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(54) Support structure for shelf brackets

(57) A support structure for supporting shelf brackets is disclosed, said support structure comprising at least two parallel sidewalls and at least one supporting wall arranged between said sidewalls and being provided with a plurality of slots. The sidewalls and the supporting wall are roll-formed of a continuous piece of metal. Further, the support structure further comprises a reinforcement wall connected to the supporting wall, and being provided with a corresponding plurality of slots. Further, a method and an apparatus for forming such support structures are also disclosed.

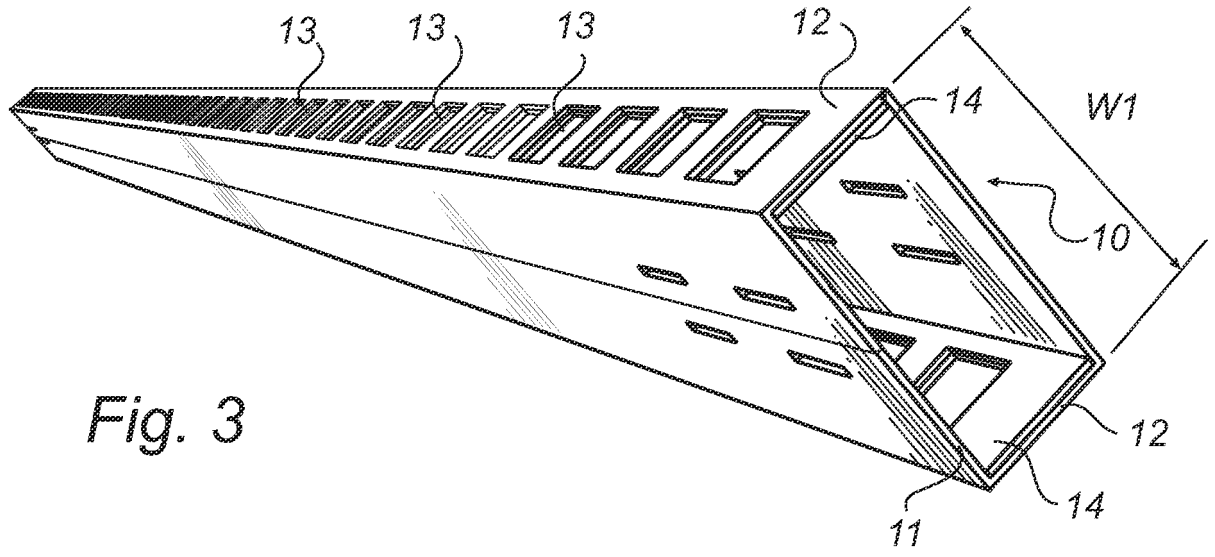

Fig. 3

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Description

Field of the invention

[0001] The present invention relates to a support structure for supporting shelf brackets, and particularly a support structure of the type forming a post comprising at least two parallel sidewalls and at least one supporting wall arranged between said sidewalls and being provided with a plurality of slots, wherein said sidewalls and said supporting wall are roll-formed of a continuous piece of metal. The present invention further relates to a method for manufacturing such a support structure.

Background of the invention

[0002] A very common type of commercial shelves include vertically extending posts with a plurality of vertically arranged slots receiving the proximal end of shelf brackets cantileveredly mounted thereto. The brackets include a plurality of fingers at the proximal end that project into the slots allowing the shelf resting atop the fixture to be adjusted to and from a horizontal position and/or an inclined position. Such shelves are widely used in e.g. retail shops. Such shelves assemblies are e.g. disclosed in US 6 641 098 and GB 2 362 808.

[0003] Further, it is known to roll-form the support structures for such shelves assemblies. Roll-forming are e.g. disclosed in US 6 742 234 and GB 989 027, both said documents hereby incorporated by reference.

[0004] On the one hand, such shelves assemblies need to fulfill standard requirements related to the intended use. For example, a common requirement for retail shop shelves is that each shelve should be able to carry about 300 kg of merchandise goods. On the other hand, there is a need for shelves assemblies which can be manufactured to a lower cost.

Summary of the invention

[0005] It is therefore an object of the present invention to provide a support structure for supporting shelf brackets, and particularly a support structure of the type forming a post comprising at least two parallel sidewalls and at least one supporting wall arranged between said sidewalls and being provided with a plurality of slots, wherein said sidewalls and said supporting wall are roll-formed of a continuous piece of metal, which can be made more cost-efficiently.

[0006] This object is achieved with a support structure and a method of manufacture according to the appended claims.

[0007] According to a first aspect of the invention there is provided a support structure for supporting shelf brackets, said support structure comprising at least two parallel sidewalls and at least one supporting wall arranged between said sidewalls and being provided with a plurality of slots, wherein said sidewalls and said supporting wall are roll-formed of a continuous piece of metal. The support structure further comprises a reinforcement wall connected to said supporting wall, and provided with a corresponding plurality of slots.

[0008] It has been found by the present inventor that the force exerted on the support structure, and in particular the posts, in the vicinity of the connection to the shelve brackets is significantly greater, due to the torque (turning moment) exerted by the cantilevered shelve structures, than the axial force exerted on the support structure. Accordingly, the forces exerted on the support wall(s) is much greater than the forces exerted on the side walls. Consequently, it is possible to significantly reduce the thickness of the sidewalls without compromising the overall strength and robustness of the support structure. In practice, this is accomplished by the provision of a reinforcement wall connected to the supporting wall, and provided with a corresponding plurality of slots.

[0009] For example, a conventional post of this type has two sidewalls with a cross-sectional width extension of 80 mm, and two support walls with a cross-sectional width extension of 30 mm. Conventionally, these walls are formed by equal thickness of about 2.5 mm. By means of the present invention, these wall could instead be made with a 1.25 mm thickness, and with reinforcement walls of about the same extension as the support walls, and with a thickness of 1.25 mm. Hereby, the support walls and the reinforcement walls together provides the same thickness as in the conventional posts, whereas the sidewalls are significantly thinner. Consequently, the material needed for the posts can be reduced with about 40%, providing a significantly more cost-efficient production.

[0010] The support structure preferably comprises two parallel supporting walls arranged between said sidewalls, wherein the walls forms a hollow structure with an essentially rectangular cross-section. This support structure preferably has two reinforcement walls, one for each supporting wall. Such a support structure can be used to support shelve brackets on two opposite sides, which is very useful e.g. in self-standing shelve systems. Alternatively, the support structure may have e.g. an essentially U-shaped cross-section.

[0011] Preferably the sidewalls and the at least one supporting walls are essentially equally thick. Further, the thickness of the reinforcement wall is preferably at least 50% of the thickness of the supporting wall. The thickness of the sidewalls and the at least one supporting wall are preferably within the range 0.5 - 2 mm, and preferably in the range 1 - 1.5 mm, and most preferably about 1.25 mm. The thickness of the reinforcement wall is preferably within the range 0.5 - 2 mm, and preferably in the range 1 - 1.5 mm, and most preferably about 1.25 mm.

[0012] The reinforcement wall is preferably arranged on the inside of the support structure. Hereby, connection of the reinforcement wall to the support wall becomes less critical, and the reinforcement wall will e.g. be automatically held in place by the shelve brackets during use.

Further, the exterior appearance of the support structure is in this case not affected by the provision of the reinforcement wall. However, arrangement of the reinforcement wall on the exterior side of the support structure is also feasible.

[0013] The reinforcement wall is preferably connected to the supporting wall by means of at least one of welding, and preferably point welding, and adhesion. The connection may be provided over the whole contacting area. However, it is preferred that the connection is only arranged in a few connection points, such as in the upper and lower end, and perhaps in one or a few intermediate points, depending e.g. on the length of the support structure.

[0014] The reinforcement wall preferably has a cross-sectional width extension which exceeds the cross-sectional width extension of the slots, and which is less than 1.5 times the cross-sectional width extension of the supporting wall. Preferably, the reinforcement wall has a cross-sectional width extension which is within 80-120 % of the cross-sectional width extension of the supporting wall, and preferably within 90-110 % of said width extension of the supporting wall, and most preferably about the same as said width extension of the supporting wall. In case the width extension of the reinforcement wall is greater than the width extension of the supporting wall, the reinforcement wall is preferably arranged to continue in to the adjacent sidewalls.

[0015] The reinforcement wall is preferably of the same type of material as the sidewalls and the supporting walls. However, it is also possible to use a stronger material in the reinforcement wall. In such a case, the reinforcement wall can be made thinner, and still provide the same strength and robustness as a thicker wall of weaker material.

[0016] According to another aspect of the invention there is provided a method of manufacturing a support structure for supporting shelf brackets, comprising the steps of: providing a first metal sheet material; roll-forming said first sheet material to form a support structure comprising at least two parallel sidewalls and at least one supporting wall arranged between said sidewalls; and punching a plurality of slots in said supporting wall; characterized in that it further comprises the step of: providing, before or after the roll-forming, at least one second metal sheet material; connecting said second metal sheet material as a reinforcement wall to said supporting wall; and providing said reinforcement wall, before, after or in conjunction with connecting it with said supporting wall, with a plurality of slots corresponding to the slots of said supporting wall.

[0017] Hereby, similar advantages are obtained as discussed above in relation to the first aspect of the invention.

[0018] According to still another aspect of the present invention, there is provided a system for manufacturing a support structure for supporting shelf brackets, comprising: a feeding device for feeding a first metal sheet material; a feeding device for feeding at least one second metal sheet material; a connecting device for connecting said second metal sheet material to said first metal sheet material; a roll-forming apparatus for forming said first sheet material to a support structure comprising at least two parallel sidewalls and at least one supporting wall arranged between said sidewalls, wherein said second metal sheet material is arranged to form a reinforcement wall connected to said supporting wall; and a punching apparatus for punching a plurality of slots in said supporting wall and said reinforcement wall, wherein said punching occurs before or after said roll-forming.

[0019] Hereby, similar advantages are obtained as discussed above in relation to the first and second aspect of the invention.

[0020] These and other aspects of the invention will be apparent from and elucidated with reference to the embodiments described hereinafter.

Brief description of the drawings

[0021] For exemplifying purposes, the invention will be described in closer detail in the following with reference to embodiments thereof illustrated in the attached drawings, wherein:

Fig 1 is a schematic overview of a method for producing support structures in accordance with an embodiment of the present invention;

Fig 2 is a perspective view from the side illustrating the material arrangement for forming a support structure in accordance with an embodiment of the present invention before roll-forming;

Fig 3 is a perspective view from one side illustrating a support structure in accordance with an embodiment of the present invention; and

Fig 4 is a cross-sectional view of a support structure having a shelve bracket arranged thereto, in accordance with an embodiment of the present invention.

Description of preferred embodiments

[0022] With reference to fig 3, the invention generally relates to a support structure 10 for supporting shelf brackets, such as posts for use in shelve systems for displaying merchandise or the like. The support structure 10 comprises at least two parallel sidewalls 11 and at least one supporting wall 12 arranged between said sidewalls. In the shown embodiment, two parallel supporting walls 12 are provided, providing a hollow structure with an essentially rectangular cross-section. The supporting walls 12 are each provided with a plurality of slots 13. Further, there is provided reinforcing walls 14 on the inside of the supporting walls 12, and being provided with corresponding slots 13.

[0023] In an operative position, the slots are arranged to receive holding structures 21, such as hooks or the like, on shelve brackets 20. Such an arrangement is il-

lustrated in Fig 4. Several different types of shelve brackets may be used with the above-discussed type of support structures. Many such shelf brackets are known in the art, and e.g. disclosed in US 6 641 098, said document hereby incorporated by reference.

[0024] In an exemplary embodiment, the two sidewalls have a cross-sectional width extension W1 of about 80 mm, and the two support walls have a cross-sectional width extension W2 of about 30 mm. The wall thickness is about 1.25 mm, and the reinforcement walls have about the same extension as the support walls, and with a thickness of 1.25 mm. The center to center distance between adjacent slots is in this example about 50 mm.

[0025] The reinforcement walls 14 are preferably connected to the supporting walls 12 by means of at least one of welding, and preferably point welding, and adhesion. The connection is preferably only arranged in a few connection points, such as in the upper and lower end, and perhaps in one or a few intermediate points.

[0026] Next, a method and an apparatus for manufacturing of a support structure of the above-discussed type will be discussed in some detail with reference to Fig 1. In a first step, metal sheet material is provided in the form of rolls of sheet material. Preferably, a roll 20 of broader sheet material is provided for the formation of the sidewalls and the supporting walls, and two rolls 21 of narrower material is provided for the formation of the reinforcement walls.

[0027] Thereafter, in a second step, the metal sheets are connected to each other, so that the sheets forming the reinforcement walls are connected to the part of the larger sheets to form the supporting walls, as illustrated in Fig 2. The connection could be made by point welding in a weld station 22, while the metal sheets are continuously moved along the production line.

[0028] In a third step, the slots are punched into the sheet materials in a punch station 23.

[0029] In a fourth step, the metal sheets are roll-formed into the intended cross-sectional shape, which in the above-discussed example is a rectangular tube. This is made in a roll-forming station 24. Such roll-forming apparatuses are per se previously known, and disclosed in e.g. GB 989 027 and US 6 742 234, both said documents hereby incorporated by reference.

[0030] In a fifth step, the now formed support structure is welded together along the joint, typically in the center of one of the sidewalls, in a weld station 25.

[0031] Finally, in a sixth step, the support structures are cut into adequate lengths in a cutting station 26.

[0032] It is to be noted that the above-discussed order of the steps may be varied in many ways. For example, the punching of the slots may be performed after the roll-forming of the posts, and also after the cutting into suitable lengths. It may also be possible to insert and connect the reinforcement walls to the support walls after the roll-forming step.

[0033] Still further, alternative ways of forming the reinforcement walls are feasible. For example, it is possible to form the reinforcement wall by folding the sheet material forming the supporting walls.

[0034] Specific embodiments of the invention have now been described. However, several alternatives are possible, as would be apparent for someone skilled in the art. For example, more than one reinforcement wall may be provided. Such multiple reinforcement walls may be arranged at various positions in the supporting structure, and/or arranged in an overlapping fashion. Further, the reinforcement wall may have different extensions and be of different material than the supporting wall. In addition, the supporting structure is particularly useful as posts in shelve systems for displaying merchandise, but the support structure of the present invention is useful for many other applications as well. Such and other obvious modifications must be considered to be within the scope of the present invention, as it is defined by the appended claims.

Claims

1. A support structure for supporting shelf brackets, said support structure comprising at least two parallel sidewalls and at least one supporting wall arranged between said sidewalls and being provided with a plurality of slots, wherein said sidewalls and said supporting wall are roll-formed of a continuous piece of metal, **characterized in that** the support structure further comprises a reinforcement wall connected to said supporting wall, and provided with a corresponding plurality of slots.

2. The support structure of claim 1, wherein the support structure comprises two parallel supporting walls arranged between said sidewalls, wherein the walls forms a hollow structure with an essentially rectangular cross-section.

3. The support structure of claim 1, wherein the support structure has an essentially U-shaped cross-section.

4. The support structure of any one of the preceding claims, wherein the sidewalls and the at least one supporting walls are essentially equally thick.

5. The support structure of claim 4, wherein the thickness of the reinforcement wall is at least 50% of the thickness of the supporting wall.

6. The support structure of any one of the preceding claims, wherein the thickness of the sidewalls and the at least one supporting wall are within the range 0.5 - 2 mm, and preferably in the range 1 - 1.5 mm, and most preferably about 1.25 mm.

7. The support structure of claim 6, wherein the thickness of the reinforcement wall is within the range 0.5

- 2 mm, and preferably in the range 1 - 1.5 mm, and most preferably about 1.25 mm.

8. The support structure of any one of the preceding claims, wherein the reinforcement wall is arranged on the inside of the support structure.

9. The support structure of any one of the preceding claims, wherein the reinforcement wall is connected to the supporting wall by means of at least one of welding, and preferably point welding, and adhesion.

10. The support structure of any one of the preceding claims, wherein the reinforcement wall has a cross-sectional width extension which exceeds the cross-sectional width extension of the slots, and which is less than 1.5 times the cross-sectional width extension of the supporting wall.

11. The support structure of any one of the preceding claims, wherein the reinforcement wall has a cross-sectional width extension which is within 80-120 % of the cross-sectional width extension of the supporting wall, and preferably within 90-110 % of said width extension of the supporting wall, and most preferably about the same as said width extension of the supporting wall.

12. A method of manufacturing a support structure for supporting shelf brackets, comprising the steps of:

providing a first metal sheet material;
roll-forming said first sheet material to form a support structure comprising at least two parallel sidewalls and at least one supporting wall arranged between said sidewalls; and
punching a plurality of slots in said supporting wall;

characterized in that it further comprises the step of:

providing, before or after the roll-forming, at least one second metal sheet material;
connecting said second metal sheet material as a reinforcement wall to said supporting wall; and providing said reinforcement wall, before, after or in conjunction with connecting it with said supporting wall, with a plurality of slots corresponding to the slots of said supporting wall.

13. The method of claim 12, wherein the support structure is roll-formed to comprise two parallel supporting walls arranged between said sidewalls, wherein the walls forms a hollow structure with an essentially rectangular cross-section.

14. The method of claim 12, wherein the support structure is roll-formed to an essentially U-shaped cross-section.

15. The method of any one of the claims 12-14, wherein the sidewalls and the at least one supporting walls are essentially equally thick.

16. The method of claim 15, wherein the thickness of the reinforcement wall is at least 50% of the thickness of the supporting wall.

17. The method of any one of the claims 12-16, wherein the thickness of the first metal sheet material is within the range 0.5 - 2 mm, and preferably in the range 1 - 1.5 mm, and most preferably about 1.25 mm.

18. The method of claim 17, wherein the thickness of the second metal sheet material is within the range 0.5 - 2 mm, and preferably in the range 1 - 1.5 mm, and most preferably about 1.25 mm.

19. The method of any one of the claims 12-18, wherein the reinforcement wall is connected to the inside of the support structure.

20. The method of any one of the claims 12-19, wherein the reinforcement wall is connected to the supporting wall by means of at least one of welding, and preferably point welding, and adhesion.

21. The method of any one of the preceding claims, wherein the reinforcement wall has a cross-sectional width extension which exceeds the cross-sectional width extension of the slots, and which is less than 1.5 times the cross-sectional width extension of the supporting wall.

22. The method of any one of the preceding claims, wherein the reinforcement wall has a cross-sectional width extension which is within 80-120 % of the cross-sectional width extension of the supporting wall, and preferably within 90-110 % of said width extension of the supporting wall, and most preferably about the same as said width extension of the supporting wall.

23. A system for manufacturing a support structure for supporting shelf brackets, comprising:

a feeding device for feeding a first metal sheet material;
a feeding device for feeding at least one second metal sheet material;
a connecting device for connecting said second metal sheet material to said first metal sheet material;
a roll-forming apparatus for forming said first sheet material to a support structure comprising

at least two parallel sidewalls and at least one supporting wall arranged between said sidewalls, wherein said second metal sheet material is arranged to form a reinforcement wall connected to said supporting wall; and
a punching apparatus for punching a plurality of slots in said supporting wall and said reinforcement wall, wherein said punching occurs before or after said roll-forming.

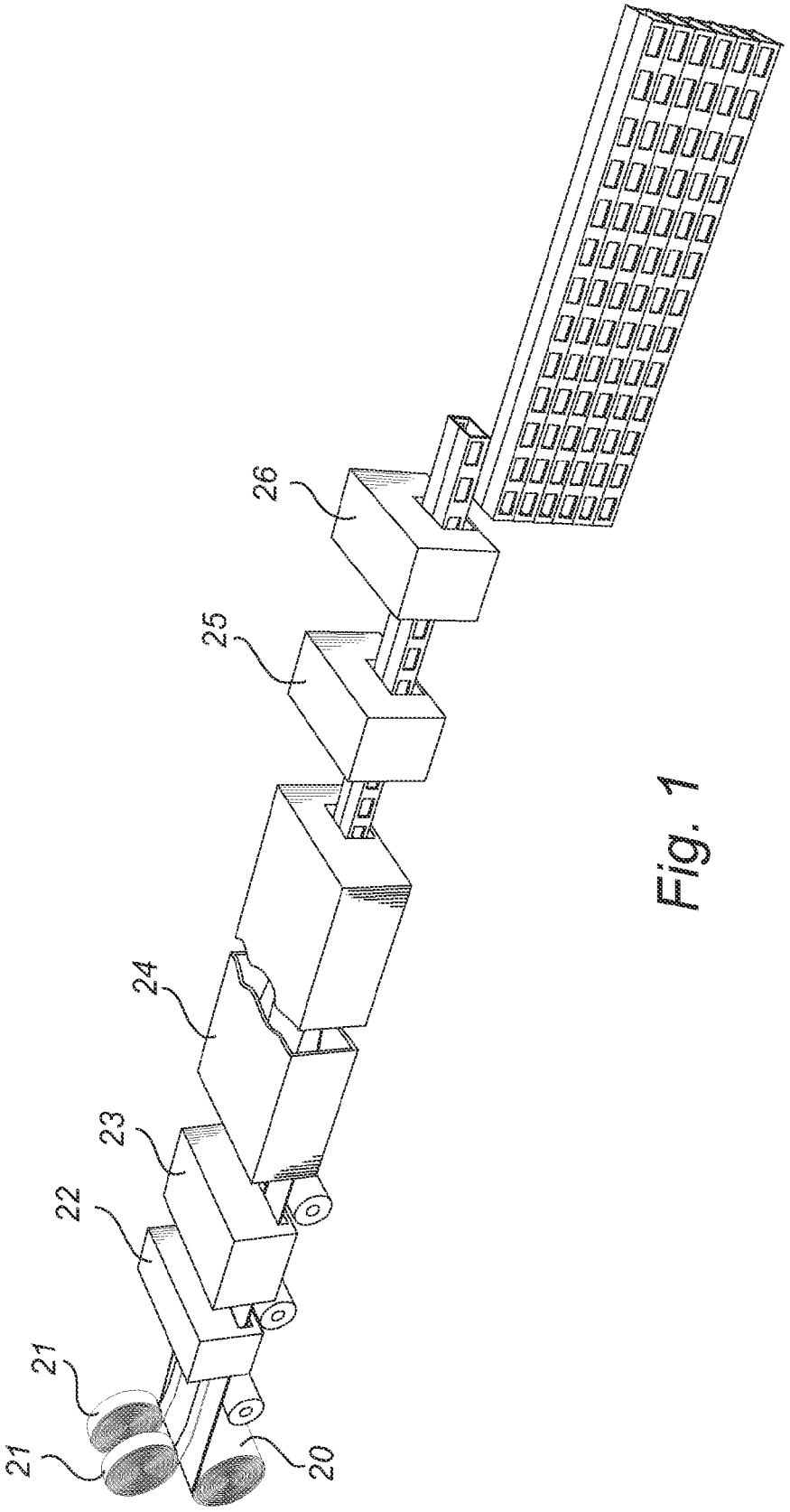

Fig. 1

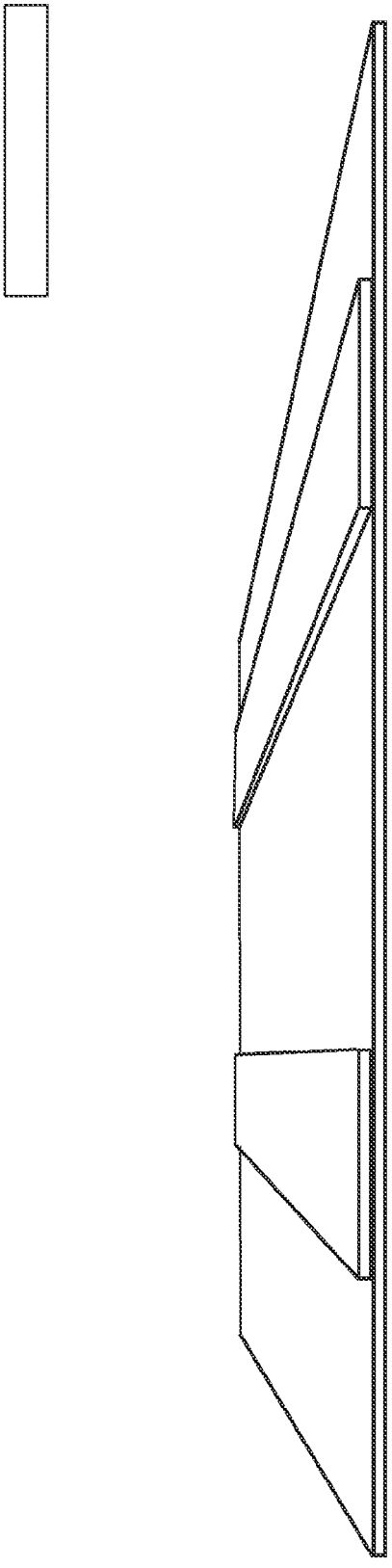

Fig. 2

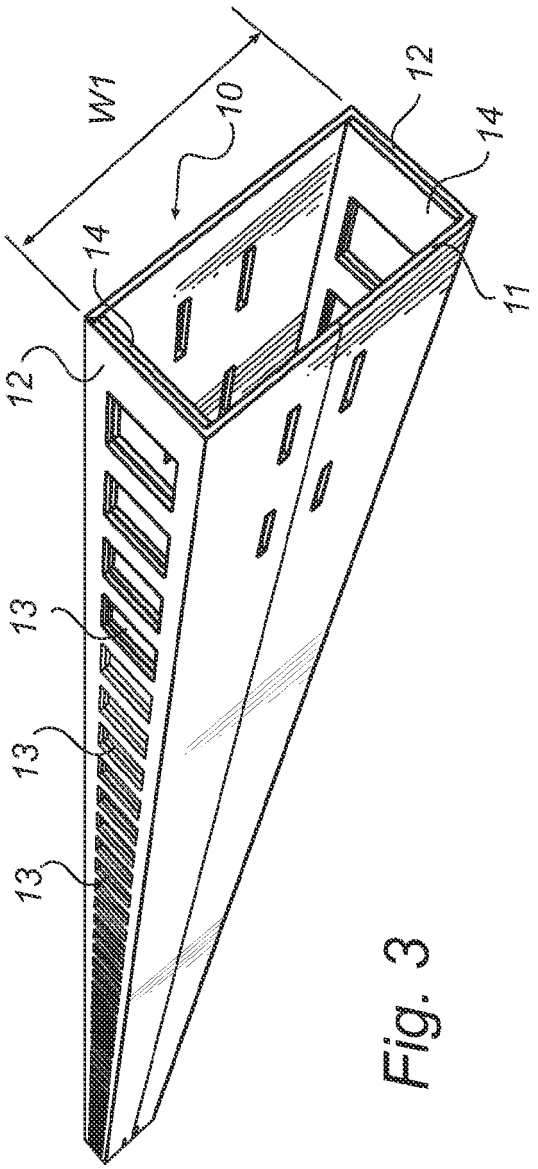

Fig. 3

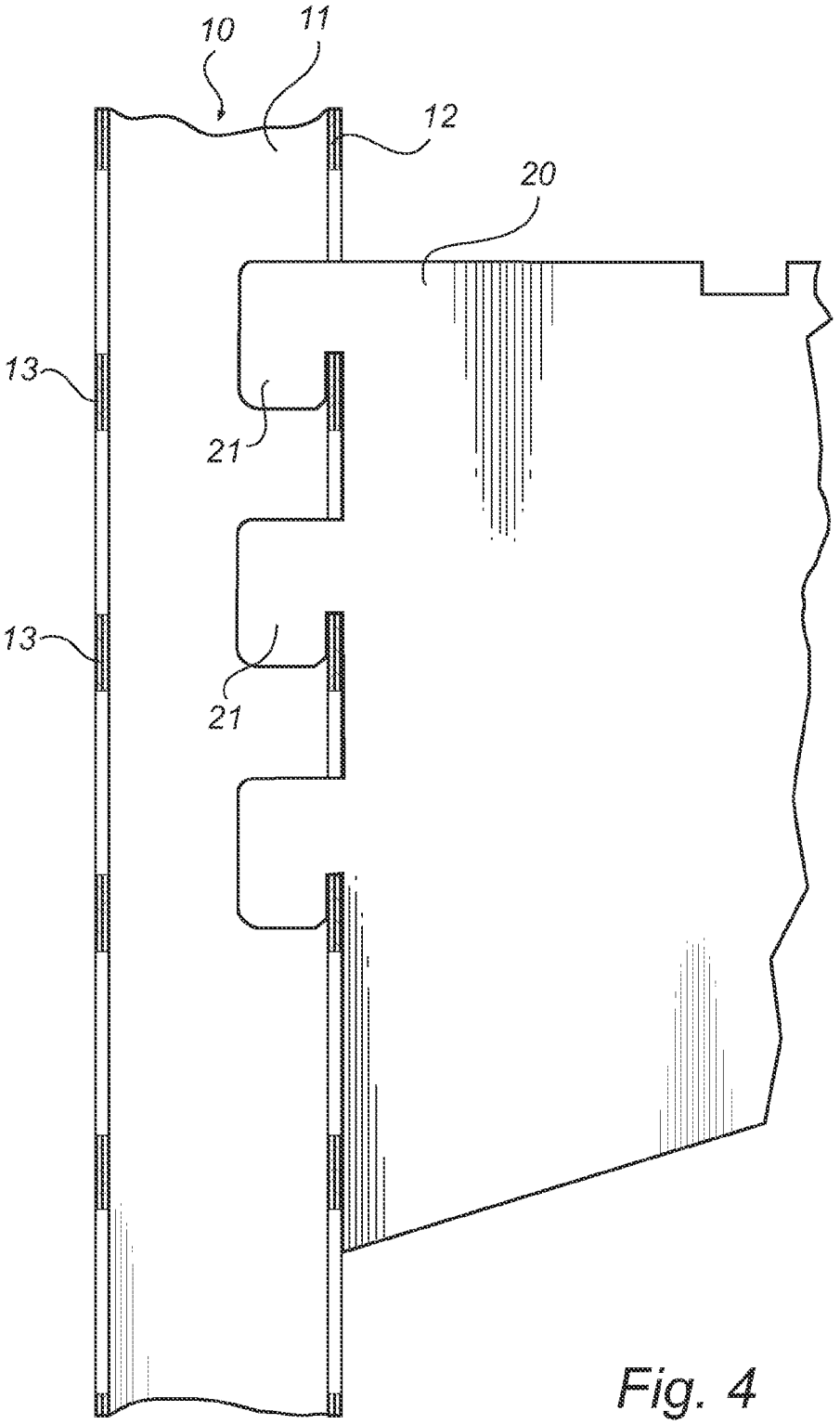

Fig. 4

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 08 15 0672

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	GB 2 017 556 A (WUPPERMANN GMBH THEODOR) 10 October 1979 (1979-10-10) * page 1, lines 103-110; figure 14 * -----	1,12,23	INV. A47B57/00 A47B57/56
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TECHNICAL FIELDS SEARCHED (IPC)

B21B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	27 May 2008	Lassen, Steen D.

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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27-05-2008

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

REFERENCES CITED IN THE DESCRIPTION

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