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

(11) **EP 3 513 688 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
24.07.2019 Bulletin 2019/30

(51) Int Cl.:
A47F 5/10 *(2006.01)* ***A47B 47/00*** *(2006.01)*
A47B 57/40 *(2006.01)* ***A47B 96/14*** *(2006.01)*

(21) Application number: **19151755.6**

(22) Date of filing: **15.01.2019**

(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: **17.01.2018 IT 201800001127**

(71) Applicant: **CEFLA S.C.**
40026 Imola (IT)

(72) Inventor: **Passanti, Andrea**
40026 Imola (IT)

(74) Representative: **Del Nero, Susanna**
CEFLA Società Cooperativa
Via Selice Provinciale, 23/A
40026 Imola (BO) (IT)

(54) MODULAR SYSTEM FOR RETAIL

(57) Modular system for building retail display structures (60, 70 80, 85, 90) comprising three basic components:
- an upright (1A, 1B);
- a crosspiece (2);
- a stringer (3)
a plurality of said component being assembled to generate a supporting structure, wherein said three components (1, 2, 3) are assembled in a disassemblable way, in correspondence of each angle area, so as to form a top plane, so that no component protrudes with respect to the other two,
characterized in that
the three said components (1, 2, 3) are provided in combination with reciprocal hooking means and in a coupled condition, each of the three said component being aligned parallel to a direction of three directions perpendicular to each other, while
- The upright element (1) is provided at least on one of its sides with a row of slots (10) pairs equidistant to each other, said side being parallel to the longitudinal axis of said stringer;
- Said stringer (3) is provided at each end with a wing (35), with the longitudinal axis of said wing oriented perpendicularly to the longitudinal axis of the stringer itself, which wing extends parallel to the axis of said upright (1), in the coupled condition, and is provided with at least two hooks (36, 37, 38) aligned to each other in a direction parallel to the slot rows (10) on said upright and engaging at least two slots of at least one row of slots;
- Said hooks (36, 37, 38) and said slots (10) are distanced respectively from the top side of said upright and from the top side of said stringer so that the top side of the stringer is co-planar with the top side of said upright or to a plan parallel to said top side of said upright in the assembled condition; and
- When assembled to said upright (1), said crosspiece (2) extends with its longitudinal axis perpendicular to the upright side provided with slot rows;
- Said crosspiece (2) is provided at its ends with two extensions (25, 25A) which extend parallel to said slot rows or to the longitudinal axis of said upright;
- Each extension (25, 25A) bears at least two pair of coupling teeth (26, 27, 28; 26A, 27A, 28A) aligned in the direction of a row of slots (10) and coinciding at least with two slots of one slot rows;
- Said teeth (26, 27, 28; 26A, 27A, 28A) being distanced from the top side of said crosspiece (2, 2A) so that the top side of said crosspiece is co-planar with the top side of the upright (1) in the coupled condition and co-planar to the top side of the stringer (3) and of the upright (1), or coplanar only to the top plane of the stringer (3).

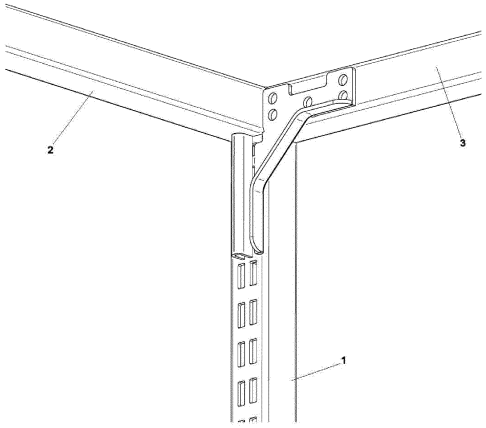

FIG. 2

EP 3 513 688 A1

Description

[0001] The present invention relates to the technical field of furniture for large retail stores, and in particular to a modular system that can be assembled and disassembled to build sale displays (shelving, gondola shelving, tables, containers, etc.).

[0002] Such modular systems are well known in the art; nonetheless, the basic components of most of them must be soldered, or fixed through the use of joints, made of plastics or aluminium.

[0003] The same basic components (upright, crosspiece, stringer) can be provided in a limited number to build different kinds of final objects like shelving, gondola shelving, tables, containers, etc. Nonetheless, once the basic components were soldered to build e.g. a gondola shelving, the finished gondola shelving cannot be disassembled anymore. The main advantage of the soldered systems is their stability, which is maximal, while their main drawback is the impossibility of assembling and disassembling their basic components. They totally lack flexibility.

[0004] E.g., DE29914238U of Tegometall describes a modular system making use of joints for the joining of components.

[0005] US 2016029786 in the name of Adco Ind Technologies LP describes a modular system for building retail display structures comprising three basic components: an upright, a crosspiece and a stringer. A plurality of said components is assembled to generate a supporting structure, wherein said three components are assembled in a disassemblable way, in correspondence of each angle area, so as to form a top plane, so that no component protrudes with respect to the other two.

[0006] US2012267332 in the name of Fabio Mariani, US9493177 of E-MAKE CO LTD, and US2014116973 of Whirlpool CO describe a modular system for building retail display structures comprising three basic components: an upright, a crosspiece and a stringer. A plurality of said components is assembled to generate a supporting structure, wherein said three components are assembled in a disassemblable way, in correspondence of each angle area. Said crosspiece and stringer form a top plane, while said upright protrudes for a fraction of said assembly.

[0007] Modular systems with joints tend to be fairly stable. Nonetheless, a drawback of the modular systems making use of joints is linked to the production of different kinds of joint, e.g. end and intermediate joints, angle joints, two-way joints, three-way joints. This leads to a rise in the number and variety of the components which must be manufactured and stored, which is a drawback for both manufacturers and points of sale.

[0008] Aim of the present invention is providing a modular system making use of a limited number of basic components (uprights, crosspieces and stringers) fitted in so as to grant the possibility of disassembling, without the use of joints, which moreover is provided with a good mechanical stability.

[0009] This object is achieved by an apparatus and a method having the features of the independent claims. Advantageous embodiments and refinements are specified in claims dependent thereon.

[0010] The solution consists in the kind of fitting in of the components crosspiece and stringer to uprights. In particular, said three assembled components allow to obtain a uniform plane and to use uprights which have slots on one side only or on the two opposed sides.

[0011] Substantially, the invention makes use of uprights provided with pairs of slots, wherein the crosspieces teeth and stringers hooks fit in with very limited play, so as to give a good mechanical stability to the three assembled components.

[0012] The modular system for the assembling of display structures according to the present invention provides a crosspiece having a U-shape comprising a tubular section bar connecting two extensions which represent the U-arms; the crosspiece for the upper connection having a downward U-shape and the crosspiece for the lower connection a upward U-shape; their extensions having three pair of L-shaped teeth with a downward slit on the internal side of said L for fitting in said slots of upright; said teeth protruding from said crosspiece in the direction of the longitudinal axis of said crosspiece; said extension having a protrusion in order to stabilize the removable fitting in between stringer and upright.

[0013] Moreover, the modular system for the assembling of displaying structures according to the present invention provides a stringer with a U-shape comprising a tubular section bar linking the two wings constituting the arms of said U; wings and tubular section bar being connected through the presence of a gusset having a rib with a development having a portion parallel to said tubular section bar, a portion perpendicular to said tubular section bar, and a portion connecting the two said portions; said stringer having three hooks with an isosceles trapezium shape, wherein the larger base of the isosceles trapezium is connected through a peduncle having dimensions smaller than said larger base; said hooks being oriented perpendicularly with respect to the longitudinal axis of the tubular section bar, and protruding below it on the side of said gusset opposed to the rib.

[0014] The modular system for the assembling of display structures according to the present invention provides that each extension of the crosspiece is provided with at least two pairs of teeth which are aligned to each other, correspondingly to the longitudinal axis of the upright, in the assembled condition to the upright slots, and which are distanced so to fit in two pairs of slots, said two pair of slots on the upright being distanced so that an intermediate pair of slots remains free.

[0015] An embodiment provides that each extension of the crosspiece is provided with three pairs of teeth which are aligned to each other correspondingly to the longitudinal axis of the upright, in the assembled condition to the upright slots, two pair of teeth being distanced

correspondingly to the distance between two adjacent pair of slots on the upright, and a further pair of teeth distanced from the adjacent so that, in an assembled condition, this last pair of teeth is engaged in a pair of teeth distanced from the one immediately adjacent, leaving free an intermediate pair of slots.

[0016] As will appear clear from the following, the modular system for the construction of displaying structures according to the present invention provides that a first pair of teeth of the crosspiece fits in the first pair of slots, the second pair of teeth fits in the second pair of slots 6, the third pair of slots is free, the third pair of teeth fits in the fourth pair of slots, while the first stringer hook fits in the free portion of one of the second slots, the second stringer hook fits in the immediately adjacent free third slot, the third stringer hook fits in the free portion of the immediately adjacent fourth slot.

[0017] The first advantage of the present invention consists in the limited number of pieces to be manufactured, as the modular system according to the present invention does not use joints.

[0018] The second advantage of the present invention is its modularity, as the limited number of basic components allows to produce a wide range of finished objects.

[0019] A third advantage lies in the fact that said finished objects can be disassembled, and their components can be re-used at will, with simple assembling operation making use of just a hammer.

[0020] A fourth advantage is the good stability of finished objects, which derives from the fitting in of their components.

[0021] A fifth advantage is that the present modular system allows to obtain finished objects which are aesthetically pleasing.

[0022] Further advantages and properties of the present invention are disclosed in the following description, in which exemplary embodiments of the present invention are explained in detail based on the drawings:

Figure 1 Axonometric view from outside of the three basic components (upright, crosspiece and stringer) assembled in a finished object;

Figure 2 Axonometric view from inside of the three basic components (upright, crosspiece and stringer) assembled in a finished object;

Figure 3 Axonometric view of two uprights of different kind;

Figure 4, 4A Axonometric view of two crosspieces, the first for upper connection, the second for lower connection;

Figure 5 Axonometric view of a stringer;

Figure 6 Axonometric view of a wall shelving;

Figure 7 Axonometric view of a gondola shelving;

Figure 8 Axonometric view of a table with wheels;

Figure 8A Axonometric view of a table without wheels;

Figure 9 Axonometric view of a clothing rack;

Figure 10 Front view of the assembled three basic components, with a section of the upright removed to show the connection between teeth and slots.

[0023] It is worthwhile noting that the three basic components herein described are upright 1, crosspiece 2 and stringer 3. In the following, little variations of the basic components will be described, which are indicated adding a letter after the digit.

[0024] The range of single basic components and consequently of assembled objects that can be obtained can be widened and articulated providing basic components having different lengths:

- Two kinds of upright, one-side slotted 1A and two-side slotted 1B said uprights can have lengths ranging 30 cm to 3 metres;
- Two kinds of crosspieces, one upper connection crosspiece 2 and one lower connection crosspiece 2A tubular section bar 24 of crosspieces 2, 2A can have lengths ranging 20 to 80 cm;
- Just one kind of stringer 3, with reversible assembling tubular section bar 34 of stringers 3 can have lengths ranging 30 to 140 cm.

[0025] It is worthwhile specifying that with the expression upper connection, lower connection is meant that the components once assembled define a plane, with no component protruding from the plane defined by the other two components.

[0026] Figure 1 shows an axonometric view from outside the corner of the assembled three basic components: upright 1, crosspiece 2 and stringer 3, as assembled in a finished object. Already from this Figure one can appreciate that the three components assembled in in the finished object define a plane (upper connection), or in other words that the three components are at the same level.

[0027] Figure 2 shows an axonometric view from inside the corner of the assembled three basic components: upright 1, crosspiece 2 and stringer 3, as assembled in a finished object.

[0028] In the preferred embodiment, upright 1, tubular section bar 24 of crosspiece 2 and tubular section bar 34 of stringer 3 have the same square transversal section.

[0029] Figure 3 shows an upright 1A and an upright 1B having pairs of slots placed at regular intervals. Uprights 1 have a square transversal section wherein the pairs of slots 10 can be present on one side only (one-side slotted upright, 1A), or on two opposed sides (two-side slotted upright, 1B).

[0030] Figure 4 shows a crosspiece 2 allowing to obtain an upward plane among upright, crosspiece and stringer, (upper connection), which overall has an upside down U shape, with downward oriented arms of the U. Said crosspiece 2 has a tubular section bar 24 connecting the two

U arms; at its ends there are provided two symmetrical extensions (U arms) provided with three pairs of teeth, a first pair of teeth 26 adjacent to tubular section bar 24, an intermediate pair 27, and a terminal pair 28.

[0031] Figure 4A shows a crosspiece 2A allowing to obtain a plane among crosspiece and stringer oriented downward (lower connection), which has overall a U shape. The difference between upper connection crosspiece 2 and lower connection crosspiece 2A is that the extensions 25 A have their three pairs of teeth always oriented downward, but said extensions 25 A are translated upward with respect to extensions 25.

[0032] The three pairs of teeth 26, 27, 28 are placed at a distance from each other such as to allow their fitting in into the slots of uprights 1A or 1B. It is worthwhile noting that the pair of teeth 26 and 27 have a distance allowing their fitting in two adjacent slots, while the pair of teeth 28 is placed so as to allow the fitting in while skipping the pair of slots immediately under the one allowing the fitting of the intermediate teeth pair 27.

[0033] In the portion of extensions 25, 25A between the pair of teeth 27 and 28 or 27A and 28A which are farther from each other, a small protrusion 29, 29A is placed, protruding from the border of the extension 25. Once the components are assembled, said protrusion 29, 29A fits in the upright 1.

[0034] The pairs of teeth 26, 26A; 27, 27A; 28, 28A have an L-shape and a slit oriented downward, which is long about half the overall dimension of the tooth. The pairs of teeth 26, 26A; 27, 27A; 28, 28A protrude from the two ends of crosspieces 2, 2A in the longitudinal direction of the crosspiece itself.

[0035] Said extensions 25, 25A are produced U-bending a portion of metal sheet and soldering said extensions inside said tubular section bar 24, so that nothing can be seen from outside.

[0036] Figure 5 shows a stringer 3, having overall a U-shape, with the two arms of said U oriented downward. Stringer 3 is provided with a tubular section bar 34, too, which is the portion connecting the two arms of the U. At the two ends of said tubular section bar there are provided two symmetrical wings 35 (the two arms), provided with three hooks, one 36 of which is adjacent to said tubular section bar, an intermediate hook 37 and an end hook 38.

[0037] Said hooks 36, 37, 38 are at a distance such that they can be fitted in three consecutive slots. Said hooks have an isosceles trapezium shape, with a peduncle thinner than the isosceles trapezium side connected to said extension 35. Said hooks 36, 37, 38 protrude from the two ends of the stringer 3 oriented perpendicularly to the longitudinal axis of the stringer itself; all the hooks are oriented so as to lie on the same side of tubular section bar 34.

[0038] Wings 35, too, are produced by bending and soldering to tubular section bar 34 a substantially triangular portion of metal sheet. Once soldered, said wings 35 have each a gusset 31 that is responsible of the stability of assembled objects.

[0039] Said gusset 31 has a rib protruding from the opposed side of said gusset 31 with respect to hooks 36, 37, 38. Said rib 32 has a portion which is parallel to said tubular section bar 34, a portion perpendicular to tubular section bar 34 and a portion placed at 45° connecting the two said portions. Overall, said rib 32 gives the system an improved rigidity, while the top portion of said rib, parallel to ground, provides a small surface which can support a panel having a load capacity up to 70 kg.

[0040] It is worthwhile noting that, while to get an upper connection or a lower connection the crosspieces must be different (2 for upper connections, 2A for lower connections), the stringer remains the same, but in the lower connection the same stringer is assembled upside down with respect to upper connection.

[0041] Figures 6, 7, 8 and 9 are meant to show the versatility of the modular system according to the present invention.

[0042] Figure 6 shows a shelving 60 built assembling four one-side slotted upright 1A, four crosspieces 2 and four stringers 3.

[0043] Figure 7 shows a gondola shelving 70 built assembling two two-side slotted uprights 1B, four one-side slotted uprights 1A, eight crosspieces 2 and six stringers 3 (crosspieces and stringer are not all visible in said Figure).

[0044] Figure 8 shows a table 80 provided with two panels 81, 82 built using four one-side slotted uprights 1A; two crosspieces 2, two stringers 3 for panel 81; two crosspieces 2A, two stringers 3 for panel 82. To the skilled person it is apparent that this is only one of the types of table obtainable with the modular system according to the present invention. Not-shown variants of table 80 might be e.g. a table lacking wheels 83; a table having only panel 81, with or without wheels 83; said tables can be provided with any desired height, by suitably cutting said four uprights 1. Alternatively, the same basic structure might be used to build a (not shown) container with or without wheels 83, provided with the lower panel 82 only and four lateral walls so as to close the parallelepiped structure on its four sides.

[0045] It is worthwhile noting that the crosspieces 2A used for the lower portion of said table 80 are different from the crosspieces 2 used in the other Figures as end pieces for the top portions of assembled objects. As a matter of fact, crosspieces 2A are specular to crosspieces 2 so as to allow to obtain the same alignment between crosspieces and stringers, but oriented downward. In fact, comparing Figure 8 and figure 8A, and in particular the position of panels 82 and 82A, the fact that panel 82 of Figure 8 is placed lower than panel 82A of Figure 8A is apparent, i.e. panel 82 is nearer to the end-point of said four uprights 1A than panel 82A. The geometries at play do not allow to get a lower connection specular to the upper connection; downwards the uprights 1 end up protruding about 1 cm with respect to the oriented downward plane defined by crosspieces 2A and stringer 3.

[0046] Figure 9 shows a clothing rack 90 which can be

used to display clothes and accessories of different kind. The basic structure of said clothing rack 90 is built assembling four one-side slotted uprights 1A, two crosspieces 2, two crosspieces 2A, and four stringers 3. Moreover, said clothing rack 90 comprises some accessories, like e.g. a clothes beam 91 and a pair of shelves 92.

[0047] It is worthwhile specifying that on the structure formed by the basic components upright 1, crosspiece 2 and stringer 3 panels 81, 82 made of wood, metal, plastics, glass can be mounted in three different ways:

- Exploiting four ribs 32, opposing two by two in their portion parallel to ground. As said rib 32 is at the height of the lower side of tubular section bar 25 and 35, said panel 81, 82 is aligned to the top sides of said tubular section bar only if it has a thickness corresponding to that of said tubular section bar; if said panel is thinner than said tubular section bar, said panel is recessed with respect to the plane (upper connection) defined by the connection of said basic components upright, crosspiece, stringer.
- Using depth connectors 84 as shown in Figure 8. Said depth connectors, well known in the art, can be shaped so as to bring said panel 81 at the same level of the plane defined by the connection of the three basic components upright, crosspiece, stringer, as shown in Figure 8, choosing a suitable height of depth connector bending according to the thickness of said panel and to the desired effect. In case of use of a crosspiece 2A, the rib 32 is at the same height of the upper connection of the tubular section bar and cannot be used to support a panel: therefore necessarily depth connectors must be used.
- Panels 81, 82 can lean on the plane defined by the connection of the three basic components upright, crosspiece, stringer (not shown). Said panel is fixed to the structure in known ways.

[0048] Figure 10 shows the mutual relationship among the three basic components upright 1, crosspiece 2 and stringer 3, thanks to the removal of a portion of upright 1. In particular, the pair of teeth 26, 26A of the crosspiece 2, 2A fits in the pair of slots 5, the pair of teeth 27, 27A fits in the pair of slots 6, the pair of slots 7 is free, the pair of teeth 28 fits in the pair of slots 8, while the stringer hook 36 fits in the free portion of one of slots 6, the stringer hook 37 fits in the free immediately adjacent slot 7, the stringer hook 38 fits in the free portion of the immediately adjacent slot 8.

[0049] For the sake of clarity, firstly the assembling of just three components upright 1, crosspiece 2 and stringer 3 will be explained, as shown in Figures 1 and 2. Said assembling is explained only for clarity's sake, while in reality it occurs differently, as normally self-supporting assemblies are mounted.

[0050] The first step of said assembling occurs connecting a crosspiece 2 or 2A with an upright 1A or 1B until all the pairs of teeth 26 or 26A; 27 or 27A; 28 or 28A sit into place, with their respective slit leaning on the lower portion of the slot pairs. This assembling is performed using a hammer, so that each protrusion 29 fits in in the same slot occupied by an end tooth 28 or 28A. This fitting in does not allow to extract upward said crosspiece 2 or 2A, and strongly contributes to the final stability of the assembled object.

[0051] In particular, with reference to Figure 10, said upright 1A or 1B has four pairs of slots 5, 6, 7, 8, counting from the top end of the upright. The first pair of teeth 26 fits in the first pair of slots 5, the second pair of teeth 27 fits in the second pair of slots 6, the third pair of slots 7 is free, the third pair of teeth 28 fits in the fourth pair of slots 8.

[0052] The second step of the assembling occurs fitting in the stringer 3 on the upright 1-crosspiece 2 assembly. The first hook 36 of stringer 3 fits in the free portion of one of the second slots 6, the second hook 37 fits in the free third underlying slot 7, the third hook 38 fits in the free portion of the underlying fourth slot 8 (in fact hooks 36, 37, 38 lie on the same plane). Said teeth 36, 37, 38 are tapered toward the end of the tooth in the direction of insertion in the upright so as to facilitate the assembling. Said teeth have an isosceles trapezium shape with a peduncle, wherein the dimension of the larger base are slightly smaller than that of the slot. As a consequence, at the beginning of the insertion, the tooth occupies the whole slot. Once the stringer 3 sits into place on upright 1, the stringer 3 is forced through the use of a hammer, so that the peduncle of each tooth sits into place on the lower portion of each slot.

[0053] The real assembling method of an assembled object 60, 70, 80, 90 according to the present invention comprises the following steps:

a. Assembling of the first corner of the first truss An upright 1 is placed on the ground with its slots oriented upwards. The pair of teeth 26 of a crosspiece 2 is inserted into the first pair of free slots 5 at the end of said upright. Said crosspiece 2 sits into place on upright 1, and then is forced through the use of a hammer in the direction of the upright axis until the protrusion 29 fits in slot 8, and therefore the top surface of crosspiece 2 is at the same level of the end of upright 1. This assembling allows to get a rigid upright-crosspiece assembly.

b. Assembling of the second crosspiece at the opposed end of the upright According to the desired position of the second crosspiece 2 on the same upright 1, the pairs of teeth 26, 27, 28 are inserted in the suitable slots in the lower portion of the upright, and forced through the use of a hammer so that the protrusions 29 end in the same pair of slots of teeth pair 28. In this way, a C-shaped rigid assembly is obtained.

c. Formation of a first truss

In order to complete the formation of the first truss, a second upright 1 preferably of the same dimension

of the preceding one is fitted in at the same time in the three+three pairs of slots of the previously obtained C-assembly, making use of a hammer and keeping the crosspieces so as to sit the two protrusions 29 into place in the same pair of slots of the pair of teeth 28. In this way, a truss is obtained, which has a rigidity comparable to the rigidity obtainable by soldering the same components. A truss comprising two uprights 1A and two crosspieces 2 is shown in the dotted portion of Figure 6.

d. Formation of the second truss A second truss is obtained repeating steps a, b, c.

e. Formation of a three-dimensional structure The two trusses are positioned at a defined distance in order to allow the insertion of a first stringer 3, wherein the top portion of the stringer 3 is aligned with the level of the trusses, so that tooth 38 can fit in the free portion of the slot occupied by the tooth 28 of crosspiece 2. Once the hooks 36, 37, 38 are inserted in the free portions of three consecutive slots, the crosspiece 3 is hit with a hammer so that the peduncles sit into place on the respective slots. The same step is repeated for assembling the second stringer, too.

[0054] It is worth noting that all the basic component so assembled can be disassembled with the help of a hammer, and re-used to build finished objects 60, 70, 80, 90 different from the previous ones.

1A one-side slotted upright
1B two-side slotted upright
2 upper connection crosspiece
2A lower connection crosspiece
3 stringer
10 slot
24 tubular section bar
25 extension
26 tooth adjacent to tubular section bar
27 intermediate tooth
28 end tooth
29 protrusion
31 gusset
32 rib
34 tubular section bar
35 wings
36 hook adjacent to tubular section bar
37 intermediate hook
38 end hook
60 shelving
70 gondola shelving
80 table
81 panel
82 panel
83 wheel
84 depth connector
85 table
90 clothing rack
91 clothes beam
92 shelf

Claims

1. Modular system for building retail display structures (60, 70 80, 85, 90) comprising three basic components:

- an upright (1A, 1B);
- a crosspiece (2);
- a stringer (3)

a plurality of said component being assembled to generate a supporting structure,
wherein said three components (1, 2, 3) are assembled in a disassemblable way, in correspondence of each angle area, so as to form a top plane, so that no component protrudes with respect to the other two,
characterized in that
the three said components (1, 2, 3) are provided in combination with reciprocal hooking means and in a coupled condition, each of the three said component being aligned parallel to a direction of three directions perpendicular to each other, while

- The upright element (1) is provided at least on one of its sides with a row of slots (10) pairs equidistant to each other, said side being parallel to the longitudinal axis of said stringer;
- Said stringer (3) is provided at each end with a wing (35), with the longitudinal axis of said wing oriented perpendicularly to the longitudinal axis of the stringer itself, which wing extends parallel to the axis of said upright (1), in the coupled condition, and is provided with at least two hooks (36, 37, 38) aligned to each other in a direction parallel to the slot rows (10) on said upright and engaging at least two slots of at least one row of slots;
- Said hooks (36, 37, 38) and said slots (10) are distanced respectively from the top side of said upright and from the top side of said stringer so that the top side of the stringer is co-planar with the top side of said upright or to a plan parallel to said top side of said upright in the assembled condition; and
- When assembled to said upright (1), said crosspiece (2) extends with its longitudinal axis perpendicular to the upright side provided with slot rows;
- Said crosspiece (2) is provided at its ends with two extensions (25, 25A) which extend parallel to said slot rows or to the longitudinal axis of said upright;
- Each extension (25, 25A) bears at least two

pair of coupling teeth (26, 27, 28; 26A, 27A, 28A) aligned in the direction of a row of slots (10) and coinciding at least with two slots of one slot rows;
- Said teeth (26, 27, 28; 26A, 27A, 28A) being distanced from the top side of said crosspiece (2, 2A) so that the top side of said crosspiece is co-planar with the top side of the upright (1) in the coupled condition and co-planar to the top side of the stringer (3) and of the upright (1), or coplanar only to the top plane of the stringer (3).

2. Modular system for building retail display structures (60, 70 80, 85, 90) comprising three basic components

- an upright (1A, 1B);
- a crosspiece (2A);
- a stringer (3)

a plurality of said component being assembled to generate a supporting structure,
wherein said three components (1, 2, 3) are assembled in a disassemblable way, in correspondence of each angle area, so that said crosspiece and stringer form a top plane, while said upright protrudes of a fraction of said assembly
characterized in that
the three said components (1, 2, 3) are provided in combination with reciprocal hooking means and in a coupled condition, each of the three said component being aligned parallel to a direction of three direction perpendicular to each other, while

- The upright element (1) is provided at least on one of its sides with a row of slots (10) pairs equidistant to each other, said side being parallel to the longitudinal axis of said stringer;
- Said stringer (3) is provided at each end with a wing (35) with the longitudinal axis of said wing oriented perpendicularly to the longitudinal axis of the stringer itself, which wing extends parallel to the axis of said upright (1), in the coupled condition, and is provided with at least two hooks (36, 37, 38) aligned to each other in a direction parallel to the slot rows (10) on said upright and engaging at least two slots of at least one row of slots;
- Said hooks (36, 37, 38) and said slots (10) are distanced respectively from the top side of said upright and from the top side of said stringer so that the top side of the stringer is co-planar with the top side of said upright or to a plan parallel to said top side of said upright in assembled condition; and
- When assembled to said upright (1), said crosspiece (2) extends with its longitudinal axis perpendicular to the upright side provided with slot rows;
- Said crosspiece (2A) is provided at its ends with two extensions (25, 25A) which extend parallel to said slot rows or to the longitudinal axis of said upright;
- Each extension (25, 25A) bears at least two pair of coupling teeth (26, 27, 28; 26A, 27A, 28A) aligned in the direction of a row of slots (10) and coinciding at least with two slots of one slot rows;
- Said teeth (26, 27, 28; 26A, 27A, 28A) being distanced from the top side of said crosspiece (2, 2A) so that the top side of said crosspiece is co-planar with the top side of the upright (1) in coupled condition and co-planar to the top side of the stringer (3) and of the upright (1), or co-planar to the top plane of the stringer (3).

3. Modular system for building retail display structures (60, 70 80, 85, 90) according to claim 1 or 2, wherein said upright (1) is provided with a square transversal section, and pair of slots (5, 6, 7, 8, 10, ...) placed at a regular distance; said pair of slots being present on one side only of said upright (1A), or on the two opposed sides of said upright (1B).

4. Modular system according to claim 1 or 2, wherein said extensions (25, 25A) of said crosspiece (2, 2A) are provided with at least two rows of teeth (26, 27, 28; 26A, 27A, 28A) forming two rows of parallel teeth and coinciding with the slots (10) of one of the two rows, so that the coupling between upright (1) and crosspiece (2, 2A) occurs engaging at least two slots of each row, while the hooks (36, 37, 38) of said stringer (3) flanking teeth (26, 27, 28; 26A, 27A, 28A) engage at least some slots of a row wherein the crosspiece teeth are engaged.

5. Modular system according to claim 4, wherein each extension (25; 25A) of said crosspiece (2; 2A) is provided with three couples of teeth (26, 27, 28; 26A, 27A, 28A), which teeth are placed in two parallel rows and coinciding each with a row of slots (10).

6. Modular system according to one or more of the claims 3 to 5, wherein each wing (35) of said stringer (3) is provided with three hooks (36, 37, 38) placed on a unique row coinciding with a row of slots (10).

7. Modular system according to one or more claims 3 to 6, wherein the crosspieces (2A) which engage the lower part of the upright are the same as the crosspieces (2) for the top part, while their extensions (25A) are oriented to the opposed direction of the crosspieces for upper connection; the same kind of stringer (3) being used for the coupling to the upper or lower ends of uprights (1A, 1B), said stringer (3) being overturned for its assembling with the top or lower part of uprights.

8. Modular system for building retail display structures (60, 70 80, 85, 90) according to one or more of the preceding claims, wherein upright (1A, 1B) and tubular section bar (24, 34) of said crosspiece (2, 2A) and of said stringer (3) have the same square transversal section.

9. Modular system for building retail display structures (60, 70 80, 85, 90) according to one or more of the preceding claims wherein

- one-side slotted upright (1A) and two-side slotted upright (1B) are provided with lengths ranging 30 cm to 3 metres;
- upper connection crosspiece (2) and lower connection crosspiece (2A) are provided with a tubular section bar (24) lengths ranging 20 to 80 cm;
- stringers (3) are provided with a tubular section bar (34) of lengths ranging 30 to 140 cm.

10. Method for assembling the modular system (1, 2, 3) according to claims 1 to 9, comprising the following steps:

a. Assembling of a crosspiece (2, 2A) on an upright (1A, 1B) inserting a crosspiece (2, 2A) in an upright (1A or 1B) so that all the pairs of teeth (26, 26A; 27, 27A; 28, 28A) sit into place, with their respective slit leaning on the lower portion of the slot pairs (5, 6, 7, 8); said assembling being performed using a hammer, so that each protrusion (29, 29A) fits in in the same slot (8) occupied by an end tooth (28, 28A);
b. Assembling a stringer (3) on the assembly upright (1A, 1B) - crosspiece (2, 2A) assembling the stringer (3) with the assembly upright (1)-crosspiece (2), inserting the hook (36) of stringer (3) in the free portion of one of slots (6), the hook (37) in the free adjacent slot (7), the hook (38) in the free portion of the adjacent slot (8); once the stringer sits into place on the upright (1A, 1B), said stringer (3) is hammered down so that the peduncle of each hook (36, 37, 38) sits into place on the lower portion of the slots (6, 7, 8).

11. Method for assembling the modular system (1, 2, 3), according to claims 1 to 9, comprising the following steps:

a. Assembling of the first corner of a first truss
Assembling a crosspiece (2, 2A) on an upright (1A, 1B) so that said crosspiece sits into place on said upright, and then fitting in the pair of protrusions (29, 29A) in the pair of slots (8).
b. Assembling of the second crosspiece at the opposed end of the upright
According to the desired position of the second crosspiece (2, 2A) on the same upright (1A, 1B), inserting the pairs of teeth 26, 26A; 27, 27A; 28, 28A) into the suitable slots in the lower portion of the upright, and hammering so that the protrusions (29, 29A) end in the same pair of slots of teeth pair (28, 28A), obtaining a C-shaped rigid assembly;
c. Formation of the first truss
In order to complete the formation of the truss, inserting a second upright (1A, 1B), preferably of the same dimension of the preceding one, at the same time in the three+three pairs of slots of the previously obtained C-assembly, so that the two protrusions (29, 29A) sit into place, which fit in the pair of slots of the pair of teeth (28, 28A);
d. Formation of the second truss
Obtaining a second truss repeating steps a, b, c;
e. Formation of a three-dimensional structure
Positioning the two trusses at a defined distance on the basis of tubular section bar (34) length, in order to allow the insertion of a first stringer (3), wherein the top portion of the stringer (3) is aligned with the level of the trusses, so that tooth (38) can fit in the free portion of the slot (8) occupied by the tooth (28, 28A) of crosspiece (2, 2A); once the hooks (36, 37, 38) are inserted in the free portions of two slots (6, 8), and the hook (379 is inserted in the free slot (7), hittting the crosspiece (3) with a hammer so that the peduncles sit into place on the respective slots; repeat the same step for assembling the second stringer;
f. Stabilization of a three-dimensional structure
Preferably, repeating step e assembling at least another stringer (3) in the top portion of the three-dimensional structure, and preferably two stringers (3) in the lower part of the three-dimensional structure itself.

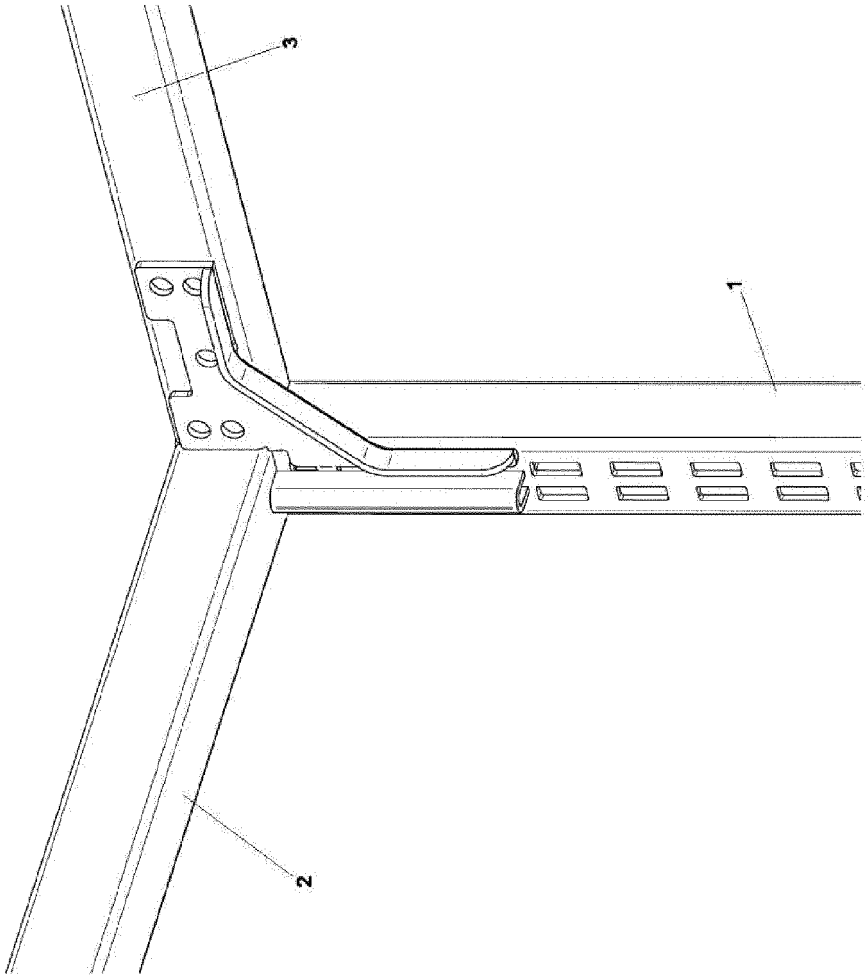

FIG. 2

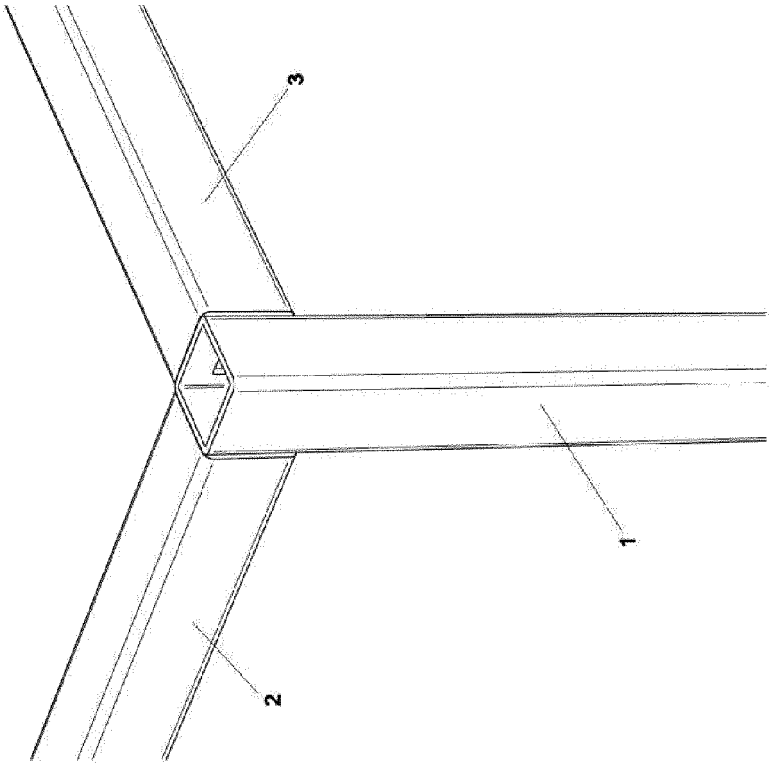

FIG. 1

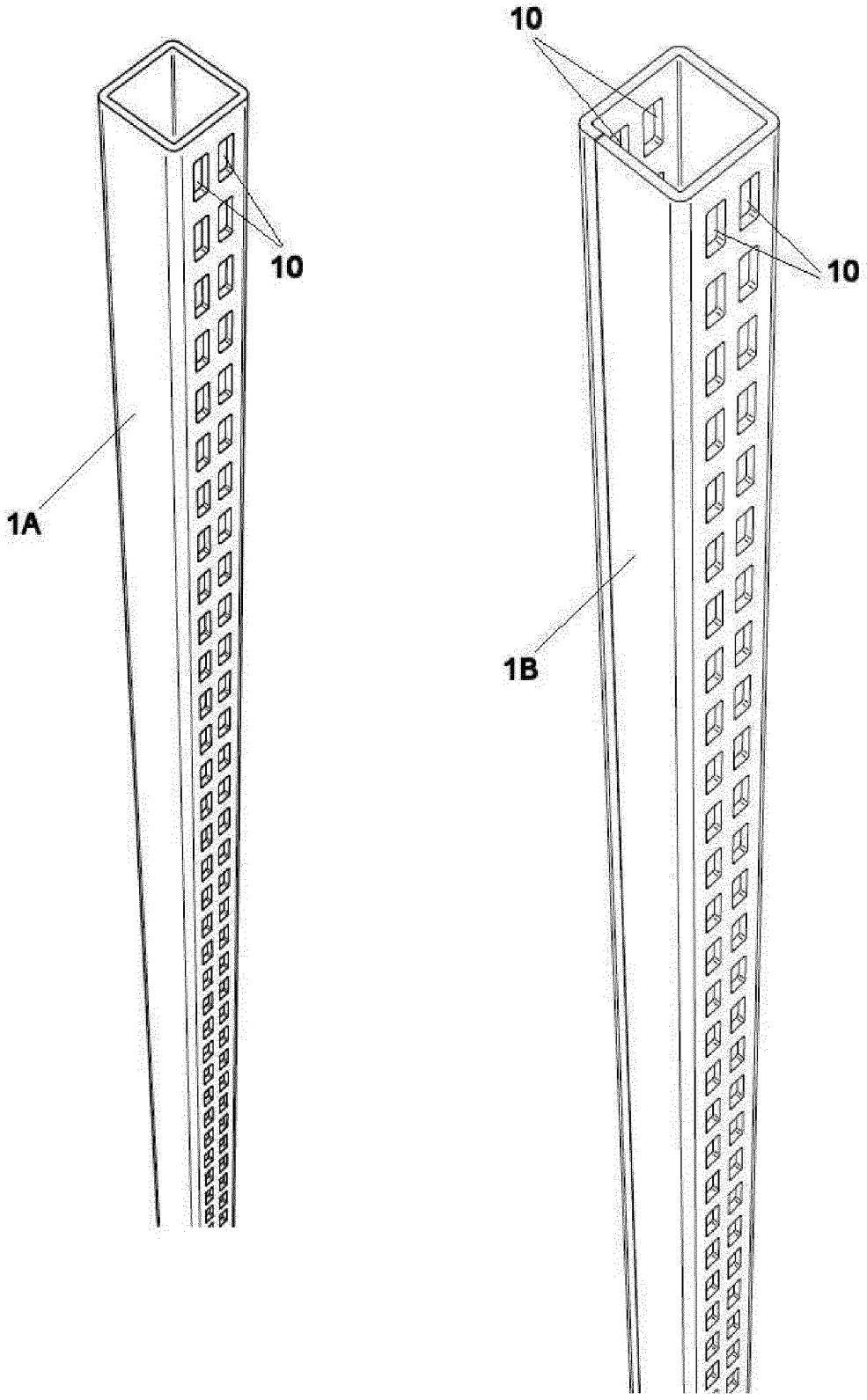

FIG. 3

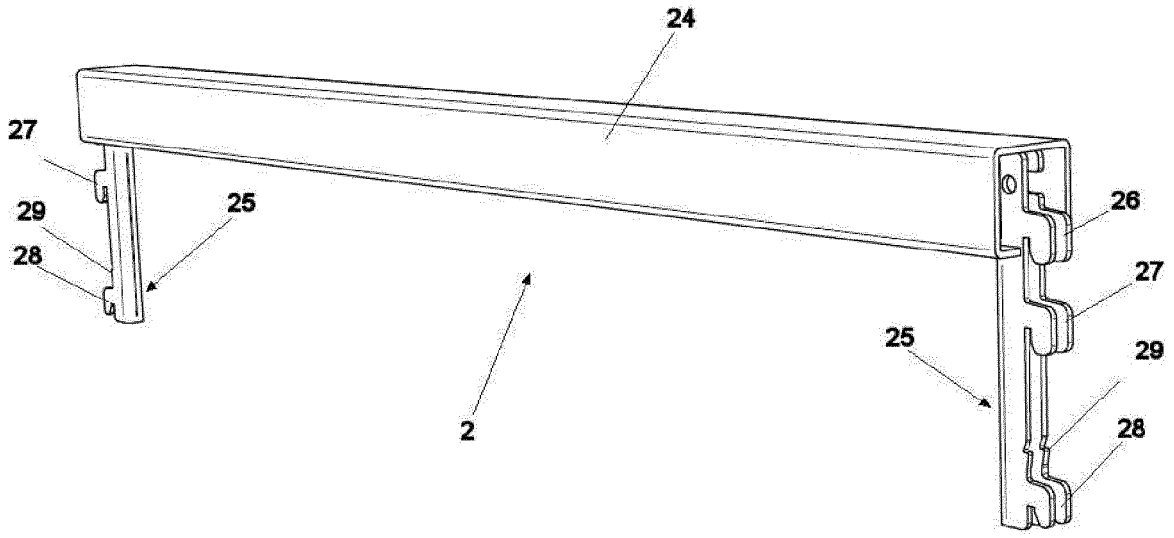
24
27
29
28
25
2
26
27
25
29
28

FIG. 4

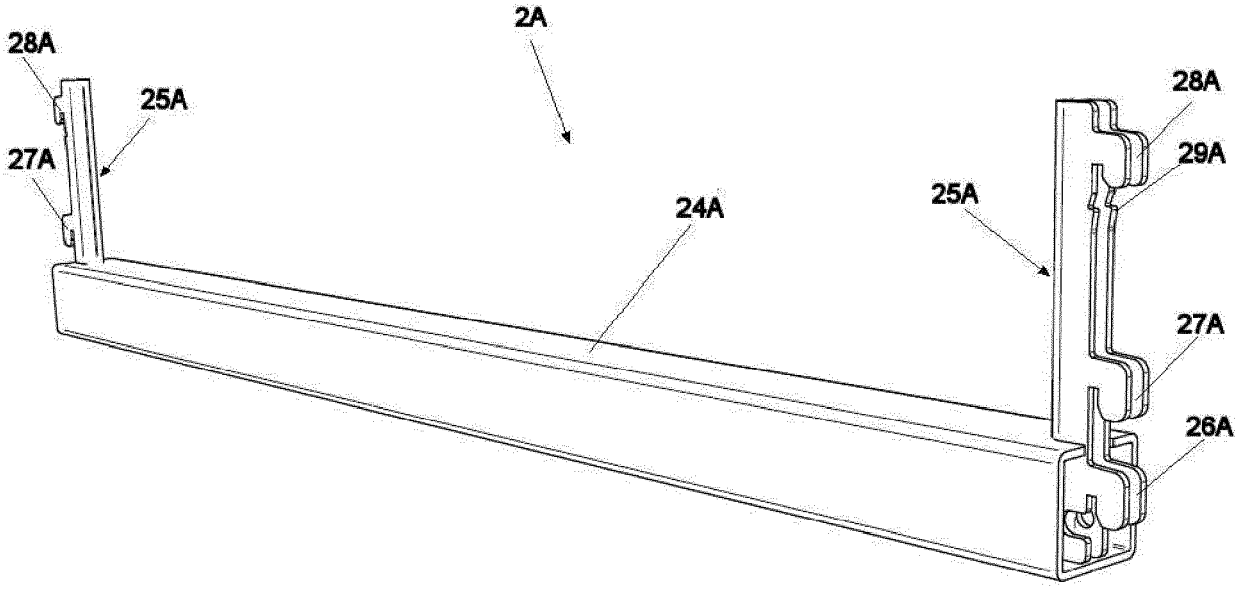
2A
28A
25A
27A
24A
28A
29A
25A
27A
26A

FIG. 4A

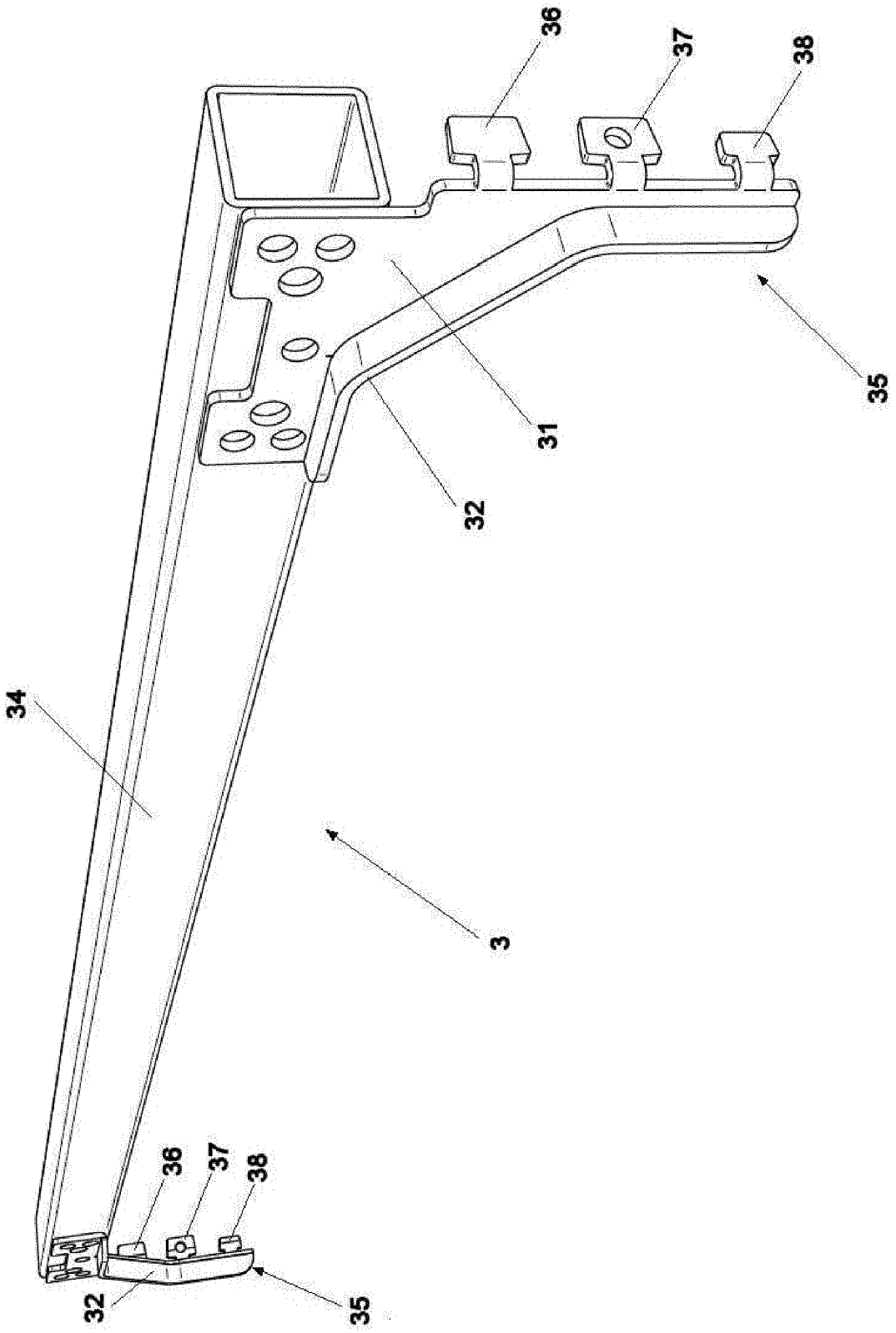

FIG. 5

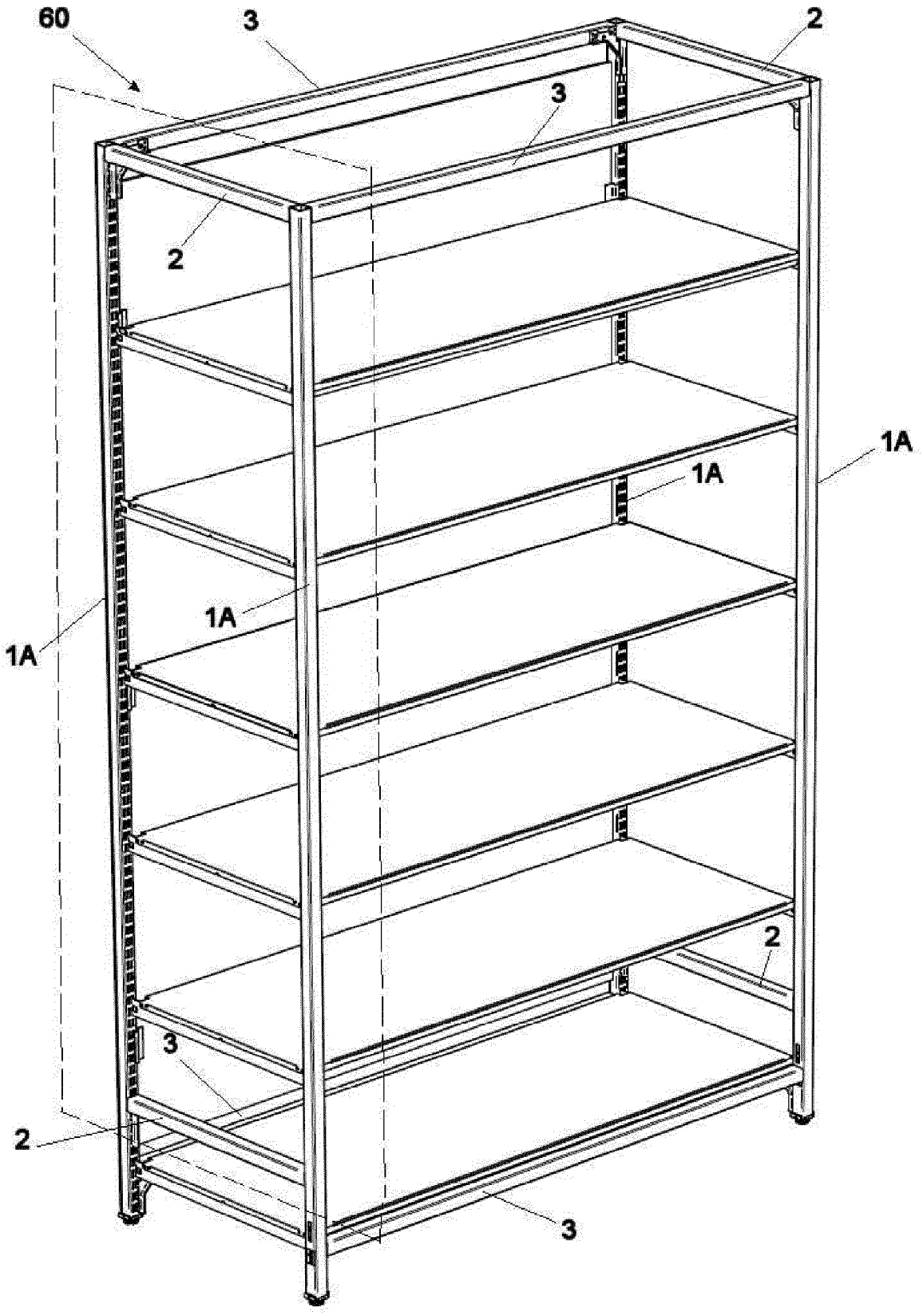

FIG. 6

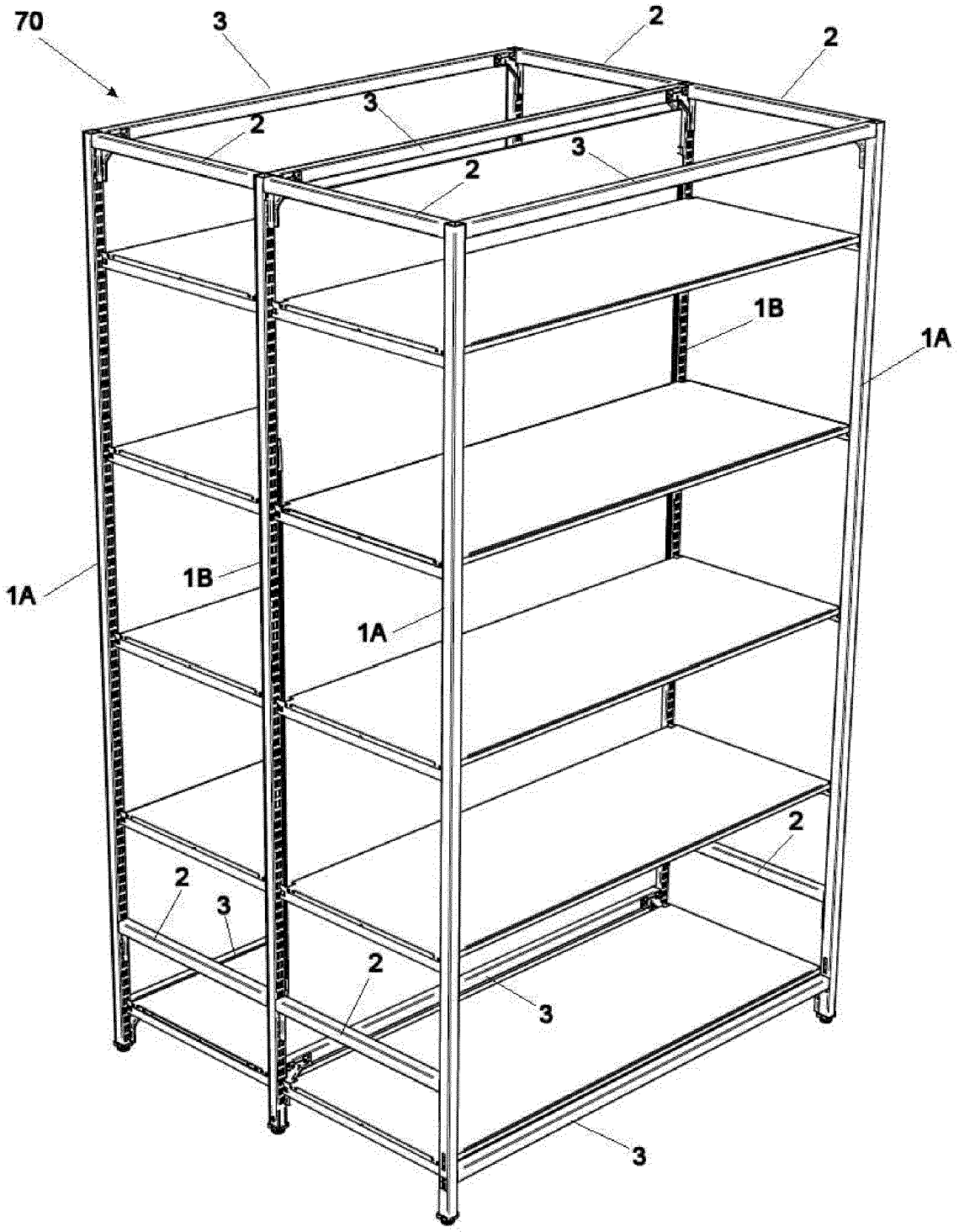

FIG. 7

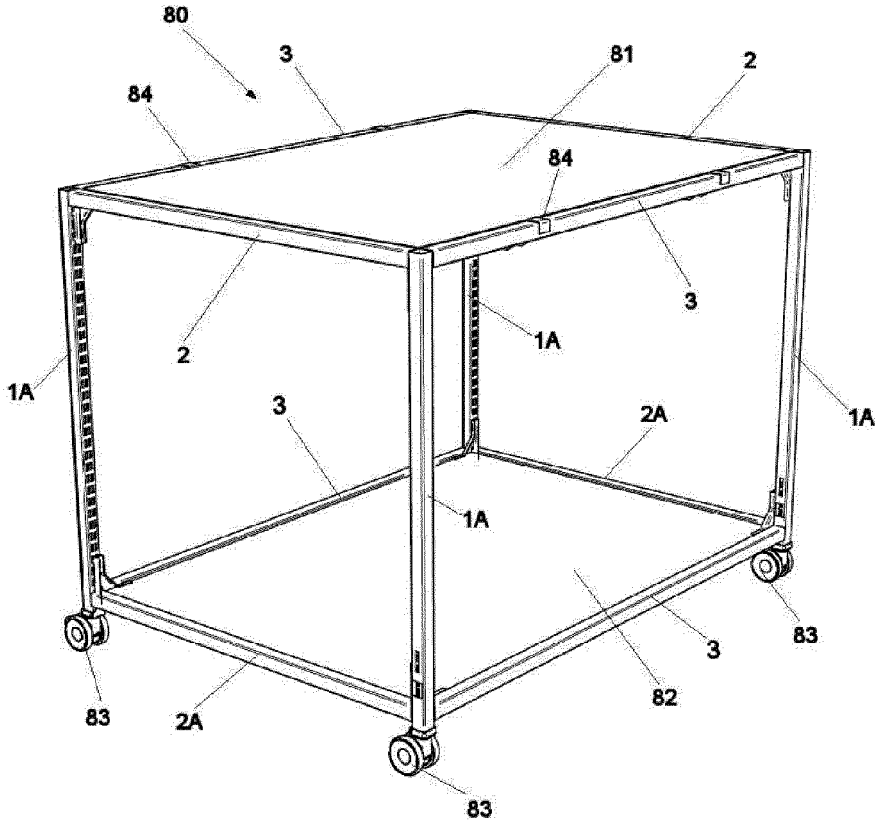
80
3
81
2
84
84
3
2
1A
1A
1A
3
2A
1A
3
83
83
2A
82
83

FIG. 8

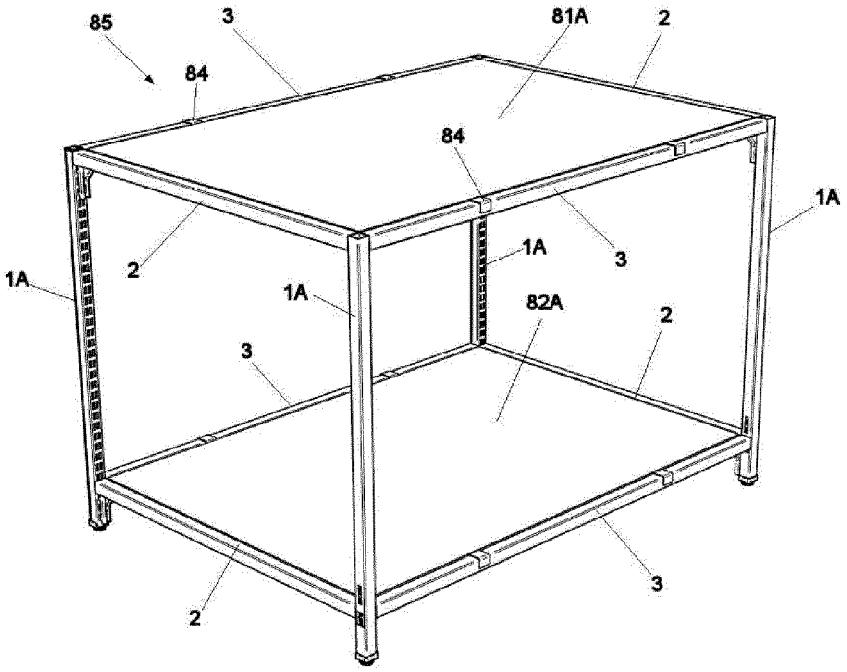
85
3
81A
2
84
84
1A
2
1A
3
1A
1A
82A
2
3
3
2

FIG. 8A

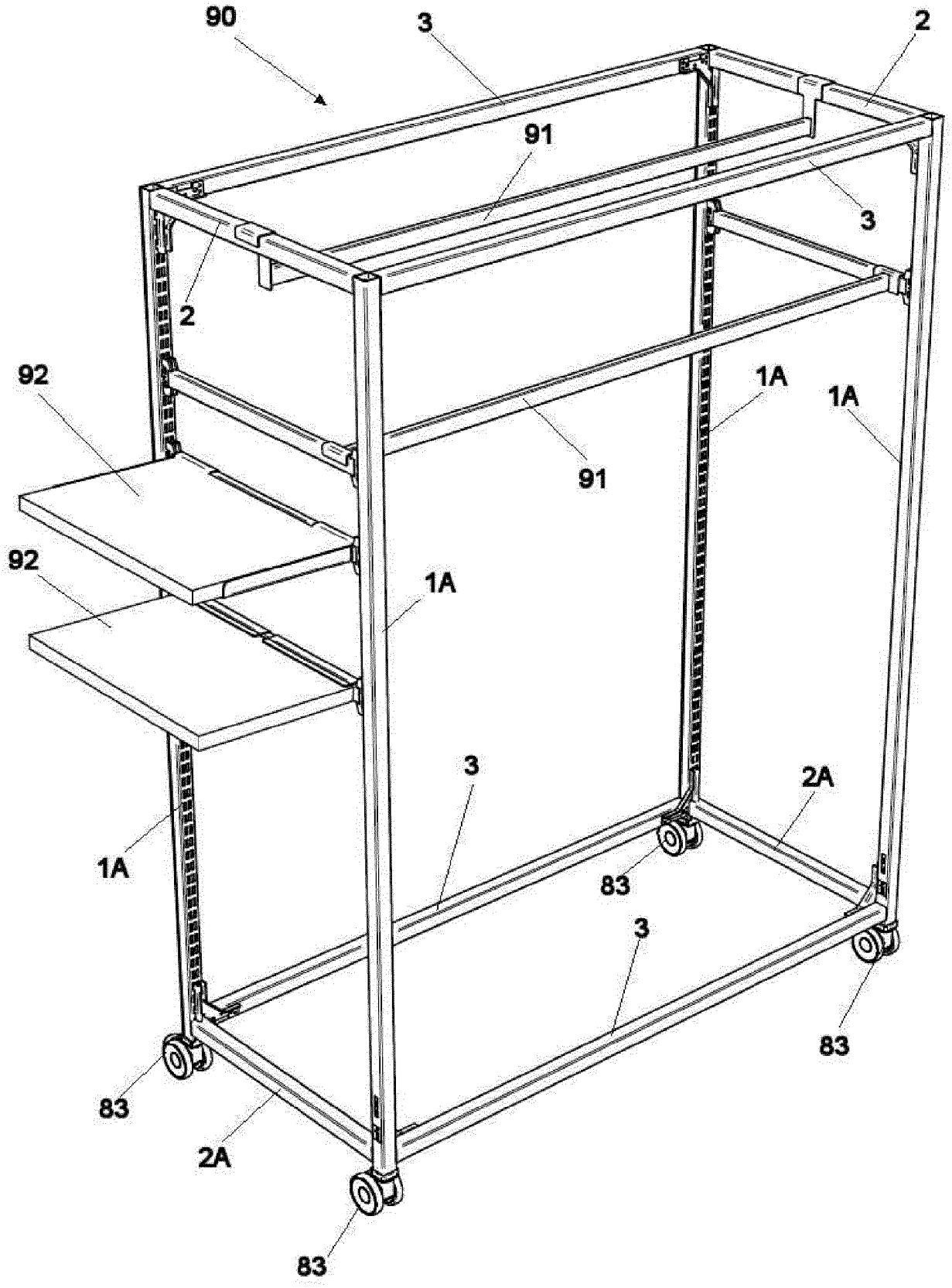

FIG. 9

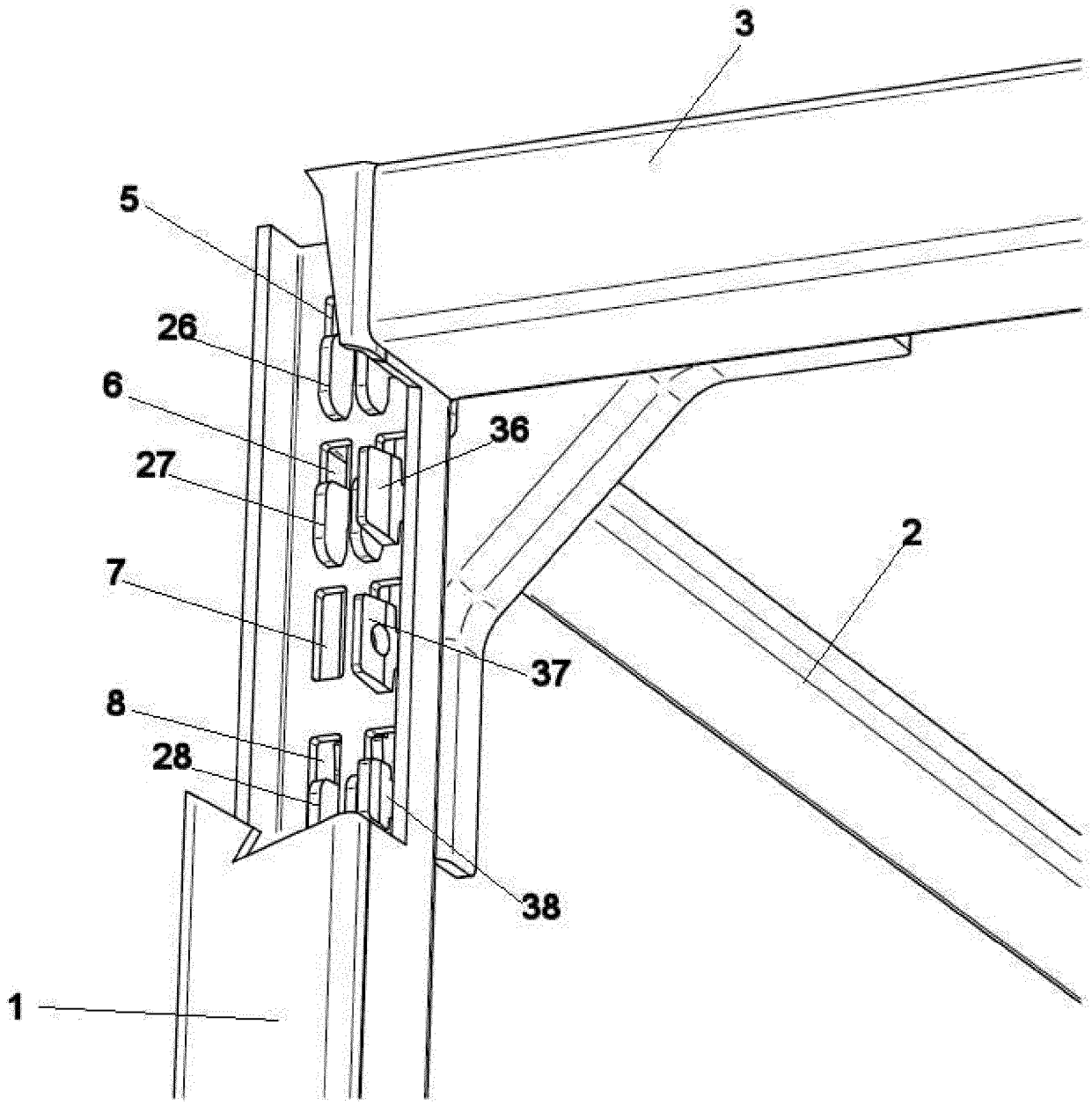

FIG. 10

Europäisches Patentamt
European Patent Office
Office européen des brevets

EUROPEAN SEARCH REPORT

Application Number
EP 19 15 1755

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	GB 2 245 821 A (1992 TECHNOLOGY LTD) 15 January 1992 (1992-01-15)	1-3,6-11	INV. A47F5/10
A	* figures 1,5,9 *	4,5	A47B47/00 A47B57/40
X	US 2012/267332 A1 (MARIANI FABIO) 25 October 2012 (2012-10-25)	1,6-11	A47B96/14
A	* figures 1,3,6,9,10 * * claims 7-11 *	4,5	

TECHNICAL FIELDS SEARCHED (IPC)

A47B
A47F

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	11 March 2019	de Cornulier, P

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 19 15 1755

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

11-03-2019

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
GB 2245821 A	15-01-1992	GB 2245821 A	15-01-1992
		IE 902177 A1	18-12-1991
		ZA 9104620 B	25-03-1992
US 2012267332 A1	25-10-2012	NONE	

EPO FORM P0459

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

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- DE 29914238 U **[0004]**
- US 2016029786 A **[0005]**
- US 2012267332 A **[0006]**
- US 9493177 B **[0006]**
- US 2014116973 A **[0006]**