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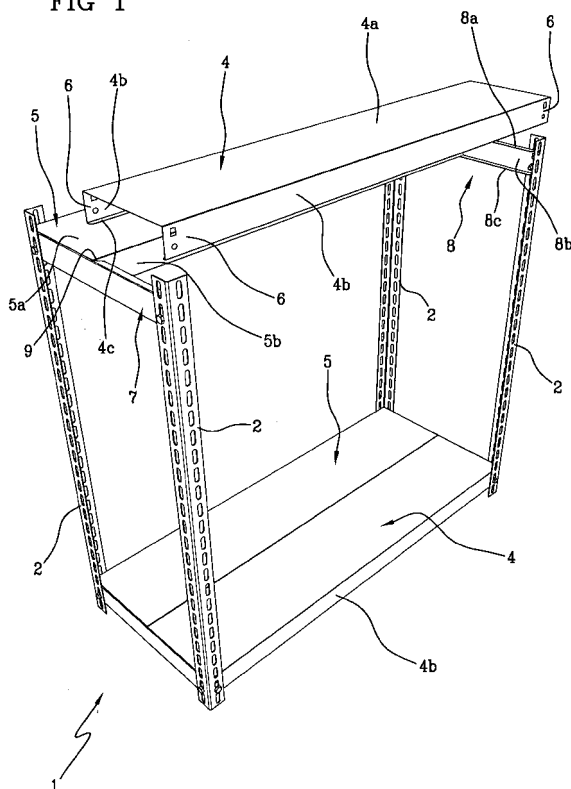
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(54) **Shelving**

(57) A shelving comprises four vertical posts (2), at least one first (4) and one second (5) horizontal shelf, disposed in mutual side by side relationship so as to define a rest surface, a first (7) and a second (8) crossbar; the first crossbar (7) being directly fastened to two vertical posts (2) and the second crossbar (8) being directly fastened to two further vertical posts (2) distinct from those

concerned with the first crossbar (7); each horizontal shelf (4, 5) being brought into contact with both the cross-bars (7, 8); the first horizontal shelf (4) being directly fastened to two vertical posts (2) and the second shelf (5) being directly fastened to two further vertical posts (2), the vertical posts engaged by each shelf (4, 5) being in engagement with the first crossbar (7) and the second crossbar (8).

**FIG 1**



## Description

**[0001]** The present invention relates to a shelving or set of shelves preferably of metallic material, of the modular type, i.e. of the type adapted to be assembled and installed by the final user.

**[0002]** These types of shelving are usually marketed in the form of a kit ready for assembly inside which the structural components of the shelving are present and, when contemplated, the related bolts and nuts for assembling the structural components.

**[0003]** These types of shelving usually find use in technical premises intended for storing goods, such as small mechanical workshops, clearing-out or store rooms, basements, garages, closets or lumber-rooms.

**[0004]** The above shelving is characterised by easy assembly (particular technical skill is not required for installation), simple transportation (each kit can usually be handled and transported by a single person), inexpensiveness in manufacture and easy storage in the sale stores.

**[0005]** Usually, the aforesaid types of shelving comprise four vertical posts to which two or more horizontal shelves or boards are fastened. The vertical posts have the function of supporting the horizontal shelves and the task of the latter is to bear the stored goods.

**[0006]** In particular, the vertical posts have two halves forming an L-shaped configuration of the post section and are provided with a plurality of fastening regions (usually holes) each of which is adapted to interact with a shelf in such a manner as to enable the shelf to be mounted to the height the most appropriate for final use of same.

**[0007]** The vertical posts, in particular the post ends, can be usually matched together to enable creation of shelving solutions of any height.

**[0008]** Shelves are of rectangular shape and have a flat surface (adapted to receive the goods) of a thickness in the order of one millimetre provided with stiffening elements (placed on the opposite side relative to the surface designed to receive the goods) adapted to give more structural stiffness to the flat surface. These stiffening elements are in the most different shapes, while all of them have a longitudinal extension, i.e. they extend from one (short) side of the shelf to the other. In addition, the stiffening elements are made integral with the flat surface through welding or gluing.

**[0009]** Usually, shelves have vertical shoulders extending from each of the perimetral edges of the flat surface. These shoulders have a dual function, i.e. of stiffening the flat surface to a higher degree and enabling the latter to be joined to the vertical posts.

**[0010]** To this aim, shoulders comprise a plurality of holes that are adapted to face the holes of the vertical posts so that by inserting a bolt into a hole of the shoulder and into the corresponding hole in the post, the post and shelf are fastened to each other.

**[0011]** Consequently, each shelf is fastened to both halves of each post, thus creating a steady structure.

**[0012]** Alternatively, a crossbar is fastened between two posts (by means of bolts and nuts, for example) and the shelf is in turn fastened to the crossbar (by means of bolts and nuts or by mechanical friction fit, for example).

**[0013]** Therefore, the function of each crossbar is to mutually fasten two posts, while the function of a bracket is to fasten the post pairs to each other.

**[0014]** The shelving solutions of the known art briefly described above have some drawbacks.

**[0015]** In fact, these sets of shelves do not always have an appropriate structural stiffness. Therefore it is sometimes necessary to fasten the shelving to a wall to ensure steady positioning of same. Other times active tie-rods are required to be provided between one shelf and the other one for stiffening the whole shelving, which will hinder easy access to the shelves.

**[0016]** Yet, the capacity of each shelf is clearly a function of the stiffening element placed under the supporting surface of the shelf. Therefore, for increasing the useful capacity it is necessary to resort to stiffening elements of complicated shape that cannot be always fastened under the supporting surface with ease. In addition, when shelves are dismantled and housed in containers for transportation and sale, the sizes of these containers are very similar to, or identical with the sizes of a shelf multiplied by the number of shelves forming the shelving. This minimum bulkiness sometimes creates strong limits to the operating range of the carriers charged with transport from the manufacturing place to the sale point. In fact, it should be pointed out that shelves of the aforesaid type are very cheap devices (in terms of production costs) and therefore the transport charges have a great incidence on the final price.

**[0017]** In this context, the technical task of the present invention is to make available a set of shelves or shelving free of the above mentioned drawbacks.

**[0018]** In particular, the present invention aims at providing a set of shelves having high structural stiffness when in use.

**[0019]** Another aim of the invention is to provide a set of shelves enabling optimal access to shelves.

**[0020]** A further aim of the invention is to make available a set of shelves of simple structure and with high shelf capacity.

**[0021]** A still further aim of the invention is to propose a set of shelves of very reduced bulkiness when dismantled.

**[0022]** The foregoing and further aims are substantially achieved by the shelving having the features described in one or more of the appended claims.

**[0023]** Further features and advantages will become more apparent from the detailed description of a preferred but not exclusive embodiment of the shelving according to the invention.

**[0024]** This description will be set out with reference to the accompanying drawings, given by way of non-limiting example, in which:

- Fig. 1 is a partly exploded perspective view of the shelving according to the present invention;
- Fig. 2 is an enlarged view of a detail of the shelving seen in Fig. 1; and
- Fig. 3 shows the shelving in a perspective view different from that seen in Fig. 1.

**[0025]** With reference to the drawings, the shelving in accordance with the present invention has been generally identified by reference numeral 1.

**[0026]** Shelving 1 comprises four vertical posts 2 each of which is provided with fastening regions 3. Each post 2 is made up of a section member having an L-shaped section, i.e. consisting of two substantially plate-shaped elements fastened to each other at right angles.

**[0027]** The fastening regions 3 can be a plurality of holes disposed upon each other (if bolts and nuts are used) or a plurality of hooks (if the constraints between the shelving components consist of mechanical pressure fits), as will be clarified in the following.

**[0028]** Shelving 1 further comprises at least one first horizontal shelf 4 and one second horizontal shelf 5 disposed in side by side relationship for defining a rest surface.

**[0029]** By the term "horizontal" and "vertical" in the context of the present invention it is intended the orientation in space of the components in the operating configuration of the shelving, i.e. when the shelving has been installed and is ready for use.

**[0030]** Each shelf 4, 5 comprises a flat surface 4a, 5a and vertical shoulders 4b, 5b extending from two opposite edges of the respective flat surfaces.

**[0031]** In the preferred embodiment of the invention, a horizontal wing 4c, 5c extends from each vertical shoulder 4b, 5b. The horizontal wings 4c, 5c extend starting from a portion of the distal vertical shoulder relative to the shoulder portion adjacent to the flat surface 4a, 5a of the shelf. Wings 4c, 5c are substantially parallel to the flat surface 4a, 5a of the shelf. Advantageously, each shelf 4, 5 only comprises two vertical shoulders 4b, 5b. The horizontal wings 4c, 5c as well are only two in each shelf 4, 5. Therefore each shelf 4, 5 is made up of the flat surface 4a, 5a, the two vertical shoulders 4b, 5b and the two horizontal wings 4c, 5c, as shown in Figs. 1 and 3.

**[0032]** Note that the individual shelves 4, 5 do not comprise any element that is glued or welded to the surface opposite to the flat surface 4a, 5a.

**[0033]** Advantageously, each shelf is of one piece construction, i.e. is made up of a single plate of material, preferably metal material and is of constant thickness included between 0.3 and 1 mm, preferably being 0.5 mm thick.

**[0034]** Each vertical shoulder 4b, 5b of each shelf 4, 5 comprises fastening regions 6. These fastening regions 6 are disposed in a peripheral position of the shoulder, i.e. in the vicinity of the free shoulder edges, as shown in Fig. 1. In the preferred embodiment of the invention the fastening regions 6 also extend on wings 4c, 5c.

**[0035]** The fastening regions 6 can be a plurality of round holes disposed upon each other (if bolts and nuts are used) or a plurality of rectangular holes (if the constraints between the shelving components are mechanical pressure fits), or yet a combination of round and rectangular holes (as in the preferred embodiment of the invention) to enable assembly of the shelves both by pressure fit and with bolts and nuts 100.

**[0036]** It should be noted that shelves 4, 5 are all identical with each other and preferably each of them has a mirror-like symmetry relative to an axis lying in the flat surface 4a, 5a.

**[0037]** Shelving 1 further comprises a first 7 and a second 8 crossbar. Each crossbar comprises a vertical shoulder 7b, 8b perpendicular to the shelf 4, 5 (when the shelf is in use) and a horizontal bracket 7a, 8a of an extension parallel to the flat surface 4a, 5a of the shelf 4, 5.

**[0038]** Each horizontal bracket 7a, 8a comprises at least one opening 9 to enable passage of shoulders 4b, 5b of the shelves 4, 5 during the shelving assembling steps (as better clarified in the following).

**[0039]** The number of openings 9 is the same as the number of active shelves (i.e. shelves resting on the crossbar) less one (in the embodiment shown only one opening 9 is present). This opening 9 is placed to a distance from a side edge of the crossbar substantially equal to the width measured between the two vertical shoulders 4b, 5b of a shelf 4, 5. Opening 9 extends over the whole depth (intended as the transverse dimension) of the bracket 7a, 8a of the crossbar.

**[0040]** In the preferred embodiment of the invention, opening 9 has a wedge-shaped configuration, the wedge vertex being very near to the vertical shoulder 7b, 8b of the crossbar.

**[0041]** Each horizontal bracket in addition comprises two further openings 9a placed at the side ends of the bracket, to enable passage of shoulders 4b, 5b of shelves 4, 5 during the shelving assembling steps (as better clarified in the following).

**[0042]** The further openings 9a extend over the whole depth (intended as transverse direction) of the bracket 7a, 8a of the crossbar.

**[0043]** In the preferred embodiment of the invention, the further openings 9a have such a shape as to generate flaring of the side ends of the horizontal bracket (see Fig. 2).

**[0044]** The further openings 9a are always two in number, irrespective of the number of the shelves forming the rest surface.

**[0045]** In the preferred embodiment of the invention, a horizontal wing 7c, 8c extends from the vertical shoulder 7b, 8b of bracket 7, 8. The horizontal wing 7c, 8c extends starting from a distal portion of the vertical shoulder relative to the shoulder portion adjacent to the horizontal bracket 7a, 8a of the crossbar. The wing 7c, 8c is substantially parallel to the horizontal crossbar bracket.

**[0046]** Each crossbar 7, 8 only comprises one vertical shoulder 7b, 8b, one horizontal bracket 7a, 8a and one

wing 7c, 8c. Therefore, each crossbar 7, 8 is made up of the vertical shoulder 7b, 8b, horizontal bracket 7a, 8a and wing 7c, 8c, as shown in Fig. 3.

**[0047]** Advantageously, each bracket is of one piece construction, i.e. it is made up of a single plate, preferably of plastic material, of constant thickness included between 0.5 and 1.5 mm, preferably of 0.8 mm.

**[0048]** The vertical shoulder 7b, 8b of each crossbar 7, 8 comprises fastening regions 10. These fastening regions 10 are disposed in a peripheral position of the shoulder, i.e. in the vicinity of the free shoulder edges, as shown in Fig. 2. In the preferred embodiment of the invention the fastening regions 10 also extend on wings 7c, 8c.

**[0049]** The fastening regions 10 can be a plurality of round holes disposed upon each other (if bolts and nuts 100 are used) or a plurality of rectangular holes (if the constraints between the shelving components are mechanical pressure fits), or yet a combination of round and rectangular holes (as in the preferred embodiment of the invention) to enable assembling of the shelves both by fitting and by bolts and nuts 100.

**[0050]** Note that crossbars 7, 8 are all identical with each other. Advantageously, the first horizontal crossbar 7 is directly fastened to two vertical posts 2 and the second horizontal crossbar 8 is directly fastened to two other vertical posts 2 distinct from those concerned with the first horizontal post 7, as shown in Fig. 3.

**[0051]** The first horizontal shelf 4 is directly fastened to two vertical posts 2 and the second shelf 5 is directly fastened to two other vertical posts 2.

**[0052]** Advantageously, the vertical posts 2 engaged by each shelf 4, 5 are in engagement with the first horizontal crossbar 7 and the second horizontal crossbar 8. In other words, the first shelf 4 is directly fastened to two vertical posts 2, each of which is directly fastened to the first 7 or the second 8 crossbar.

**[0053]** By the term "directly fastened" it is intended, in the context of the present invention, that the two elements directly fastened to each other are joined by constraint members that permanently immobilise the relative positions (even if in a reversible manner). This immobilisation can be carried out by means of bolts and nuts, as shown in the accompanying figures, or by mechanical pressure fits.

**[0054]** In the preferred embodiment of the invention, only said constraint members act between elements directly fastened to each other, i.e. further structural elements are not interposed between the two elements.

**[0055]** It should be noted that the presence of possible additional elements between the elements directly fastened to each other falls within the above given definition of "directly fastened", should not said additional elements have any structural function on the shelving economy.

**[0056]** Each horizontal shelf 4, 5 is put in contact with both crossbars 7, 8. Each shelf 4, 5 only rests on the crossbars 7, 8 and is not fastened thereto. In particular, each shelf rests, through the flat surface 4a, 5a, on the

horizontal bracket 7a, 8a of each crossbar 7, 8.

**[0057]** In particular, a vertical shoulder 4b, 5c of the first and second shelves is directly fastened to two vertical posts 2. The vertical shoulder 7b, 8b of each crossbar 7, 8 is directly fastened to two vertical posts 2.

**[0058]** Note that crossbars 7, 8 and brackets 4, 5 are not directly fastened to each other, but these elements are only in mutual contact relationship (in a rest condition).

**[0059]** In addition, the first 4 and second shelves 5 are directly fastened to each other at the respective vertical shoulders 4b, 5b facing each other (therefore not fastened to the vertical posts 2).

**[0060]** The two vertical shoulders 4b, 5b fastened to each other define, in combination with the respective wings 4c, 5c, a rib 4d having an "IPE" section that is disposed under the rest surface of the shelf (see Fig. 3).

**[0061]** This "IPE" rib greatly stiffens the structure defined by the approached arrangement of shelves 4, 5 enabling a great capacity of the rest surface.

**[0062]** In addition, it appears from the above that a shelf and a crossbar are directly fastened to each vertical post 2, which shelf and crossbar in turn are in mutual contact relationship. This enables a shelf structure of the hyperstatic type to be obtained which is therefore of great stiffness and sturdiness.

**[0063]** Note that these structural features are obtained through use of structurally very simple components (posts 3, crossbars 7, 8 and shelves 4, 5), of easy and cheap manufacture and easy storage.

**[0064]** In fact, the rest surfaces (which usually have the greatest bulkiness in the disassembled package) are divided into brackets to be disposed in side by side relationship, thus greatly reducing the package bulkiness during transportation.

**[0065]** In addition, the brackets can be mutually piled up, the respective vertical shoulders 4b, 5b being inserted between two flat surfaces 4a, 5a in such a manner that two brackets can be located within the geometric bulkiness of one bracket.

**[0066]** Shelving assembly contemplates the operation of fastening (for instance by means of bolts and nuts 100) the first crossbar 7 to two vertical posts 2 (Fig. 2). Subsequently, the second crossbar 8 too is fastened to the remaining two posts 2.

**[0067]** At this point shelves 4, 5 are inserted laying them down on the crossbars 7, 8.

**[0068]** Note that in this step the vertical shoulders 4b, 5b of the shelves are inserted into the openings 9, 9a of the crossbars 7, 8 in such a manner that the flat surfaces 4a, 5a can come into contact with the crossbar brackets 7a, 8a (Fig. 1).

**[0069]** The vertical shoulders 4b, 5b are then fastened to each other (in particular those facing each other) and to the vertical posts 2 (Fig. 3).

**[0070]** Note that tie-rods or other structural elements in addition to the mentioned ones are not present, which will make access to the rest surface very easy.

**[0071]** It is therefore apparent that the shelving assembly is very easy and quick.

**[0072]** It should be also pointed out that the shelves can be more than two. In particular, in each shelving a plurality of pairs of shelves can be present (in the example shown the pairs of shelves are two). In addition, the shelves can be disposed in side by side relationship not only by pairs, but also in a greater number.

**[0073]** For instance, each rest surface can consist of three shelves disposed side by side. Under this situation, the central shelf identical with the two others, has both the vertical shoulders directly fastened to the vertical shoulders of the adjacent shelves. The rest surface is provided with the "IPE" ribs.

**[0074]** It should be noted that in this case the wedge-shaped openings 9 of the crossbars are two in number.

**[0075]** The same principle applies, should the shelves of each rest surface be more than three in number.

## Claims

1. Shelving including four vertical posts (2), at least one first (4) and one second (5) horizontal shelf disposed in mutual side by side relationship so as to define a rest surface, a first (7) and a second (8) crossbar; the first crossbar (7) being directly fastened to two vertical posts (2) and the second crossbar (8) being directly fastened to two further vertical posts (2) distinct from those fastened to the first crossbar (7); each horizontal shelf (4, 5) being brought into contact with both the crossbars (7, 8); the first horizontal shelf (4) being directly fastened to two vertical posts (2) and the second shelf (5) being directly fastened to two further vertical posts (2), the vertical posts engaged by each shelf (4, 5) being in engagement with the first crossbar (7) and the second crossbar (8).
2. Shelving as claimed in claim 1, wherein the first (4) and the second (5) shelves comprise respective flat surfaces (4a, 5a) and respective vertical shoulders (4b, 5b) extending from two opposite edges of the respective flat surfaces (4a, 5a); said first (4) and second (5) shelves being directly fastened to each other at respective vertical shoulders (4b, 5b) facing each other.
3. Shelving as claimed in claim 2, wherein the first shelf (4) and second shelf (5) are fastened to the respective vertical posts (2) at shoulders (4b, 5b) that are opposite to the shoulders facing each other.
4. Shelving as claimed in anyone of the preceding claims, wherein each shelf (4, 5) rests on and is not fastened to the crossbars (7, 8).
5. Shelving as claimed in claim 2 or 3, wherein a horizontal wing (4b, 5b) extends from each vertical shoulder (4b, 5b) of the shelves (4, 5), which wing protrudes therefrom starting from a portion of the distal vertical shoulder (4b, 5b) relative to the shoulder portion adjacent to the flat surface (4a, 5a) of the shelf.
6. Shelving as claimed in claim 5, wherein the two vertical shoulders (4b, 5b) fastened to each other define a rib (4b) having an "IPE" section in combination with the respective wings (4c, 5c).
7. Shelving as claimed in claim 2, 3 or 5 in which each shelf (4, 5) only comprises two vertical shoulders (4b, 5b).
8. Shelving as claimed in anyone of the preceding claims, wherein each crossbar (7, 8) comprises a vertical shoulder (7b, 8b) perpendicular to the shelf (4, 5) and a horizontal bracket (7a, 8a) having an extension parallel to the shelf (4, 5); each crossbar (7, 8) being fastened to the vertical posts (2) at the vertical shoulder (7b, 8b) and each shelf (4, 5) resting on the horizontal bracket (7a, 8a) without being fastened thereto.
9. Shelving as claimed in claim 7 or 8, wherein each horizontal bracket (7a, 8a) comprises at least one opening (9) to enable passage of the vertical shoulders (4b, 5b) of the shelves (4, 5) during the assembling operations.
10. Shelving as claimed in claim 8 or 9, wherein each crossbar (7, 8) comprises a wing (7c, 8c) disposed on the vertical shoulder (7b, 8b), on the opposite side relative to the horizontal bracket (7a, 8a).
11. Shelving as claimed in claim 9, wherein the number of openings is the same as the number of shelves forming a rest surface less one.
12. Shelving as claimed in anyone of the preceding claims, wherein all shelves are of one piece construction.
13. Shelving as claimed in anyone of the preceding claims, wherein all shelves are identical with each other.
14. Shelving as claimed in anyone of the preceding claims, wherein the crossbars (7, 8) and the posts (2), the shelves (4, 5) and the posts (2) and the vertical shoulders (4b, 5b) of the shelves relative to each other, are fastened by means of bolts and nuts (100).
15. Shelving as claimed in anyone of the preceding claims, wherein the crossbars (7, 8) and the posts (2), the shelves (4, 5) and the posts (2) and the vertical shoulders (4b, 5b) of the shelves relative to each

other, are fastened by means of mechanical pressure fits.

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FIG 1

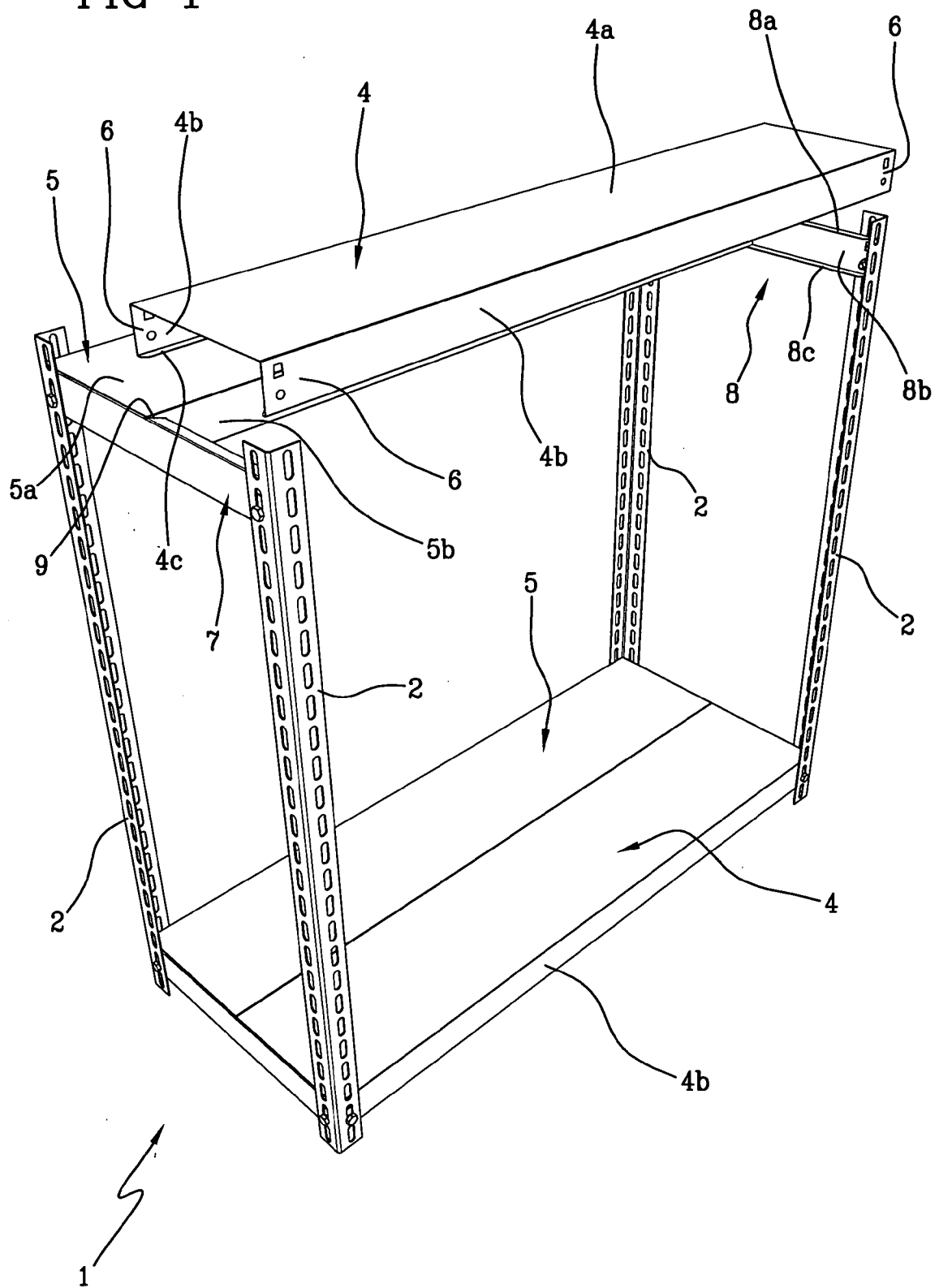
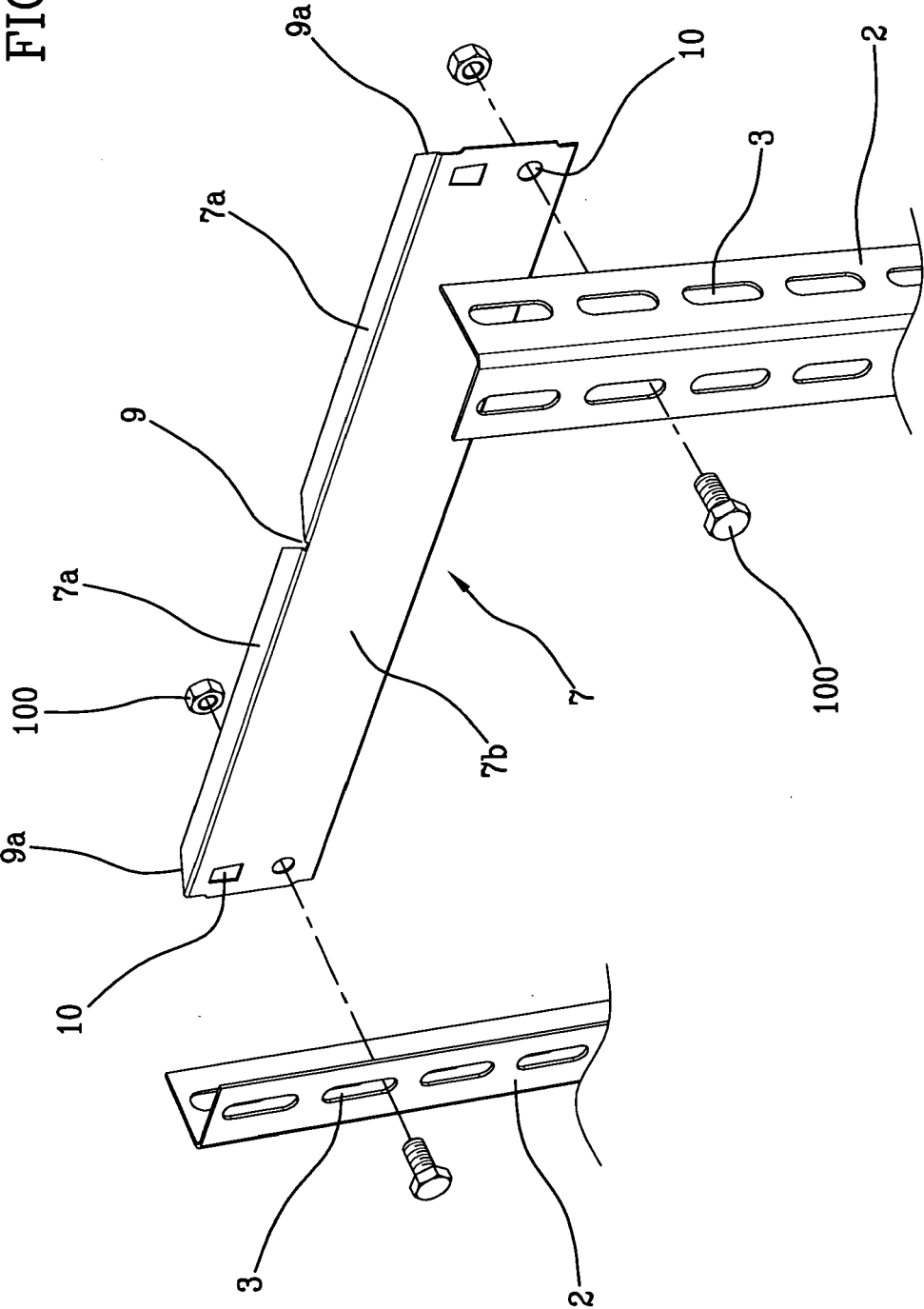


FIG 2



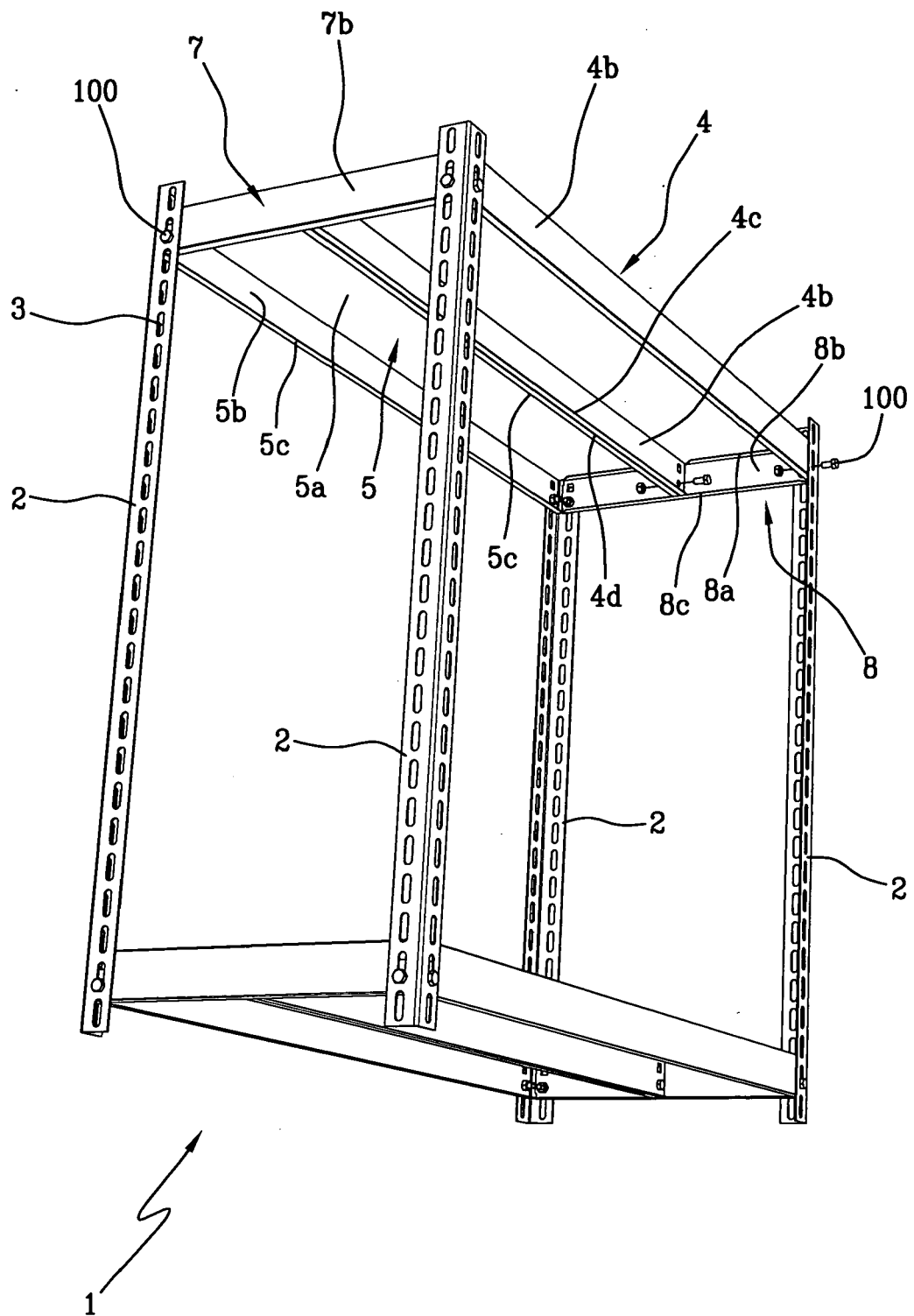


FIG 3



## EUROPEAN SEARCH REPORT

Application Number  
EP 11 42 5118

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	US 2 065 133 A (HEPPENSTALL THOMAS E) 22 December 1936 (1936-12-22)	1-4, 12-15	INV. A47B57/18
Y	* page 2, column 1, line 65 - page 3, column 2, line 7; figures 14-20 *	5-8	
Y	FR 935 876 A (MME VEUVE BACHOLLET) 2 July 1948 (1948-07-02) * page 1, line 44 - page 2, line 34; figure 2 *	5-7	
Y	DE 91 08 698 U1 (KOLLMANN LORENZ) 10 October 1991 (1991-10-10) * page 4; figures 2,3 *	8	
A	DE 11 66 428 B (FRIEDRICH WILHELM PAEGE) 26 March 1964 (1964-03-26) * column 2, line 42 - column 3, line 36; figures 1,2 *	1-15	
A	FR 2 471 159 A1 (HYLLCENTER SVENSKA AB [SE]) 19 June 1981 (1981-06-19) * page 5, line 2 - page 7, line 4; figures 1-3 *	1-15	TECHNICAL FIELDS SEARCHED (IPC)
			A47B
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 25 July 2011	Examiner Dartis, Daniel
<p>CATEGORY OF CITED DOCUMENTS</p> <p>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</p> <p>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 &amp; : member of the same patent family, corresponding document</p>			

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EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT  
ON EUROPEAN PATENT APPLICATION NO.**

EP 11 42 5118

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.  
The members are as contained in the European Patent Office EDP file on  
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25-07-2011

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 2065133	A	22-12-1936	NONE	
FR 935876	A	02-07-1948	NONE	
DE 9108698	U1	10-10-1991	NONE	
DE 1166428	B	26-03-1964	NONE	
FR 2471159	A1	19-06-1981	DE 2949891 A1	19-06-1981