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(71) Applicant: **VÄLINGE INNOVATION AB** [SE/SE]; Prästavägen 513, SE-263 64 VIKEN (SE).

(72) Inventor: **BOO, Christian**; Tvärgatan 8, SE-268 77 KÄGERÖD (SE).

(74) Agent: **ENGSTRAND, Ola**; Välinge Innovation AB, Prästavägen 513, 263 64 VIKEN (SE).

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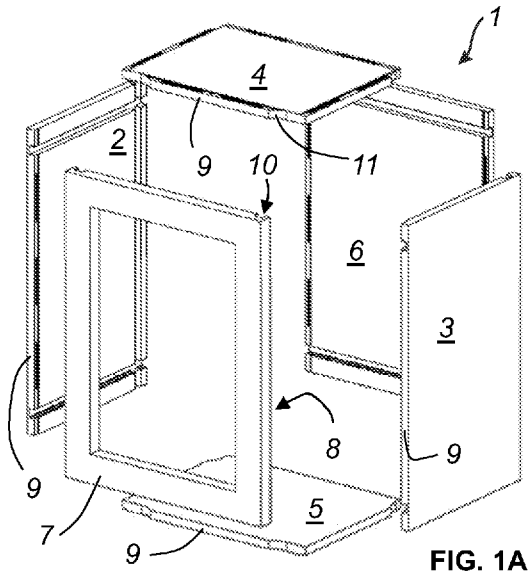

FIG. 1A

(57) Abstract: A cabinet (1) comprises two side panels (2, 3), a top panel (4), a bottom panel (5), and a back panel (6). The cabinet (1) further comprises a rectangular front face frame (7), wherein a side (8) of the front face frame (7) is facing a front facing edge (9) of each of the two side panels (2, 3), top panel (4), and bottom panel (5). Each front facing edge (9) comprises an integrally formed and elongate protruding section (11). The rectangular front face frame (7) comprises elongate grooves (10), each groove (10) is configured for mechanical locking with one of the elongate protruding sections (11), wherein each of the elongate grooves (10) comprises a longitudinal recess (12) on a side of each groove (10) for receiving a flexible locking element (13), wherein each of the protruding sections (11) comprises a longitudinal insertion recess (14) for holding a flexible locking element (13).

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CABINET ASSEMBLY ARRANGEMENT

TECHNICAL FIELD

Embodiments of the present invention relate to a cabinet comprising two side panels, a top panel, a bottom panel, a back panel, and a rectangular front face frame.

BACKGROUND

Assembling two or more objects into one piece, for instance furniture, has historically required tools such as drills, screwdrivers, hammers, and wrenches. Also, sometimes glue is needed.

Starting with click floors, assembling not requiring tools has further been developed and many types of furniture in a household can be assembled without tools or at least with a minimum of tools.

WO 2012/154113 A1 discloses a set of panels that comprises a first and a second panel. An edge of the second panel is insertable into a groove of the first panel when the panels are arranged essential perpendicular to each other, to obtain a mechanical connection between the first and the second panel when the second panel is displaced essentially perpendicularly to the first panel. Said edge comprises a separate and flexible tongue and said groove comprises a tongue groove, or said edge comprises a tongue groove and said groove comprises a separate and flexible tongue. The separate and flexible tongue is insertable into the tongue groove for connecting said panels to each other in a first direction, which is parallel to a main plane of the first panel. The edge of the second panel is configured to cooperate with the groove of the first panel for connecting said panels to each other in a second direction, which is parallel to a main plane of the second panel. The length direction of the separate and flexible tongue extends parallel with said edge and/or groove. The groove comprises an opening, two side walls, and a bottom. The separate and flexible tongue is arranged in an insertion groove. The separate and flexible tongue has an inner part mounted in the insertion groove and an outer part extending outside an opening of the insertion groove. The flexible tongue is displaceable inwardly towards a bottom of the insertion grove and outwardly into the tongue groove during locking.

SUMMARY

It is an object of an embodiment of the present invention to provide a cabinet that can be assembled without any tools. This may be achieved with a cabinet according to the appended claims.

According to a first aspect of the present disclosure a cabinet comprising two side panels, a top panel, a bottom panel, and a back panel is provided. The cabinet further comprises a rectangular front face frame, wherein a side of the front face frame is facing a front facing edge of each of the two side panels, top panel, and bottom panel. Each front facing edge comprises an integrally formed, such as formed in one piece with the respective panel, and elongate protruding section. The rectangular front face frame comprises elongate grooves, wherein each groove is configured for mechanical locking with one of the elongate protruding sections. Each of the elongate grooves comprises a longitudinal recess on a side of each groove for receiving a flexible locking element. Further, each of the protruding sections comprises a longitudinal insertion recess for holding a flexible locking element.

The particular arrangement disclosed above allows for assembly without the use of tools and is stable enough without using glue/adhesive. An assembled cabinet may be sufficiently stable when the cabinet can remain locked together in response to reasonable forces to which a cabinet would be exposed during use.

According to an alternative aspect of the present disclosure, two of the four panels with edges towards the rectangular front face frame are connected with the front face frame. Preferably, if the shape of the cabinet does not have a square cross section, the two panel edges that are the longer ones are connected with the front face frame with the type of mechanical locking system disclosed herein. In a further alternative, three panel edges are connected with the front face frame with the type of mechanical locking system disclosed herein.

In an embodiment of the present disclosure, a top panel and a bottom panel may connect with the two side panels with the type of mechanical locking system disclosed herein. The two side panels may connect with the front face frame and the back panel with the type of mechanical locking system disclosed herein.

According to another aspect of the present disclosure, also the back panel is arranged for mechanical locking with the two side panels, top panel, and bottom panel.

According to a further aspect of the present disclosure, edges of the back panel have elongated protruding sections for said mechanical locking with corresponding elongate grooves of the two side panels.

The side panels, the top panel, the bottom panel, the back panel, and the rectangular front face frame may comprise wood based materials, such as particle boards, plywood boards, HDF-boards, MDF-boards, and solid wood.

The flexible locking element may comprise a polymer material, such as a thermoplastic or a thermosetting plastic.

The flexible locking element may be an injection moulded or extruded component which may comprise a polymer material, such as a thermoplastic.

The edges of the top panel and the bottom panel have, according to an aspect of the present disclosure, elongate protruding sections for said mechanical locking with corresponding elongate grooves of the back panel.

According to yet another aspect of the present disclosure, the side panels, the back panel, and the front face frame each may have an upper groove for connecting to the top panel, and the side panels, the back panel, and the front face frame may each have a lower groove for connecting to the bottom panel. The upper and lower grooves of the side panels, the back panel, and the front face frame are at a distance from their respective edges that is greater than half the thickness of the top panel or the bottom panel; the distance being measured from an edge of groove closest to the respective edge.

According to an alternative aspect of the present disclosure, the longitudinal recesses of the upper and lower grooves in the side panels are located on the side of the grooves closest to their respective edges. This allows for variations in thickness of the panels minimizing any potential gap.

According to a further alternative aspect of the present disclosure, the longitudinal recesses of the upper and lower grooves in the back panel are located on the side of the grooves closest to their respective edges.

According to another aspect of the present disclosure the longitudinal recesses of the upper and lower grooves in the front face frame are located on the side of the grooves closest to their respective edges.

The protruding parts have, according to a further aspect of the present disclosure, an elongate indent on one side of the panels with a longitudinal beveled surface between the indent and the panel side. In addition, the grooves may have, at one side, an elongate beveled surface generally corresponding, such as within 5°, to the longitudinal beveled surface of the corresponding panel with the protruding part. The longitudinal beveled surface and the elongate beveled surface may be parallel. This allows for variations in thickness of the panels without creating a gap. According to preferred aspect of this solution, the longitudinal recesses of the grooves are on the same side of the grooves as the beveled surface.

Further features of, and advantages with, the present invention will become apparent when studying the appended claims and the following description. The skilled person realize that different features of the present invention may be combined to create embodiments other than those described in the following, without departing from the scope of the present invention.

BRIEF DESCRIPTION OF THE DRAWINGS

The above, as well as additional objects, features and advantages of the present invention, will be better understood through the following illustrative and non-limiting detailed description of exemplary embodiments of the present invention, wherein:

FIG 1A is an exploded perspective view of a cabinet according to an embodiment of the present disclosure.

FIG 1B is the cabinet of FIG 1A in an assembled state.

FIGS 2A and 2B show a front face frame according to an embodiment of the present disclosure in two views.

FIGS 3A and 3B show a side panel according to an embodiment of the present disclosure in two views.

FIG 3C is an enlarged portion of FIG 3B.

FIGS 4A and 4B show the connection arrangement between two panels.

FIGS 5A and 5B show an alternative connection arrangement between two panels.

FIGS 6A and 6B show an embodiment of the flexible locking element arranged in an embodiment of the longitudinal insertion recess.

FIG 6C shows in a 3D-view an embodiment of the flexible locking element.

FIG 6D shows an enlarged end part of an embodiment of the side panels.

FIG 6E shows an enlarged end part of an embodiment of the top panel or the bottom panel.

FIG 6F shows in a connected state an enlarged end part of an embodiment of the side panels and an enlarged end part of an embodiment of the top panel or the bottom panel.

DETAILED DESCRIPTION OF EXAMPLE EMBODIMENTS OF THE INVENTION

The present invention will now be described more fully hereinafter with reference to the accompanying drawings, in which exemplary embodiments of the invention are shown. The invention may, however, be embodied in many different forms and should not be construed as limited to the embodiments set forth herein; rather, these embodiments are provided for thoroughness and completeness. Like reference character refer to like elements throughout the description.

With reference to FIG 1A, a cabinet 1 comprises two side panels 2, 3, a top panel 4, a bottom panel 5, and a back panel 6. The cabinet 1 further comprises a rectangular front face frame 7, wherein a side 8 of the front face frame 7 is facing a front facing edge 9 of each of the two side panels 2, 3, top panel 4, and bottom panel 5. Each front facing edge 9 comprises an integrally formed and elongate protruding section 11. In this embodiment, each front facing edge 9 comprises a protruding section 11 that is formed in one piece with the respective panel. The rectangular front face frame 7 comprises elongate grooves 10, see FIGS 2A and 2B, wherein each groove 10 is configured for mechanical locking with one of the elongate protruding sections 11. Each of the elongate grooves 10 comprises a longitudinal recess 12, see FIG 3A, on a side of each groove 10 for receiving a flexible locking element 13. Each of the protruding sections 11 comprises a longitudinal insertion recess 14 for holding a flexible locking element 13, see FIG 3A.

The protruding section 11 may be formed in one piece with one of the two side panels 2, 3, the top panel 4, and the bottom panel 5, respectively. The protruding section may be the entire front facing edge or may be a portion of the front facing edge. The longitudinal insertion recess may extend along the entire front facing edge, or at least effectively extend

along the entire front facing edge excepting where there is an elongate groove for receiving a top panel or a bottom panel. The longitudinal insertion recess may extend along only a portion of the front facing edge. For example, the longitudinal insertion recess may have longitudinal ends which do not extend to longitudinal ends of the front facing edge.

The protruding section 11 may be formed by mechanical cutting, such as milling.

The side panels 2, 3, the top panel 4, the bottom panel 5, the back panel 6, and the rectangular front face frame 7 may comprise wood based materials, such as particle boards, plywood boards, HDF-boards, MDF-boards, and solid wood.

The flexible locking element 13 may comprise a polymer material, such as a thermoplastic or a thermosetting plastic.

The flexible locking element 13 may be an injection moulded or extruded component which may comprise a polymer material, such as a thermoplastic.

As also can be seen the back panel 6 may be arranged for mechanical locking with the two side panels 2, 3, top panel 4, and bottom panel 5. The side edges of the back panel 6 have elongate protruding sections 11 for said mechanical locking with corresponding elongate grooves 10 of the two side panels 2, 3.

The back edges of the top panel 4 and the bottom panel 5 may have elongate protruding sections 11 for said mechanical locking with corresponding elongate grooves 10 of the back panel 6.

In an embodiment, the side panels may include one edge, a front facing edge, with a protruding section and three edges, a top edge, a bottom edge, and a back edge, each with an elongate groove. The top panel and bottom panel may each have four edges, each edge with a protruding section. The front face frame may have four edges, each with an elongate groove. The back panel may include top and bottom edges, each with an elongate groove, and side edges, each with a protruding section.

FIG 3B is a side view of the panel 2, 3 shown in FIG 3A, and an enlarged portion of FIG 3B is shown in FIG 3C.

Moving on to FIG 4A, two panels are connected such that the protruding part 11 of a panel 4, 5 is inserted in a groove 10 of the other panel 2, 3. As shown in FIG 4B, which is

enlarged portion from FIG 4A, the longitudinal recess 12 is located closest to the edge of the panel 2, 3. The left side of the vertically arranged panel 4, 5 is flat which means that any variations in the thickness of the horizontally arranged panel 2, 3, should not create a gap between the panels that is visible from the inside of the cabinet.

In an embodiment, all connections of a protrusion part and a groove in a cabinet are arranged such that the longitudinal recesses face away from the inside of the cabinet. This reduces gaps between the panels that may be visible from inside the cabinet.

Further, the upper and lower grooves of the side panels 2, 3, the back panel 6, and the front face frame 7 may be at an edge distance 41 from their respective edges 43. The top panel 4 and/or the bottom panel 5 may have a panel thickness 42. The edge distance may be in the range of 0.2 to 5 times the panel thickness 42, such as 0.3 to 4 times the panel thickness 42, such as 0.4 to 3 times the panel thickness 42, such as 0.5 to 2 times the panel thickness 42. The edge distance may be measured from an outer groove surface to an outer edge surface 43.

The longitudinal recesses 12 of the upper and lower grooves 10 in the side panels 2, 3 may be located on the side of the grooves 10 closest to their respective edges. Also, the longitudinal recesses 12 of the upper and lower grooves 10 in the back panel 6 may be located on the side of the grooves 10 closest to their respective edges, the principle shown in FIG 3C.

The longitudinal recesses 12 of the upper and lower grooves 10 in the front face frame 7 may be located on the side of the grooves 10 closest to their respective edges.

As can be seen in FIGS 5A and 5B, an embodiment is shown where a protruding part 11 has an elongate indent on one side of the panel with a longitudinal beveled surface 15 between the indent and the panel side. In addition, the corresponding groove 10 may have, at one side, an elongate beveled surface 16 generally corresponding, such as within 5°, to the longitudinal beveled surface of the panel with the protruding part 11. As also can be seen, the longitudinal recess 12 of the groove may be on the same side of the groove as the beveled surface 16.

FIG 6A shows in a cross-cut view an embodiment of the flexible locking element 13 arranged in an embodiment of the longitudinal insertion recess 14.

FIG 6B shows in a cross-cut view that an embodiment of the flexible locking element 13 may be compressed in a direction 32 toward a bottom surface 31 of an embodiment of the longitudinal insertion recess 14. The flexible locking element 13 may be compressed to a compressed state in which essentially the whole flexible locking element is within the longitudinal insertion recess 14. The compressed state may facilitate an assembling of the panels.

FIG 6C shows, in a 3D-view, an embodiment of the flexible locking element 13. The flexible locking element 13 may comprise a bendable portion 34, such as a first bendable portion and a second bendable portion. The flexible tongue 33 may comprise a recess 36 at each of said bendable portions 34. An advantage with this embodiment of the flexible tongue is that a stronger spring force may be obtained which may provide a stronger locking.

The flexible locking element 13 may comprise an outer edge, with a beveled or rounded shape.

The flexible locking element 13 may comprise a protruding friction element 107 on the first and/or second bendable portion 34.

FIG 6D shows in a cross-cut view an enlarged end part of an embodiment of the side panels 2,3.

FIG 6E shows in a cross-cut view an enlarged end part of an embodiment of the top panel 4 or the bottom panel 5.

FIG 6F shows in a cross-cut view the enlarged end part of the embodiment of the side panels 2, 3 shown in FIG 6D connected to the enlarged end part of an embodiment of the top panel 4 or the bottom panel 5 shown in FIG 6E.

Further embodiments are described below:

1. A cabinet 1 comprising two side panels 2, 3, a top panel 4, a bottom panel 5, a back panel 6, and a rectangular front face frame 7, wherein a side 8 of the front face frame 7 is facing a front facing edge 9 of each of the two side panels 2, 3, top panel 4, and bottom panel 5, each front facing edge 9 comprises an integrally formed and elongate protruding section 11, the rectangular front face frame 7 comprises elongate grooves 10, each elongate groove 10 is configured for mechanical locking with one of the elongate protruding sections 11, and wherein each of the elongate grooves 10 comprises a longitudinal recess

12 on a side of each groove 10 for receiving a flexible locking element 13, wherein each of the elongate protruding sections 11 comprises a longitudinal insertion recess 14 for holding a flexible locking element 13.

2. The cabinet 1 according to embodiment 1, wherein the back panel 6 is arranged for mechanical locking with the two side panels 2, 3, the top panel 4, and the bottom panel 5.

3. The cabinet 1 according to embodiment 2, wherein side edges of the back panel 6 have elongate protruding sections 11 for said mechanical locking with corresponding elongate grooves 10 of the two side panels 2, 3.

4. The cabinet 1 according to any of the embodiments 2 and 3, wherein back edges of the top panel 4 and the bottom panel 5 have elongated protruding sections 11 for said mechanical locking with corresponding elongate grooves 10 of the back panel 6.

5. The cabinet 1 according to any of the preceding embodiments, wherein an upper elongate groove 10 and/or a lower elongate groove 10 of the side panels 2, 3, the back panel 6, and the front face frame 7, respectively, are at a distance from their respective edges that is greater than half the thickness of the top panel 4 or the bottom panel 5.

6. The cabinet 1 according to any of the preceding embodiments, wherein a longitudinal recess 12 of upper and lower elongate grooves 10, respectively, in the side panels 2, 3 are located on the side of the grooves 10 closest to their respective edges.

7. The cabinet 1 according to any of the preceding embodiments, wherein a longitudinal recess 12 of upper and lower elongate grooves 10, respectively, in the back panel 6 are located on the side of the grooves 10 closest to their respective edges.

8. The cabinet 1 according to any of the preceding embodiments, wherein a longitudinal recess 12 of the upper and lower elongate grooves 10, respectively, in the front face frame 7 are located on the side of the grooves 10 closest to their respective edges.

9. The cabinet 1 according to any of the preceding embodiments, wherein one or more of the protruding parts 11 comprises an elongated indent on one side of the panel with a longitudinal beveled surface 15 between the indent and the panel side, wherein one or more of the elongate grooves 10 has an elongate beveled surface 16 at a side of the elongate groove that corresponds to the longitudinal beveled surface 15 of the protruding part 11,

wherein the longitudinal beveled surface 15 and the and elongate beveled surface 16 are optionally parallel.

10. The cabinet 1 according to embodiment 9, wherein the longitudinal recess 12 of the groove 10 are on the same side of the grooves as the elongate beveled surface 16.

11. The cabinet 1 according to any of the preceding embodiments, wherein the side panels 2, 3, the top panel 4, the bottom panel 5, the back panel 6, and the rectangular front face frame 7 comprise wood based materials, such as particle boards, plywood boards, HDF-boards, MDF-boards, and solid wood.

The present invention has been described above with reference to specific embodiments. However, other embodiments than the above described are equally possible within the scope of the invention. The different features of the invention may be combined in other combinations than those described. The scope of the invention is only limited by the appended patent claims.

The indefinite articles "a" and "an," as used herein in the specification and in the claims, unless clearly indicated to the contrary, should be understood to mean "at least one." The phrase "and/or," as used herein in the specification and in the claims, should be understood to mean "either or both" of the elements so conjoined, i.e., elements that are conjunctively present in some cases and disjunctively present in other cases.

CLAIMS

1. A cabinet (1) comprising two side panels (2, 3), a top panel (4), a bottom panel (5), a back panel (6), and a rectangular front face frame (7), wherein a side (8) of the front face frame (7) is facing a front facing edge (9) of each of the two side panels (2, 3), top panel (4), and bottom panel (5), each front facing edge (9) comprises an integrally formed, such as formed in one piece with the respective panel, and elongate protruding section (11), the rectangular front face frame (7) comprises elongate grooves (10), each elongate groove (10) is configured to cooperate with one of the elongate protruding sections (11) for a mechanical locking, wherein each of the elongate grooves (10) comprises a longitudinal recess (12) on a side of each groove (10) wherein each of the elongate protruding sections (11) comprises a flexible locking element (13) arranged in a longitudinal insertion recess (14), wherein the flexible locking element (13) of one of the elongate protruding sections (11) is configured to cooperate with the longitudinal recess (12) of one of the elongate grooves (10) for a mechanical locking.

2. The cabinet (1) according claim 1, wherein the flexible locking element is configured to be compressed towards a bottom surface of the longitudinal insertion recess (14).

3. The cabinet (1) according claim 1 or 2, wherein the longitudinal recess (12) of an upper and a lower of the elongate grooves (10), respectively, of the front face frame (7) are located on a side of the elongate grooves (10) closest to their respective edge.

4. The cabinet (1) according to any of the preceding claims, wherein edges of the back panel (6) each comprises an elongate protruding section (11) which is configured to cooperate with a matching elongate groove (10) of each of the two side panels (2, 3) for a mechanical locking.

5. The cabinet (1) according to any of the any of the preceding claims, wherein a back edge of the top panel (4) and a back edge of the bottom panel (5) each comprise an elongated protruding section (11) which is configured to cooperate with a matching elongate groove (10) of the back panel (6) for a mechanical locking.

6. The cabinet (1) according to any of the preceding claims, wherein side edges of the top panel (4) and sides edges of the bottom panel (5) each comprise an elongated protruding section (11) which is configured to cooperate with a matching upper or lower elongate groove (10) of each of the two side panels (2, 3) for a mechanical locking.

7. The cabinet (1) according to any of claims 4-6, wherein the elongate protruding section (11) of one or more of the edges comprises a flexible locking element (13) arranged in a longitudinal insertion recess (14), wherein the matching elongate groove (10) comprises a longitudinal recess (12), and wherein the flexible locking elements (13) is configured to cooperate with the longitudinal recess (12) for a mechanical locking.

8. The cabinet (1) according to claim 7, wherein the longitudinal recess (12) of an upper and a lower of the elongate groove (10), respectively, of the side panels (2, 3) are located on the side of each of the upper and the lower of the elongate grooves (10) closest to their respective edge.

9. The cabinet 1 according to claim 7 or 8, wherein the longitudinal recess (12) of an upper and a lower of the elongate grooves (10), respectively, of the back panel (6) are located on the side of each of the upper and the lower of the elongate grooves (10) which is closest to their respective edge.

10. The cabinet (1) according to any of the preceding claims, wherein the flexible locking element (13) comprises a polymer material, such as a thermoplastic material.

11. The cabinet (1) according to any of the preceding claims, wherein an upper elongate groove (10) and/or a lower elongate groove (10) of each of the side panels (2, 3), the back panel (6), and the front face frame (7), respectively, are at an edge distance 41 from their respective edges 43, wherein the top panel 4 and/or the bottom panel 5 has a panel thickness 42, wherein the edge distance 41 is in the range of 0.2 to 5 times the panel thickness 42, such as 0.3 to 4 times the panel thickness 42, such as 0.4 to 3 times the panel thickness 42, such as 0.5 to 2 times the panel thickness 42.

12. The cabinet (1) according to any of the preceding claims, wherein a longitudinal recess (12) of upper and lower elongate grooves (10), respectively, in the back panel (6) are located on the side of the grooves (10) closest to their respective edges.

13. The cabinet (1) according to any of the preceding claims, wherein one or more of the protruding parts (11) comprises an elongated indent on one side of the panel with a longitudinal beveled surface (15) between the indent and the panel side, wherein one or more of the elongate grooves (10) has an elongate beveled surface (16) at a side of the elongate groove that corresponds to the longitudinal beveled surface (15) of the protruding

part (11), wherein the longitudinal beveled surface (15) and the elongate beveled surface (16) are optionally parallel.

14. The cabinet (1) according to claim 13, wherein the longitudinal recess (12) of the groove (10) is on the same side of the groove as the elongate beveled surface (16).

15. The cabinet (1) according to any of the preceding claims, wherein the side panels (2, 3), the top panel (4), the bottom panel (5), the back panel (6), and the rectangular front face frame (7) comprise wood based materials, such as particle boards, plywood boards, HDF-boards, MDF-boards, and solid wood.

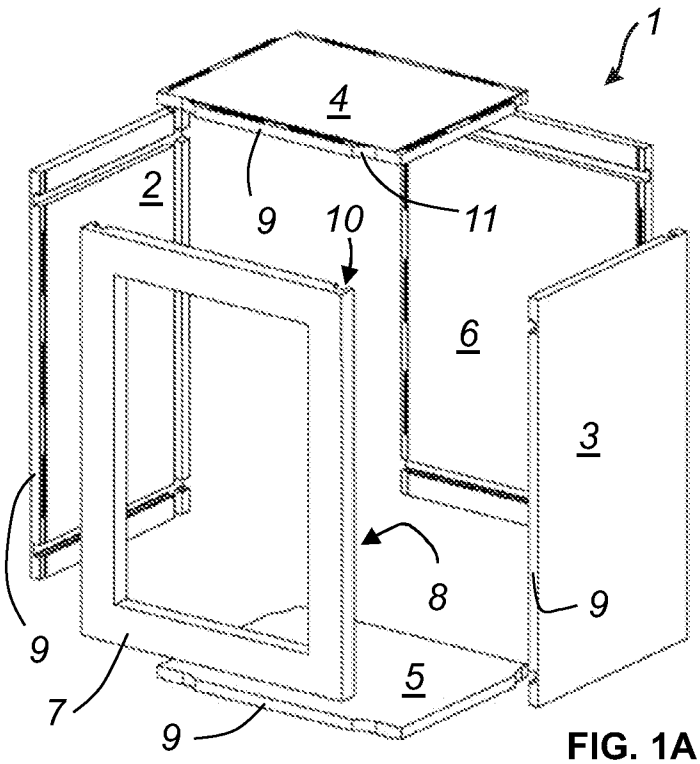

FIG. 1A

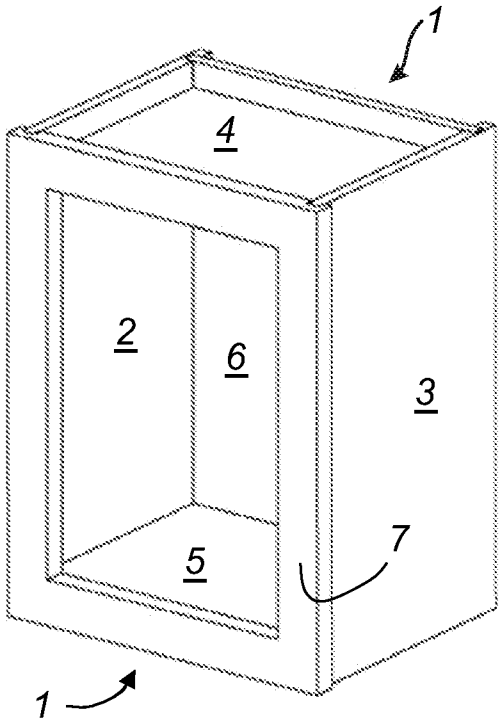

FIG. 1B

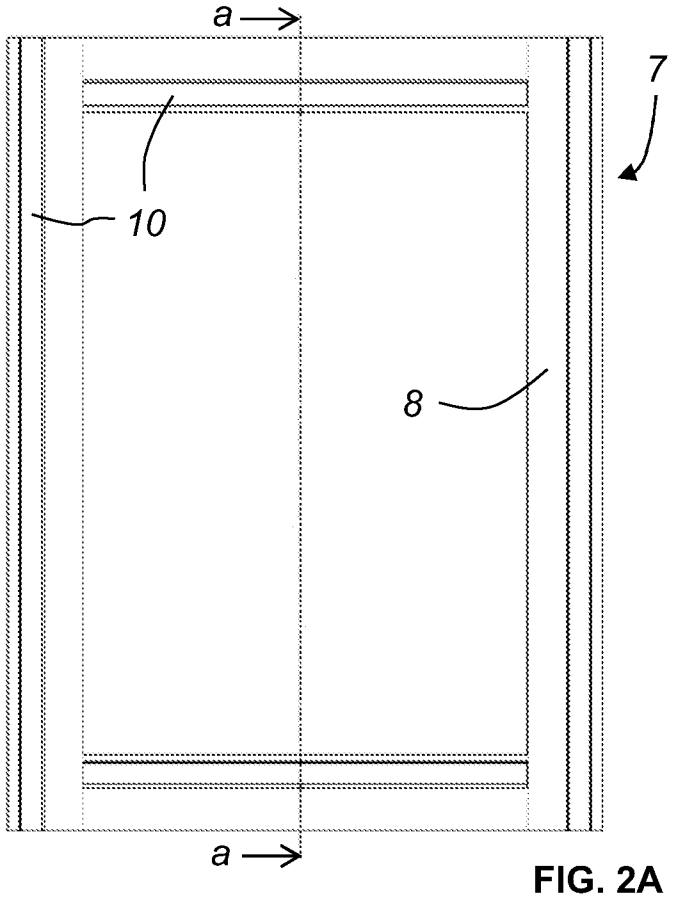

FIG. 2A

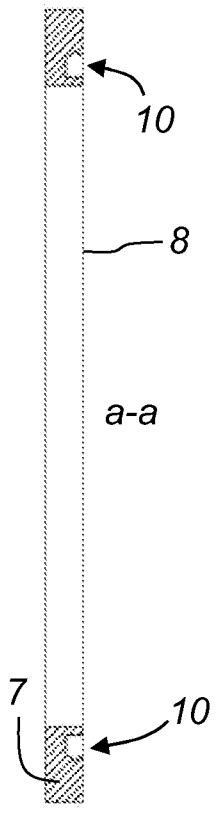

FIG. 2B

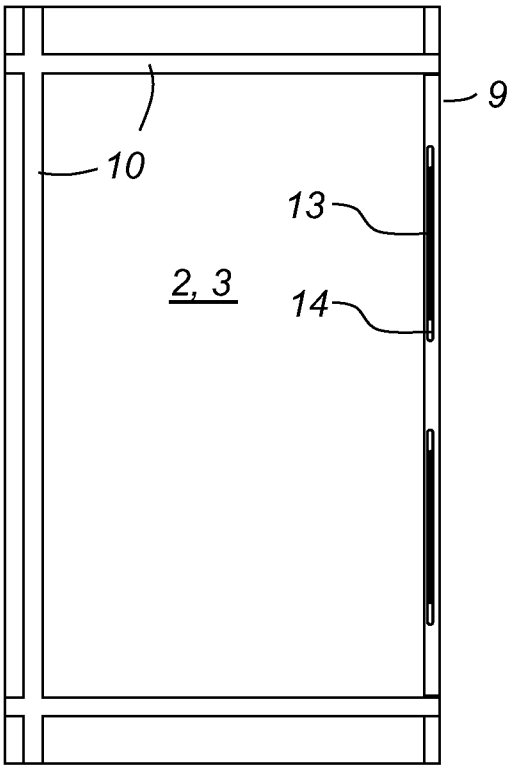

FIG. 3A

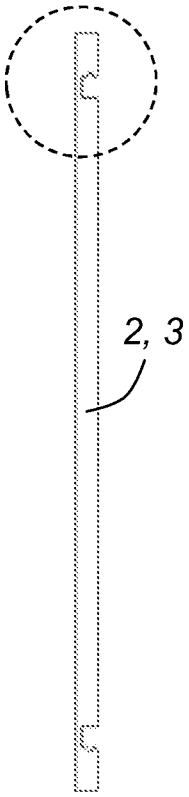

FIG. 3B

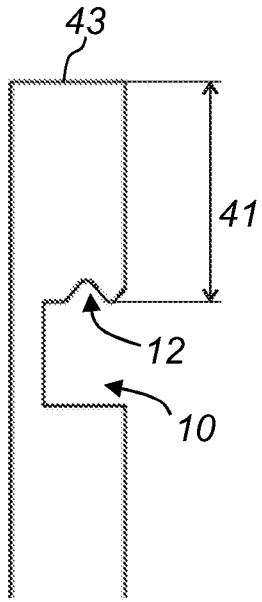

FIG. 3C

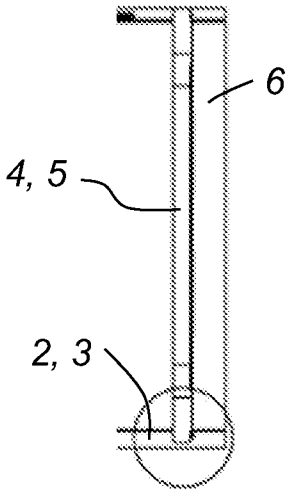

FIG. 4A

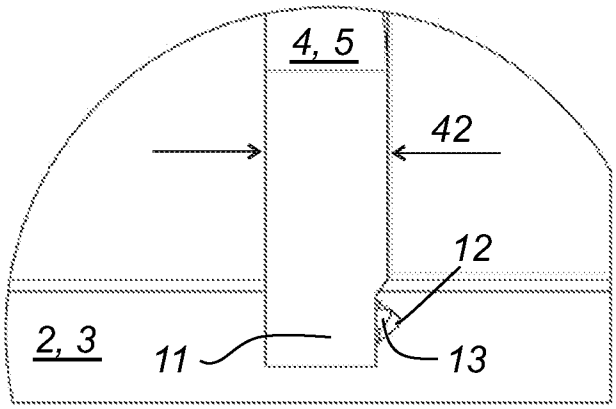

FIG. 4B

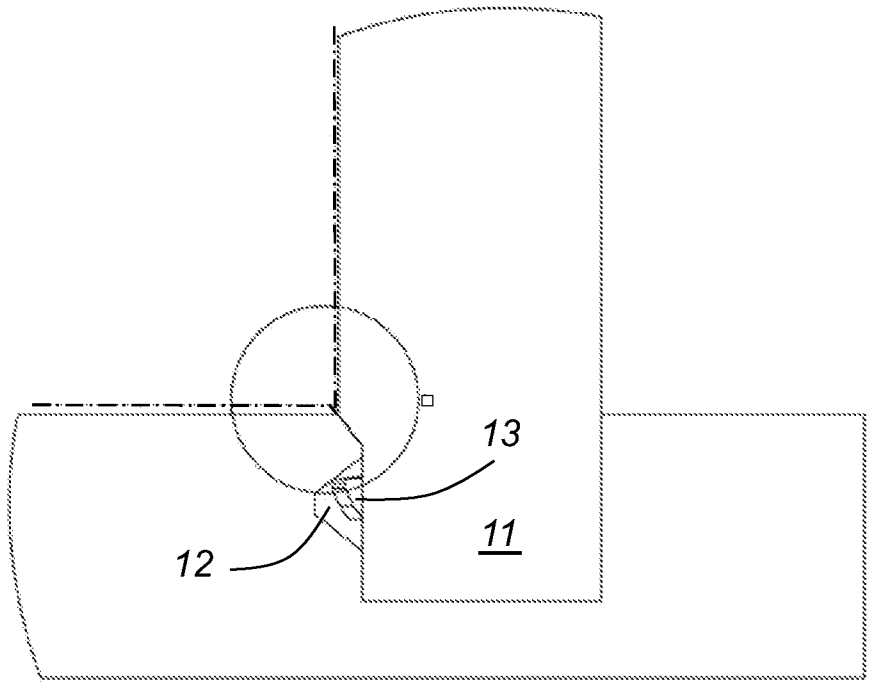

FIG. 5A

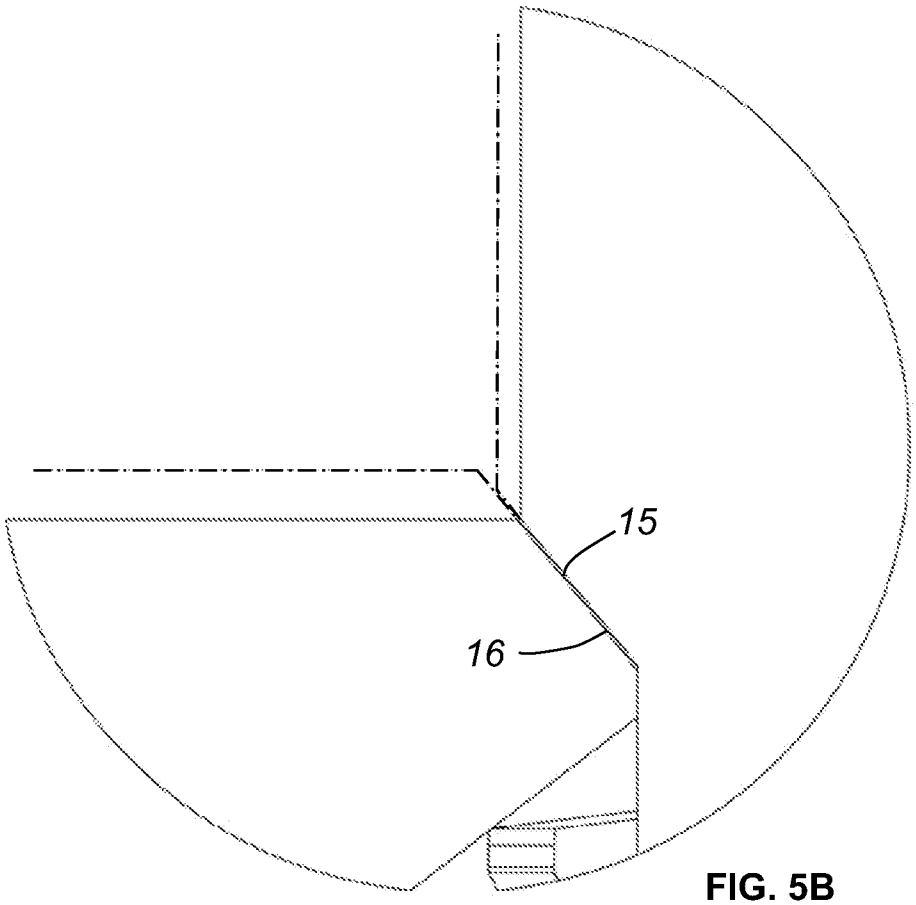

FIG. 5B

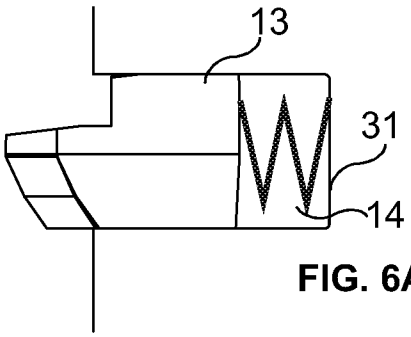

FIG. 6A

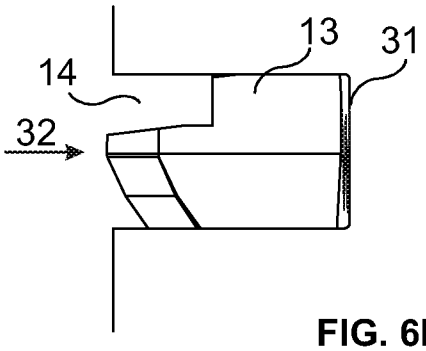

FIG. 6B

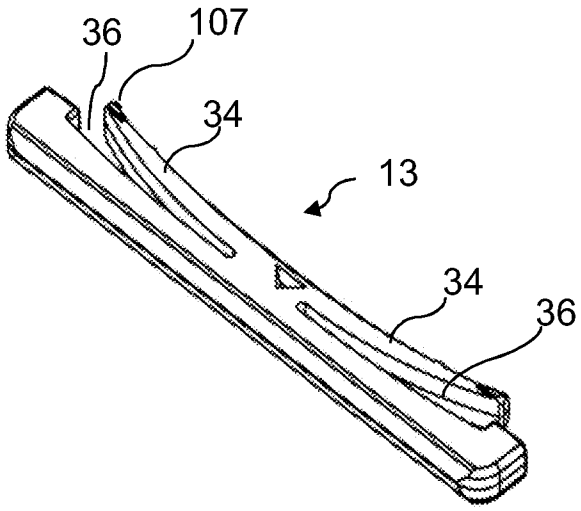

FIG. 6C

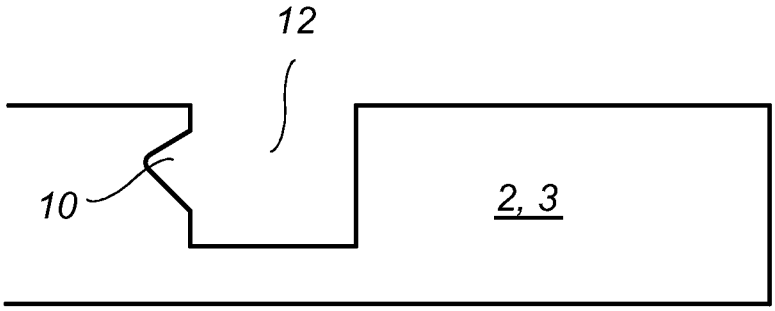

FIG. 6D

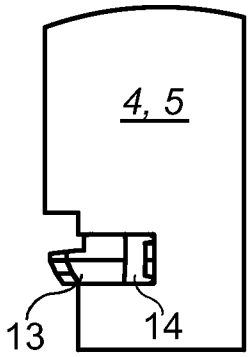

FIG. 6E

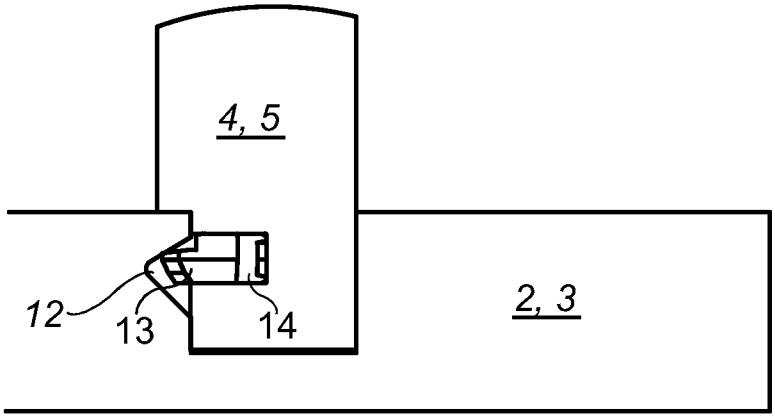

FIG. 6F

INTERNATIONAL SEARCH REPORT

International application No.
PCT/SE2024/050065

A. CLASSIFICATION OF SUBJECT MATTER

IPC: see extra sheet

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC: A47B, F16B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE, DK, FI, NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPO-Internal, PAJ, WPI data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 20060273085 A1 (CASTO DANIEL A), 7 December 2006 (2006-12-07); paragraphs [0057]-[0058], [0061]-[0064]; figures 16-21	1-15
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X	DE 102009008059 A1 (FORMAT TRESORBAU GMBH & CO KG), 19 August 2010 (2010-08-19); figures 1-2b; claims 1-12	1-15
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☒ Further documents are listed in the continuation of Box C. ☒ See patent family annex.

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"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
15-02-2024	15-02-2024

Name and mailing address of the ISA/SE	Authorized officer
Patent- och registreringsverket Box 5055 S-102 42 STOCKHOLM Facsimile No. + 46 8 666 02 86	Tobias Ericson Telephone No. + 46 8 782 28 00

INTERNATIONAL SEARCH REPORT

International application No.
PCT/SE2024/050065

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

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A	US 20080042532 A1 (CRABTREE PHILLIP C), 21 February 2008 (2008-02-21); paragraphs [0023]-[0034]; figures 1-13	1-15
A	US 3021187 A (MITCHELL GEORGE M), 13 February 1962 (1962-02-13); column 2, line 1 - column 3, line 30; all figures	1-15
A	US 20100173122 A1 (SUSNJARA KENNETH J), 8 July 2010 (2010-07-08); abstract; figures 2-5	1-15
A	US 6413007 B1 (LAMBRIGHT MICHAEL D), 2 July 2002 (2002-07-02); abstract; figures 3-7	1-15
A	US 10451097 B2 (BRÄNNSTRÖM HANS ET AL), 22 October 2019 (2019-10-22); abstract; figures 1-5a	1-15

International application No.
PCT/SE2024/050065

Continuation of: second sheet

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F16B 12/12 (2006.01)
F16B 12/26 (2006.01)

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