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(71) Applicant: **METALGAMMA S.n.c. di L.G. Belloni & C.**
Via Leonardo da Vinci, 172
I-20090 Trezzano sul Naviglio (Milano)(IT)

(72) Inventor: **Belloni, Luciano Giulio**
Via Puecher
Gaggiano (Milano)(IT)

(74) Representative: **La Ciura, Salvatore**
Via Francesco Sforza 5
I-20122 Milano(IT)

(54) **Carrying structure for storage shelving.**

(57) The invention refers to a carrying structure for storage shelving, whose vertical rods (2) have a rectangular section and are provided with rows of seats, (22) both in the front face and in the back one, designed to house wedge-shaped joints. The stringers, (1) on their side, have their extremities sheared and shaped in such a way as to include the hooks (9, 10) which are to be inserted into these seats (22), not being thus necessary an added (welded) coupling.

Said stringers (1) have a section which permits their fitting up, either separately or in a couple, to parallel vertical rods (2) being hooked one in the front face and the other in the back face of the vertical rod itself. They may also be superimposed one to the other, thus allowing different combinations suitable to support increasing loads.

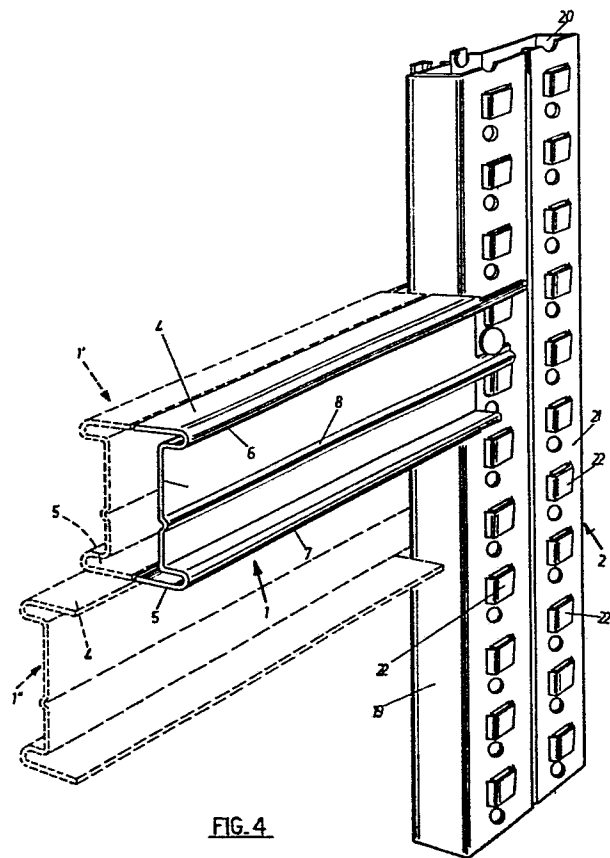


FIG. 4

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Carrying structure for storage shelving

The present invention refers to a carrying structure, particularly conceived for storage shelving.

Carrying structures for storing material are already known,
5 in particular those composed by properly spaced vertical rods and by horizontal stringers, restrained at their extremities to two successive vertical rods. Said stringers may be placed at one or more levels in order to support one or more shelves where light goods may be stored
10 directly and heavy goods can be stored making use of pallets which permit loading and unloading by means of high loaders.

According to the known technique, stringers are provided
15 at their two extremities with couplings made up by two angled walls, forming an L shaped section. They are added by welding and, at least on one wall, are provided with hooks which should wedge in designed seats existing either in the front face only or in the front face and in a
20 contiguous lateral face of the vertical rod.

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The vertical rods and the horizontal stringers, as well as the welded couplings, are notoriously of shaped, metallic plate.

5 According to this known technique, the stringers in particular, are produced in differently sealed sections, depending upon the maximum load foreseen for each structure shelf. Hence the necessity, for the firm that makes such structures, to produce different section profiles and
10 therefore to multiply the appropriate equipments.

Moreover, the necessity to weld couplings at each extremity of the stringers, prevents production of said stringers from plates already painted or galvanized (zinc
15 plating).

Painting or zinc plating can be done only after stringers completion, the ultimate consequence being a high equipment cost, a limitation in production and an increased cost of
20 the carrying structure components.

The present invention refers to a metallic structure, whose stringers do not have welded extremities and are suitable for mass production, also because they can be manufactured
25 from pre-painted or galvanized plate and therefore do not require any operation after their completion.

Moreover the stringers profile presents only one shape and one sealing, so that every stringer provides strength
30 and stiffness proportional to a foreseen load. Each stringer

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can be coupled with stringers of the same profile, arranged in parallel and/or superimposed one to the other, thus providing different combinations capable to support different loads as they increase. It is possible therefore, to
5 reduce the cost of production equipments, to increase the current production and to reduce remarkably production costs.

The carrying structure of the invention is characterized
10 by the fact that the vertical rods have a rectangular section made up in such a way as to generate a front wall provided with two vertical rows of seats to house wedge-shaped hooks, a back wall also provided with two rows of seats for wedge-shaped joints and two lateral walls of a
15 predetermined width.

The stringers, on the other hand, present a section having a vertical core and two horizontal wings; the extremities of each stringer are trimmed in such a way as to obtain a
20 core extension which, when coupled with the vertical rod, extends along one wall of the rod provided with seats for wedge-shaped joints. Said core extension on its side is characterized in a way to obtain directly upon itself at least two coplanar hooks, vertically spaced of the same
25 amount existing between two seats and therefore suitable to wedge in two consecutive seats of a row.

Said structure is also characterized by the fact that the lateral walls of the vertical rod have a width at least
30 double with respect to the inside projection of the

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stringer wings, so that two identical stringers can be placed side by side parallel and hooked one in the seats of the front wall and the other in the seats of the back wall of the vertical rod.

5

The same structure is also characterized by the fact that the vertical dimensions of the two hooks, at the extremities of each stringer, do not exceed the section height of the stringer itself, so that two identical stringers can be assembled superimposed and in contact with their contiguous wings. The position of these hooks is such that in said superimposition the distance between the lower hook of the stringer immediately below is equal to the distance between the hooks of a same stringer, so that in the combination between two superimposed hooks, successive seats are respectively occupied by the hooks. The object of the invention, presented as a non-limiting example of embodiment, is shown in the enclosed drawings, where:

20 Figures 1 and 2 are respectively a view in elevation and a plan view of the structure vertical rod;
Figure 3 is an assonometric view of a horizontal stringer;
Figure 4 is an assonometric view of the coupling
25 between vertical rod and stringer, showing the different possibilities of stringers' coupling in relation to the increase in the foreseen load.

With reference to said figures, the structure object of the present invention is characterized by a stringer 1 and a
30 vertical rod 2.

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According to a preferred form, stringer 1 is made up of a shaped plate having cross section including a vertical core 3, an upper wing 4 and a lower wing 5.

5 Wings 4 and 5 are connected to core 3 by means of an extended curvature, respectively 6 and 7, so that wings 4 and 5 form together with core 3, a sort of double T section having however the core offset in regard to the center line wing plane and closer to curvature 6 and 7.

10

Lengthwise, core 3 shows a stiffening rib 8, preferably offset in regard to the center line, and closer to lower wing 5, for reasons that will be specified later.

15 At each extremity, stringer 1 presents some shearings in order to obtain teeth 9 and 10 needed for the coupling with the respective vertical rod 2. To this end a first square shearing 11 involves the upper wing 3 and a portion of the bending 6, in order to obtain a right angle notch limited
20 by a transversal side 12, designed to rest on the lateral wall of vertical rod 2 (see Fig. 4) and by a longitudinal side 13 which constitutes an extension of curvature 6 and is designed to lean on the front face or on the back face of the same vertical rod 2.

25

Below side 13, on an extension of core 3, two hooks are machined, firstly hook 9, immediately below side 13, and secondly the lower hook 10, immediately below rib 8 (which is also extended by a certain amount 14 together with the
30 core)

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With such a shearing shape, hooks 9 and 10, in the phase of coupling with vertical rod 2, are practically brought to rest on the front wall or on the back wall of vertical rod 2, so that they can be safely inserted into the foreseen
5 seats on vertical rod 2.

Hooks 9 and 10 are at fixed distance between them, equal for both extremities of stringer 1; hook 10, moreover, is placed at such a level as to keep the same distance from
10 hook 9 of another identical stringer hooked below stringer 1, wing 5 of one of the stringer being in contact with wing 4 of the other, as indicated in Fig. 4. Stringer 1, as it is designed, presents remarkable technical advantages, as explained in the introduction.

15

The first advantage is that the joints at the extremities of the stringer, provided with hooks 9 and 10, are obtained by shearing and shaping of the stringer itself, thus eliminating the successive welding operation required by
20 the customary technique. This also permits to work on plates already painted or galvanized, thus totally eliminating successive operations of painting or galvanizing which are required by the previous technique, due to joints welding. Another advantage is due to the fact that, being hooks 9 and
25 10 enclosed within the profile height, and being the internal projection of wing 4 and 5 not in excess of half the width of lateral walls of rod 2, more profiles can be coupled together and form a unique stringer, as shown in Fig. 4. It may be seen from this figure that a profile 1 can be coupled
30 with a profile 1', counteropposed and parallel, or with a

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profile 1" placed immediately below.

Different combinations can be repeated many times, thus
permitting to produce and to use only one profile, which
5 allows the formation of structures capable of increasing
loads. There is a remarkable saving of equipments on the
producer side and the possibility of easy mass production.

The two advantages added together permit the production of
10 profiles for carrying structures at a remarkably low cost.

With reference to Figures 1, 2 and 4, it can be seen that
vertical rod 2 is obtained from a plate shaped in a way to
assume a practically rectangular section.

15

The longitudinal edges 15 and 16 are bended, a first time
on the back side of the vertical rod up to a short distance
from the center plane and then bended a second time, to the
outside, remaining parallel and leaving between them a
20 predetermined space suitable to receive a transversal
bracing profile. Such transversal profile is secured between
edges 15 and 16 by means of bolts crossing the coaxial holes
17 and 18 existing on said edges.

25 The rectangular section of the vertical rod 2 is also
composed of two lateral walls 19 and 20, whose width is
determined in the following precise way: when two stringers
1 and 1' are positioned in parallel and lean with their
cores 3 on the front and back walls respectively, the
30 internal edges of wings 4 and 5 should not interfere, but

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on the contrary remain spaced or preferably, just coincide, as indicated in Fig. 4. The section of vertical rod 2 also features a front wall 21 provided with two vertical rows of seats 22, equally spaced and able to receive, by wedge-in insertion, hooks 9 and 10 of each stringer.

Of course, the distance between successive seats 22 is identical to the distance between hooks 9 and 10, and, for the reasons already explained, they may receive, one after the other not only the hooks of a profile 1, but also the hooks of two or more profiles 1' , 1" overlapped and in contact each to the other.

A median rib 23 can be foreseen on walls 21 in order to increase their stiffness.

Vertical rod 2 presents in the rear two walls 24 and 25 coplanar and divided by the two edges 15 and 16. These walls are also provided with a respective row of seats 22. The distance between the two rows is identical to the one of the rows existing on the front wall 21, while the distance between the successive seats of the same row is equal to the distance between hooks 9 and 10. The rear walls 24 and 25 permit the hooking of stringers 1', 1".... parallel to stringer 1, or overlapped and in contact each to the other, in order to provide the various combination of stringers in relation to the loads that the structure must support. In fig. 4, two overlapped stringers 1' and 1" are indicated, but it is evident that one more stringer can

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be placed below, or above, stringer 1 shown in full lines.

Holes 26 do exist between the successive seats 22, in order to receive a pin 27 used to restrain hooks 9 and 10 and to
5 prevent the unperceived disjoint of the same hooks, when the structure is under load.

The shape of hooks 9 and 10 existing on stringers 1, as well as the configuration of the related seats 22 existing
10 on vertical rods 2, are not prominent for the purpose of the patent and may be replaced by other types of hooks and seats without prejudice for the present invention. Of course the invention is not limited to the embodiment described and illustrated in the enclosed drawings: on the contrary
15 every addition and variation within the reach of an expert technician can be incorporated, still remaining in the spirit and in the object of the present invention.

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Claims

1. Carrying metallic structure particularly intended for storing material, of a type composed of vertical rods spaced
5 between themselves, and of horizontal stringers restrained at their extremities to two successive rods. The stringers can be put at one or more levels in order to support shelves for the goods to be stored. The anchorage between the extremities of each stringer and the respective vertical
10 rods is guaranteed by the insertion of hooks, existing at such extremities, into proper seats in the vertical rod and arranged according to one or more vertical rows.

The structure is characterized by the fact that the vertical
15 rods (2) present a rectangular section which generates; a front wall provided with two vertical rows of seats (22) for the wedge-shaped joints of hooks (9 and 10), a back wall also provided with two rows of seats for wedge-shaped joints and two lateral walls of predetermined width, while the
20 stringers present a section provided with a vertical core (3) and two horizontal wings (4 and 5). The extremities of each stringer are sheared in order to obtain an extension of the core which, when coupled with the vertical rod, extends itself on one of the wall of the vertical rod where
25 seats for the wedge-shaped joint do exist. These extensions, in turn, are also sheared in order to obtain directly on it at least two hooks coplanar and vertically spaced between them of the same distance existing between seats, and therefore able to wedge into consecutive seats of a row.

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2. Carrying structure as in claim 1 characterized by the fact that the lateral walls (19 and 20) of the vertical rod present a width at least double than the inside projection of the stringer's wings, so that two identical stringers (1, 1') may be arranged side by side parallel, and hooked one into the seats of the front wall and the other into the seats of the back wall of the vertical rod.
3. Carrying structure as in claim 1, characterized by the fact that the vertical dimensions of the two hooks (9 and 10), existing at each extremity of each stringer, do not exceed the height of the stringer's section, so that two identical stringers can be laid one upon the other, having their contiguous wings in contact. The position of said hooks is such that in the overlap, the distance between the lower hook of a stringer and the upper hook of the stringer immediately below is equal to the distance between the two hooks of a same stringer, so that when combining two superimposed stringers, successive seats are occupied by the hooks.
4. Carrying structure as in claims 1 and 3 characterized by the fact that the upper hook at each extremity of the stringer is stiffened by a protruding portion of the upper wing, said portion being extended from the core itself, while the lower hook is stiffened by a longitudinal rib, also extended together with the core extension during the shearing operation.

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5, Carrying structure as in claim 1, where the section of each stringer presents a vertical core (3) and two wings (4 and 5), said wings, being joined to the core by respective bendings (6 and 7) transversally extended, so that
5 part of the upper bending (6) is utilized to stiffen the upper hook (9) while the sheared part constitutes a ledge side.

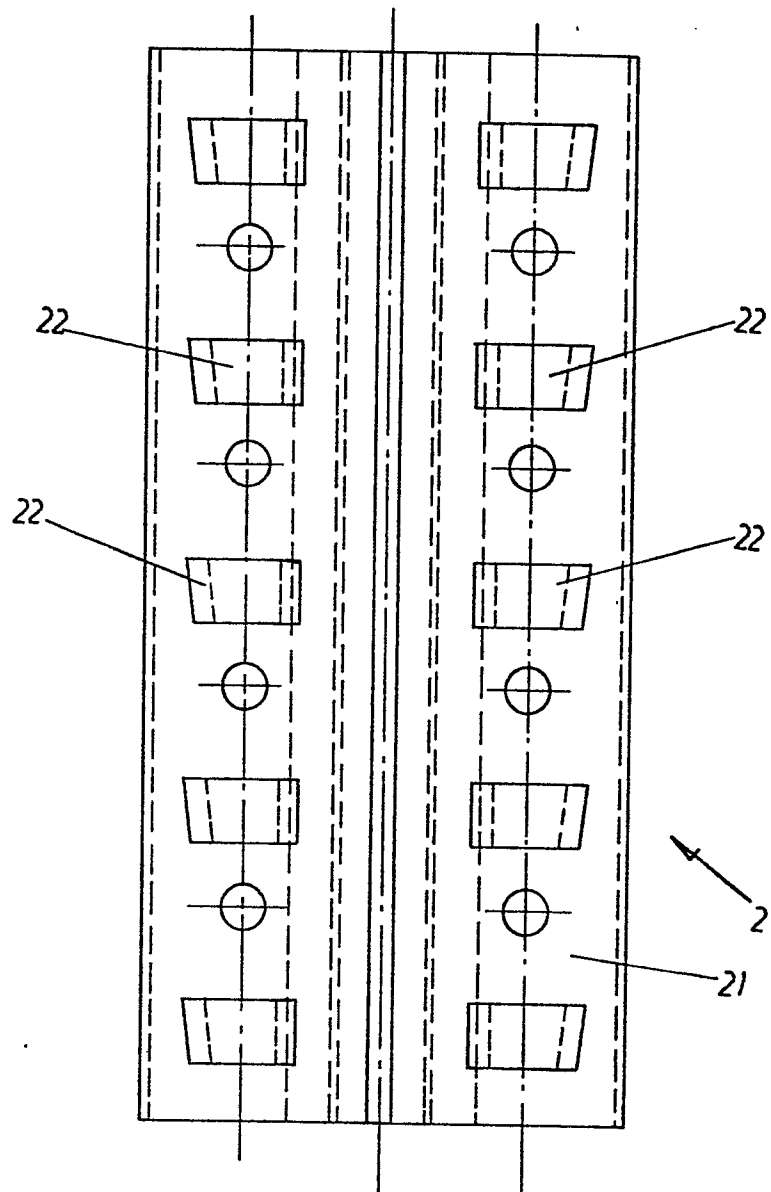


FIG. 1

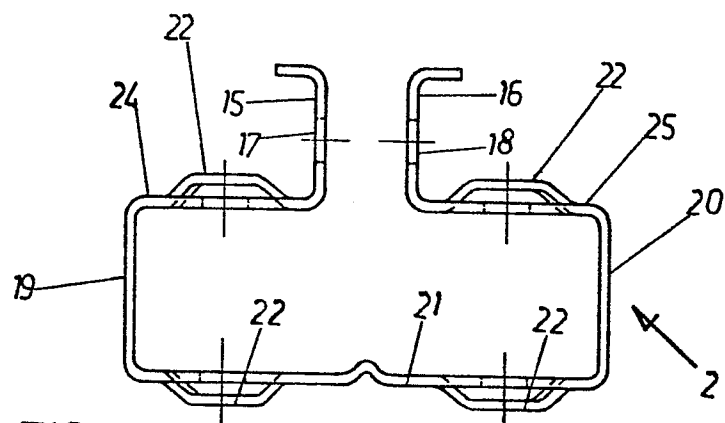


FIG. 2

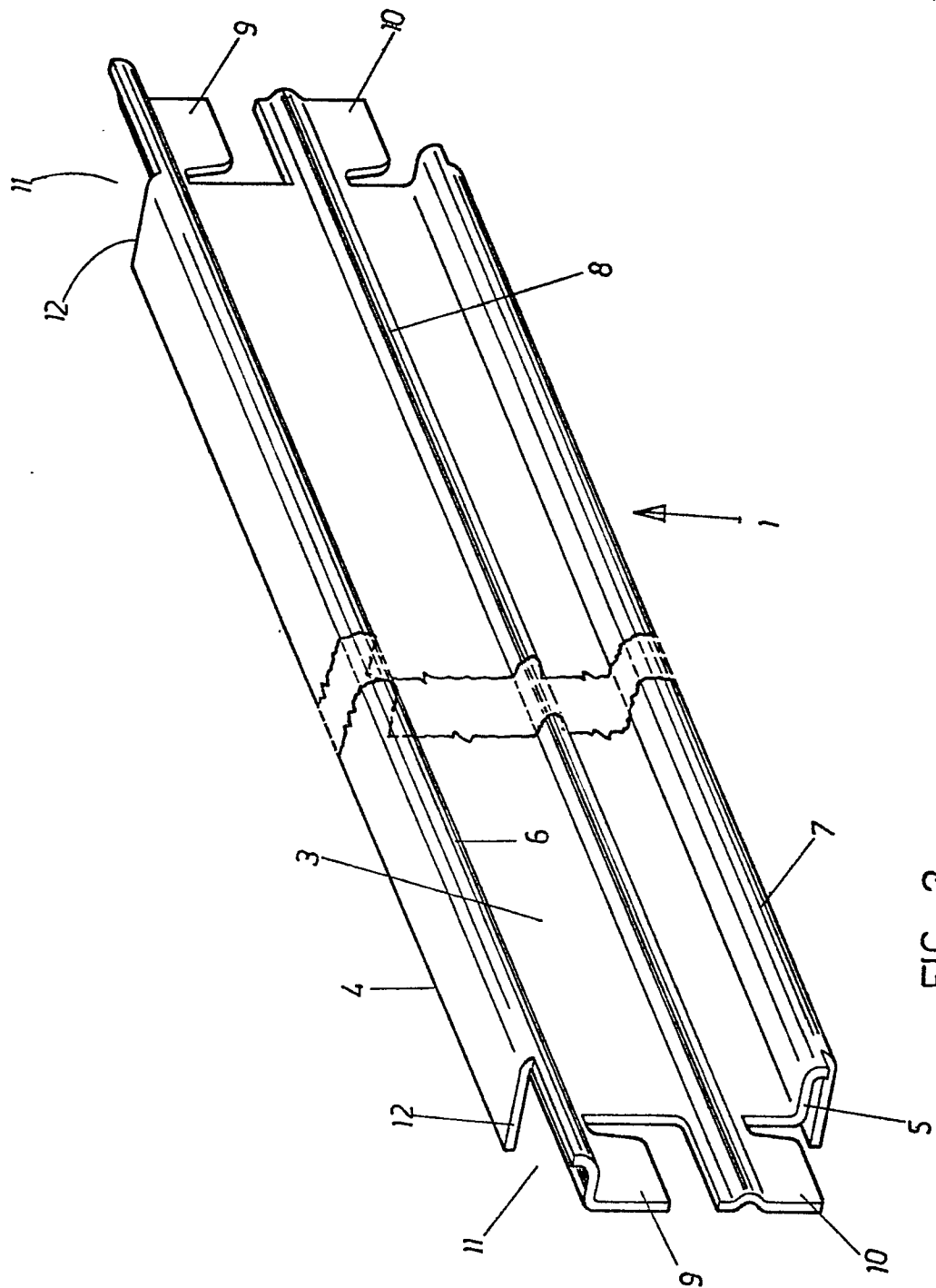
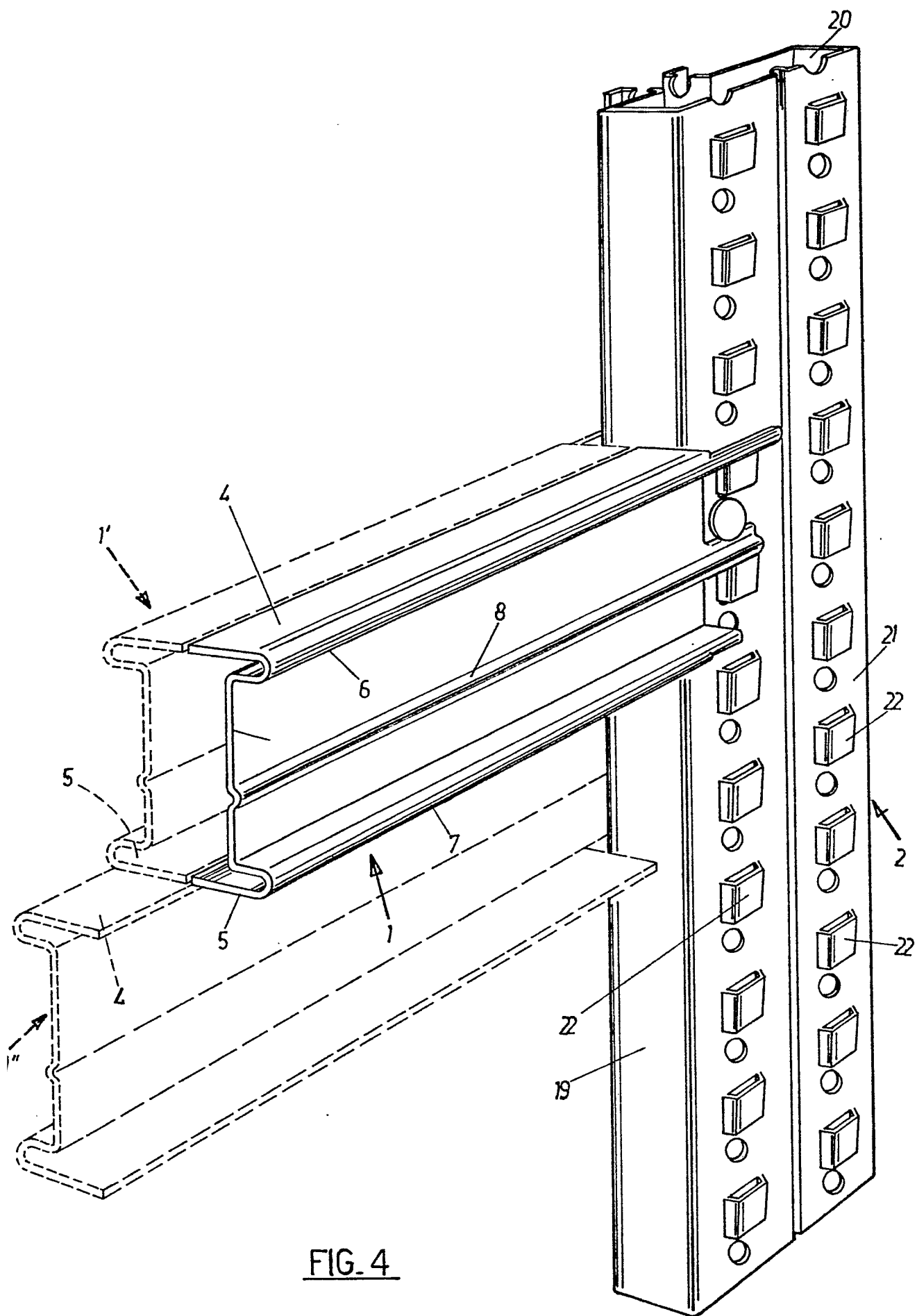


FIG. 3





European Patent
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EUROPEAN SEARCH REPORT

0064955

Application number

EP 82 83 0085

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. ³)
X	FR-A-2 445 122 (SPEEDSHELF)	1,2	A 47 B 57/40
A	---	3,5	
A	FR-A-2 071 003 (ROUS P.) * figure 2 *	1,2	
A	GB-A- 515 259 (PARNALL & SONS) * figures 1-3 *	1,2,5	
A	FR-A-2 447 165 (POZZER) * figures 1-3 *	1,2,5	
A	US-A-1 366 743 (J.B. O'CONNOR) * figures 6-7 *	1	
A	US-A-3 031 088 (J.J. RIBBENS) * figure 6 *	1	TECHNICAL FIELDS SEARCHED (Int. Cl. ³)
A	US-A-3 112 034 (M. KAUFMAN et al.) * figures 2,3 *	2	A 47 B
A	GB-A- 952 576 (PALMER-SHILE) * figure 7 *	5	
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 01-07-1982	Examiner CURZI D.
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			