



Europäisches Patentamt
European Patent Office
Office européen des brevets



(11) **EP 0 765 825 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
02.04.1997 Bulletin 1997/14

(51) Int. Cl.⁶: **B65G 1/00, A47B 57/40**

(21) Application number: **95115370.9**

(22) Date of filing: **29.09.1995**

(84) Designated Contracting States:
**AT BE CH DE DK ES FR GB GR IE IT LI LU MC NL
PT SE**
Designated Extension States:
LT LV SI
(71) Applicant: **LOSEY LTD**
Nicosia (CY)

(72) Inventor: **Bozzone, Amedeo**
98000 Monaco (MC)
(74) Representative: **Lanzoni, Luciano**
c/o Bugnion S.p.A.,
Via Pellicceria, 2
33100 Udine (IT)

(54) **Shelving system**

(57) A shelving system for warehouses or the like comprising a plurality of vertical up-rights (1) which support at a pre-fixed height the transversal supporting joists (6) attached to up-rights (1) by means of brackets (7) counter-shaped with respect to an external portion of the up-rights (1). The up-rights (1) are formed by a frontal wall (2) rigidified by a longitudinal groove (10) and at least one lateral wall (3) and present, along the

height of the same, a plurality of slits (4) mutually spaced, in which are engaged the engaging tongues (9) supported by the brackets (7) for the removable coupling of the brackets (7) to the up-rights (1). The brackets (7) show internal protrusions (13) predisposed to interact with the groove (10) so as to avoid the relative rotation between the brackets (7) and the up-rights (1).

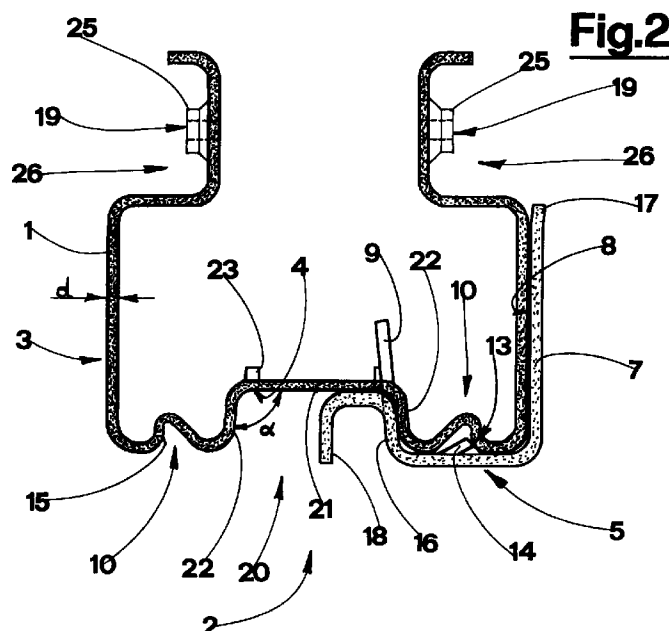


Fig.2

EP 0 765 825 A1

Description

The present invention concerns a shelving system for warehouses or the like.

In particular the present invention relates to metallic shelving including vertical up-rights which support, at a pre-fixed height, a plurality of transversal supporting elements, capable of being assembled as required, to which it is possible to couple shelves or the like. This shelving allows the variation, with great facility, of both the extension thereof in longitudinal and transversal directions, and the distance, in a vertical direction, between one shelf and another.

Shelving of this type is used to make big self-carrying warehouses in which the trellis structure of the shelving supports directly the lateral walls and the overhead covering of the building.

This method presents the advantage of reducing the manufacturing costs remarkably because it makes the best of the available soil surface and the available volume and additionally eliminates the costs relating to the construction of the building. The warehouse made in this way must be able to sustain, in addition to the weight of the stored material, the weight of the covering pre-fab panels, and must also be able to withstand the external stresses due to, for example, the weight of snow deposited on the roof or to the force of the wind acting on the covering panels.

Other prior art shelving is of particular robustness being capable of supporting such stresses. They are constituted by bolted or welded shoulders made with two identical pressed steel up-rights connected to each other by diagonals and cross-pieces to which the stringers are attached. This is a mixed solution in which the cross-pieces and diagonals are bolted to the up-rights to form the shoulders while the stringers are attached to the up-rights by means of specially pre-formed brackets.

The up-rights are substantially "C" shaped and present a plurality of frontal notches for the attachment of the stringers and of lateral holes for fixing, by means of bolts, the diagonals and cross-pieces. The section of such up-rights is generally symmetrical and the notches and lateral holes are equidistant from each other.

The up-rights constructed in accordance with this prior art technique present therefore, a multitude of holes and notches which, apart from weakening the structure, are also the source of uneconomical working residues.

The connection of the stringers to the up-rights is obtained, in the prior art technique, by means of an "L" shaped bracket which embraces the vertical up-right on two sides and that presents a plurality of engaging tongues which are inserted into the frontal notches of the up-right itself.

The bracket is generally soldered directly onto the extremity of the stringer but solutions also exist in which the bracket presents a plug-shaped protrusion which is inserted into the slotted extremity of the stringer, which

protrusion has the same internal profile.

The shelving constructed in accordance with prior art techniques however presents the drawback of not being in itself particularly rigid and robust.

To rigidify the up-rights, prior art techniques increase the thickness thereof or the number of folds necessary for the making of said up-rights, envisaging longitudinal recesses and protrusions both on the frontal part and the lateral parts thereof. Such recesses or protrusions however present the drawback of taking up space along the external surface of the up-right, thus reducing the useful bearing surface of the brackets.

To rigidify the connection between the bracket and the up-right, prior art techniques lengthen the bracket to increase the number of engaging tongues inserted into the notches made on the up-rights, increasing at the same time, the surface of the bracket resting against the up-right.

Prior art techniques differ the form of the engaging tongues of the bracket according to the load which they have to support. In fact, stressing the bracket results in the highest engaging tongue exerting a traction load on the notch while the lowest tongue exerts a compressing force on the notch.

By shaping appropriately both, the sides of the engaging tongues and the form of the notch, it is possible to limit the rotation of the bracket with respect to the up-right.

Prior art techniques also slightly incline a side of the frontal notches of the up-right with respect to the axis of the up-right itself in such a way that with the increase of the load the bracket tends to slide downwards and become closer to the up-right obtaining so an increased connection. This solution requires however, the creation of notches of increased size further weakening the up-right. A further drawback of prior art techniques is due to the small bearing surface existing between the base of each engaging tongue and the base of the corresponding notch.

It therefore occurs that the engaging tongue and the notch are incised and with the continued presence over time of the load being sustained, one or the other yields completely.

The aim of the present invention, as characterised in the appended claims, is therefore to eliminate the drawbacks above mentioned by supplying an extremely robust and stable shelving system which can be made up in a rational and economical manner.

A further aim of the present invention is to envisage the manufacturing of up-rights with a minimal thickness with respect to the up-rights of prior art techniques with the same carrying capacity and overall dimensions.

A still further aim of the present invention is to ensure a coupling between the bracket and the up-right bringing the bracket closer to the frontal surface of the up-right with the increase in the load without deforming the bracket as a result.

A jet still further aim is to divide the load uniformly on all the engaging tongues of the same bracket avoid-

ing the formation of dangerous incisions at the same time.

Finally, an aim of the present invention is to limit the loss of carrying capacity consequential to the reduction of the useful section due to the presence of frontal slits and lateral holes carried out in the up-rights.

A final aim is to make available a coupling between the up-right and the bracket which does not present anaesthetic and dangerous projections and lumps towards the exterior of the shelving.

From a construction point of view, the shelving system, the subject of the present invention, is characterised by the presence of a vertical groove disposed frontally on the up-right designed to interact with a corresponding opposing element of the bracket to avoid the relative rotation between the bracket and the up-right.

The opposing element can be created analogously to the groove, envisaging a rib along the length of the bracket or can, more simply, be constituted by small portions jutting out of the bracket itself.

Advantageously, a receding central part is envisaged on the frontal surface of the up-right.

The brackets preferably present a section including a "U" shaped tract in such a way that at least three of the internal surfaces thereof rest against the up-right.

Advantageously the engaging tongues of the brackets present their lower edge inclined with respect to the plane of the bracket.

Also advantageously the holes effected laterally on the up-right present a ring-shaped reinforcement around each of the holes. Such reinforcement is preferably obtained through drawing.

Also advantageously, the frontal slits of the up-right are obtained by means of cuts, deformations and foldings of the metal plate. The slits present a thickness of the base of the notch greater than the thickness of the up-right, this can be obtained by folding the lower edge of the slid.

Thanks to this particular arrangement it is possible to obtain an extremely economical shelving system which resolves in a safe and compact way the job of sustaining even very heavy loads. In particular, this solution completely eliminates the material residues due to the effecting of the holes and slits in the up-right, exploiting instead such residues to rigidify the structure. Further advantages and characteristics of the present invention will become more evident in the detailed description which follows, made with reference to the attached drawings which represent a form of the embodiment thereof being purely by way of non-limiting example in which:

Figure 1 shows a perspective view of the coupling between the up-right and the bracket;

Figure 2 shows a section across the up-right and the bracket;

Figure 3 shows an enlarged perspective view of a detail of the up-right and the bracket during the insertion phase;

Figure 4 shows a perspective view of the bracket;

Figure 5 shows an enlarged detail of one of the engaging tongues of the bracket;

Figure 6 shows the coupling between the up-right and a couple of cross-pieces and diagonals.

With reference to the appended drawings 1 denotes a pressed steel up-right the same being substantially vertical.

The section of the up-right 1 is substantially "C" shaped and includes a frontal wall 2 and two lateral walls 3, parallel and symmetrical to each other. The frontal wall 2 shows a plurality of slits 4 which are mutually spaced.

A bracket 7 has a bearing surface 8 counter-shaped with respect to a corresponding portion of the external surface of the up-right 1. The bracket 7 is also fitted with a plurality of engaging tongues 9 placed on a same vertical plane, capable of being attached to the slits 4 for the removable coupling of the brackets 7 to the up-right 1.

The up-right 1 shows, along its frontal wall 2, a couple of grooves 10, parallel to each other, having a longitudinal development with respect to the axis of the up-right 1 (see Figures 2 and 3).

The transversal section of each of the grooves 10 is substantially shaped in the form of a right-angled triangle and one of its bases 15 is placed perpendicularly to the plane of the frontal wall 2.

The bracket 7 shows, along its internal surface, corresponding opposing elements 12 shaped as protrusions 13. These protrusions 13, clearly evident in Figures 2 and 3, are formed in the shape of a fin 14 protruding from the plane of the bracket 7. This configuration presents the notable advantage that it can be carried out in an extremely simple and economical manner by pressing a part of the surface of the bracket 7 towards the interior. The task of the groove 10 interacting with the protrusion 13 is to stiffen the coupling of the bracket 7 to the up-right 1 avoiding the relative rotation between the bracket 7 and the up-right 1. In fact, at the first hint of the rotation of the bracket 7 as a result of a load on a joist 6, the protrusion 13 is rested on the base 15 of the wall of the groove 10 thus preventing any further rotation.

The protrusions 13 are placed, in the illustrated example, in correspondence with the first two engaging tongues 9, towards the top of the bracket 7; as is clearly visible in Figure 4.

The frontal wall 2 of the up-right 1 presents a marked recess 20 in the form of a "U" formed by a base wall 21 and two receding sides 22. The base wall 21 is placed parallelly to the frontal wall 2 while the sides 22 are placed in such a way as to form an obtuse angle α with the base 21.

The slits 4 are placed on the base wall 21 near to the sides 22. Figure 3 shows very clearly the slit 4 which is obtained by cutting and folding partially downwards the metal plate of the up-right 1 in such a way as to form

a lower edge 23 inclined in accordance with an acute angle β with the axis of the up-right 1. Figure 5 further shows the configuration of the slit 4 and of the engaging tongues 9 which show a lower bearing edge 11 inclined in accordance with the same acute angle β . The lower edge 23 of the slits 4 is therefore folded and inclined towards the interior part of the up-right 1 in the same angle β ensuring a good sustain to the engaging tongue 9 in the slit 4.

In particular it is noted that the lower edge 23 shows a bearing base for the engaging tongue 9 which is notably greater than the simple thickness d of the material of the up-right 1.

This particular configuration of the slit 4 also presents the advantage that it can be made by drawing.

The inclined surface of the engaging tongue 9 thus tends to cause the engaging tongue 9 to slide, and with it, the bracket 7, pressing the same against the up-right 1.

This configuration whereby the engaging tongue 9 rests on an inclined wall avoids the problem of incisions present when a projection is borne by a flat edge.

It is therefore extremely important that the lower bearing edge 11 of the engaging tongue 9 is made and folded with extreme precision to make the best of the whole bearing surface.

The folded lower edge 23 of the slit 4 has thus an increased bearing surface and ensures so that the bearing behaves like a (very rigid) spring which is elastically deformed according to the load to which it is subjected. This therefore ensures the uniform distribution of the load on all the engaging tongues 9 of the same bracket 7.

The brackets 7 present a transversal section substantially shaped in the form of a squared and elongated "S".

In this way the bracket 7 embraces the up-right 1 along four of the walls thereof.

The bracket 7 therefore shows a central wall 16 from which project the engaging tongues 9 which are situated practically in the same plane as the wall 16. This ensures an excellent distribution of forces from the tongue 9 to the bracket 7.

In Figure 2 is clearly visible an edge 17 of the bracket 7, slightly folded towards the exterior, namely the part opposite to the up-right 1 which has the aim of facilitating the insertion of the bracket 7 in the seat thereof of the up-right 1.

It is further to be noted that the opposing extremity 18 of the bracket 7 does not protrude in any way and therefore does not pose any danger for operating staff.

This configuration of the up-right 1 and of the brackets 7 permits the extremely effective exploitation of the limited space available on the frontal wall 2 of the up-right 1 and permits the positioning at the same height, of two facing brackets 7.

The slight inclination of the side 22 of the recess 20 of the up-right 1 ensures an excellent contact between the bracket 7 and the up-right 1 and also facilitates the

insertion phase of the bracket 7 on the up-right 1 since it ensures the presence of a moderate play in the first insertion phase which is then completely recuperated when the bracket 7 has reached the lower position thereof.

The up-right 1 also shows a plurality of holes 19 made along the lateral wall 3 for connection with other up-rights 1. The holes 19 are fitted with a ring-shaped reinforcement 25 in the form of a funnel the same being preferably obtained by means of drawing. The aim of such ring-shaped reinforcements 25 is substantially not to weaken the lateral wall 3 of the up-right 1.

The presence of such reinforcements 25 which does not weaken the lateral wall 3 of the up-right 1 permits the creation of a lateral recess 26 of wide dimensions which facilitates the operation of assembling the shelving during which it is necessary to insert and screw up bolts (not illustrated) or the like into the holes 19 for the connection with cross-pieces 27 or diagonals 28.

It is noted therefore, that contrary to what happens with prior art shelving, the structure of the up-right 1 is not weakened by the presence of lateral holes 19 and of the frontal slits 4.

Indeed, the material which would normally be considered as working residue is here used in an extremely rational way, contributing to the strengthening of the structure of the shelving.

For this reason the up-rights 1 made according to the present invention can be made, with the same dimensions and the same resistance, with thinner materials with respect to that used in prior art techniques.

The saving in terms of materials obviously makes itself felt as well in the economical nature of the solution described here.

With the present invention it is therefore possible to make extremely robust shelving in an extremely effective and cheap way.

The invention is susceptible to numerous variations or changes without falling outside the scope of the present invention. Furthermore, all details can be replaced by technically equivalent elements.

Claims

1. A shelving system comprising:

- at least one up-right (1) substantially vertical, formed by a frontal wall (2) and at least one lateral wall (3), presenting along the height thereof a plurality of mutually spaced slits (4);
- at least one bracket (7) having a surface (8) counter-shaped with respect to a portion of the external surface of the up-right (1) and also having at least one engaging tongue (9) capable of being engaged in the slits (4), for the removable coupling of the bracket (7) to said up-right (1), characterised in that it also comprises stiffening means (5) operatively connected between the up-right (1) and to the

bracket (7), to avoid the relative rotation between the bracket (7) and the up-right (1).

2. Shelving as in claim 1, characterised in that said rigidifying means (5) include a groove (10) having a longitudinal development with respect to the axis of the up-right (1) predisposed to interact with a corresponding opposing element (12). 5
3. Shelving as in claim 2, characterised in that said groove (10) is obtained along the frontal wall (2) of the up-right (1) and the opposing element (12) is placed on the bracket (7). 10
4. Shelving as in claim 2, characterised in that the opposing element (12) comprises at least one protrusion (13) obtained in the bracket (7) protruding towards the internal part of the bracket (7) itself. 15
5. Shelving as in claim 1, characterised in that the frontal wall (2) of the up-right (1) shows a receding part (20) on the base thereof being placed the slits (4). 20
6. Shelving as in claim 5, characterised in that said receding part (20) comprises a substantially "L" shaped transversal section having a base wall (21) parallel to the frontal wall (2) and a receding side (22) forming an obtuse angle α with the base (21). 25
7. Shelving as in claim 6, characterised in that the bracket (7) comprises a transversal section substantially "U" shaped so to embrace the up-right (1) along three sides. 30
8. Shelving as in claim 6, characterised in that the bracket (7) comprises a transversal section substantially in the form of a squared and elongated "S" embracing the up-right (1) along four sides. 35
9. Shelving as in claim 8, characterised in that the bracket (7) comprises a central wall (16) from which project the engaging tongues (9). 40
10. Shelving as in claim 1, characterised in that a lower bearing edge (11) of the engaging tongues (9) is inclined according to an acute angle (β) with respect to the axis of the up-right (1). 45
11. Shelving as in claim 10, characterised in that a lower edge (23) of each slit (4) is inclined in the direction of the internal part of the up-right (1). 50
12. Shelving as in claim 1, characterised in that a lower edge (23) of each slit (4) is thicker than the thickness (d) of the up-right (1). 55
13. Shelving as in claim 1, characterised in that a lower edge (23) of each slit (4) is folded and inclined

towards the interior of the up-right (1).

14. Shelving as in claim 1, characterised in that the up-right (1) presents along the lateral wall (3) a plurality of holes (19) having a ring-shaped reinforcement (25) for the connection with other elements (27,28) of the shelving system.
15. Shelving as in claim 14, characterised in that the ring-shaped reinforcement (25) is obtained by drawing of the up-right (1).

Fig.1

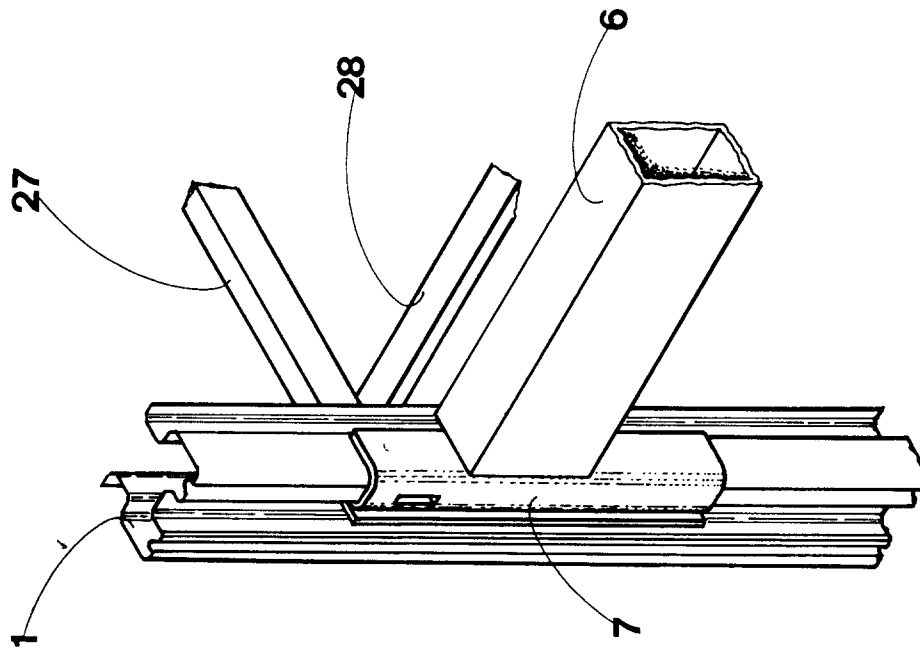
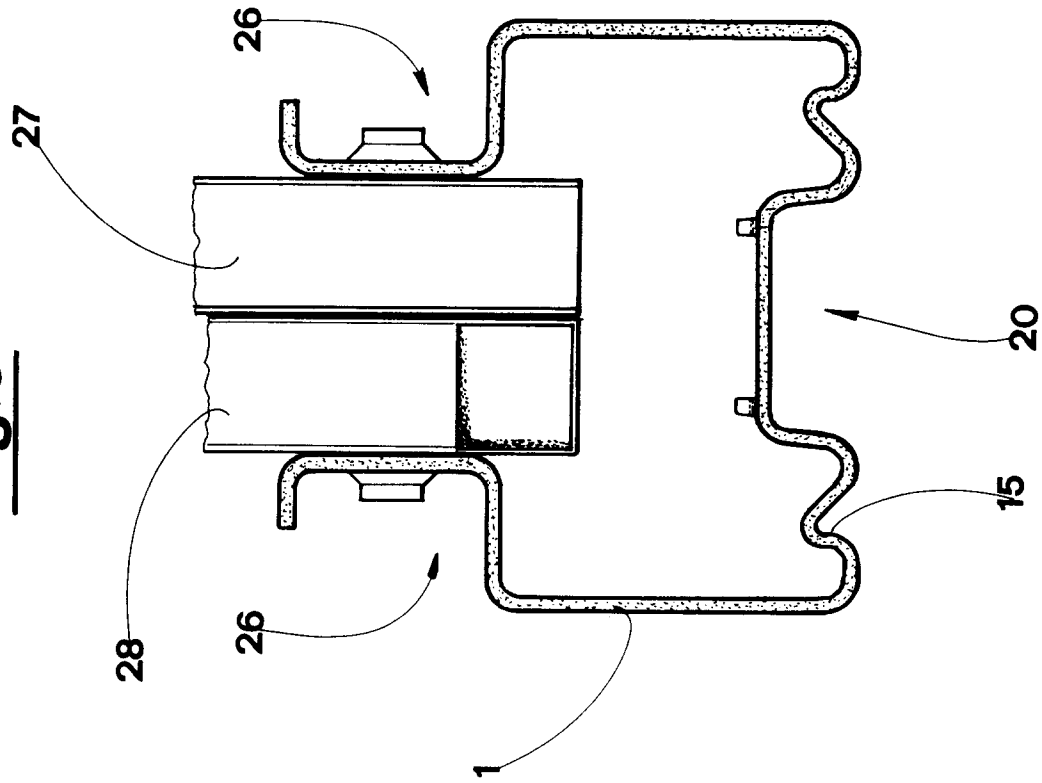


Fig.6



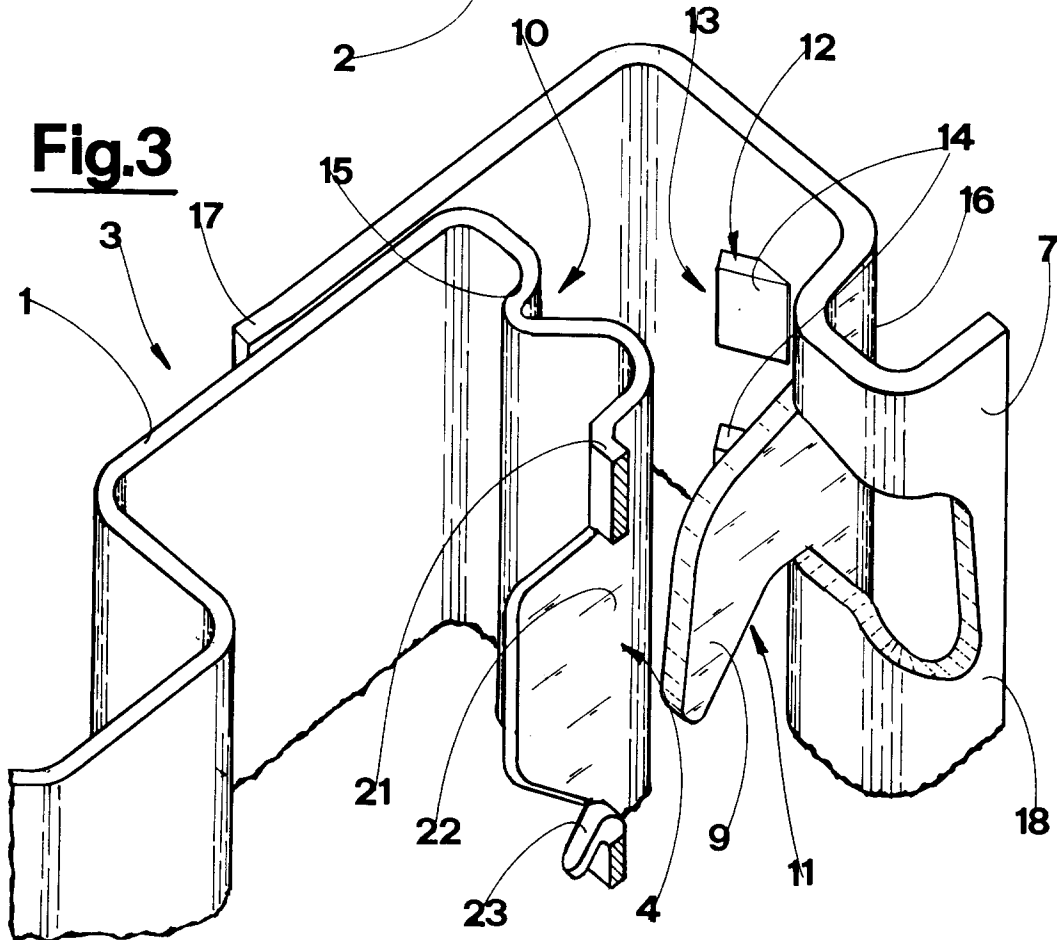
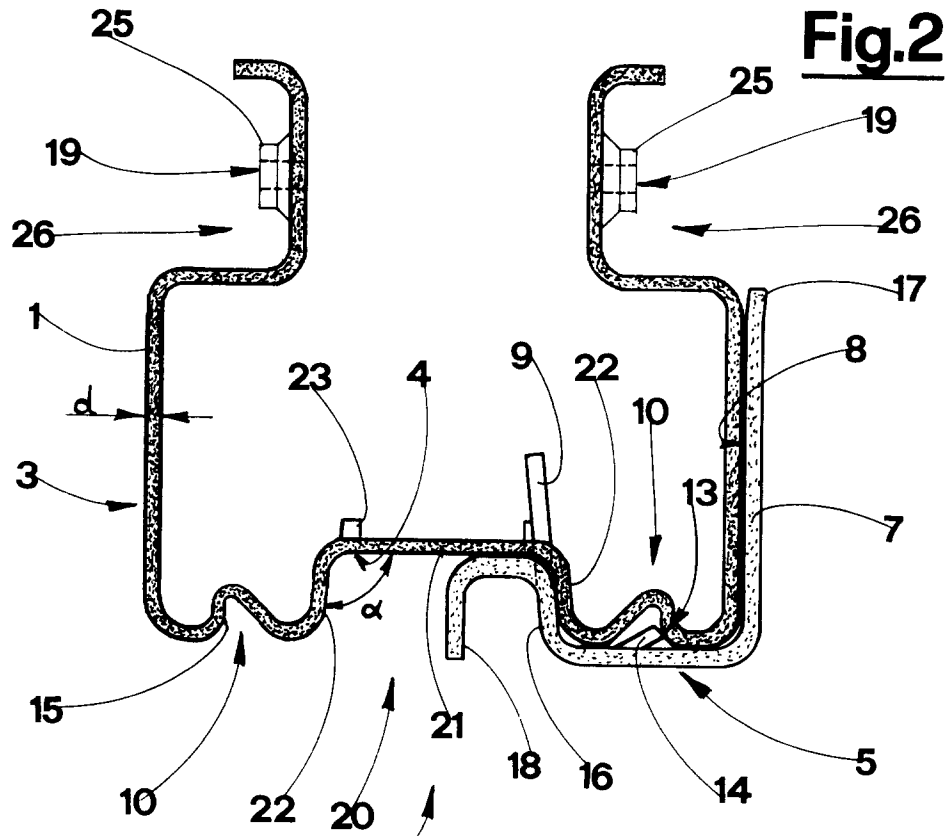


Fig.5

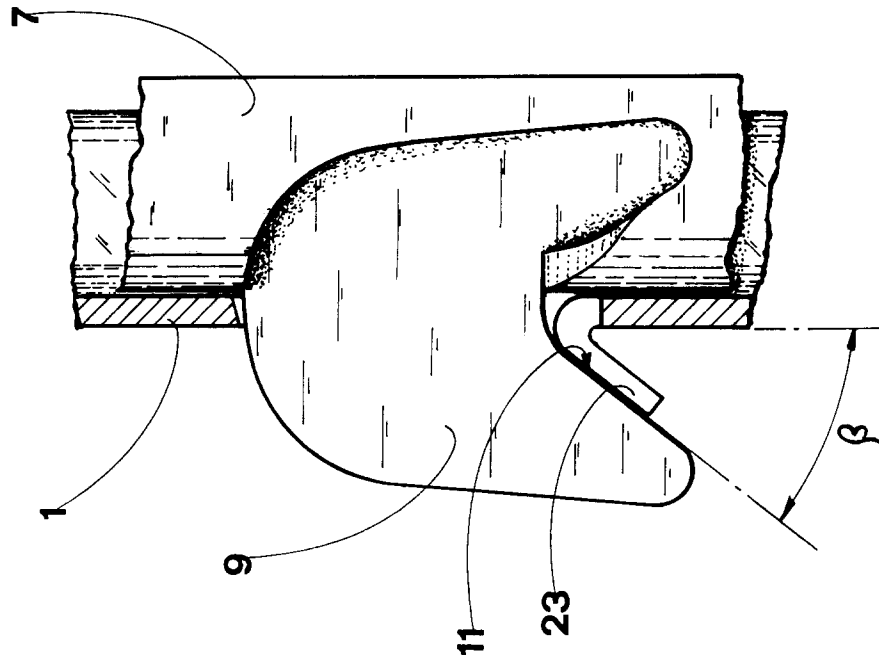
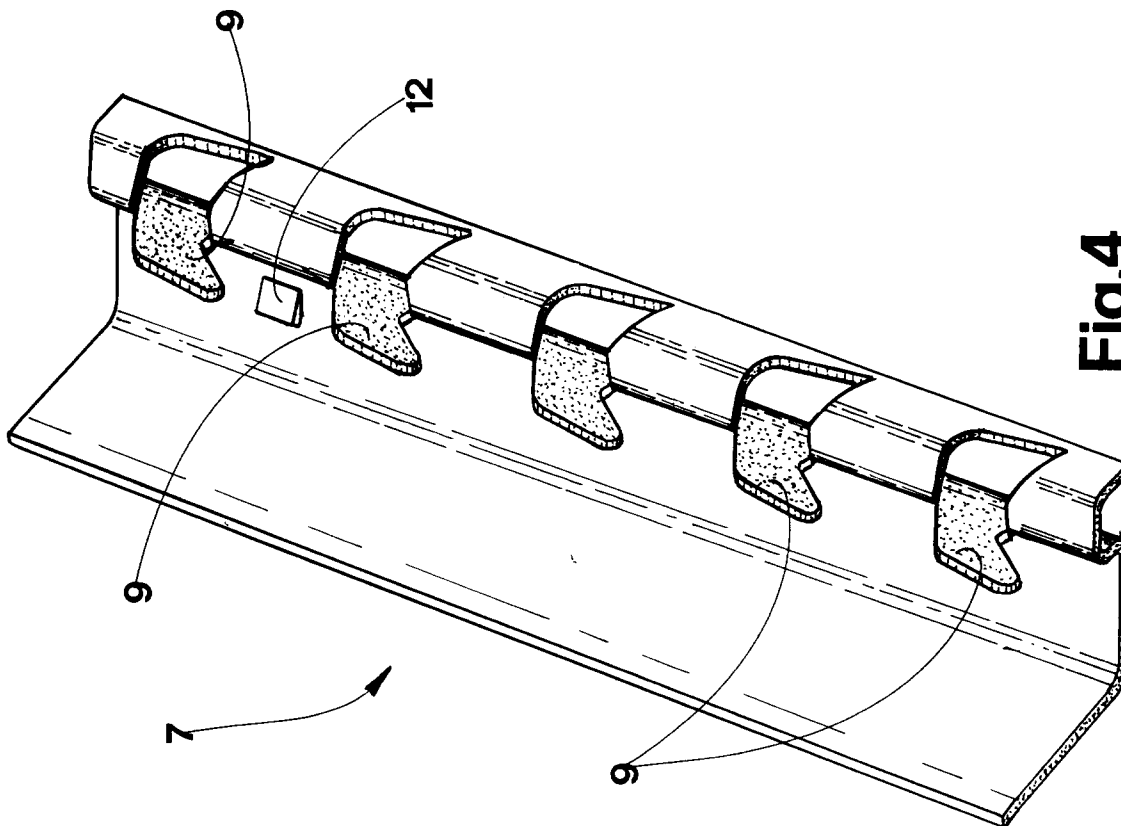


Fig.4





European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 95 11 5370

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
X	DE-C-12 88 266 (REDIRACK INDUSTRIES LTD.)	1,5-7,10	B65G1/00
Y	* claim 1; figures 1-3 *	2,4	A47B57/40

X	US-A-4 928 834 (NEIMAN)	1	
	* abstract; figures 1,2,6,7 *		

X	FR-A-2 097 401 (INTEGRATED HANDLING LTD.)	1	
	* page 5, line 22 - page 6, line 6;		
	figures 1-3 *		

Y	DE-A-44 20 236 (ROSSI DEI FRATELLI BETTINI S.N.C.)	2,4	
	* abstract; figures 1,2,4 *		

			TECHNICAL FIELDS SEARCHED (Int.Cl.6)
			A47B
The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
THE HAGUE		15 March 1996	Jones, C
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 03.92 (P04C01)