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54 **Improvements to metallic shelvings and the like.**

57 This invention relates to metallic shelvings and the like of the kind constituted by horizontal sheet panels (1) connected at their corners to struts (15), wherein each panel is provided with a peripheral vertical wall (2) extending along all the sides of the panel and reinforced on each side by alternated longitudinal ribs (3) and grooves (4) delimited each other by flat sides included on the plane of said peripheral wall, on said flat sides (6), near the corners of the panels, longitudinally elongated holes (8, 9, 10) are obtained disposed along vertical ranges, while each strut shows respective hooks (16) being able to be inserted and forced through all the holes of a respective range.

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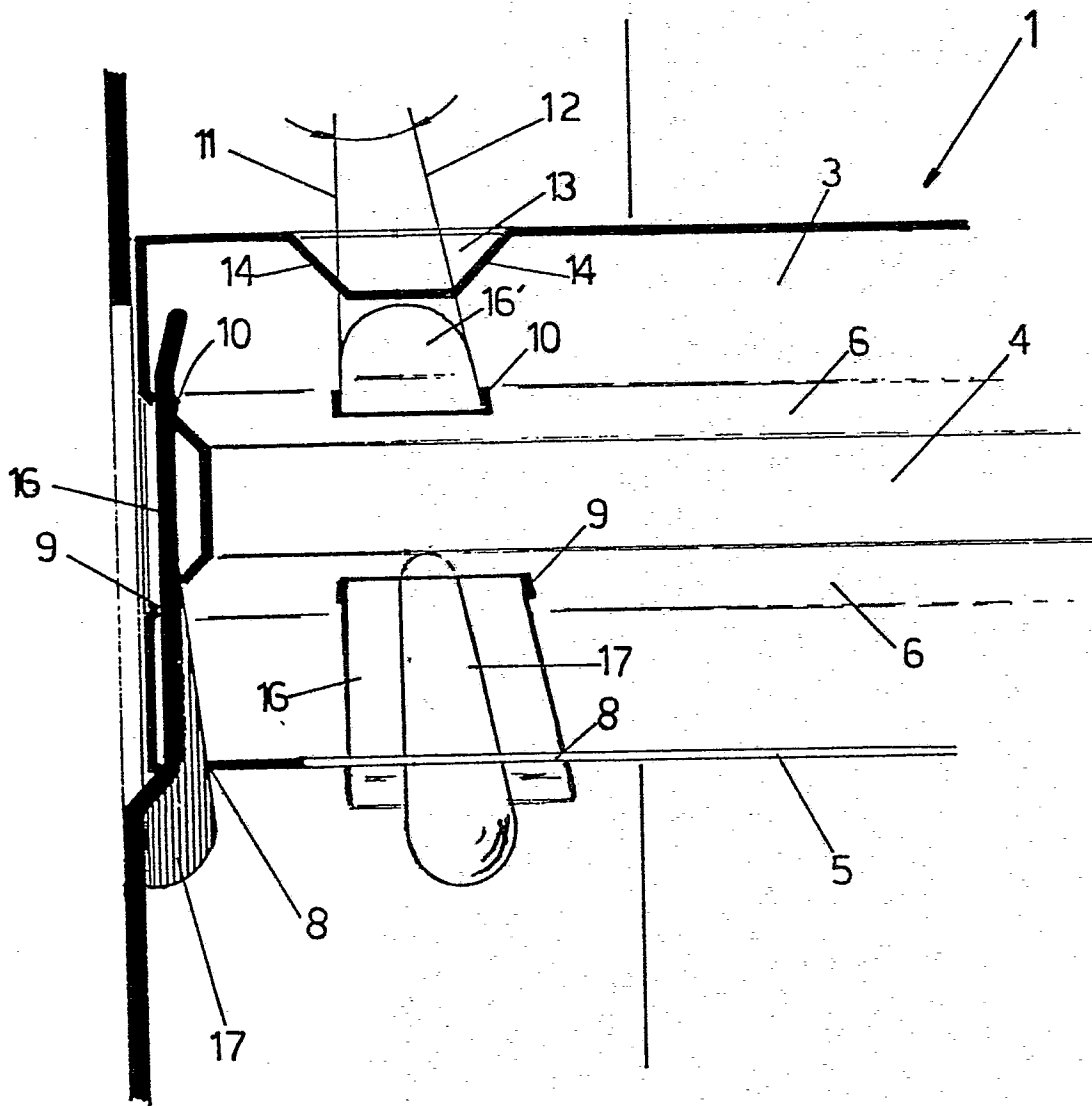


FIG. 4

- 1 -

Improvements to metallic shelvings and the like

The present invention relates to some improvements to metallic shelvings particularly to the shelvings that are composed by horizontal sheet panels, or shelves, provided with a peripheral vertical wall connected at their corners
5 to vertical struts usually obtained by angled metallic strips.

A first aim of the invention is to provide metallic shelves or panels that may support a load greater than the load
10 supported by the shelves of the prior art having the same thickness of the metallic sheets and the same sizes in plane view.

A second aim of the invention, is to strengthen the
15 peripheral wall of the horizontal sheet panels, or shelves, and the junction between each shelf and the strut, so that a greater load may be applied along the strut, and so that a greater coupling stiffness, and consequently a greater stiffness of the whole structure, may be obtained.

20

A further aim of the invention is to obtain a junction between each horizontal panel and the respective strut

- 2 -

without any possibility of play, without any possibility of spontaneous release, said junction having the tendency to approach each corner of the horizontal panel to respect
ive strut so that the stability and the load capacity of
5 the structure are increased.

To reach said aims, the improvements of the present invent
ion are characterized in that each side of the vertical
peripheral wall, of the horizontal sheet panel, is shaped
10 such in a way that it shows an alternation of juxtaposed
longitudinal ribs and grooves delimited one with respect
to the other by flat sides inclined with respect to the
plane of said peripheral wall, and is provided with a ter-
minal edge folded inwardly of the same peripheral wall, said
15 inclined flat sides and the respective folded terminal edge
of a side at least of the peripheral wall, in proximity of
each corner of the panel, being provided with respective
longitudinally elongated holes located in a vertical range,
so that a respective hook, projecting from the adjacent
20` strut, may be inserted through all the holes of the vertical
range.

In a preferred embodiment of the invention, the longitudinal
ly elongated holes of each vertical range have a respective
25 lenght decreasing from the lower hole to the upper hole, so
that a correspondently tapered hook may be inserted through
all the holes of the vertical range, forcing their lateral
edges against the ends of said holes.

30 In a further embodiment of the invention, the longitudinally

- 3 -

elongated holes of each vertical range have the respective ends, nearer to the corner of the horizontal sheet panel, disposed along a common vertical line, while the other respective ends are disposed along an inclined line with
5 respect to the vertical one and consequently the hook shows the inner lateral edge vertically directed while the outer lateral edge is inclined as said inclined line, so that in the coupling, the hook of each side of the strut has the tendency to push the respective corner of the
10 horizontal panel toward the corner of the strut.

In a further embodiment of the invention each hook of a strut is provided with an embossment starting from below the base of the hook and extending beyond the middle point
15 of the height of the same hook, said embossment being able to cause a shrinkage in the transversal direction of each hole, and consequently forcing the hook into each hole both in the longitudinal and transversal direction.

20 In a further embodiment of the invention, each horizontal sheet panel is provided on its horizontal plane surface with peripheral grooves, so that even said horizontal plane surface is strenghtened, thus avoiding the employment of tubular elements that up to now have been applied by welding
25 on the underface of the sheet panels.

An embodiment of the invention will now be described in more details with reference to the accompanying drawings, in which:

- 4 -

- Figure 1 is a sectional view of an horizontal sheet panel improved according to the invention;
- Figure 2 is a perspective external view of a corner of the sheet panel as represented in figure 1;
- 5 Figure 3 is a perspective view of a strut designed to be coupled with the corner represented in figure 2;
- Figure 4 is a sectional view of the corner of figure 2 coupled with the strut of figure 3;

10 As shown in figures 1 and 2, an horizontal sheet panel 1 for composing metallic shelvings, according to the present invention, is provided with a peripheral wall 2, each side of which is so shaped as to show alternated longitudinal ribs 3 and grooves 4, and a lower edge 5 folded horizontall
15 ly and inwardly for an appreciable width.

Ribs 3 and grooves 4 are delimited each other by inclined flat sides 6.

20 As shown in the drawings, both ribs 3 and grooves 4 have respective top and bottom flat walls, but said top and bottom walls may have an arcuated shape.

In proximity of each corner 7 of the panel 1, and on at
25 least one of the sides of the peripheral wall converging in said corner, the inclined flat sides 6 and the bent edge 5 are provided with respective holes 8, 9 and 10, so located as to compose a vertical range, said holes being comprised between the top and bottom walls respectively of
30 the ribs and the grooves.

- 5 -

The holes 8, 9, 10 of each vertical range are generally elongated in the longitudinal direction of the respective side of the peripheral wall 2, so that they are flattened in the vertical direction.

5

The shape and the location of said holes allow the insertion of a flattened hook, inserted starting from the hole 8, through all the holes of the vertical range, passing between the top and bottom walls of the ribs and the
10 grooves respectively, as shown in figure 4.

Moreover, the holes of each vertical range, are gradually reduced in length starting from hole 8 toward hole 10.

15 In a preferred embodiment of the invention, and as better shown in figures 1 and 4, the ends of the holes 8, 9 and 10 nearer to the corners 7 are located along a vertical line 11 or along a line perpendicular to the sheet panel 1, while the other ends are located along a line 12 inclined
20 with respect to said panel, or to the vertical line.

The horizontal sheet panel 1 is provided on its plane with peripheral grooves 13 limited by inclined flat sides 14 said grooves providing a stiffness of the surface of the
25 sheet panel, and avoiding the employment of additional stiffening elements, that, according to the known art have been employed and applied on the underface of the sheet by welding, with a consequent appreciable increasing of the production cost.

In the case of the sheet plane shown in figure 1, on the contrary, said stiffening grooves are obtained in the shaping phase of the sheet and consequently without an appreciable increasing of the cost.

5

As seen in figures 1, 2 and 4, the sheet panel of the invention, constitutes a component of a shelving showing high stiffness and mechanical resistance, because of the shaping of the peripheral wall and of the grooves 13, so that, the thickness of the sheet and the plane size being equal, the sheet panel of the invention may support a load greater than the one supported by the sheet panels of the prior art.

15 Figure 3 shows a strut 15 according to the present invention.

Said strut has right angled section obtained from a strip having an adequate thickness, by shearing and shaping the same, according to the usual art. According to the present invention on each wall of the angled strut, a range of vertically spaced hooks 16 is provided, each hook projecting from the inner face of the respective wall.

25 Each hook 16, as shown in figures 3, 4 is so vertically elongated as to be inserted through a vertical range of holes 8, 9, 10 and to project from the upper hole 10 with its end 16'.

30 Each hook has a shape upwardly tapered so that it may

- 7 -

follow, as accurately as possible, the variation of the
length of the holes 8 to 10 and may be forced in each one
of the holes, through which it has been inserted, by inter-
ference of its edges with the ends of the elongated holes
5 8 to 10.

As better shown in figure 4 according to the preferred
arrangement of the holes, the hook 16 has the edge nearer
to the corner of the strut, perpendicular to the sheet panel
10 and the opposed edge inclined with respect to said panel,
so that, in the coupling of the panel and the strut, the
interference between the inclined edges and the respective
ends of the holes has more and more the tendency to wedge
in the corner of the panel toward the strut.

15
Furthermore, each hook 16, is provided with a front embos-
sment 17 which extends from below the base of the same
hook and beyond the middle point of its height. This
embossment is designed to generate a forcing of the hook
20 also in the transversal direction of the holes 8, 9, 10 so
that the coupling assures a complete forcing and eliminates
every possible play.

The coupling of the hook 16 with holes 8, 9, 10 is better
25 shown in figure 4.

The hook seen in frontal view in figure 4 shows the manner
in which the hook 16 is forced through the holes 8, 9, 10
in the direction of their length, while the hook seen in
30 sectional view shows the forcing in the transversal direc-

tion of the holes, said forcing being due to the embossment 17 and substantially interesting the holes 8 and 9.

5 So, it can be seen from figure 4 that the coupling of the sheet panel 1 with each strut is very rigid, with a consequent great increasing of the stiffness and the capacity load of the whole structure.

10 Moreover a greater capacity load of the coupling between the hook 16 and holes 8, 9 and 10 corresponds to the increased capacity load of each sheet panel, because the stress exercised over each coupling is distributed in correspondence of each hole both by the forcing in said holes and by the fact that the embossment 17 strenghtens the respective
15 hook 16, thus increasing the bending stress of the latter.

This description is made only by way of example and not as a limitation to the scope of the invention; many variations and modifications may be made and will become apperent to
20 those skilled in the art; said modifications and variations fall within the true spirit and scope of the invention as pointed out by the appended claims.

Claims

1. Improvements to metallic shelvings, of the kind composed by horizontal sheet panel and by vertical struts on which
5 said horizontal sheet panels are mounted at each corner, said horizontal sheet panels being provided at each side with a vertical peripheral wall, characterized in that each side of the vertical peripheral wall (2) of the horizontal sheet panel (1) is shaped such in a way as to show an al
10 ternation of juxtaposed longitudinal ribs (3) and grooves (4) delimited one with respect to the other by flat sides (6) inclined with respect to the plane of said peripheral wall, said inclined flat sides and the respective folded
15 terminal edge of at least a side of the peripheral wall, in proximity of each corner of the panel, being provided with respective longitudinally elongated holes (8, 9, 10) located in a vertical range, so that a respective hook (16) projecting from the adjacent strut (15) may be inserted through all the holes of the vertical range.

20

2. Improvements to metallic shelvings as claimed in claim 1. characterized in that, in a preferred embodiment of the invention, the longitudinally elongated holes of each vertical range have a respective length decreasing from the
25 lower hole (8) to the upper hole (10), so that a correspondently tapered hook (16) may be inserted through all the holes of the vertical range, forcing their lateral edges against the ends of said holes.

30 3. Improvements to metallic shelvings as claimed in claims

1,2 characterized in that the longitudinally elongated holes of each vertical range have the respective ends, closer to the corner of the horizontal sheet panel, disposed along a common vertical line (11), while the other
5 respective ends are disposed along an inclined line (12) with respect to the vertical one and consequently the hook (16) shows the inner lateral edge vertically directed while the outer lateral edge is inclined as said inclined line, so that in the coupling, the hook of each side of the
10 strut, has the tendency to push the respective corner of the horizontal panel toward the corner of the strut.

4. Improvements to metallic shelvings according to claims 1, 2 characterized in that each hook (16) of a strut (15)
15 is provided with an embossment (17) starting from below the base of the hook and extending beyond the middle point of the height of the same hook, said embossment being able to cause a shrinkage in the transversal direction of each hole.

20
5. Improvements to metallic shelvings according to claim 1 characterized in that each horizontal sheet panel 1 is provided on its horizontal plane surface with peripheral grooves (13).

- 113 -

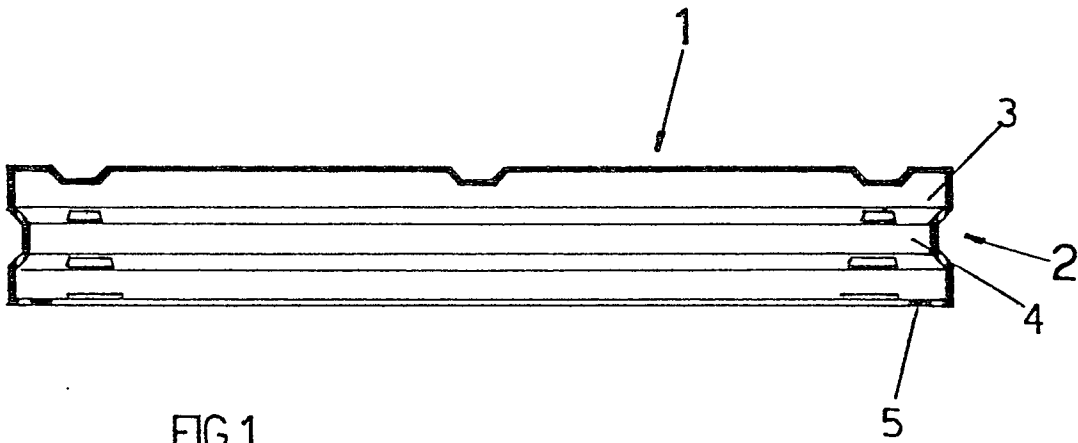


FIG. 1

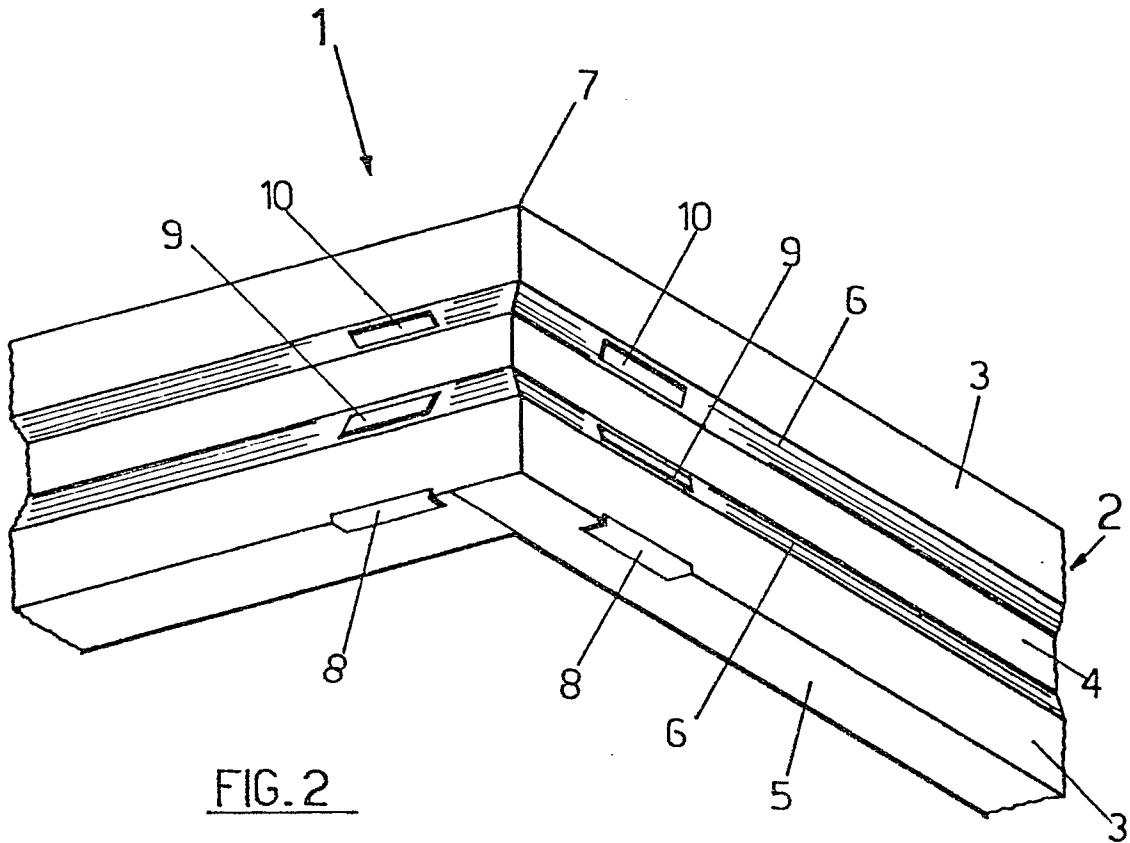


FIG. 2

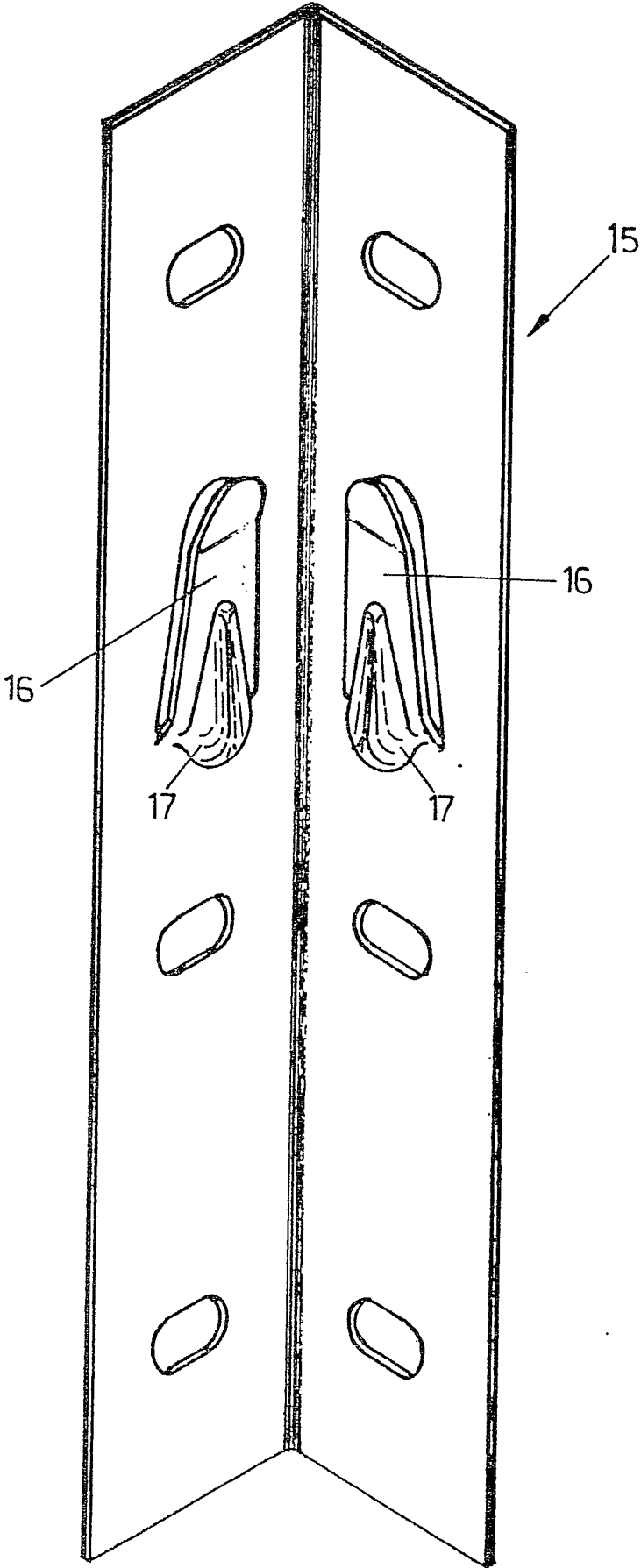


FIG.3



DOCUMENTS CONSIDERED TO BE RELEVANT			CLASSIFICATION OF THE APPLICATION (Int. Cl. ³)
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	
X	<u>FR - A - 2 344 249 (GUILLEMIN)</u> * Claims 1,2; figures 1-3 * --	1-3	A 47 B 57/16
X	<u>DE - B - 1 186 182 (NULKEN)</u> * Claim 1; figures 1-4 * --	1-3	
	<u>GB - A - 952 576 (PALMER SHILE)</u> * Claim 1; figure 7 * ----	1	
			TECHNICAL FIELDS SEARCHED (Int. Cl. ³)
			A 47 B
			CATEGORY OF CITED DOCUMENTS
			X: particularly relevant A: technological background O: non-written disclosure P: intermediate document T: theory or principle underlying the invention E: conflicting application D: document cited in the application L: citation for other reasons
			&: member of the same patent family, corresponding document
<input checked="" type="checkbox"/> The present search report has been drawn up for all claims			
Place of search	Date of completion of the search	Examiner	
The Hague	04-02-1981	SCHMITTER	