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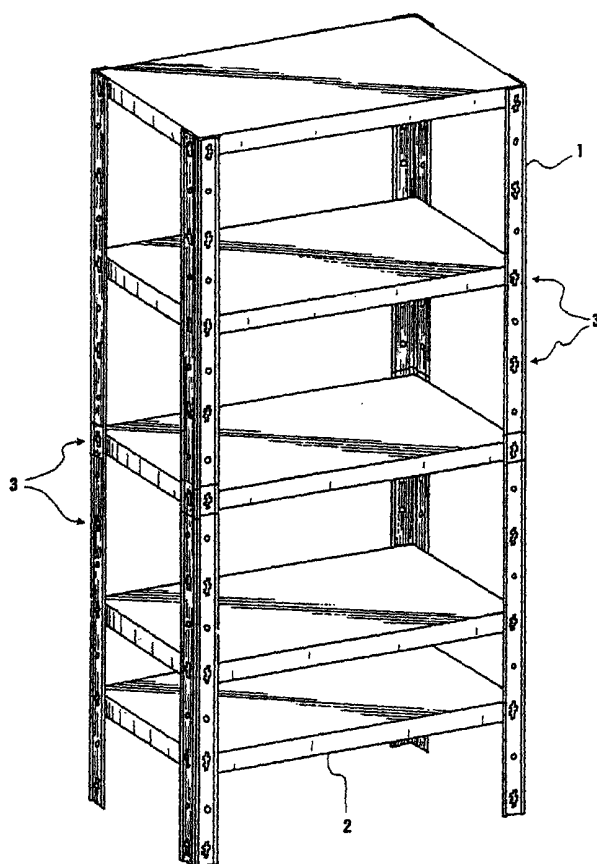
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[Continued on next page]

(54) Title: **JOINT LOCKING SYSTEM FOR FURNITURE AND THE LIKE**



(57) Abstract: A joint locking system (3) for shelving of the type comprising a plurality of elongated vertical members (1) and a plurality of load supporting flat members (2) is provided, characterised in that it comprises first locking means (4, 5) of said plurality of flat support members (2) on said plurality of vertical members (1) and second locking and anti-release means (42, 44, 52, 54, 55) for the locking of said plurality of flat members (2) on said plurality of vertical members (1); the arrangement being such that, subsequently to the engagement of the first locking means (4, 5) of said plurality of flat members (2) onto said plurality of vertical members (1) the engagement of the second locking means (42, 44, 52, 54) is realised.

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## JOINT LOCKING SYSTEM FOR FURNITURE AND THE LIKE

DESCRIPTION

The present invention relates to a joint locking system for shelves members and the like, and, more precisely, to a joint locking system for members of light metal shelves of the type apt to provide an interference lock and an anti-release lock.

In the art various types of joint locking systems for light metal shelves are already known, these systems having substantially complementary male and female locking members formed onto the vertical members and onto the supporting shelves, respectively, that are apt to be locked by interference rather than by fastening means like bolts or the like. Such complementary locking members can be of various shapes and sizes, and are usually obtained onto the load bearing member (or upright), as well as onto the supporting flat member (or shelf), by means of a shearing, punching or drawing step. Such joint systems respectively provide the assembly of the vertical and shelf members by means of the mutual sliding therebetween.

However, a drawback of such joint systems derives from the fact that when the shelf has a concentrated load eccentrically applied thereon, i.e., at one end thereof, the opposite end thereof tends to rise according to the plastic reaction of the metallic sheet of which the shelf is made, causing an increase of the probability of a disengaging of the male members from the female portion, due to the reciprocal sliding of the engagement portions.

An improved joint system for shelves and the like of the above-described type is disclosed in the Patent Application N. RM98U000257, filed in the name of the same applicant, is.

Therefore, an object of the present invention is that of overcoming the above-mentioned drawbacks, providing a further improvement to a joint locking system for shelving and the like, which provides members for an

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interference joint engagement apt to prevent the disengagement of the connecting members of the structure.

Another object of the present invention is to provide a joint system for furniture, shelves and the like that be of easy implementation and sturdy, thereby  
5 facilitating the assembly of the shelf itself, and last but not least, of low cost.

Therefore, according to the present invention, a joint locking system for shelving of the type comprising  
10 a plurality of elongated vertical members and a plurality of load bearing shelves is provided, the system being characterised in that it comprises:

- first means for locking said plurality of flat load bearing shelves onto said plurality of vertical  
15 members; and

- second means for locking said plurality of shelf members onto said plurality of vertical members;  
the arrangement being such that, subsequently to the engagement of said first locking means of said plurality  
20 of shelf members on said plurality of vertical members, the engagement of said second locking means is realised.

The present invention will hereinafter be better illustrated with the description of a preferred embodiment thereof, given by way of example and not for  
25 limitative purposes and making reference to the annexed drawings, wherein:

Fig. 1 is a perspective view illustrating a metal shelving incorporating the device of the present invention;

30 Fig. 2 is a partial exploded view of the shelving of Fig. 1;

Fig. 3 is a partial perspective view of the joint system of the present invention;

Fig. 4 is a partial exploded view illustrating  
35 a portion of the shelving of Fig. 1;

Fig. 5 is an exploded view partially showing a first detailed part of the joint system of the shelving

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of Fig. 1 in a condition; and

Fig. 6 is an exploded view partially showing a second detailed part of the joint system of the shelving of Fig. 1 in a second condition.

5 Referring to Figs. 1 and 2, a generic shelving incorporating the joint system of the present invention is illustrated. According to the present invention, the shelving has a structure made of four elongated L-section upright members 1 apt to be stacked and connected by  
10 jointing the ends thereof in the already known manner. Moreover, the shelving has a plurality of load bearing flat members 2 (shelves) apt to engage with said plurality of verticals 1 by means of a joint locking system 3 object of the present invention. Further, as it  
15 is apparent from Fig. 2, the upright members 1 are made integral in a stacked manner by means of the joint locking system 3 object of the present invention as well.

In particular, referring to Figure 3, the joint system of the present invention provides two  
20 complementary members made of a pair of male members 4, formed along the whole length of the upright member 1 by a shearing and drawing step, and of a pair of complementary female areas 5 formed at one end only by each of the upright members 1 with a shearing step. The  
25 arrangement is such that one end of a first upright member 1 (preferably the top one) is apt to engage to a respective end of a second upright member 1 (preferably the bottom one) by means of the reciprocal engagement between the male member 4 of the first upright 1 and the  
30 respective female area 5 of the second upright 1 (better illustrated hereinafter), thus carrying out a stacking of two upright members 1 for the elevation of the metallic structure formed thereby.

Referring now to Fig. 4, the application of the  
35 joint system of the present invention for the engagement of the shelf members 2 to the upright members 1 is illustrated.

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As it is apparent in the Figure, each shelf member 2 has, at its corner area, a pair of female areas 5 complementary to a respective pair of male members 4 formed in the upright member 1 to which it is to be connected (better illustrated hereinafter). In particular, and as it will be made apparent hereinafter, it has to be pointed out that, according to the invention, the shape of the female area 5 formed into the shelf member 2 allows the connection also to a generic upright member 1 of the already known in the art type, where a plurality of holes 10 (only two thereof shown in the Figs.), with a bolt and nut locking system is provided.

The above is possible by virtue of the shape of the top portion of the female area 5, that is also apt to engage to a respective bolt and nut through the holes 10 of the upright member 1 (better illustrated hereinafter).

Referring now to Fig. 5, in it the joint system of the present invention applied to the upright members 1 for obtaining the mutual engagement thereof is shown in details.

According to the invention, the joint system 3 provides the male members 4 to be formed in pairs, and one on each side of the upright member 1 (only one thereof shown in Fig.) along the whole length thereof, each having a substantially wing-shaped main body 41 formed onto the upright member 1 by shearing and drawing.

The main body 41 has a slanting edge 45, formed by drawing, apt to be inserted and subsequently to slide on an edge 55 of a respective complementary female edge 5 formed at an end of a respective upright member 1 to be stacked and connected thereon. Likewise, at the corner area of the shelf member 2 a pair of complementary female areas 5 is formed (of which only one is shown in the Figure).

Moreover, at the slanting edge 45 of the main body 41 of the male member 4, a pair of wing-shaped projecting

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members 42, apt to slidably engage into respective female areas 52 formed in each female area 5, are formed by shearing. Furthermore, each member 42 has a top edge 43, bent inwards in order to cause the insertion thereof into the respective areas 52 during the sliding engagement.

The integral engagement between upright members is obtained when each edge 55 of each pair of female areas 5 slides on each slanted edge 45 of the pair of male members 4 and pushes the top upright 1 towards the corner area of the bottom upright 1 until the former abuts against the latter.

Moreover, at the sheared edge between the main body 41 and the surface of the upright member 1, a further joint member 44 is formed by shearing and bending inwards so as to engage to a respective female area 54 formed at the edge 51 of the female area 5.

It has to be pointed out that the engagement of the member 44 into the area 54 implements an anti-lift joint of the top upright member 1 with respect to the respective bottom upright member 1 (the engaged condition being depicted in the Figure by a dotted line).

Referring now to Fig. 6, in it the joint system 3 of the present invention applied for the connection between the upright 1 and the shelf 2 is illustrated.

For the sake of simplicity, same parts have same numbers.

In particular, firstly the joint system 3 provides the male members 4 to be formed in pairs, at each side of the upright member 1 along the whole length thereof (only one of which being shown in the Figure). Likewise, at the corner area of the shelf member 2, pairs of complementary female areas 5 are formed (of which only one is shown in the Figure).

The arrangement is such that each female area 5 is apt to slidably engage to a respective male member 4 during the assembly of the shelf member 2 onto the

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vertical 1. It has to be pointed out that the edge 45 of the body 41 is tilted of a few degrees with respect to the longitudinal direction of the upright member 1. Therefore, during the sliding of the edge 45 onto the edge 55 of the respective female area 5 of a shelf member 2, a thrust towards the corner area of the upright 1 is generated, until bringing the flat member 2 to abut onto such corner area.

Thus, an integral engagement between the upright 1 and the shelf member 2 is obtained.

Moreover, the pair of wing-shaped projecting members 42 formed onto the drawn edge of the body 41 are apt to slidably engage onto the surface adjacent to the edge 55 of the female area 5, thus implementing an engagement which is locked in the orthogonal direction to the sliding surface.

As above, the respective female area 54 for the release engagement to the joint member 44 is formed at the edge 51 of the area 5 subsequently to the insertion of the latter in said area 54. An anti-lift joint of the shelf member 2 with respect to the respective upright member 1 is implemented by the engagement of the member 44 to the area 54.

It has to be pointed out, as schematically shown in Fig. 4, that the female area 54 thus shaped is also apt to provide a housing for possible fastening threaded bolts between the shelf member 2 and a generic upright member 1 provided only with holes 10, thus providing the shelf member 2 with a greater versatility of use in the manufacture of shelving components.

The present invention is not limited to the above-disclosed embodiment, comprising all the variants thereof that fall within the scope of the annexed claims.

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CLAIMS

1. A joint locking system (3), for components of shelving of the type comprising a plurality of elongated upright members (1) and a plurality of load bearing shelf members (2), characterised in that it comprises:

first means (4,5) for locking said plurality of load bearing shelf members (2) onto said plurality of upright members (1); and

second means (42,44,52,54) for locking said plurality of shelf members (2) onto said plurality of upright members (1);

the arrangement being such that, subsequently to the engagement of said first means (4,5) for the locking of said plurality of shelf members (2) onto said plurality of upright members (1), the engagement of said second locking means (42,44,52,54) is concomitantly implemented.

2. The system according to claim 1, wherein said first locking means comprises a plurality of male members (4) and a plurality of female areas (5) complementary to the male members (4).

3. The system according to claim 2, wherein each male member (4) of said plurality of male members (4) is substantially wing-shaped and tilted with respect to a main body (41), the main body (41) being formed by a shearing and a drawing step, and formed onto said first plurality of upright members (1).

4. The system according to claim 2 or 3, wherein each female area of said plurality of female areas is a slot(5), having a complementary shape to the main body (41) of a male member (4).

5. The system according to the preceding claim, wherein each upright member 1 has a pair of female areas (5) at an end thereof, the arrangement being such that each end of a first upright member (1) is apt to engage an opposed respective end of a second upright member (1) by means of the mutual engagement between said pair of female areas (5) in a respective pair of male members

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(4), thereby implementing a connection in a stacked manner between said first and second upright member (1).

6. The system according to any one of the preceding claims, wherein said second locking means comprises:

5       at least one projecting wing member (42), integrally formed onto said main body (41) and formed by shearing onto said upright member (1), the member (42) being apt to engage a respective first connecting area (52,55) formed in said female area (5); and

10       at least one second connecting member (44), apt to engage with a respective second connecting area (54) formed in said female area (5).

7. The system according to any one of the preceding claims, wherein each upright member (1) has an L-shaped cross section and a plurality of pairs of male members (4) arranged along the whole length of the upright member (1).

8. The system according to any one of the preceding claims, wherein said slot (5) is substantially trapezoid-shaped, geometrically connected to said first connecting area (52,55) and to said second connecting area (54),

20       the arrangement being such that, the sliding connection of said main body (41) into said slot (5) provides the sliding connection of said at least one projecting wing member (42) into said first area (52,55) and, concomitantly, the engagement of said at least one second connecting member (44) into said second female area (54), thereby preventing the vertical sliding in a direction opposite to that of insertion of the main body (41) in said female area (5).

9. The system according to the preceding claim, wherein said at least one projecting wing member (42) has a bent top edge (43) for facilitating the insertion thereof in said first female area (52).

35       10. The system according to any one of the preceding claims, wherein each shelf member (2) of said plurality of shelf members (2) has a pair of female areas (5) at

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each corner area thereof.

11. A shelving of the type comprising a plurality of elongated upright members (1) and a plurality of load bearing shelf members (2) characterised in that it  
5 incorporates the joint locking system (3) according to claims 1 to 10.

12. The locking system for shelves and the shelving substantially as aforescribed with reference to the annexed drawings.

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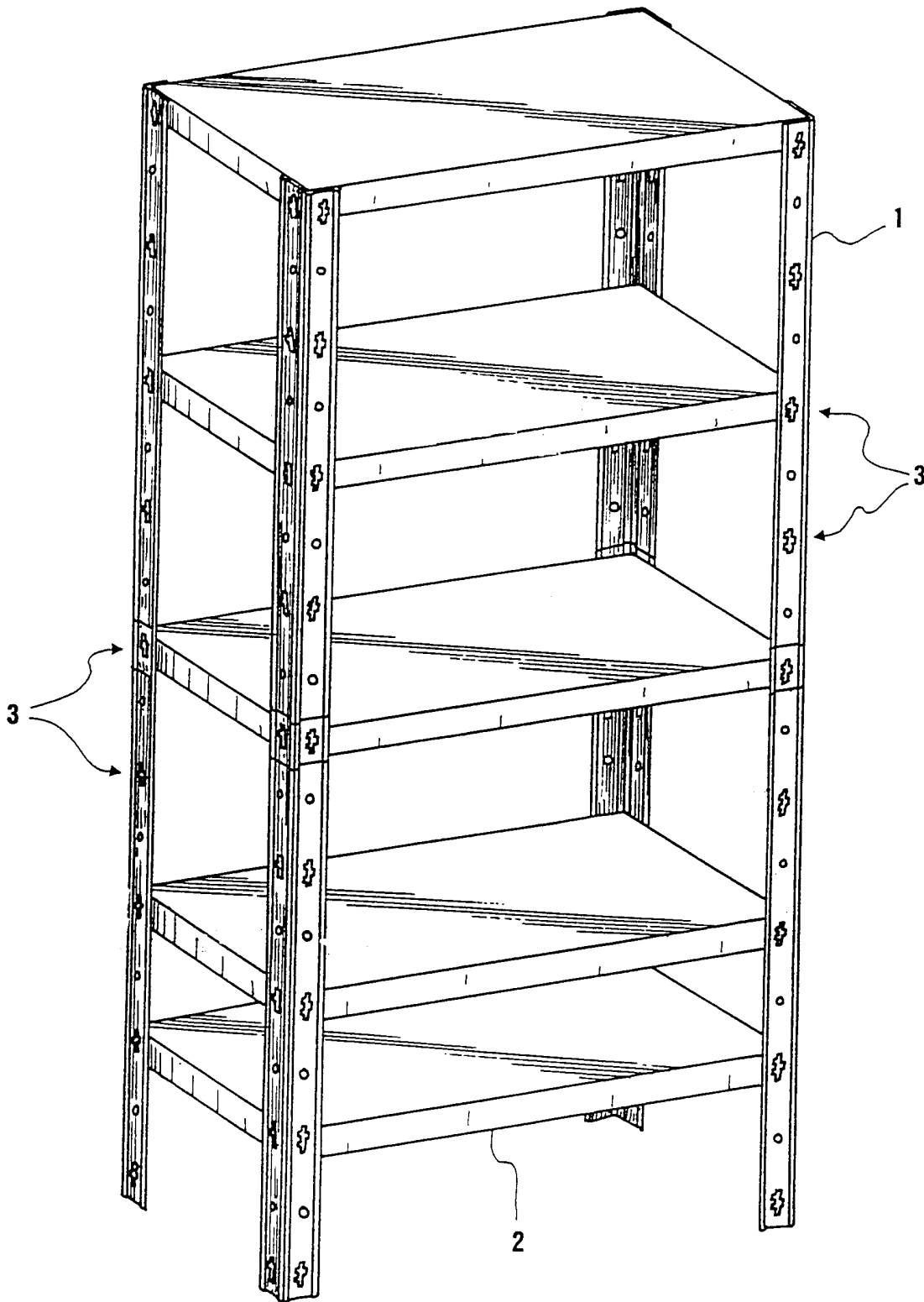


FIG.1

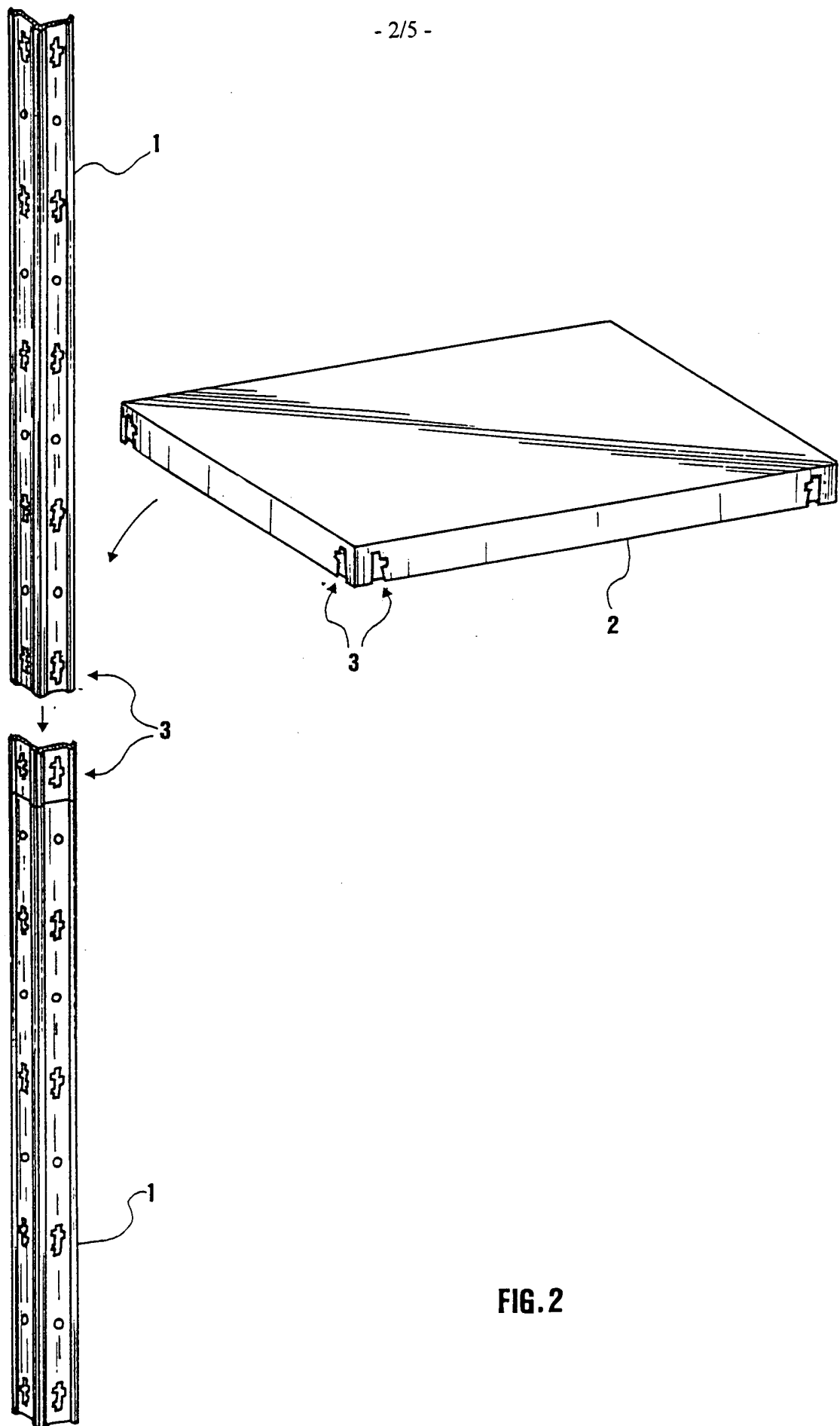


FIG. 2

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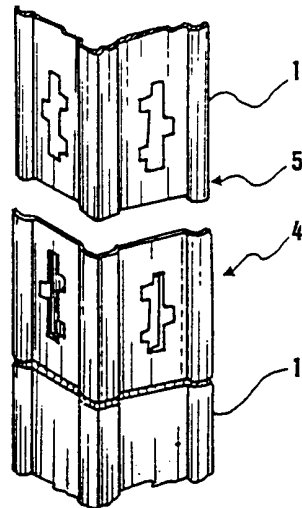


FIG. 3

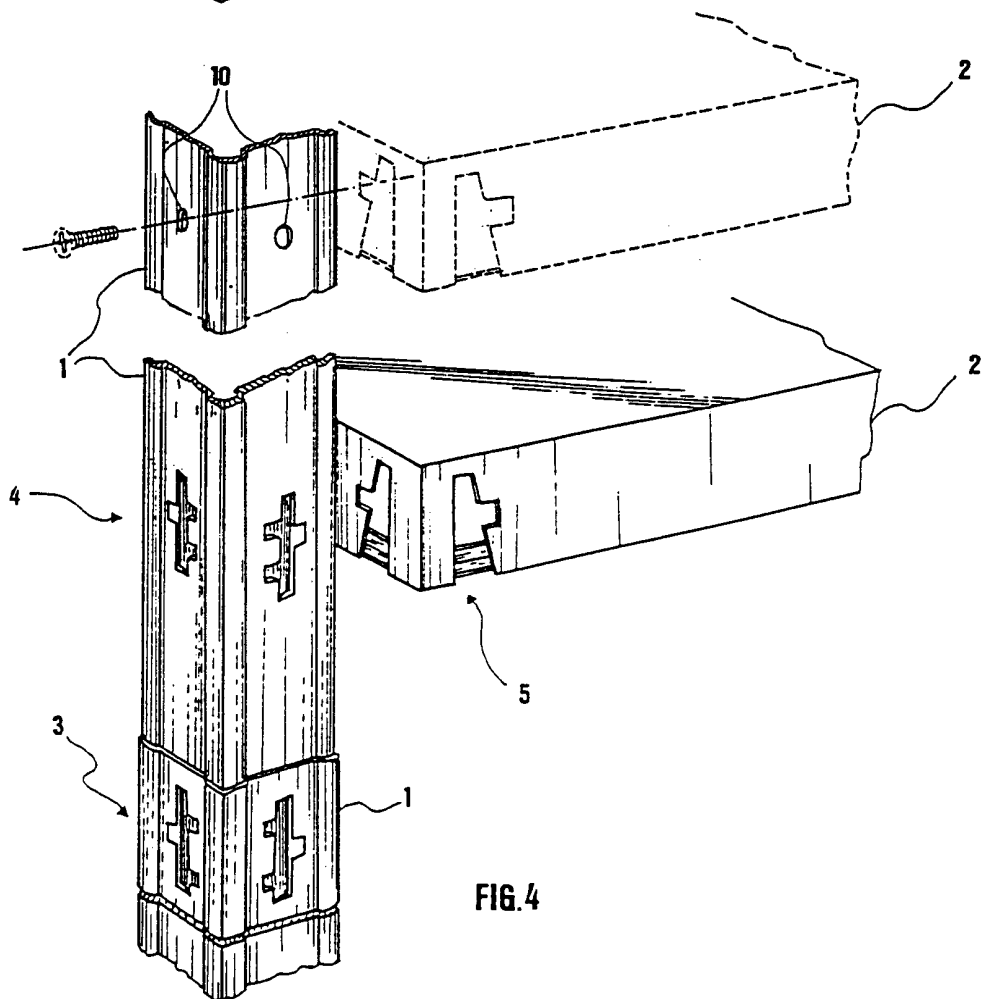


FIG. 4

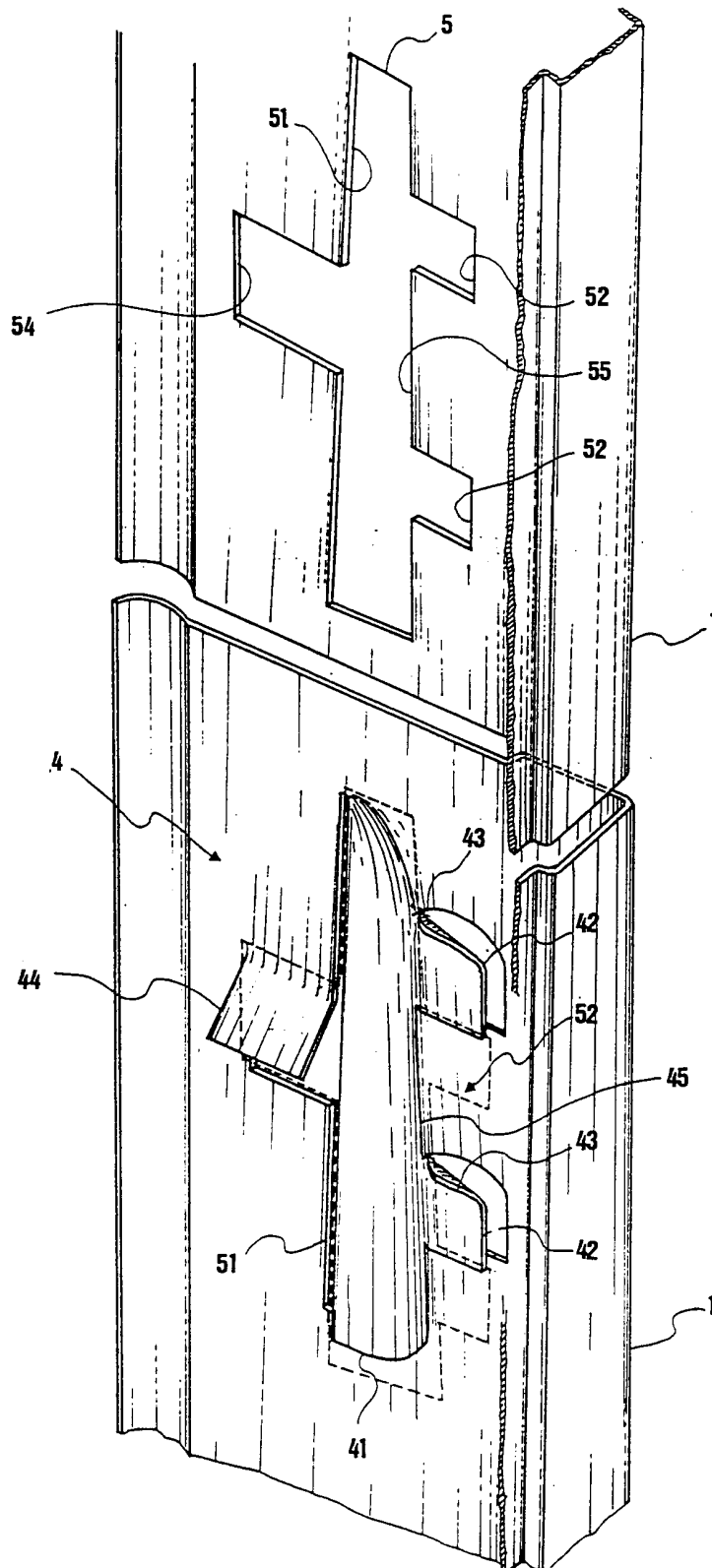
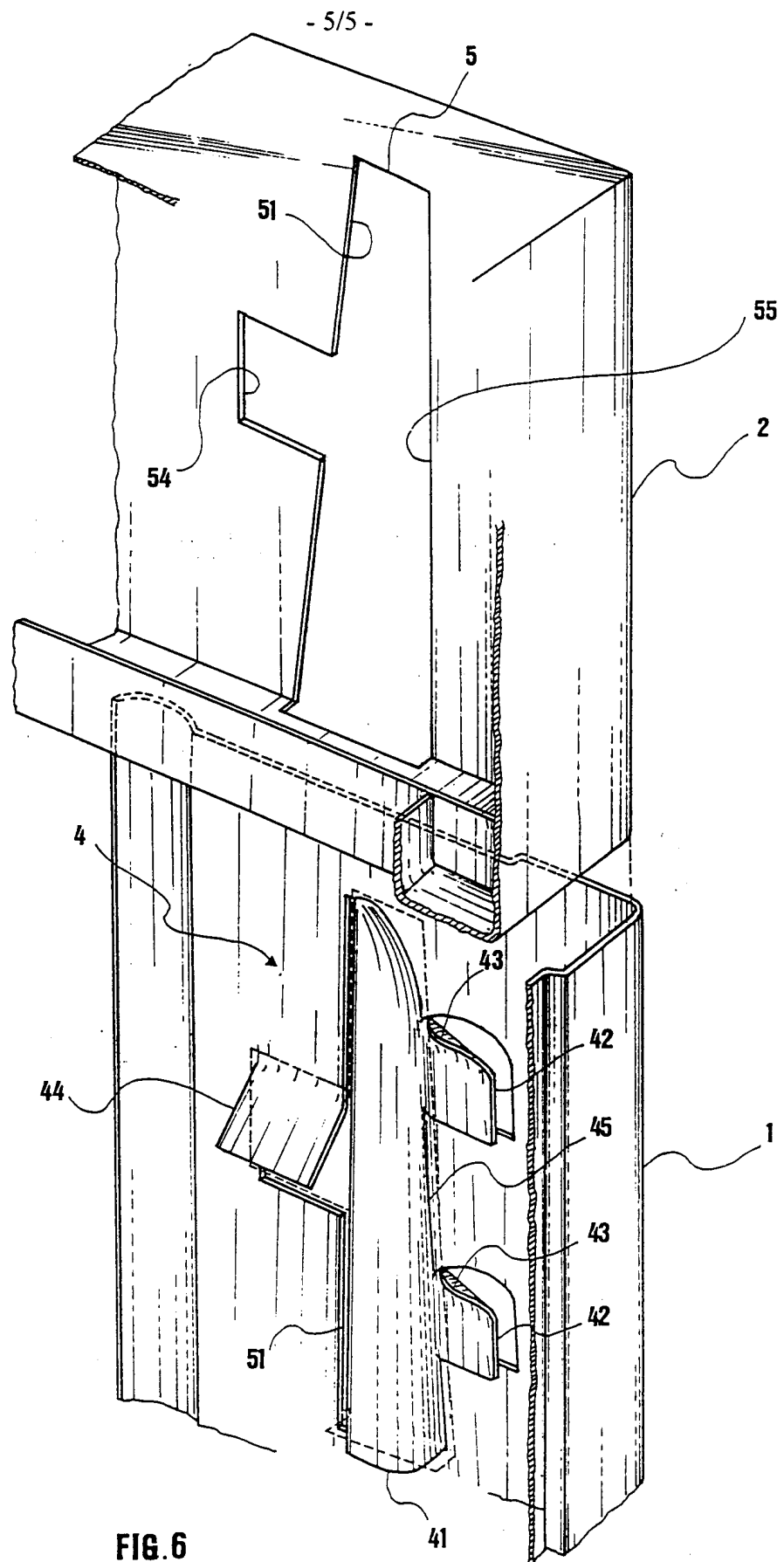


FIG. 5



# INTERNATIONAL SEARCH REPORT

International Application No

PCT/IT 00/00246

## A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 F16B12/34

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

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 A47B F16B

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

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

EPO-Internal, WPI Data

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category ° | Citation of document, with indication, where appropriate, of the relevant passages                                                          | Relevant to claim No. |
|------------|---------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| A          | EP 0 808 589 A (GS SCAFFALATURE ENGINEERING S)<br>26 November 1997 (1997-11-26)<br>column 2, line 53 -column 4, line 39;<br>figures<br>---- | 1-12                  |
| A          | FR 2 344 249 A (GUILLEMIN HENRI)<br>14 October 1977 (1977-10-14)<br>page 2, line 5 -page 3, line 4; figures<br>----                         | 1-4,6-12              |
| A          | EP 0 752 223 A (ANEMOS S P A)<br>8 January 1997 (1997-01-08)<br>column 5, line 11 - line 44; figures 7-9<br>----                            | 1-4,6-8,<br>11,12     |
| A          | US 4 201 139 A (SUTTLES JAMES M)<br>6 May 1980 (1980-05-06)<br>column 3, line 22 - line 62; figure 4<br>-----                               | 1,2,6                 |



Further documents are listed in the continuation of box C.



Patent family members are listed in annex.

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# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/IT 00/00246

| Patent document<br>cited in search report | Publication<br>date | Patent family<br>member(s) | Publication<br>date |
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| EP 0752223 A                              | 08-01-1997          | IT PD950059 U              | 07-01-1997          |
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|                                           |                     | ES 2147331 T               | 01-09-2000          |
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