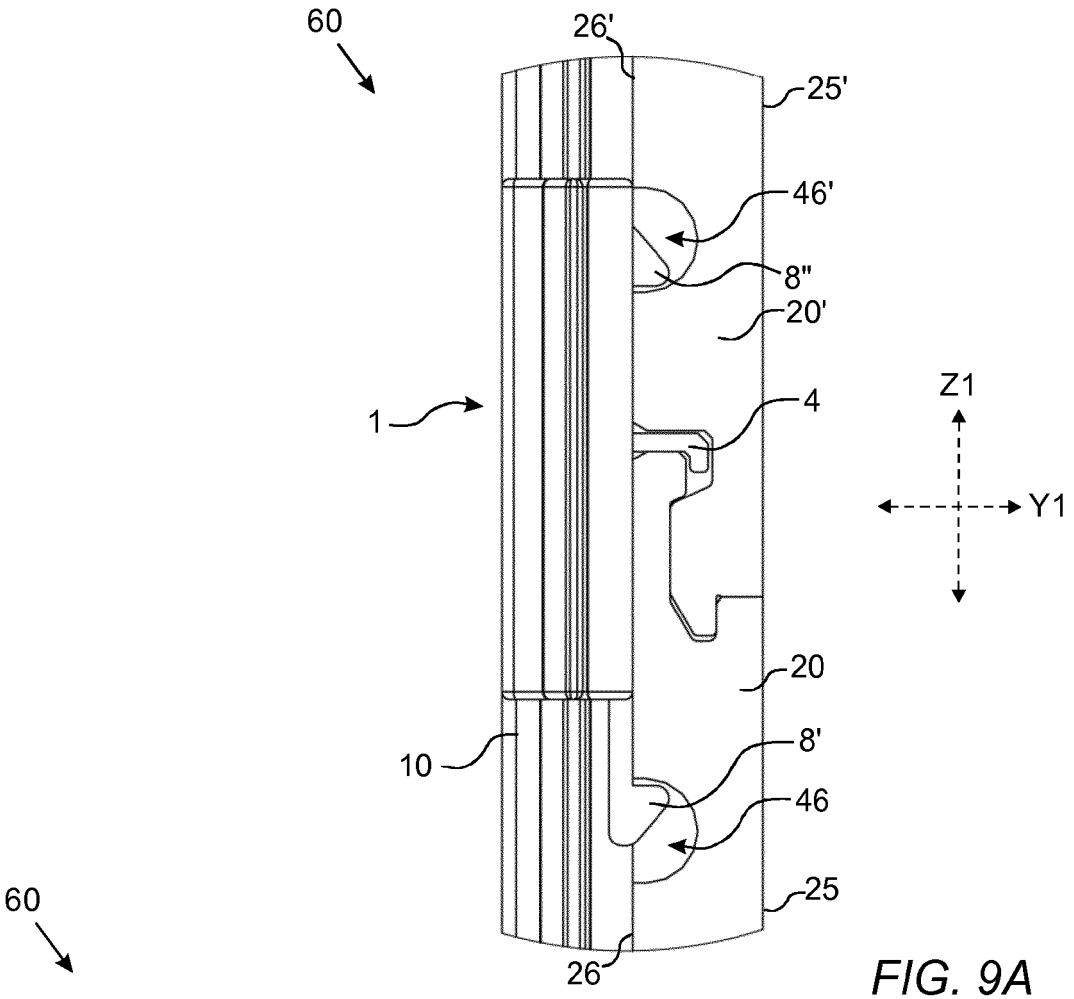

60
26'
25'
46'
8"
20'
1
4
Z1
Y1
20
10
8'
46
25
26

FIG. 9A

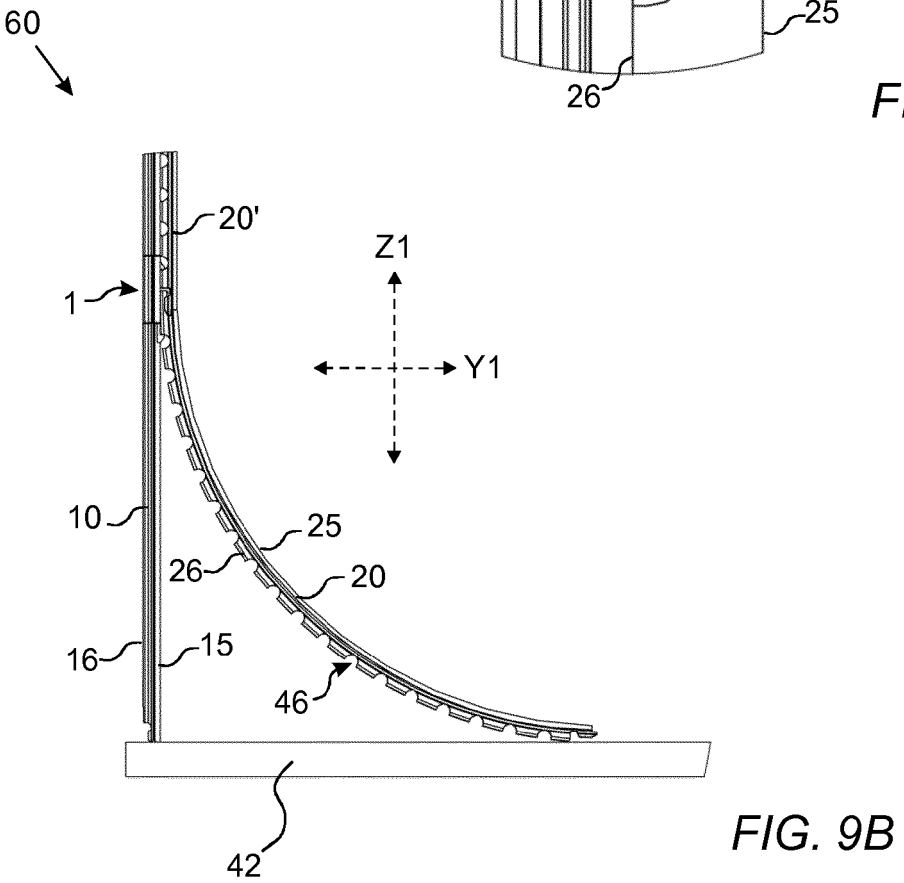

60
20'
Z1
1
Y1
10
25
26
20
16
15
46
42

FIG. 9B

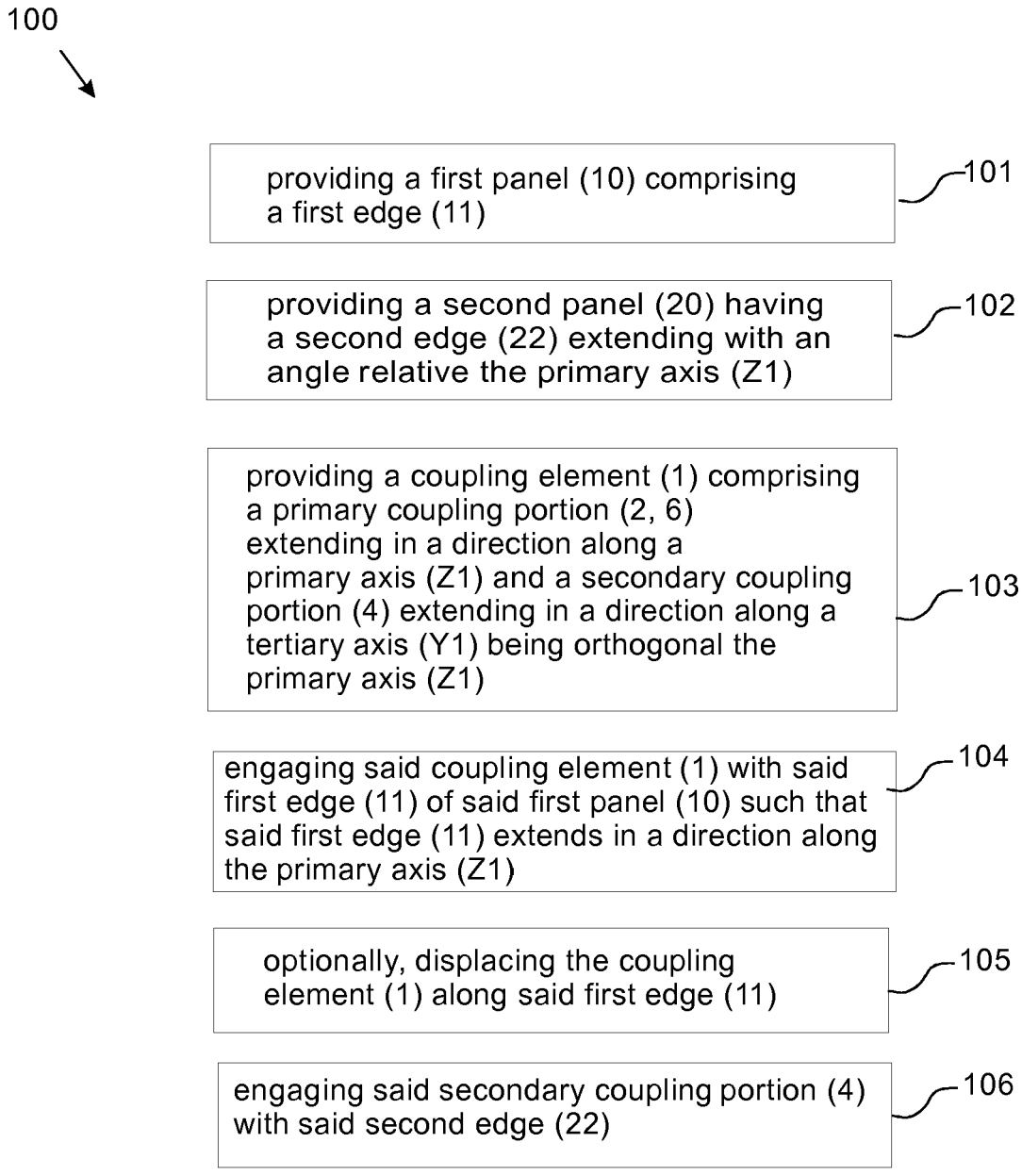

100
providing a first panel (10) comprising a first edge (11)
101
providing a second panel (20) having a second edge (22) extending with an angle relative the primary axis (Z1)
102
providing a coupling element (1) comprising a primary coupling portion (2, 6) extending in a direction along a primary axis (Z1) and a secondary coupling portion (4) extending in a direction along a tertiary axis (Y1) being orthogonal the primary axis (Z1)
103
engaging said coupling element (1) with said first edge (11) of said first panel (10) such that said first edge (11) extends in a direction along the primary axis (Z1)
104
optionally, displacing the coupling element (1) along said first edge (11)
105
engaging said secondary coupling portion (4) with said second edge (22)
106

FIG. 10

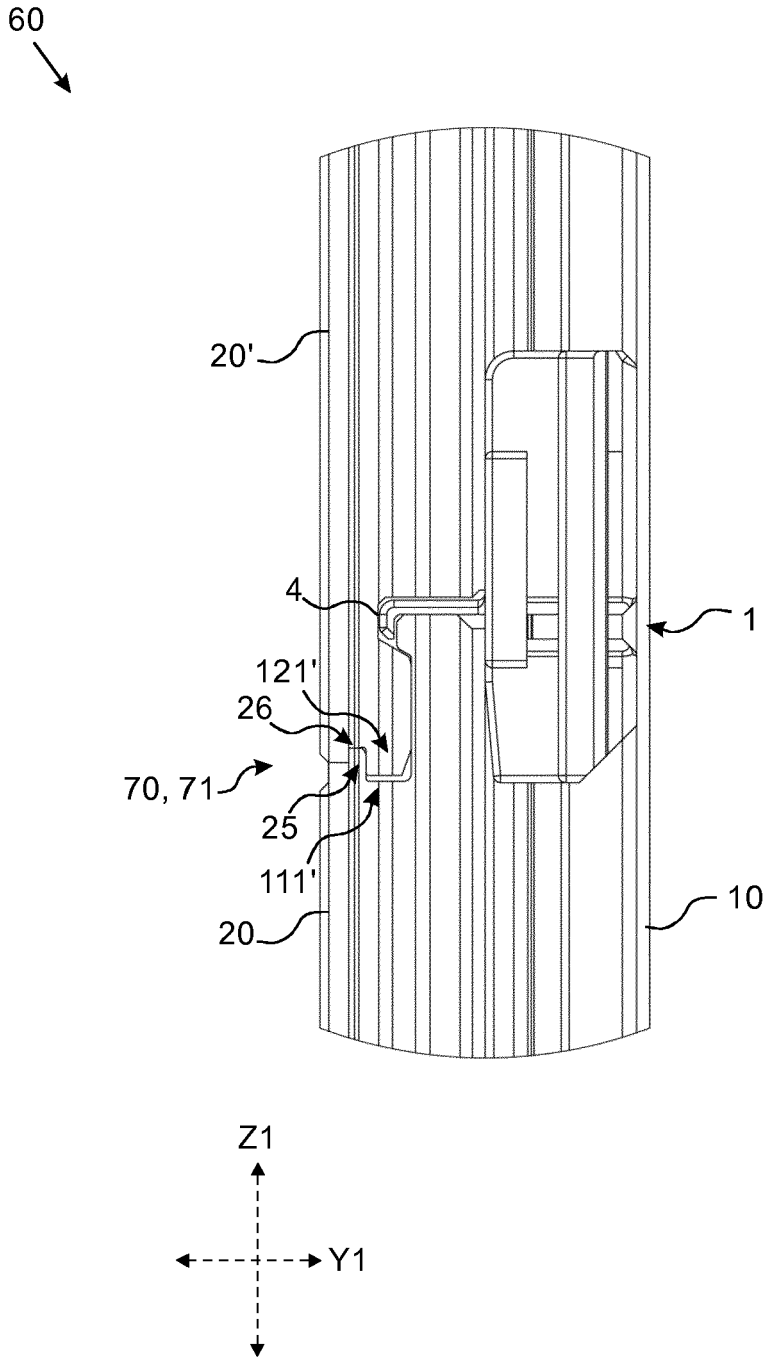


FIG. 11

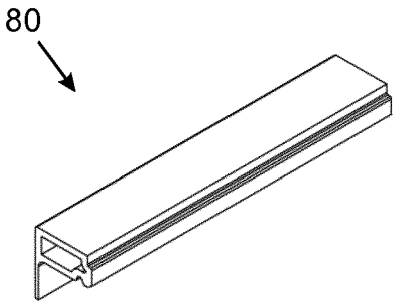


FIG. 12A

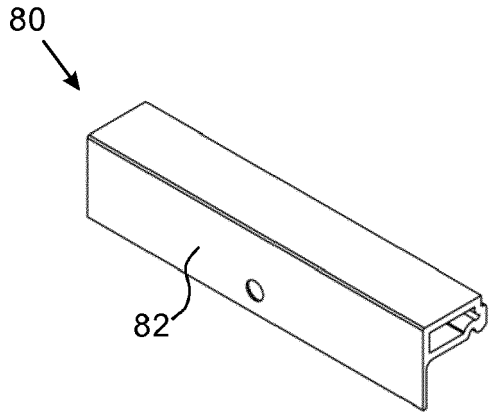


FIG. 12B

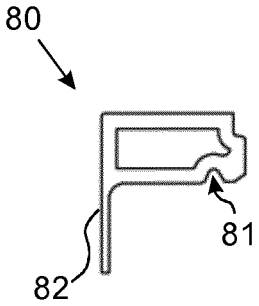


FIG. 12C

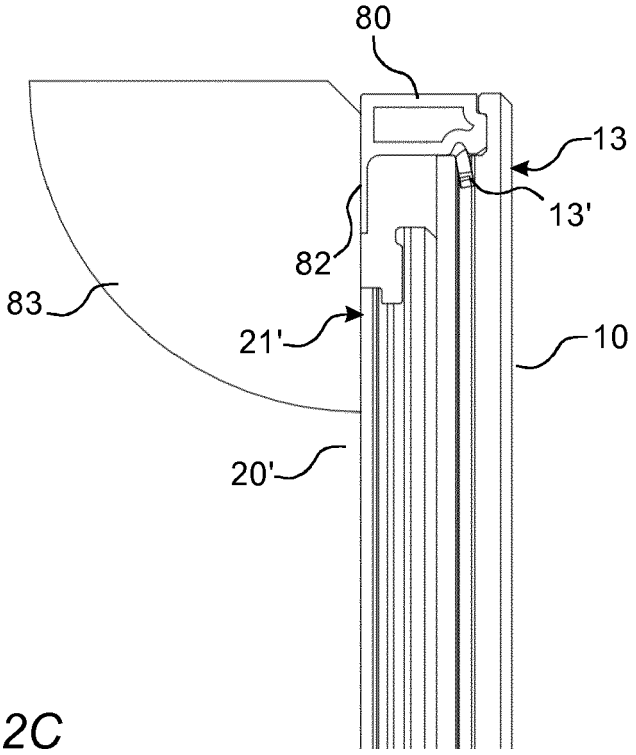


FIG. 12D

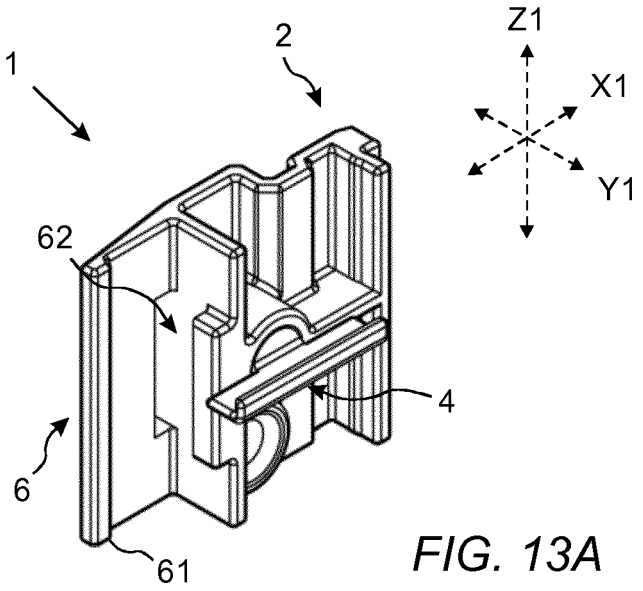


FIG. 13A

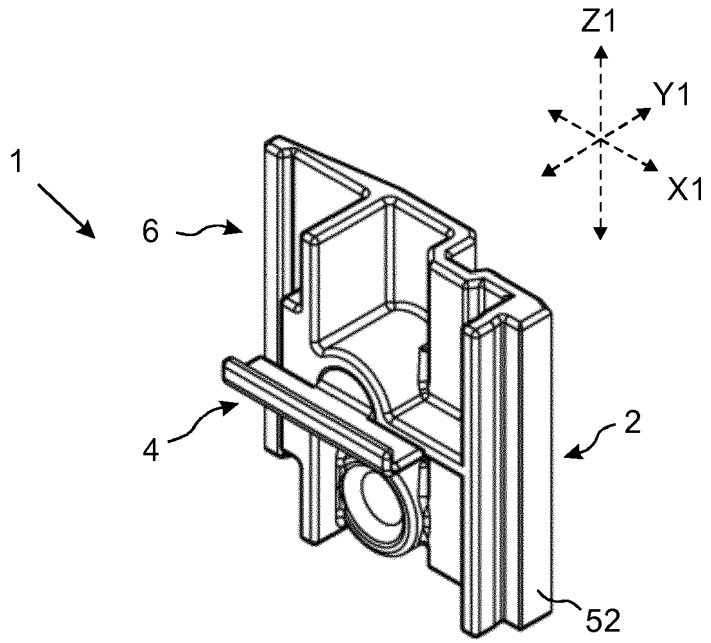


FIG. 13B

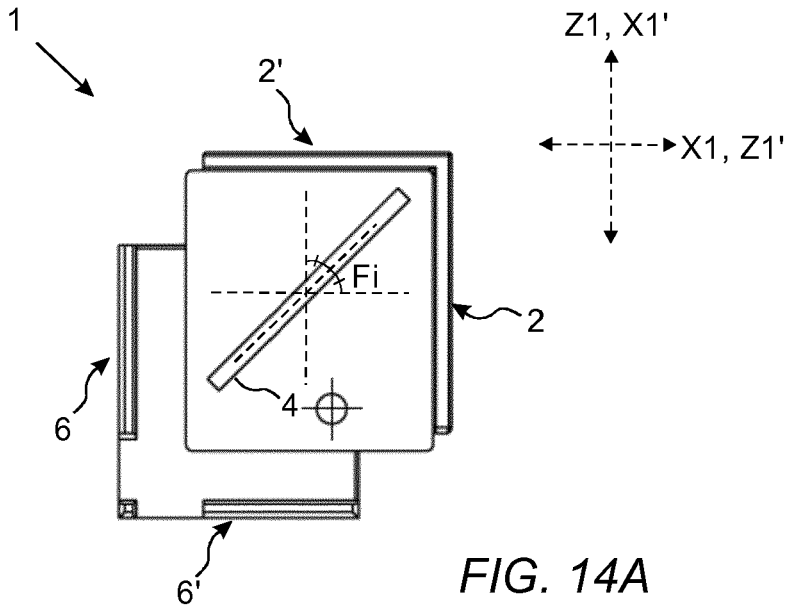


FIG. 14A

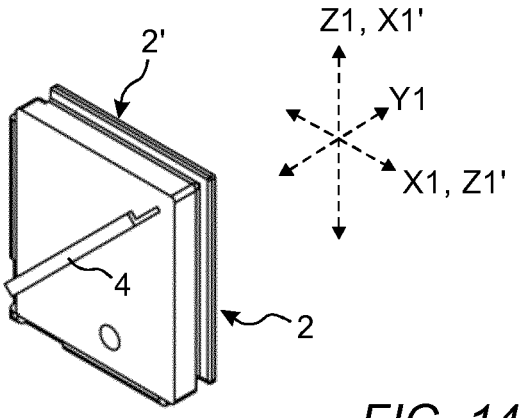


FIG. 14B

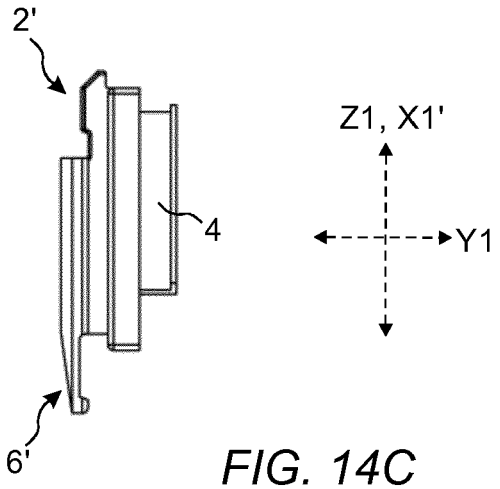


FIG. 14C

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EUROPEAN SEARCH REPORT

Application Number
EP 19 16 5028

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 Y	ES 2 504 665 A1 (CONTROL Y DESARROLLO EMPRESARIAL S L [ES]) 8 October 2014 (2014-10-08) * abstract; figures 1-4 *	1,4-8, 10,15 2,3,9, 11-14	INV. E04F13/08

X Y	DE 16 59 937 A1 (GOETZ KG METALLBAU) 28 January 1971 (1971-01-28) * page 5, line 5 - page 6, line 4; figures 1,2,6 *	1-8,10, 15 9,11-14	

X Y	US 2 316 424 A (HENRY HASENBURGER ET AL) 13 April 1943 (1943-04-13) * page 1, right-hand column, line 22 - page 2, left-hand column, line 57; figures 1,2 *	1-8,10, 13-15 9,11,12	

X Y	WO 2012/056074 A1 (LOPEZ LLIMARGAS ALEJANDRO [ES]) 3 May 2012 (2012-05-03) * abstract; figures 1-4 *	1,4-10, 14,15 2,3, 11-13	
	-----		TECHNICAL FIELDS SEARCHED (IPC) E04F

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	23 September 2019	Khera, Daljit

CATEGORY OF CITED DOCUMENTS

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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)

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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
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23-09-2019

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
ES 2504665 A1	08-10-2014	NONE	
DE 1659937 A1	28-01-1971	NONE	
US 2316424 A	13-04-1943	NONE	
WO 2012056074 A1	03-05-2012	ES 1073507 U	20-12-2010
		ES 2448190 A1	13-03-2014
		WO 2012056074 A1	03-05-2012

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