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

(11) **EP 3 552 518 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
16.10.2019 Bulletin 2019/42

(51) Int Cl.:
A47B 57/40 *(2006.01)*

(21) Application number: **19168846.4**

(22) Date of filing: **12.04.2019**

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

(30) Priority: **12.04.2018 IT 201800004428**

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(54) **SHELVING**

(57) Shelving comprising: at least one pair of vertical uprights (2); at least one shelf (3) engaged with the two uprights (2) and defining a flat support surface (3a) arranged horizontally with respect to said vertical uprights (2); and reversible interlocking means (6) of said shelf (3) with said uprights (2); the interlocking means (6) comprising at least one series (7) of projections (8a, 8b) which extend from an inner surface (5) of a respective upright (2) and can be housed within an opening (11) formed in the shelf (3); said series (7) comprising at least a first and a second pair (7a, 7b) of projections (8a, 8b), wherein the projections (8a, 8b) of the first pair (7a) are closer than the projections (8a, 8b) of the second pair (7b).

Fig.1A

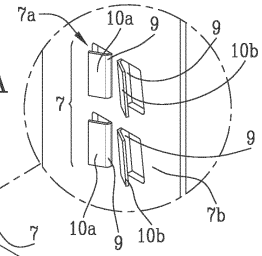
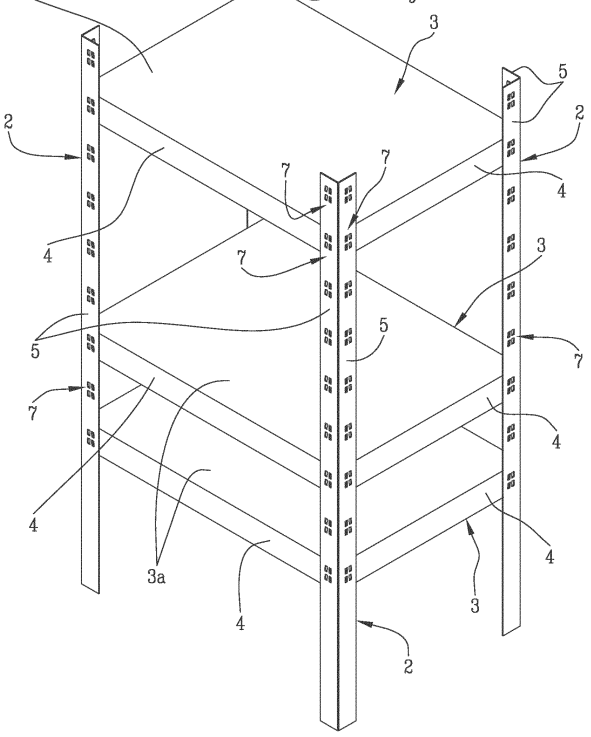


Fig.1



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Description

[0001] The present invention relates to a shelving.

[0002] In particular the present invention relates to a shelving made of metallic material, of the modular type, i.e. of the type suitable of being mounted and installed by the end user.

[0003] These types of shelving are usually marketed in assembling kit inside of which are present the structural components of the shelving and, when provided, the associated hardware suitable to assemble the structural components.

[0004] The metal shelves are used in any context, usually in the technical rooms destined for the storage of goods, as for example, small mechanical workshops, clearing rooms, garages, but also domestic premises as basements, storage rooms and the like.

[0005] The aforementioned shelving is characterized by ease of assembly, in fact no special technical skills are required for their installation, for their simple transport (each kit is usually manageable and transportable by a single person), due to the cost-effectiveness of realization and to the ease of storage in sales warehouses.

[0006] Usually, the shelves of the type indicated above include four vertical uprights, two or more horizontal shelves generally rectangular in shape and defining a flat surface able to support the goods.

[0007] Each shelf is coupled to the four uprights at the respective corners and by means of the said hardware for assembly.

[0008] In particular, are provided screws insertable in holes formed both on the upright and on a lateral face of the shelf and engageable with respective bolts to define a stable coupling between the shelves and the uprights. Preferably, each upright consists of an "L" section that defines a housing seat of the respective corner of the shelf.

[0009] The section has one series of holes for the passage of the screw, distributed along the whole vertical extent of the same uprights and arranged on both sides defining the "L" section.

[0010] In this way, the shelves can be associated with the uprights at any height depending on the number of shelves and the size of the objects that have to be supported by the shelving.

[0011] The system for coupling the shelves and the uprights, although efficient and easy to use, is however inconvenient because it needs to screw one series of screws for each shelf. In particular, considering that for each corner of the shelf there are two holes for the passage of the screws and that for each shelving numerous shelves can be provided, the action of assembling then becomes very expensive in terms of time given the amount of screws to be tightened.

[0012] In addition, a further drawback is derived from the presence of screws and bolts which have notoriously small size, and which can therefore easily be lost.

[0013] In this situation, it proves to be difficult to find and replace such components.

[0014] To overcome this situation, interlocking coupling systems are provided, integrated into the metal sheets that define the uprights and the shelves. Such systems are mostly constituted by inserts projecting from the upright and that can be inserted for mechanical interlocking in suitable openings formed in the shelf.

[0015] In this way, the bolts and screwing tools are eliminated, thus allowing a practical assembly in which the user merely inserts the shelves inside the projecting inserts.

[0016] However, even this solution is not free from important drawbacks.

[0017] In fact, it should be noted that the inserts have interlocking surfaces of limited size and therefore not capable of sustaining high weights on the individual shelves.

[0018] The use of inserts of reduced size, and therefore of limited overall encumbrances in the direction transverse to the longitudinal extension of the upright, is derived from the need to facilitate the interlocking operations, and at the same time avoid accidental impacts of the user during the assembling phase.

[0019] Therefore, the transverse extent of the inserts in the form of a lamina must be limited to protect the user from possible dangerous conditions.

[0020] In this context, the inserts may not be sufficiently sized to allow a high stability of the shelves in the conditions of supporting high loads.

[0021] In this context, the technical aim of the present invention is to provide a shelving without the aforementioned drawbacks.

[0022] In particular, it is an object of the present invention to provide a shelving that is particularly stable even in conditions of support of very high weights, and at the same time is able to eliminate hardware elements to allow a quick assembling by interlocking.

[0023] Another object of the present invention is to provide the end user with a shelving that is easy to assemble and disassemble, achievable without the use of tools or other elements that are not constituted merely by the structural elements of the base.

[0024] A further object of the present invention is to propose a shelving of very reduced overall encumbrance, either assembled or disassembled and which is able to minimize as much as possible the presence of projecting elements potentially harmful to the user.

[0025] These and other objects are substantially achieved by a shelving as described in one or more of the appended claims. Dependent claims correspond to further embodiments of the shelving according to the present invention.

[0026] Further characteristics and advantages will become more evident from the detailed description of a preferred but not limitative embodiment of a shelving according to the invention.

[0027] This description is provided with reference to the appended figures, also provided only by way of a

non-limiting example, wherein:

- Figure 1 is a perspective and schematic view of the shelving according to the present invention;
- Figure 1a is an enlargement of a detail of the shelving of Figure 1.
- Figures 2a and 2b are side views of a constructive detail of the shelving in respective operating assembling conditions;
- Figure 3 is an enlarged and side view of the detail of Figure 1a; and
- Figure 4 is an enlarged view of a side portion of a shelf of the shelving according to the present invention.

[0028] With reference to the attached figures, reference number 1 globally indicates a shelving according to the present invention.

[0029] The shelving 1 comprising at least one pair of vertical uprights 2, and at least one shelf 3 engaged with the two uprights 2 and defining a flat support surface 3a arranged horizontally with respect to said vertical uprights 2.

[0030] In greater detail, the shelving 1 preferably comprises four vertical uprights 2 and a plurality of shelves 3 engageable to the uprights 2 and arranged overlapped between them at different heights which are determined in function of the individual operational requirements.

[0031] By way of example only and therefore not limiting, Figure 1 shows a shelving 1 equipped with three shelves 3 assembled at different distances from one another.

[0032] However, it should be considered that the number of shelves 3 and the distance between a shelf 3 and the adjacent one can be any according to the individual needs of use of the shelving 1.

[0033] Each shelf 3 preferably has a substantially rectangular peripheral development that defines said support surface 3a.

[0034] In addition, each shelf 3 has four lateral surfaces 4 arranged respectively along the sides of the rectangular development.

[0035] The side surfaces 4 are perpendicular to the support surface 3a and made of one piece therewith by bending a metal sheet that constitutes the entire shelf 3.

[0036] Each shelf 3 thus formed is engaged with the four uprights 2 by arranging each angle to a respective upright 2.

[0037] In particular, each upright 2 is constituted by a bar having a cross section "L" profile defined by two surfaces 5 perpendicular between each other. The surfaces 5 define in mutual collaboration a space to accommodate a corner of the shelf 3 (Figure 1) and are made of one piece by bending a metal sheet which defines the whole upright 2.

[0038] The shelving 1 further comprises reversible interlocking means 6 of each shelf 4 with said uprights 2.

[0039] In particular, the interlocking means 6, better described in the following present discussion, extend between each corner of the shelf 3 and the respective upright 2 to allow to manually interlock and then constrain the shelves 3 to the uprights 2. The means 6, of the reversible type, also allow, from a configuration of assembly, to provide for removal of the shelves 3 from the uprights 2 and then releasing the same.

[0040] In greater detail, the interlocking means 6 comprise at least one series 7 of projections 8a, 8b extending from a surface 5 of the respective upright 2. The series 7 of projections 8a, 8b can be housed in an opening 11 formed in the shelf 3.

[0041] In particular, with reference to the construction detail better illustrated in Figure 3, the series 7 comprises at least a first pair 7a and a second pair 7b of projections 8a, 8b in which the projections 8a, 8b of the first pair 7a result closer to the projections 8a, 8b of the second pair 7b.

[0042] Always with reference to Figure 3, it should also be noted that the first pair 7a of projections 8a, 8b is arranged above the second pair 7b of projections 8a, 8b.

[0043] In this situation, the projections 8a, 8b of the series 7 are arranged according to a substantially trapezoidal path "P". In other words, the projections 8a, 8b of each series 7 are arranged at the corners of said path "P" to define a trapezoidal configuration, in particular in the form of a right trapezium wherein the minor base "B1" the major base B2" and two sides B3, B4" are identified. The side "B3" defined between first projections 8a of the two pairs 7a, 7b is perpendicular to the bases "B1, B2", while the side "B4" defined between the second projections 8b of the two pairs 7a, 7b is an oblique side.

[0044] In this situation, each projection 8a, 8b presents an edge 9 disposed at a side "B3, B4" along the path trapezoidal "P".

[0045] As better illustrated in the enlargement of Figure 1a, each projection 8a, 8b consists of a tab 10a, 10b formed by bending a portion of the upright 2, in particular a part of the surface 5 of the upright 2.

[0046] Therefore, the edge 9 of each projection 8a, 8b is defined by a bending line of the tab 10a, 10b with respect to the upright 2.

[0047] Furthermore, it should be noted that the first projection 8a of each pair 7a, 7b is defined by a first tab 10a having a rectangular development. The second projection 8b of each pair 7a, 7b instead is defined by a second tab 10b having a parallelogram development (Figure 3).

[0048] The first tabs 10a, of the first and second pairs 7a, 7b are mutually superimposed and aligned along the respective edges 9 and along said perpendicular side B3.

[0049] The second tabs 10b of the first and second pairs 7a, 7b are mutually superimposed and aligned along the respective edges 9 and along the oblique side "B4".

[0050] Furthermore, again with reference to Figure 3, the edges 9 of the first tabs 10a are aligned along vertical development axis "X" parallel to the longitudinal extension of the upright 2.

[0051] Instead, the edges 9 of the second tabs 10b are aligned along an inclined development axis "Y" with respect to the longitudinal extension of the upright 2 and converging towards the vertical axis "X" at the top of the uprights 2.

[0052] In this situation, the minor base "B1" is positioned towards the top of the upright 2, while the major base "B2" is positioned towards the support base of the upright 2.

[0053] As is better illustrated in Figure 2a, and 4, the opening 11 has a trapezoidal shape, preferably a right trapezium, corresponding to the trapezoidal path "P" for housing the projections 8a, 8b.

[0054] In this situation, the opening 11 formed on the lateral surface 4 and at the corner of the shelf 3, presents an access side 11a of access of the projections 8a, 8b. The access side 11b is formed in the major base of the trapezoidal configuration of the opening 11.

[0055] In this situation, the opening 11 comprises a tilted side 12 of contact with the edges 9 of the second tabs 10b and a rectilinear side 13 in contact with the edges 9 of the first tabs 10a (Figures 2a and 2b).

[0056] As can be seen from Figure 2a, the sides 12, 13 of the opening 11 are slidable by being dragged with the edges 9 of the tabs 10a, 10b up to a respective mechanical interlocking position.

[0057] In other words, by means of the interlocking means 6, the shelf 3 is switchable between a coupling configuration (Figure 2a) with the uprights 2 wherein the opening 11 is fitted on the first and second pairs 7a, 7b of projections 8a, 8b in a mechanical interlocking condition and along a top-to-base direction of the uprights 2 (from top to bottom).

[0058] Furthermore, the shelf is switchable in a decoupling configuration (Figure 2b) with the uprights 1 wherein the opening 11 is removed from the first and the second pairs 7a, 7b of projections 8a, 8b and along a base-to-top direction of the uprights 2 (from bottom to top).

[0059] In other words, thanks to the particular trapezoidal configuration, a mechanical interlocking is defined between the opening 11 and the series 7 of projections 8a, 8b suitably configured to allow the insertion into the opening 11 through the access side 11b and to interlock in a stable manner due to the tilted side 12 which defines a conical coupling with the aforementioned series 7.

[0060] Preferably, each shelf 3 has eight openings 11, arranged in pairs for each lateral surface 4. In this way, for each corner of the shelf extend two adjacent openings 11 arranged in the two respective surfaces 4.

[0061] In this situation, it should be noted that for each surface 5 of the upright 2 two series 7 extend, each of which is intended to be inserted in a respective opening 11 of the shelf 3.

[0062] Still, in order to allow the housing of the shelves 4 at any height of the upright 2, a plurality of series 7 of projections 8a, 8b are provided along the entire longitudinal extension of each upright.

[0063] Advantageously, the reversible interlocking means 6 allow the coupling of multiple shelves 3 at any height of the uprights 2.

[0064] The above described invention provides numerous advantages and solves the drawbacks of the prior art.

[0065] It should first be noted that the interlocking means 6 are completely obtained by bending and shaping the structural parts of the shelving 1 (uprights 2 and shelves 3). Consequently, bolts, tools, or other external elements suitable for anchoring the shelves 3 to the uprights 2 are not used.

[0066] The stable and releasable coupling is therefore obtained by means of the insertion of the projections 8a, 8b in the respective openings 11 formed on the shelves.

[0067] Therefore, the assembling system of the shelving 1 proves to be very simple, limited in terms of cost and time and feasible even by non-specialized personnel.

[0068] Still, the system, which just provides the positioning of the shelves 3 with respect to the uprights 2 is particularly versatile in that it allows to place any number of shelves 3 at any height with respect to the uprights 2. This advantage is given by the presence of the series 7 being arranged along the entire longitudinal extension of each upright 2.

[0069] Furthermore, the presence of one series 7 defined by four projections 8a, 8b allows to limit the size of each projection 8 itself while still maintaining a wide contact (support) surface between a shelf and the upright.

[0070] In other words, the presence of two pairs 7a, 7b for each series allows to extend the contact line defined by all the edges 9, while limiting the overall volumetric encumbrance defined by the projections. This advantage is derived precisely from having increased the number of projections and therefore of contact surfaces (edges 9) for each opening 11 of the shelf 3. Accordingly, the present invention allows to considerably limit the presence of particularly projecting parts and therefore potentially harmful to the user during assembly.

[0071] Even from the point of view of overall volumetric encumbrance, especially during disassembly, the entire shelving 1 is more compact and easier to store and handle.

Claims

1. A shelving comprising:

- at least one pair of vertical uprights (2);
- at least one shelf (3) engaged with the two uprights (2) and defining a flat support surface (3a) arranged horizontally with respect to said vertical uprights (2); and
- reversible interlocking means (6) of said shelf (3) with said uprights (2); **characterized in that** said interlocking means (6) comprise at least one series (7) of projections (8a, 8b) which extend from an inner surface (5) of a respective

upright (2) and can be housed within an opening (11) formed in the shelf (3); said series (7) comprising at least a first and a second pair (7a, 7b) of projections (8a, 8b), wherein the projections (8a, 8b) of the first pair (7a) are closer than the projections (8a, 8b) of the second pair (7b).

2. The shelving according to the previous claim, **characterized in that** said first pair (7a) of projections (8a, 8b) is arranged above the second pair (7b) of projections (8a, 8b); said projections (8a, 8b) of the series (7) being arranged along a substantially trapezoidal path (P).

3. The shelving according to claim 1 or 2, **characterized in that** each projection (8a, 8b) has an edge (9) arranged at one side (B3, B4) of said trapezoidal path (P).

4. The shelving according to the previous claim, **characterized in that** each protrusion (8a, 8b) comprises a tab (10a, 10b) obtained by bending a portion of the upright (2); said edge (9) of each projection (8a, 8b) being defined by a tab fold line (10a, 10b) with respect to the upright (2).

5. The shelving according to the previous claim, **characterized in that** each pair (7a, 7b) has a first tab (10a) having a rectangular development and a second tab (10b) having a parallelogram development; said first tabs (10a) of the first and the second pairs (7a, 7b) being mutually superimposed and aligned along the respective edges (9); said second tabs (10b) of the first and the second pairs (7a, 7b) being mutually superimposed and aligned along the respective edges (9).

6. The shelving according to the previous claim, **characterized in that** the edges (9) of the first tabs (10a) are aligned along a vertical development axis (X) parallel to the longitudinal extension of the upright (2); and **in that** the edges (9) of the second tabs (10b) are aligned along an inclined development axis (Y) with respect to the longitudinal extension of the upright (2).

7. The shelving according to the previous claim, **characterized in that** said inclined axis (Y) converges towards the vertical axis (X) at the top of the uprights (2); said trapezoidal development has a minor base (B1) towards the top of said upright (2).

8. The shelving according to claim 6, **characterized in that** said opening (11) has a trapezoidal shape corresponding to the trapezoidal path (P) for housing the projections (8a, 8b); said opening (11) also presenting an access side (11a) of the projections (8a, 8b) formed in the major base (B2) of the opening (11) itself.

9. The shelving according to the previous claim, **characterized in that** said opening (11) comprises a tilted side (12) of contact with the edges (9) of the second tabs (10b) and a rectilinear side (13) in contact with the edges (9) of the first tabs (10a); said sides (12, 13) of the opening (11) being slidable by being dragged with the edges (9) of the tabs (10a, 10b) up to a respective mechanical interlocking position.

10. The shelving according to the previous claim, **characterized in that** said shelf (3) is switchable between a coupling configuration with the uprights (2), wherein the opening (11) is fitted on said first and second pairs of projections (8a, 8b) in said mechanical interlocking condition and along a top-to-base direction of the uprights (2), and a decoupling configuration with the uprights (2) wherein the opening (11) is removed from the first and the second pairs of projections (8a, 8b) and along a base-to-top direction of the uprights (2).

11. The shelving according to any one of the preceding claims, **characterized in that** each upright (2) has a bar having a cross-sectional "L-shaped" profile and defining two perpendicular surfaces (5) for receiving the shelf (3); each upright (2) being arranged at a corner of the shelf (3).

12. The shelving according to the previous claim, **characterized in that** said interlocking means (6) comprise at least two series (7) of projections (8a, 8b) for each corner of the shelf (3); each series (7) extending from a surface (5) of the upright (2) and being housed within a respective opening (11) formed in the shelf (3).

13. The shelving according to any of the previous claims, **characterized in that** said shelf (3) has a substantially rectangular shape and defines four lateral surfaces (4), each having two openings (11) for housing the respective series (7) of projections (8a, 8b); and **in that** it comprises four uprights (2), each arranged on the respective sides of the shelf (3).

Fig.1A

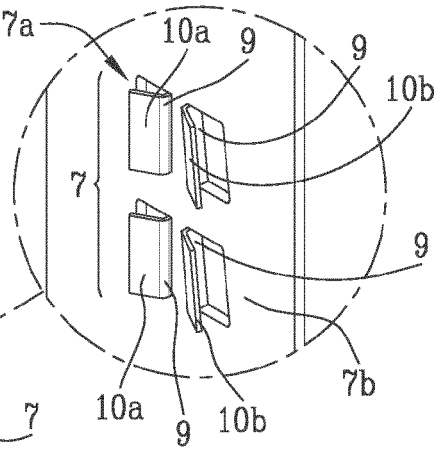


Fig.1

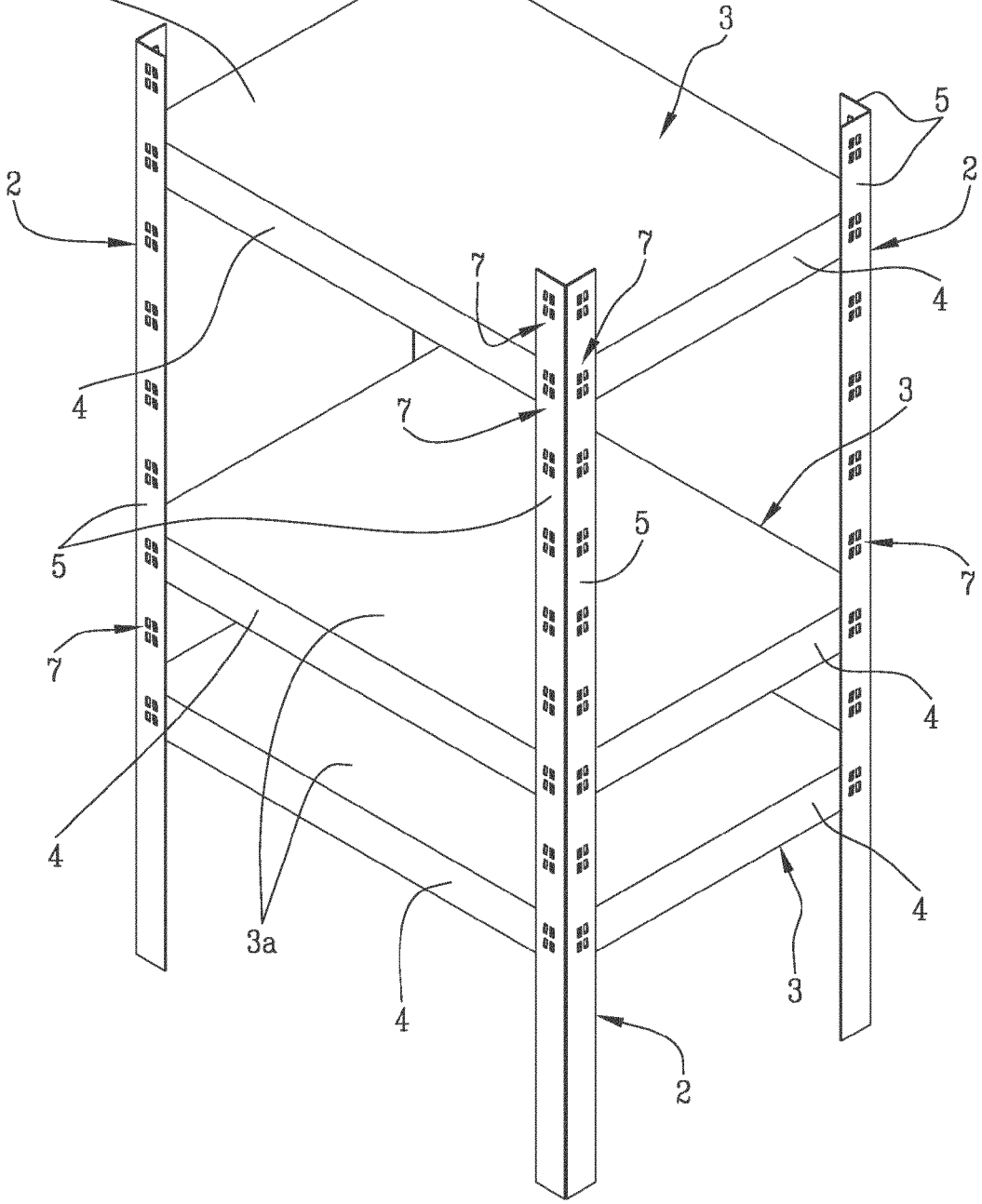


Fig.2B

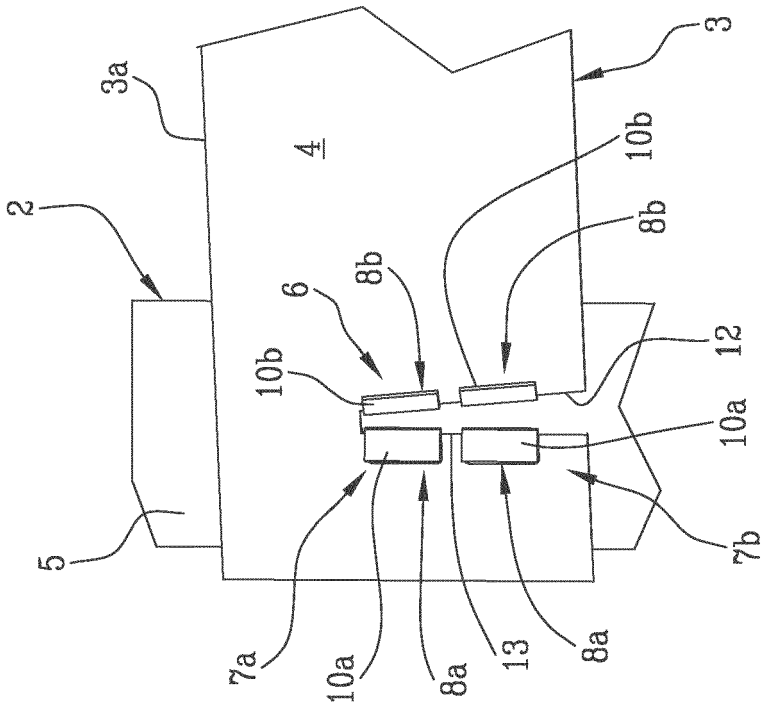
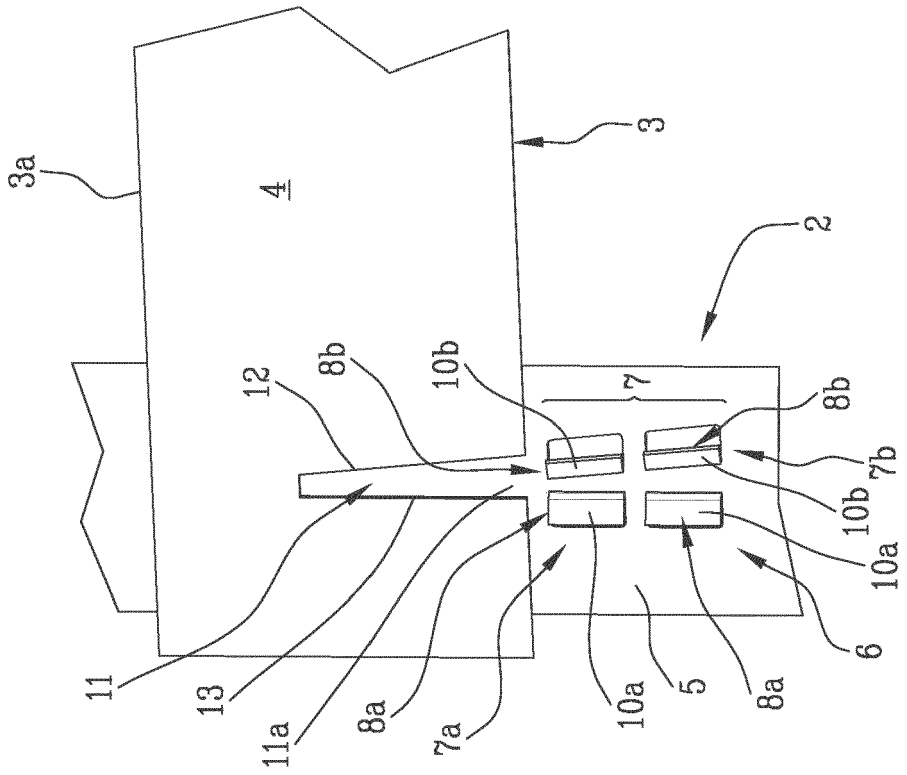

3
3a
4
2
10b
8b
6
8b
12
10b
10a
5
7b
7a
10a
8a
13
8a

Fig.2A


3
3a
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2
12
8b
10b
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11
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11a
8a
7a
10a
5
8a

Fig.4

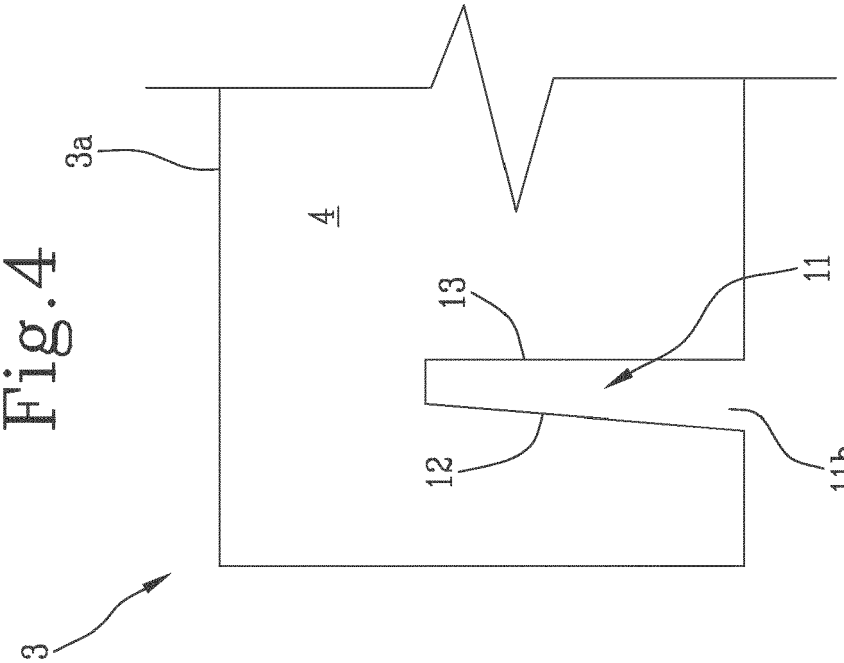
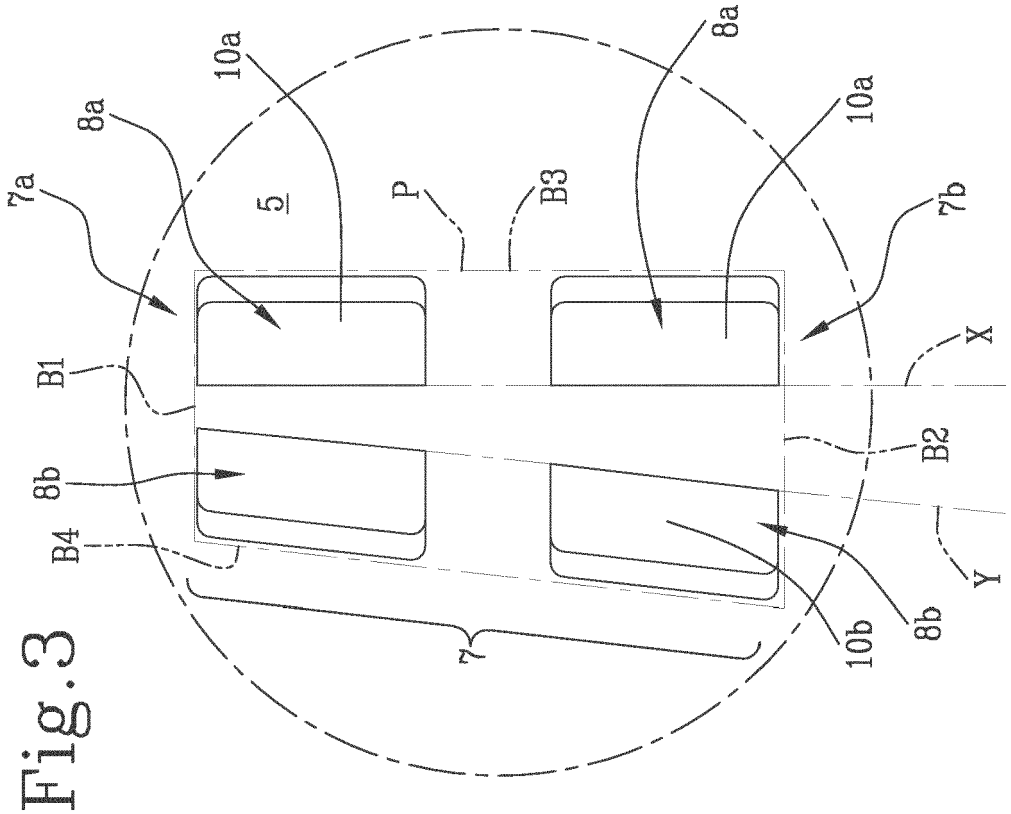


Fig.3



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EUROPEAN SEARCH REPORT

Application Number
EP 19 16 8846

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	16 July 2019	Kohler, Pierre

CATEGORY OF CITED DOCUMENTS

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16-07-2019

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