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(54) **Shelf construction.**

(57) Shelf construction to be positioned on two supporting brackets which can be secured to a rack, the shelf being made of sheet material and the front margin and/or the rear margin of the shelf being through-shaped, and a hook-shaped ledge of a boxlike body being detachably hookable to the free wall of this through-shaped margin, in which the box extends over the entire length and over a portion of the width of the underside of the shelf and in which the other longitudinal margin of the box facing the hook-shaped ledge is perpendicularly bent so that a strip of said box, extending along said longitudinal margin, can be positioned against the underside of the shelf in such a manner that the portion of the shelf above the box fits like a cover onto the box.

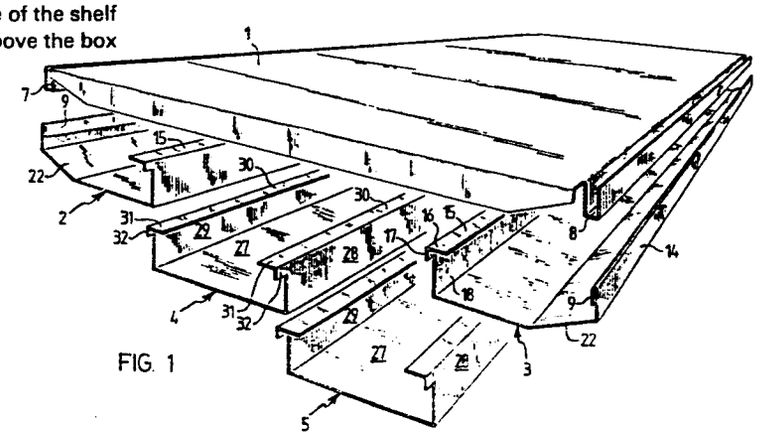

FIG. 1

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Shelf construction with pertaining rigid supporting brackets.

The invention relates to a shelf construction to be positioned on two supporting brackets which can be secured to a rack, the shelf being made of sheet material.

Such a shelf is not rigid enough to be able to support relatively heavy objects without sagging between the brackets. Moreover, the shelf has an unattractive appearance in side view and particularly in bottom view since the shelf has been made of thin sheet material. If the margins of the shelf are bent downwards, this will give the shelf a more attractive appearance in oblique top view and in side view, however, a high-positioned shelf will remain an unattractive appearance in oblique bottom view.

According to the invention, these drawbacks are removed since the front margin and/or the rear margin of the shelf are trough-shaped, a hook-shaped ledge of a boxlike body being detachably hookable to the free wall of this trough-shaped margin, in which the box extends over the entire length and over a portion of the width of the underside of the shelf and in which the other longitudinal margin of the box facing the hook-shaped ledge is perpendicularly bent so that a strip of said box, extending along said longitudinal margin, can be positioned against the underside of the shelf in such a manner that the portion of the shelf above the box fits like a cover onto the box.

Said boxes, which will be called marginal boxes hereafter, and

its hook-shaped ledge in particular, provide a stiffening support to the shelf since the hook-shaped ledge comprises two vertical and thus rigid in vertical direction wall portions, supporting the shelf by means of its trough-shaped margin. Moreover, the shelf is stiffened by the two vertical wall portions of every trough-shaped margin against sagging. Furthermore the other vertical wall facing the hook-shaped ledge of every marginal box constitutes a stiffening support beam for the shelf. Finally the shelf with the marginal box, when viewed from the side, obtains a massive and therefore more attractive appearance.

The underside of the shelf can be entirely or partially hidden from view by the two marginal boxes, depending on the width of the shelf and the width of the two marginal boxes. Wide shelves can be sufficiently supported and their underside can be hidden from view since then, according to the invention, the two boxes each cover only a marginal strip of the underside of the shelf, in which at least one intermediate box can be disposed between the two marginal boxes and in which every intermediate box has the same length as every marginal box and has a U-shaped cross-section with perpendicularly bent longitudinal margins, so that two longitudinal strips of the intermediate box can be positioned against the underside of the shelf.

The two vertical walls of every intermediate box are rigid in vertical direction so they support the shelf against sagging. The stiffening effect of the two marginal boxes and every intermediate box on the shelf is increased if, according to another characterizing feature of the invention, the perpendicularly ben margins of every marginal box and intermediate box protrude and fit in corresponding recesses in each of the two supporting brackets.

According to another characterizing feature of the invention, every marginal box can easily be mounted onto the shelf since the hook-shaped ledge of every marginal box fits so tightly onto the free wall of the trough-shaped margin of the shelf, that

when securing the hook-shaped ledge to the free wall by pivoting it, the free strip of the hook-shaped ledge yields resiliently and springs back. In this embodiment, preferably the free wall of the troughlike margin of the shelf fits between the upwards bent portion and the portion bent over 180° of the hook-shaped ledge of every marginal box, on account of which the shelf, via its free wall of its troughlike edge, is soundly supported on every marginal box and thus is stiffened.

If the upper surface of the shelf has to be defined by walls extending above the shelf, such a defining wall can be inserted in every throughlike margin of the shelf, positioning said defining wall between the free strip of the hook-shaped ledge of the marginal box and the wall of the throughlike margin of the shelf facing it. Should such a defining wall extending above the shelf not be required, then, according to the invention, the free marginal strip of the hook-shaped ledge of every marginal box resiliently and closely fits between the two side walls of the throughlike margin of the shelf.

According to the invention, the front margin and the rear margin of the shelf are preferably symmetrically shaped and the marginal boxes are equeal to each other, so that the shelf and the marginal boxes can be mounted at random.

So as not to disfigure the shelf by spot welding, rivets or other connecting means, the marginal strips of the boxes mounted against the underside of the shelf, according to the invention, can be glued to the shelf. Another possibility according to the invention is that the adjacent vertical wall portions of adjacent boxes comprise recesses and projections which fit together.

According to the invention it is optional whether the bottom of every marginal box is inclined entirely or partially upwards to the hook-shaped ledge, but is it also possible according to the invention that the bottoms of all the boxes are parallel to the shelf.

According to the invention, the ends of all boxes can be open and furthermore preferably covered by the supporting brackets.

Also according to the invention, the shelf can be made of 0.9 mm thick sheet material, while every box is made of 0.4 mm thick sheet material.

The invention will be elucidated hereafter on the basis of the following description of a number of examples and embodiments of the invented shelf construction which have been indicated in the drawing.

Fig. 1 shows the shelf, the marginal boxes and the intermediate boxes according to the invention in perspective and in their condition before they are assembled into the invented shelf construction.

Fig. 2 shows the parts of the invented shelf construction according to fig. 1 in assembled condition and a supporting bracket for the shelf construction in perspective with the pertaining partial upright.

Fig. 3 shows the invented shelf construction mounted to the supporting bracket according to fig. 2.

Fig. 4 shows in cross-section a marginal box being secured to the trough-shaped margin of the shelf.

Fig. 5 shows in cross-section a marginal box secured to the trough-shaped margin of the shelf.

Fig. 6 shows in perspective marginal boxes and intermediate boxes with recesses and projections which fit together in their adjacent vertical wall portions.

Fig. 7 shows in schematical cross-section a shelf with only marginal boxes, so without intermediate boxes.

The invented shelf construction can, in general, be constructed as shown in figs 1 and 2. Here the shelf construction is assembled from the actual shelf 1, two equal marginal boxes 2 and 3 and two equal intermediate boxes 4 and 5. It goes without saying that no, one or more than two intermediate boxes can be positioned between the two marginal boxes. According to figs 2 and 3 the shelf, the marginal boxes and the intermediate boxes can be disposed on two supporting brackets 6 being detachably secured to the uprights 35 of a rack which has not been drawn further since such a rack is generally known.

According to the invention, the shelf 1 is made of sheet material, e.g. sheet metal and e.g. 0.9 mm thick and according to fig. 1 the shelf at least comprises a troughlike bent front margin 7 and a trough-like bent rear margin 8, the shelf being symmetrical in cross-section so that the shelf can be disposed with the rear margin as front margin and vice versa.

According to fig. 1, every marginal box 2 and 3 comprises a hook-shaped ledge 9 which, according to fig. 4, resiliently and closely fits about the free side wall 10 of the trough-shaped margin 7 of the shelf 1 so that when placing the side wall 10 into the hook-shaped ledge 9 by pivoting the shelf, the free strip 11 of the marginal box 2 or 3 yields and springs back into its normal position again according to figs 4 and 5. This resilient yielding and springing back is realized because the marginal box is made of thinner plate material, e.g. 0.4 mm thick plate metal, whereas the shelf is made of thicker and consequently more rigid plate material having a thickness of e.g. 0.9 mm.

As appears from fig. 5, the side wall 10 of the shelf closely fits between the upwards bent portion 12 and the portion 13 bent over 180° of the hook-shaped ledge 9 of the marginal box 2 or 3.

On account of this, and due to the fact that the side wall 10 of the shelf 1 fits resiliently and closely into the hook-shaped ledge 9 of the marginal box 2 or 3, the marginal box is firmly anchored in the shelf, whereas on the other hand the shelf 1 is

stiffened due to the rigidity in vertical direction of the vertical parts 14 and 11 of the hook-shaped ledge 9 of the marginal box 2 or 3.

Every marginal box 2 or 3 is perpendicularly bent at the other vertical wall 18 opposite the hook-shaped ledge 9 so that a strip 15 can be mounted against the underside of the shelf 1 according to figs 1, 2 and 3. Preferably a portion 16 of this strip 15 and an adjacent portion 17 of the vertical, interior wall 18 of the marginal box 2 or 3 protrude with respect to the rest of the end of the marginal box and these protruding portions 16 and 17 of the marginal box protrude in a similarly shaped recess 19 in the supporting bracket according to figs 2 and 3. On account of that, the strip 15 and the interior wall 18 of every marginal box 2 and 3 rest direct onto the supporting brackets 6 and thus they provide support for the shelf 1 which, via the strip 15, rests on the interior wall 18. For the rest, the shelf 1 rests direct on the supporting bracket 6 outside the recesses 19 and 20 in the supporting bracket and outside the projections 21 and 26 of the supporting bracket 6 as appears from fig. 2 and 3.

A part 22 of the bottom of every marginal box 2 or 3 can incline upwards to the exterior wall 14 of every marginal box as is indicated in fig. 1, but the bottom of every marginal box can also be flat according to fig. 6. Moreover a fully inclined bottom 24 is possible in every marginal box 2 and 3 according to fig. 7. The fact that the bottom of every marginal box is entirely or partially inclined or completely flat is only meant to give the shelf a nice appearance. It goes without saying that in one and the same shelf, the one marginal box can have an entirely or partially inclined bottom and the other marginal box can have a completely flat bottom, or the one marginal box can have an entirely inclined bottom and the other marginal box can have a partially inclined bottom.

As appears from figs 4 and 5, the distance between the vertical wall portions 10 and 25 of the through-shaped margin 7 or 8 of

the shelf 1 is far greater than the thickness of the free strip 11 of the hook-shaped ledge 9 of the marginal box 2 and 3, so that a wall known per se can be inserted between the strip 11 and the wall portion 25 so as to provide the front or the rear of the shelf 1 with a wall extending above the shelf in order to prevent objects disposed on the shelf from falling off. However, if such a defining wall for the shelf 1 is not desired, the strip 11 and the wall portion 25, according to fig. 7, can be placed so close together as is necessary for placing the strip 11 of the marginal box 2 or 3 between the wall portions 10 and 25 of the trough-shaped margin 7 or 8 of the shelf 1.

The protruding portion 21 at the free end of the supporting bracket 6 serves to confine the end of the trough-shaped margin 8 at the front of the shelf 1, as appears from figs 2 and 3, from which it also appears that the protruding portion 26 at the base of the supporting bracket 6 serves to confine the end of the trough-shaped margin 7 at the rear of the shelf 1.

If a shelf 1 is narrow, its underside could be completely covered by two sufficiently wide marginal boxes 2 and 3. With a wide shelf 1, as indicated in fig. 7, it is also possible to suffice with only the two marginal obxes 2 and 3, leaving a part of the underside of the shelf 1 uncovered, in which uncovered part of the shelf 1 one or more supporting beams for the shelf 1 which are known per se can be mounted.

Otherwise, the uncovered part of the underside of the shelf 1 can be entirely covered by disposing one or more intermediate boxes between the two marginal boxes 2 and 3. Fig. 2 shows e.g. the application of two intermediate boxes 4 and 5. In this embodiment, according to fig. 1, each intermediate box comprises a flat bottom 27 and two vertical side walls 28 and 29 each abutting the side wall of an adjacent intermediate box of an adjacent marginal box. The two side walls 28 and 29 are perpendicularly bent near their free margin so that every intermediate box comprises two strips 30 that can be positioned against the underside of the shelf 1.

According to fig. 1, every strip comprises a protruding part 31, and every side wall 28 and 29 also comprises a protruding part 32, the two protruding parts 31 and 32 being interconnected. Every pair of protruding parts 31 and 32 is insertable into a corresponding recess 19 or 20 in the supporting bracket 6 according to fig. 2, so that every intermediate box 4 or 5 rests direct onto the supporting brackets 6 and thus, via strips 30, supports the shelf 1. In this way, the vertical walls 28 and 29 of every intermediate box attribute to the rigidity of the shelf 1 against sagging on account of the weight of the objects placed onto the shelf. Moreover, the bottoms 27 of the intermediate boxes attribute to a nice appearance of the shelf construction.

So as to interconnect the intermediate boxes 4 or 5 and the marginal boxes 2 or 3, their adjacent vertical side walls 28 and 28, respectively, may comprise recesses 33 and projections 34 which fit together, as is indicated in fig. 6. In this embodiment, every projection 34 is substantially formed by a downwards and outward sloping face with respect to the wall in question of the box, on account of which this projection is easily slidable upwards along the wall of the adjacent box until the projection is inserted into a complementary recess 33 due to the fact that the wall with the projection springs back to its normal position.

Otherwise or moreover, the widths of the intermediate boxes and marginal boxes can have been chosen so accurately with respect to the width of the shelf 1 that the intermediate boxes 4 and 5 are clamped inbetween the marginal boxes 2 and 3.

If desired, the strips 15 of the marginal boxes 2 and 3 as well as the strips 30 of the intermediate boxes 4 and 5 can be attached to the shelf 1. Attaching them is preferably performed by glueing, because spot welding, rivets and other connecting means disfigure the top of the shelf 1.

The ends of the marginal boxes 2 and 3 and the intermediate boxes 4 and 5 are open and are preferably covered by the supporting brackets 6 as according to fig. 3.

Preferably the widths of the shelfs 1 are so adapted to the widths of the marginal boxes 2 and 3 and the intermediate boxes 4 and 5, that one size of marginal box and one size of intermediate box only are sufficient to provide every shelf, no matter what its width, with two marginal boxes of the same size and one or more intermediate boxes of the same size.

The supporting bracket preferably comprises a shifted portion 36 in which at least the flanged end margin 37 of the shelf 1 fits. This adjusted part renders the supporting bracket more rigid, so that the supporting bracket can either have an encreased carrying capacity or a slimmer shape, or both. Moreover, the flanged margin 37 does not extend or extends less beyond the supporting bracket, so that two supporting brackets can be positioned more closely together, on account of which every perforation 38 in every upright can be more narrow, resulting in stronger and more appealing and/or more narrow uprights.

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CLAIMS

1. Shelf construction to be positioned on two supporting brackets which can be secured to a rack, the shelf being made of sheet material, characterized in that the front margin and/or the rear margin of the shelf is trough-shaped, a hook-shaped ledge of a boxlike body being detachably hookable to the free wall of this through-shaped margin, in which the box extends over the entire length and over a portion of the width of the underside of the shelf and in which the other longitudinal margin of the box facing the hook-shaped ledge is perpendicularly bent so that a strip of said box, extending along said longitudinal margin, can be positioned against the underside of the shelf in such a manner that the portion of the shelf above the box fits like a cover onto the box.

2. Shelf construction according to claim 1, characterized in that the two boxes each cover only a marginal strip of the underside of the shelf, in which at least one intermediate box can be disposed between the two marginal boxes and in which every intermediate box has the same length as every marginal box and has a U-shaped cross-section with perpendicularly bent longitudinal margins, so that two longitudinal strips of the intermediate box can be positioned against the underside of the shelf.

3. Shelf construction according to claim 1 or 2, characterized in that the perpendicularly bent margins of every marginal box and intermediate box protrude and fit in corresponding recesses in

each of the two supporting brackets.

4. Shelf construction according to any of the preceding claims, characterized in that the hook-shaped ledge of every marginal box fits so tightly onto the free wall of the through-shaped margin of the shelf, that when securing the hook-shaped ledge to the free wall by pivoting it, the free strip of the hook-shaped ledge yields resiliently and springs back.

5. Shelf construction according to any of the preceding claims, characterized in that the free wall of the through-shaped margin of the shelf closely fits between the upwards bent portion and the portion bent over 180° of the hook-shaped ledge of every marginal box.

6. Shelf construction according to any of the preceding claims, characterized in that the free strip of the hook-shaped ledge of every marginal box resiliently and closely fits between the two side walls of the through-shaped margin of the shelf.

7. Shelf construction according to any of the preceding claims, characterized in that the front margin and the rear margin of the shelf are symmetrically shaped and in that the marginal boxes are equal to each other, so that the shelf and the marginal boxes can be mounted at random.

8. Shelf construction according to any of the preceding claims, characterized in that the marginal strips of the boxes which are mounted against the underside of the shelf are glued to the shelf.

9. Shelf construction according to any one of claims 1-7, characterized in that the marginal boxes hooked to the shelf clamp between them the box or boxes disposed inbetween.

10. Shelf construction according to any one of claims 1-7, characterized in that the adjacent verticall wall portions of adjacent boxes comprise recesses and projections which fit together.

11. Shelf construction according to any of the preceding claim-, characterized in that the bottom of every marginal box is inclined entirely or partially upwards to the hook-shaped ledge.

12. Shelf construction according to any one of claims 1-10, characterized in that the bottoms of all the boxes are parallel to the shelf.

13. Shelf construction according to any of the preceding claims, characterized in that the ends of all boxes are open.

14. Shelf construction according to any of the preceding claims, characterized in that the shelf is made of 0.9 mm thick sheet material, while every box is made of 0.4 mm thick sheet material.

15. Shelf construction according to any of the preceding claims, characterized in that each supporting bracket comprises a shifted portion on which at least the flanged margin of the end of the shelf extending along the supporting bracket fits.

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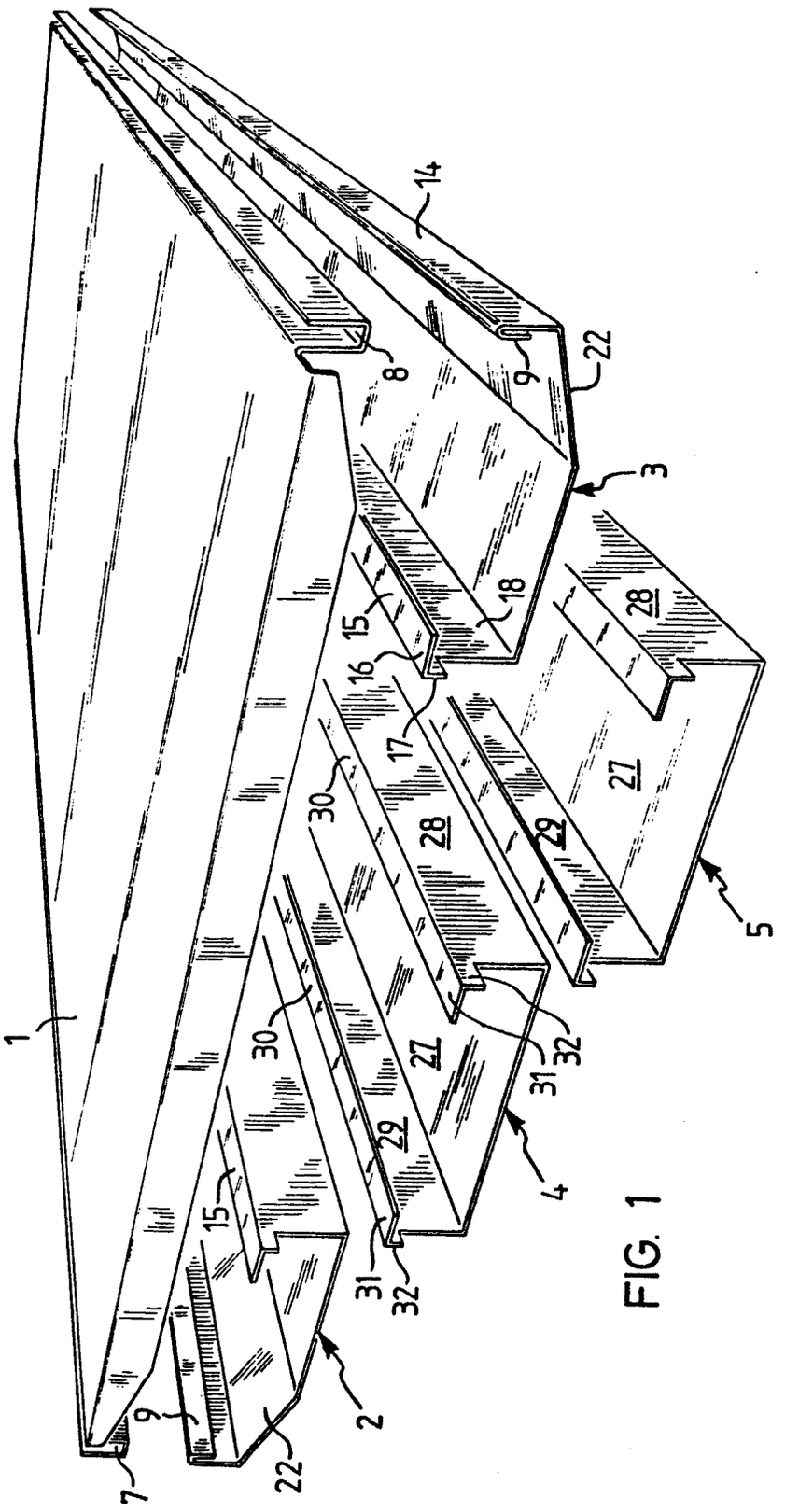

FIG. 1

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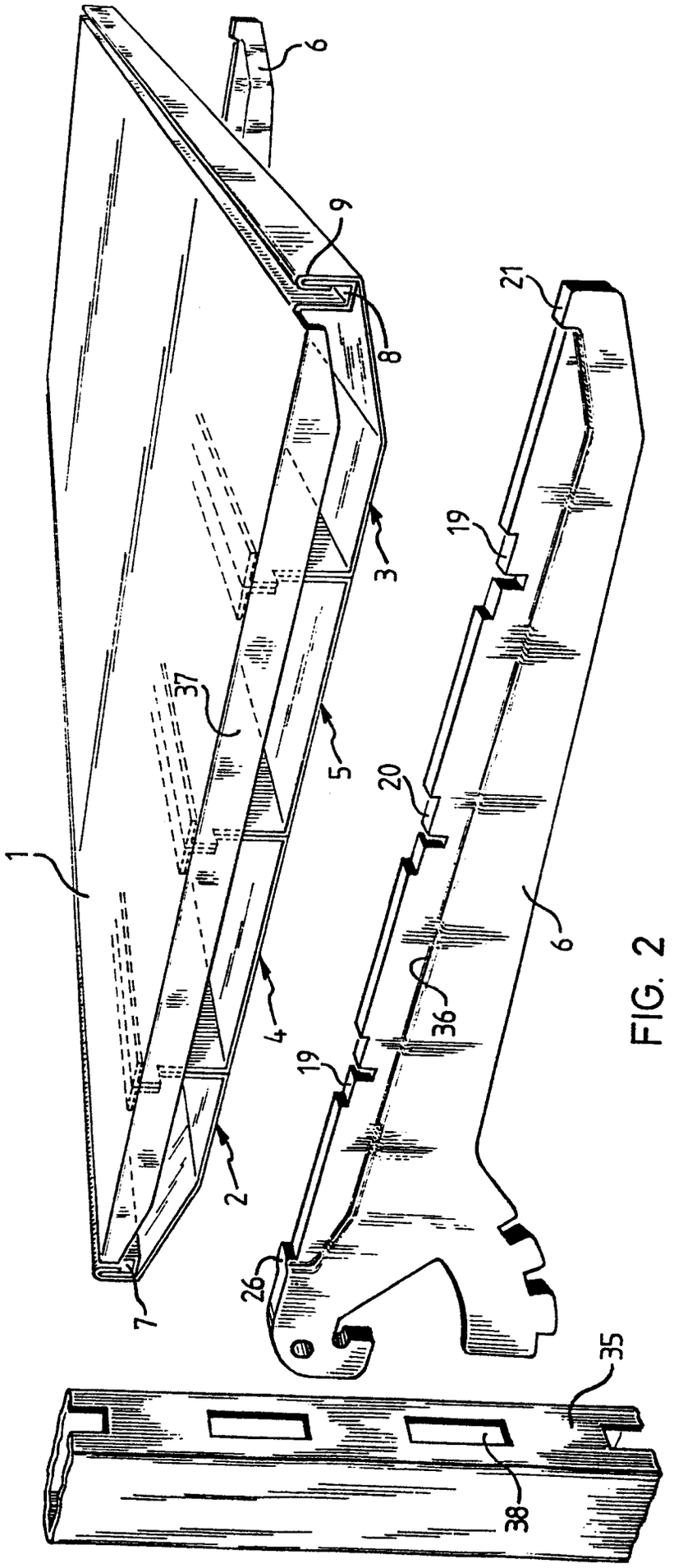

FIG. 2

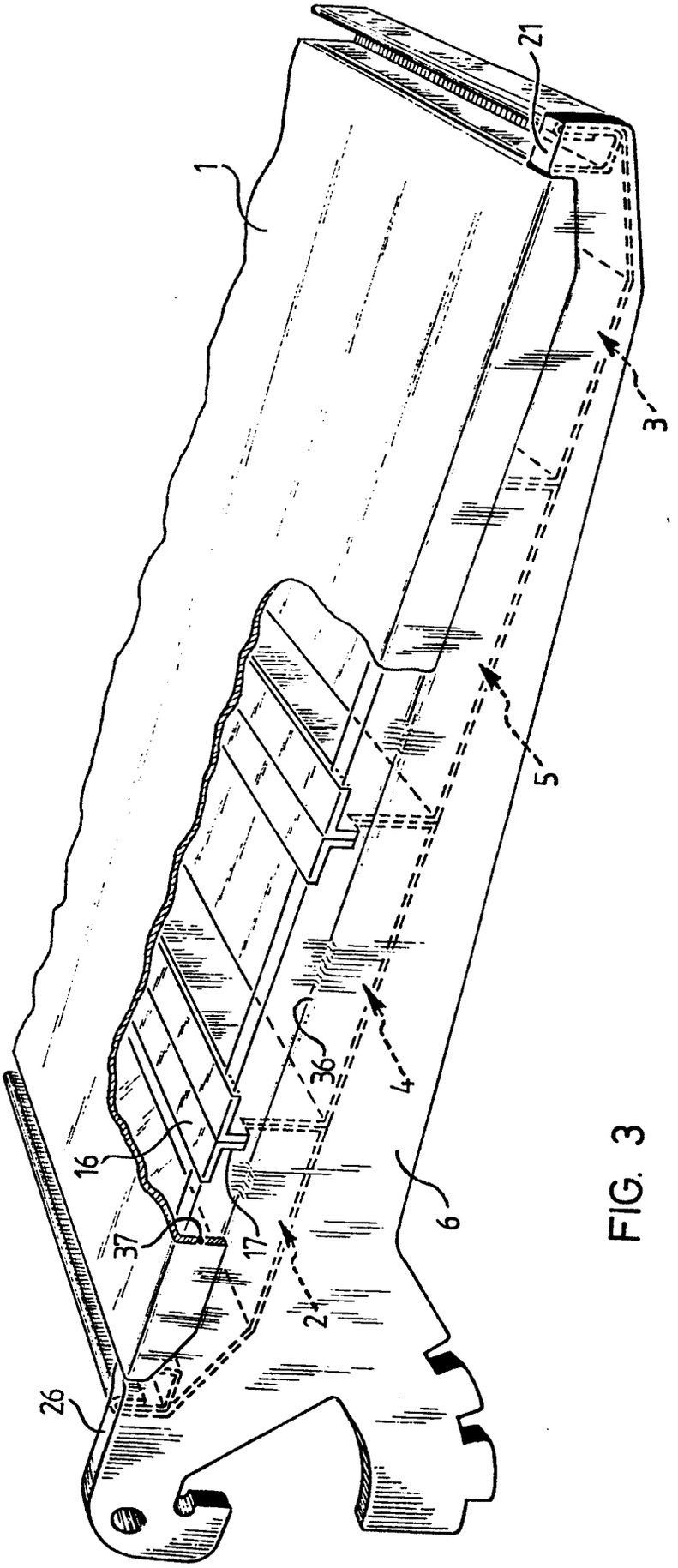

FIG. 3

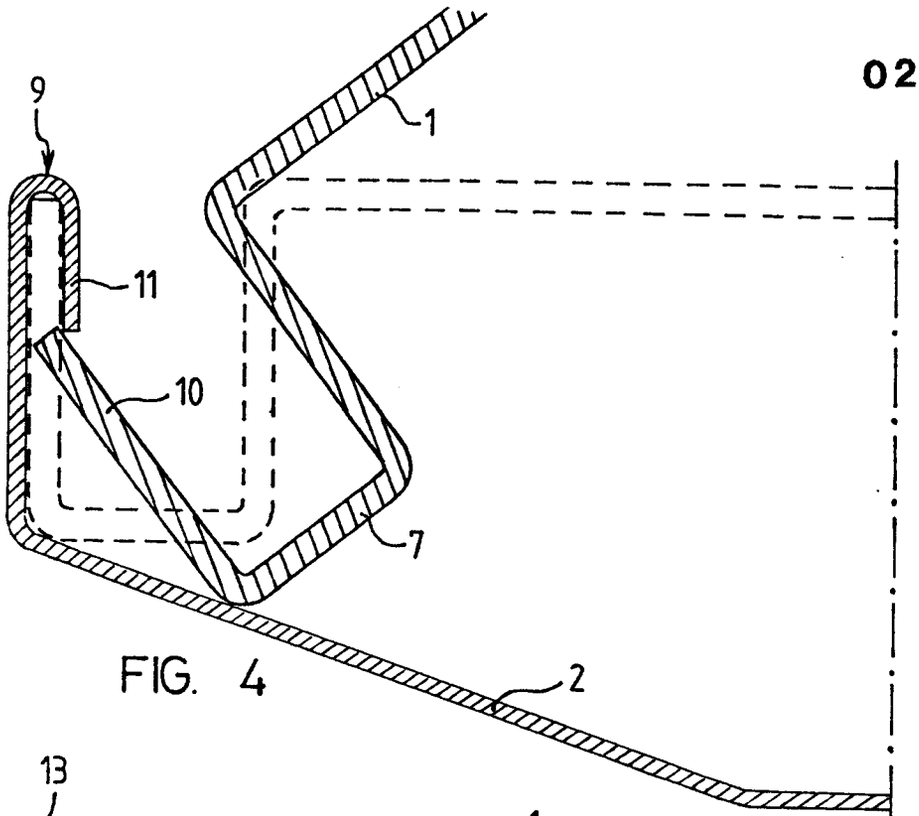

FIG. 4

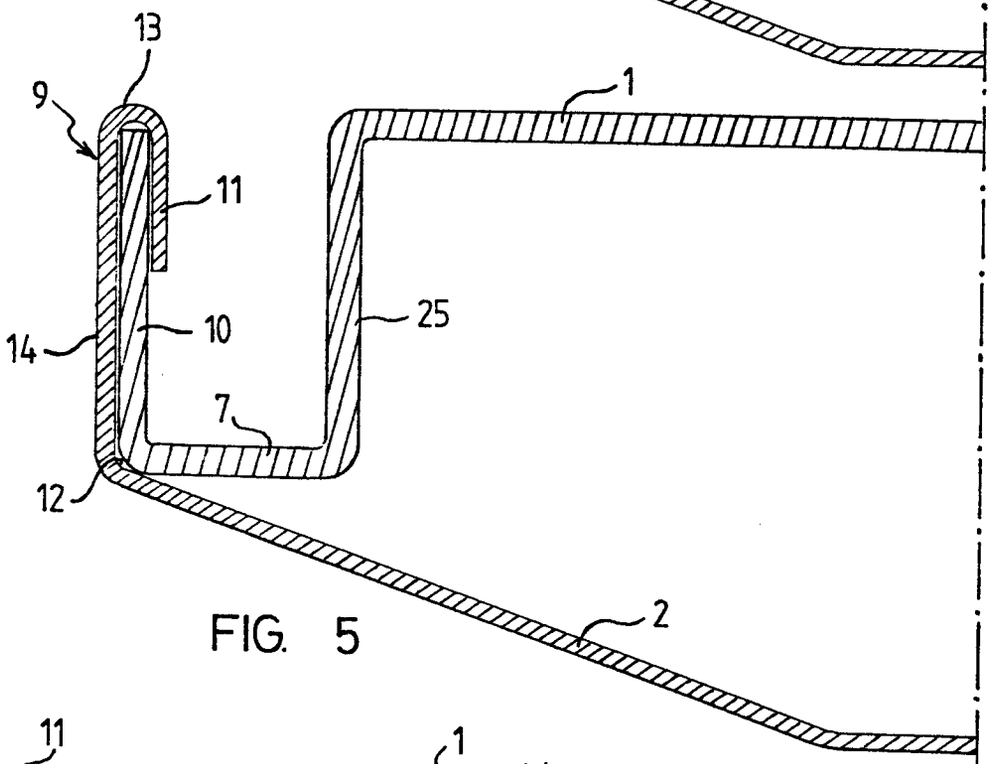

FIG. 5

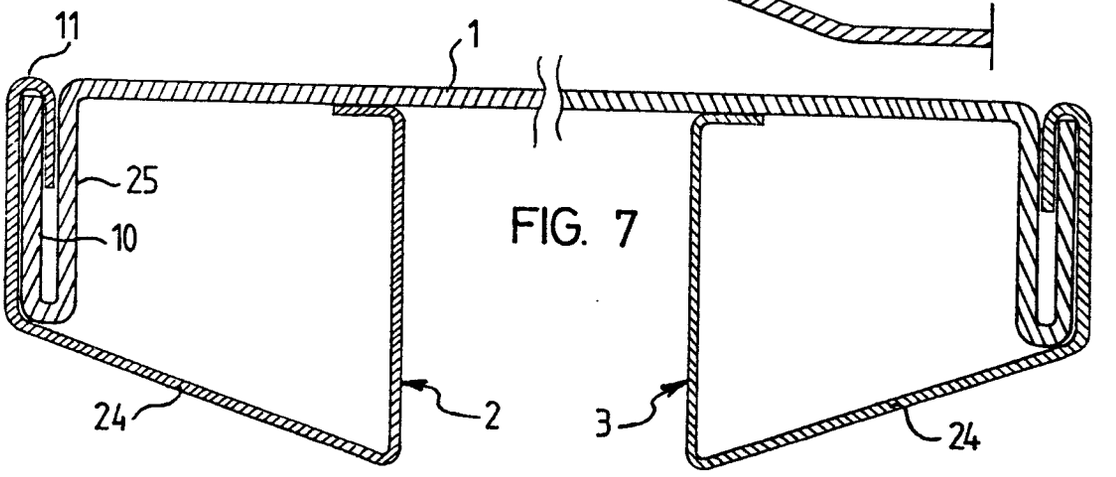

FIG. 7

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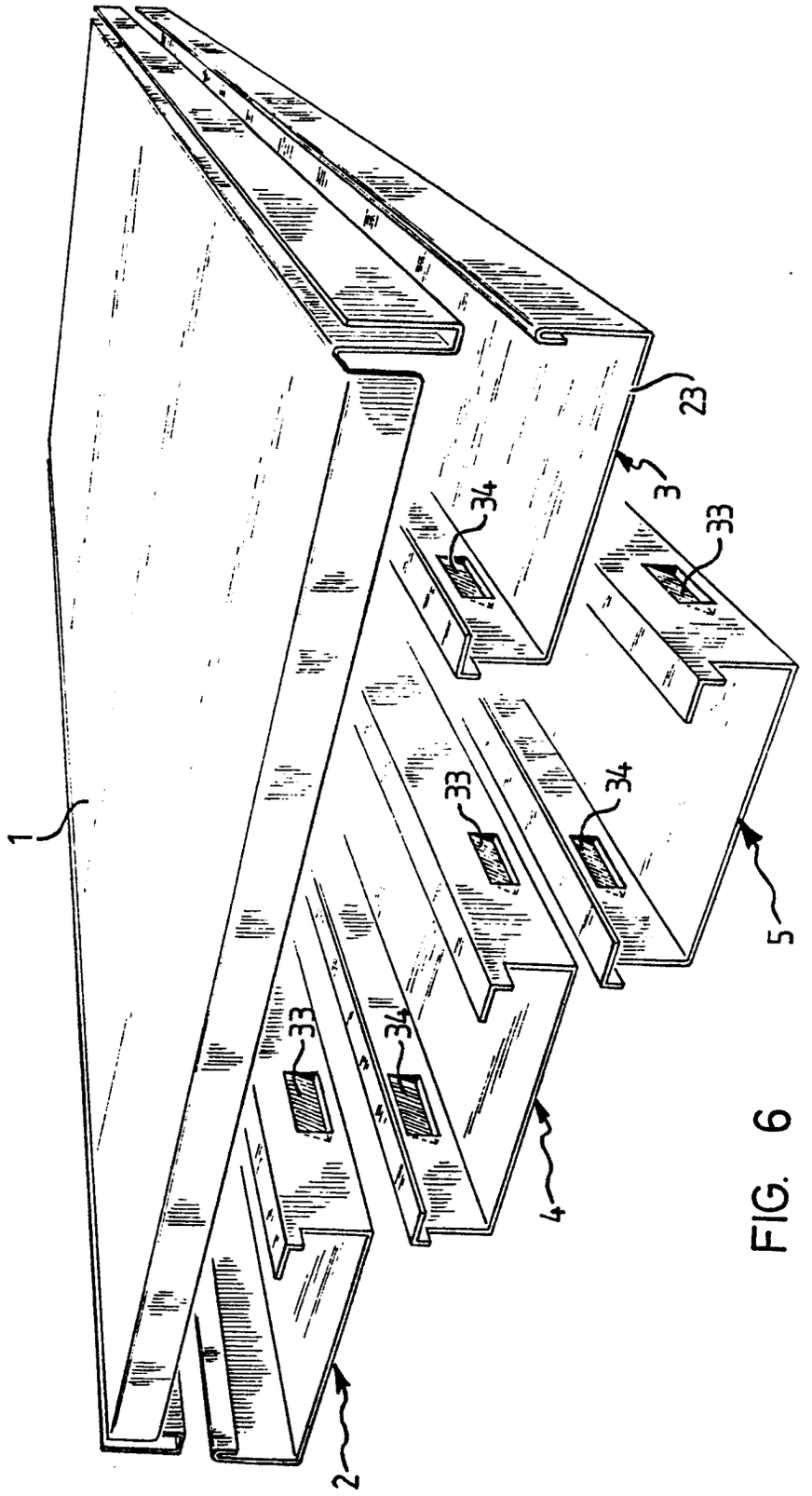

FIG. 6

European Patent Office

EUROPEAN SEARCH REPORT

Application number 0228753

EP 86 20 2399

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 4)
Y	GB-A-1 065 304 (FLEXIBLE SELECTION) * Page 2, lines 55-69; figures 1-7 *	1	A 47 B 96/02 A 47 B 57/42
Y	FR-A-2 258 151 (BOHNACKER) * Claim 1; figures 3,4,7 *	1	
A		2,3,7, 12,13, 15	
A	US-A-2 975 908 (HUET) * Column 3, lines 7-55; figures 1-3 *	9,14, 15	

TECHNICAL FIELDS SEARCHED (Int. Cl.4)
A 47 B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	01-04-1987	SCHMITTER BERNARD

CATEGORY OF CITED DOCUMENTS

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