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(54) **SELF-SUPPORTING SUSPENSION DEVICE AND METHOD FOR ASSEMBLING THEREOF**
FREISTEHENDE AUFHÄNGEVORRICHTUNG UND MONTAGEVERFAHREN DAFÜR
DISPOSITIF DE SUSPENSION AUTOPORTEUR ET SON PROCÉDÉ D'ASSEMBLAGE

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Description

[0001] The present invention relates to a self-supporting suspension device for suspending shelves, baskets or the like, with or without the aid of brackets, from at least two columns which in their raised position are substantially vertically oriented, a foot belonging to each column and being in the form of an elongate element which, when assembled to the associated column, is substantially at right angles to the longitudinal direction of the column, and a stabilisation element, which is adapted to be fastened to said columns to firmly interconnect them in a plane which is substantially at right angles to said feet.

[0002] The invention also relates to a method for assembling this self-supporting suspension device.

[0003] Mountable self-supporting sets of storage shelves are already known in a number of variants. They all have in common that they have factory-assembled end pieces and some kind of structure for lateral stabilisation of the set of shelves. Usually, metal profiles are used, such as flat bars, metal bars or thick metal wires, which are fastened diagonally in adjacent end pieces. Also scissor-like devices arranged for this purpose and fastened in similar manner are frequently used. Integral back pieces adapted to be nailed to adjacent end pieces have the same function. The different shelves rest on shelf carriers which are fastened to the columns of the end pieces. As a rule, a plurality of holes are bored in the columns, in which holes the shelf carriers are intended to be inserted. The shelf carriers have the form of pins, angle bars provided with pins, or wire straps.

[0004] Another type of self-supporting set of storage shelves has end pieces which consist of a pair of metal columns which are interconnected by screwed-on, crossed flat bars or the like, and in some sets of storage shelves they are stabilised by screwed-on shelves.

[0005] These self-supporting sets of storage shelves all have in common that they require a column in each corner of the shelves and that a plurality of pins and/or bolted joints are needed for the assembly of the sets of storage shelves. When assembled in upright position, they are also, in general, cumbersome and difficult to assemble. In addition, they are only intended for shelves and not for wire baskets, clothes racks, trouser hangers and the like.

[0006] Such a shelf is known in the prior art from Patent document EP 1 444 923 A.

[0007] The object of the present invention is to provide a self-supporting suspension device which is easy to assemble and which does not require any screwed or bolted joints or the like, which is stable, which has a small number of components and which requires minimum package space.

[0008] Another object of the invention is to provide a self-supporting suspension device in which shelves, wire baskets, clothes racks, trouser hangers and the like can be fastened in an easy and replaceable/rearrangeable manner.

[0009] Yet another object is to provide a self-supporting suspension device, in which both sides can be used to suspend shelves, wire baskets, etc. which are easily accessible at the same time.

[0010] These objects are achieved by a self-supporting suspension device according to that stated by way of introduction wherein each column comprises at least two mutually parallel flanges which are interconnected by at least one web, which is characterised in that the inner distance between the flanges corresponding to the thickness of the foot, and that the foot has a slot at one of its ends, into which slot the column is adapted to be inserted with its web, the flanges straddling the foot in a clamping manner.

[0011] Methods for assembling the self-supporting suspension device according to the invention are defined in independent claims 11 and 12.

[0012] Further developments of the self-supporting suspension device are apparent from the features stated in the dependent claims.

[0013] Preferred embodiments of the invention have been described for the purpose of exemplification and with reference to the accompanying drawings, in which:

Fig. 1 is an exploded perspective view showing a column and a foot included in an embodiment of the self-supporting suspension device according to the invention;

Fig. 2 is an enlarged partial view illustrating the end of a bar which forms a stabilisation element in the suspension device;

Fig. 3 is a perspective view illustrating the bar in Fig. 2 when mounted on a column according to Fig. 1;

Fig. 4 is a perspective view showing the end portion of a locking beam included in some embodiments of the suspension device according to the invention;

Figs 5-11 describe each step of assembling a section of a self-supporting suspension device according to the invention;

Figs 12-16 describe each step of assembling an additional section to the section of the suspension device shown in Fig. 11;

Figs 17-18 illustrate the first step and the last step, respectively, of assembling a section in an alternative embodiment of a self-supporting suspension device according to the invention;

Figs 19 and 20 show alternative embodiments of columns included in embodiments of the suspension device according to the invention;

Figs 21, 22 and 23 illustrate different variants of stabilisation elements included in embodiments of the suspension device according to the invention;

Fig. 24 is a sectional view showing an alternative embodiment of a locking beam;

Figs 25-27 illustrate alternative embodiments of the stabilisation element shown in Figs 6-16 and 18; and Figs 28-29 illustrate alternative embodiments of the stabilisation element shown in Figs 22-23.

[0014] With reference first to Figs 1 and 16, which show components in an embodiment of a self-supporting suspension device according to the invention and the device in an assembled state, respectively, the suspension device comprises at least two columns 1 and the same number of feet 2.

[0015] In this embodiment, the columns 1 are a hollow rail or profile with rectangular cross-section having two mutually parallel flanges 3 and two mutually parallel webs 4, cf. Fig. 3. The webs 4 of this embodiment are provided with slots or grooves 5 which are arranged in pairs and from which shelves, baskets, clothes racks or the like can be suspended, either directly or via brackets, see for instance the Elfa leaflet "Planerings- och produktguide". The columns 1 can also be formed as a U-profile, and for instance look like Elfa's carrier rail in said leaflet and as shown in Fig. 19. They can also have an H-profile as shown in Fig. 20. It is, however, necessary for the columns 1 to have at least one web 4 and a pair of parallel flanges 3, for reasons which will become clear below.

[0016] The feet 2 have the form of an elongate element, preferably in the form of a hollow sheet-metal part with an adjusting screw 6 at each end to obtain exact vertical alignment of the associated column, as will be evident from the reading of the description part. It is also possible to use only one adjusting screw, see Fig. 19, or a foot of optional design suitable to this end. The foot 2 has a non-negligible thickness T in the transverse direction, see Fig. 19. Furthermore, the foot has a slot 7 at one of its ends, which is oriented perpendicularly to the longitudinal axis of the foot and extends from the upper side of the foot towards, but not all the way to, its underside. The distance A between the slot 7 and the end is preferably substantially half the inner distance between the webs 4 of the column 1 for reasons that will appear from the text referring to Fig. 18. Furthermore, the inner distance between the flanges 3 substantially corresponds to the thickness T of the foot 2. This is because the column 1, when mounted on the foot 2, should firmly and fixedly straddle the foot so that they together function as a rigid unit, which will be explained in more detail in connection with the presentation of the assembling method.

[0017] The self-supporting suspension device according to the invention also comprises a stabilisation element 8 in order to make the assembled suspension device torsionally rigid in the longitudinal direction (in a plane at right angles to the feet of the assembled suspension device), as indicated by the two-way arrow L in Fig. 16 and as known from the sets of storage shelves mentioned by way of introduction. Different types of stabilisation elements are shown in Figs 8, 21-23, 25-29 and will be discussed in more detail in the text referring to these Figures.

[0018] Finally, the self-supporting suspension device according to the invention also comprises, in some embodiments, a locking beam 9, see Figs 9, 18 and 24, whose function will also be presented in connection with these Figures.

[0019] Reference is now made to Figs 1 and 5-11

which illustrate the different steps of assembling a section of an embodiment of a self-supporting suspension device according to the invention. First, two columns 1 are inserted in the slot 7 in their respective feet 2 so that the lowermost end of the web 4 abuts the lowermost portion of the slot and the flanges 3 are press fit on the end of the foot over the distance A, see Figs 1 and 5.

[0020] Subsequently, said parts are placed as a unit on a support or a substructure, preferably a floor, the feet 2 being directed away from each other. In this embodiment, the flanges 3 of the columns 1 are, in their lower portion (in the upright position of the suspension device), provided with a pair of spaced-apart through holes or bores 11, in which the stabilisation element 8 is fastened. In this embodiment, the stabilisation element 8 has the form of two bars 12 which, at their two ends, comprise a portion 13 of the bar that is bent substantially at right angles to the longitudinal axis of the bar, see Fig. 2. At a distance from this portion 13, a lug 14 is formed on the bar, and this distance substantially corresponds to the thickness of the flanges 3.

[0021] The first bent portion 13 of one of the bars 12 is inserted into the lower hole 11 of the column 1, and the second bent portion 13 of the bar 12 is inserted into the upper hole 11 of the second column and vice versa, so that the bars 12 cross each other as illustrated in Fig. 8.

[0022] In the next step, the feet 2 are turned towards each other so as to become substantially parallel (and perpendicular to the floor), see Fig. 9. The bent portion 13 and the lug 14 of the bars 12 then fix the bars on the flanges 3 so as to guarantee the mutual distance between the columns 1 as well as their parallelism, see Fig. 3.

[0023] To ensure that the feet 2 remain parallel and that the assembled section will be a firm and stable unit (to prevent the columns from being turned), a locking beam 9 is arranged on the upper end of the columns, that is, their end opposite the end inserted in the foot 2, cf. Fig. 10. In this embodiment, the locking beam 9 is preferably an elongate profile which comprises two flange portions 15 and at least one web portion 16, see Fig. 4. At its ends, the locking beam 9 has a slot formation 17, whose width corresponds to the thickness of the flange 3 of the column. The locking beam is thus slipped on to the upper ends of the two columns 1, the opposite flanges 3 of the columns being inserted into the slot formations 17, which is most clearly seen in Figs 11 and 18.

[0024] Finally, the assembled section 18 is raised and aligned by means of the adjusting screws 6 so that the columns will have an exact vertical orientation, if desired, see Fig. 11.

[0025] When it is desirable to add sections to the above self-supporting suspension device, the bent portions 13 of two bars 12 are inserted into the two holes or bores 11 of one of the columns which are located opposite the above-mentioned holes or bores 11, see Figs 12 and 13. If the previously assembled section 18, cf. Fig. 11, is placed adjacent a wall, the bent portions of the bars are inserted into the respective holes 11 with the bars 12

oriented parallel to and directed in the same direction as the foot 2 of the column in question, in contrast to the situation when the first section 18 was assembled with the bars oriented opposite to the direction of the foot, see Fig. 6. Subsequently, the crossed bars are turned so as to be located substantially in the same plane as the previously assembled bars.

[0026] A column 1 mounted on a foot 2 according to that stated above is placed beside the already assembled section 18 with its foot directed towards the same and the bent portions on the free ends of the two crossed bars are inserted in the associated above-mentioned holes or bores in the flange 3 of the column, see Fig. 15. The foot is then turned together with the column away from the already assembled section 18 so as to become parallel to and directed in the same direction as the other feet. Finally, the column is fixed by a locking beam 9 as described in connection with Figs 4 and 9-10.

[0027] If additional sections are desired in the suspension device, the above procedure is repeated.

[0028] In the above-described embodiment of the self-supporting suspension device according to the invention, each column only has one foot. If the suspension device is intended to be placed at a distance from a wall, for instance as a room divider or with the purpose of using both sides of the suspension device in a safe manner, it is advantageous to use two feet for each column. In that case, a profile with a closed section is used, that is, two flanges 3 and two webs 4, cf. Fig. 3. As already mentioned in connection with Fig. 1, the distance A between the slot 7 of the foot and its end nearest to the slot substantially corresponds to half the inner distance between the webs 4 of the column. The two feet 2 are placed with said ends adjacent to each other and directed in opposite directions. The column 1 is inserted into the slots 7 and presses the ends of the feet towards each other, as illustrated in Figs 17 and 18, which results in a firm and rigid column-foot unit. If two feet are used for each column instead of one foot, the same assembling method is used as described above in connection with Figs 5-16.

[0029] In the above embodiments of a suspension device according to the invention, the stabilisation element 8 is presented as two separate crossed bars which are fastened in the adjacent columns. They can also be formed as a unit, i.e. the bars 12 can be interconnected before they are mounted on the columns 1. Fig. 27 thus shows the bars 12 as pivotally connected to each other by a through bolt or rivet joint 31 at the respective centre portions of the bars. As an alternative embodiment, it is also possible to bend each bar into essentially V-shape and interconnect the bars 12 by one or two bolt or rivet joints 31, as exemplified in Fig. 25. A variant thereof is shown in Fig. 26, in which the bars 12 bent into V-shape are interconnected in a torsionally rigid manner by a connecting plate 32, to which they are attached, for instance, by welding or soldering.

[0030] The stabilisation element 8 can also have other embodiments, among which one is illustrated in Fig. 21.

The stabilisation element 8 can have a design similar to that of the locking beam 9, that is, a profile comprising two flange portions 19 (of which only one is shown in Fig. 21) and at least one web portion 21. From its two ends, a pair of spaced-apart closed or not closed clamps 22 project (only closed clamps are shown in the Figure) which have a contour corresponding to the cross-section of the columns, in Fig. 21 rectangular. Owing to the torsional rigidity of this stabilisation element, it is sufficient to slip the clamps 22 on to each column 1 to obtain the desired stability of the suspension device, that is, there is no need for a locking beam. Instead of the clamps 22, a through hole with the same contour as the cross-section of the columns can be made in the web portion/web portions 21 in the vicinity of the ends of the stabilisation element 8, into which the columns are inserted (not shown).

[0031] Using the above-mentioned stabilisation element 8, the assembly of the suspension device comprises fewer steps. After the insertion of one end of the columns into the slot of the respective feet (cf. Fig. 5), the columns are placed on the above-mentioned substructure or support in a manner such that the feet are substantially at right angles thereto. Then the columns are passed into the clamps 22 or the through holes, after which the ready-assembled suspension device is raised to vertical position.

[0032] Fig. 22 illustrates a further embodiment of the stabilisation element 8. In this embodiment, the stabilisation element comprises a relatively wide sheet-metal plate 23, which at each end has a portion 24 bent into U-shape. The shape of this portion is congruent with that of the column and tightly partially surrounds the respective columns. The bent portion is further provided with inwardly directed hook-shaped elements 25 for locking engagement with the slots or grooves 5 of the columns.

[0033] Fig. 23 illustrates an alternative design of the stabilisation element in Fig. 22. This embodiment of the stabilisation element 8 differs from the stabilisation element in Fig. 22 in that the sheet-metal plate 23 does not have a U-shaped portion at its ends but a portion 26 which is bent at right angles to the sheet-metal plate and which ends with hook-shaped elements 25 for engagement with the slots or grooves 5 in the columns 1.

[0034] The assembly of the suspension device using the stabilisation element 8 according to Figs 22 and 23 is preferably performed in a manner similar to that discussed in connection with Fig. 21, which is obvious for a person skilled in the art.

[0035] Figs 28 and 29 illustrate alternative embodiments of the stabilisation element 8 shown in Figs 22 and 23. To better illustrate the fastening of the stabilisation element to the columns, the left columns in Figs 28 and 29 are shown in longitudinal section through the two webs 4 of the columns 1. In these embodiments, the stabilisation element 8 comprises a flat (Fig. 28) or curved (Fig. 29) plate 23 made of sheet metal or some other suitable material. Instead of being fastened in the slots or grooves 5 of the columns 1, use is made of the holes or bores 11

shown in Figs 5-18. A pair of spaced-apart hook-shaped elements 25 (as shown in detail view in Fig. 28) or bent bar portions 13 (as shown in detail view in Fig. 29) project from each end of the plate 23. The hook-shaped elements 25 and the bent bar portions 13, respectively, are preferably arranged at the ends of a pair of bars 33 with rectangular or circular cross-section, which are fastened at the top and lower parts of the plate 23 (in its mounted state). The two end portions 34 of the plate function as the lug means 14 illustrated in Fig. 2.

[0036] The stabilisation elements 8 according to Figs 25-29 are assembled in the same way as described in Figs 6-16 and 18, and in particular in Figs 8-9 and 14-16, which is obvious to a person skilled in the art.

[0037] Fig. 24 is a cross-sectional view of an alternative embodiment of the locking beam 9. The locking beam is here arcuate but it can, of course, have some other shape and, for instance, be straight with angled end portions 28. In this embodiment, the ends of the locking beam 9 are provided with projecting tongues or cut-in portions 27, the thickness of which substantially corresponds to half the inner distance between the flanges 3 of the columns and the width of which substantially corresponds to the distance between the webs 4 of the columns. Owing to this, the two tongues 27 of two locking beams 9 can be inserted in form-fit manner into the upper end of the same column and prevent the column from being turned.

[0038] A number of embodiments of the suspension device according to the invention have been discussed above, and it will be obvious for a person skilled in the art that the various features presented in the different Figures can be combined in a number of ways within the scope of the inventive idea.

[0039] The invention is thus not limited to that described above and shown in the drawings, and can be modified within the scope of the appended claims.

Claims

1. A self-supporting suspension device for suspending shelves, baskets or the like from at least two columns (1) which in their raised position are substantially vertically oriented, a foot (2) belonging to each column (1) and being in the form of an elongate element which, when assembled to the associated column (1), is substantially at right angles to the longitudinal direction of the column, and a stabilisation element (8), which is adapted to be fastened to said columns (1) to firmly interconnect them in a plane which is substantially at right angles to said feet, wherein each column (1) comprises at least two mutually parallel flanges (3) which are interconnected by at least one web (4) **characterised in that** the inner distance between the flanges (3) corresponding to the thickness of the foot (2), and that the foot (2) has a slot (7) at one of its ends, into which slot the column (1) is adapted to be inserted with its web (4), the flanges (3) straddling the foot (2) in a clamping manner.
2. A self-supporting suspension device as claimed in claim 1, **characterised in that** the column (1) is formed as a U-profile with slots or grooves (5) which are arranged in pairs in the web (4) of the column (1) in the longitudinal direction of the web.
3. A self-supporting suspension device as claimed in claim 2, **characterised in that** the column (1) comprises two mutually parallel webs (4).
4. A self-supporting suspension device as claimed in claim 3, **characterised in that** the two webs (4) of the column (1) are adapted to be inserted into the respective slots (7) of a pair of feet (2) positioned opposite each other.
5. A self-supporting suspension device as claimed in any one of the preceding claims, **characterised in that** the the stabilisation element (8) has at its two ends a pair of spaced-apart clamps (22) or through holes, which are adapted to be slipped on to said columns (1).
6. A self-supporting suspension device as claimed in any one of claims 2-4, **characterised in that** the stabilisation element (8) has at its two ends a U-shaped bend (24), which is adapted to tightly partially surround the respective columns (1), and hook-shaped elements (25) which are adapted to be inserted into said slots or grooves (5) in the respective columns (1).
7. A self-supporting suspension device as claimed in any one of claims 2-4, **characterised in that** the stabilisation element (8) has at its two ends at least two hook-shaped elements (25), which are adapted to be inserted into said slots or grooves (5) in the respective columns (1).
8. A self-supporting suspension device as claimed in any one of claims 1-4, **characterised in that** the columns (1) have a pair of through holes (11) in their flanges (3), which through holes are spaced-apart in the longitudinal direction of the columns, that the stabilisation element (8) comprises a pair of bars (12), which at their two ends comprise a portion (13) which is bent substantially at right angles to the longitudinal axis of the bar (12) and which, at a distance from said portion (13), comprises a lug means (14), which distance corresponds to the thickness of the flange (3), the bars (12) being adapted to be inserted into said through holes (11) so as to cross each other between the columns (1).
9. A self-supporting suspension device as claimed in

any one of claims 1-4, **characterised in that** the columns (1) have a pair of through holes (11) in their flanges (3), which through holes are spaced-apart in the longitudinal direction of the columns, that the stabilisation element (8) comprises a pair of parallel bars (12), which at their two ends comprise a bent portion (13) or a hook-shaped element (25), and a plate (23) to which the bars (12) are fastened, the bars being adapted to be attached in said through holes (11).

10. A self-supporting suspension device as claimed in any one of the preceding claims, **characterised in that** it also comprises a locking beam (9) which at each of its two ends has a slot formation (17), which is adapted to be slipped on to the mutually facing flanges (3) of the columns (1), at their end opposite the end adapted to be fastened to said foot or feet (2).

11. A self-supporting suspension device as claimed in any one of claims 1-9, **characterised in that** it also comprises a locking beam (9) which at its two ends comprises a portion (28) that is bent or arcuate, which portion (28) has a projecting tongue (27) which is adapted to be inserted into the end of the columns (1) opposite the end adapted to be fastened to said foot or feet (2).

12. A method for assembling a self-supporting suspension device as claimed in any one of claims 1-11, **characterised by** the steps of

- (A) inserting one end of each column (1) into the slot (7) of the respective feet (2);
- (B) placing at least two columns (1) on a support so that the feet (2) are substantially at right angles to the support;
- (C) fastening the stabilisation element (8) to the columns (1);
- (D) raising the suspension device to a vertical position; and
- (E) if desired, before or after step (D), arranging a locking beam (9) at the free end of the columns (1).

13. A method for assembling a self-supporting suspension device as claimed in any one of claims 1-11, **characterised by** the steps of

- (A) inserting one end of each column (1) into the slot (7) of the respective feet (2);
- (B) placing two columns (1) on a support so that the feet (2) are oriented in opposite directions;
- (C) passing the bent portions (13) of two bars (12) into the through holes (11) in the flanges (3) of the columns (1) with the bars (12) crossing each other;
- (D) turning the feet (2) towards each other so

that they are substantially mutually parallel;
(E) arranging a locking beam (9) at the free end of the columns (1); and
(F) raising the assembled suspension device (18) to a vertical position.

14. A method for assembling a self-supporting suspension device as claimed in claim 13, **characterised by** the following steps when assembling additional columns

- (G) performing step (A);
- (H) placing an additional column (1) so that its foot (2) is directed towards the previously raised columns (1);
- (I) passing the bent portions (13) of the bars (12) into the through holes (11) in the flanges (3) of the columns (1) with the bars (12) crossing each other and with the bent portions (13) oriented in the same direction as the feet (2) of the previously assembled suspension device (18);
- (J) turning the foot (2) of the additional column (1) away from the previously assembled suspension device (18), so that it is parallel to the other feet (2); and
- (K) arranging a locking beam (9) at the free end of the additional column (1) and an adjacent column (1).

Patentansprüche

1. Freistehende Aufhängevorrichtung zum Aufhängen von Regalen, Körben oder dergleichen an zumindest zwei Ständern (1), die in ihrer aufrechten Position im Wesentlichen vertikal ausgerichtet sind, wobei ein Fuß (2) zu jedem Ständer (1) gehört und in der Form eines gestreckten Elements ist, das, wenn es an dem zugehörigen Ständer (1) montiert ist, im Wesentlichen rechtwinklig zur Längsrichtung des Ständers ist, und ein Stabilisierungselement (8), das dazu geeignet ist, an den Ständern (1) befestigt zu sein, um sie in einer Ebene, die im Wesentlichen rechtwinklig zu den Füßen ist, fest miteinander zu verbinden, wobei jeder Ständer (1) zumindest zwei zueinander parallele Flansche (3) umfasst, die durch zumindest eine Rippe (4) miteinander verbunden sind, **dadurch gekennzeichnet, dass** der Innenabstand zwischen den Flanschen (3) der Stärke des Fußes (2) entspricht, und dass der Fuß (2) einen Schlitz (7) an einem seiner Enden aufweist, wobei der Ständer (1) dazu geeignet ist, mit seiner Rippe (4) in den Schlitz eingefügt zu sein, wobei die Flansche (3) den Fuß (2) klemmenartig überspannen.
2. Freistehende Aufhängevorrichtung nach Anspruch 1, **dadurch gekennzeichnet, dass** der Ständer (1) als U-Profil mit Schlitzsen oder Nuten (5) ausgebildet

- ist, die in Paaren in der Rippe (4) des Ständers (1) in der Längsrichtung der Rippe angeordnet sind.
3. Freistehende Aufhängevorrichtung nach Anspruch 2, **dadurch gekennzeichnet, dass** der Ständer (1) zwei zueinander parallele Rippen (4) umfasst. 5
 4. Freistehende Aufhängevorrichtung nach Anspruch 3, **dadurch gekennzeichnet, dass** die zwei Rippen (4) des Ständers (1) dazu geeignet sind, in die jeweiligen Schlitze (7) eines Paares von Füßen (2) eingefügt zu sein, die einander gegenüberliegend angeordnet sind. 10
 5. Freistehende Aufhängevorrichtung nach einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** das Stabilisierungselement (8) an seinen zwei Enden ein Paar voneinander beabstandeter Klemmen (22) oder Durchgangslöcher aufweist, die dazu geeignet sind, auf die Ständer (1) aufgeschoben zu sein. 20
 6. Freistehende Aufhängevorrichtung nach einem der vorhergehenden Ansprüche 2 bis 4, **dadurch gekennzeichnet, dass** das Stabilisierungselement (8) an seinen zwei Enden eine U-förmige Biegung (24), die dazu geeignet ist, die jeweiligen Ständer (1) teilweise eng zu umgeben, und hakenartige Elemente (25) aufweist, die dazu geeignet sind, in die Schlitze oder Nute (5) in den jeweiligen Ständern (1) eingefügt zu sein. 25 30
 7. Freistehende Aufhängevorrichtung nach einem der vorhergehenden Ansprüche 2 bis 4, **dadurch gekennzeichnet, dass** das Stabilisierungselement (8) an seinen zwei Enden zumindest zwei hakenartige Elemente (25) aufweist, die dazu geeignet sind, in die Schlitze oder Nute (5) in den jeweiligen Ständern (1) eingefügt zu sein. 35 40
 8. Freistehende Aufhängevorrichtung nach einem der vorhergehenden Ansprüche 1 bis 4, **dadurch gekennzeichnet, dass** die Ständer (1) ein Paar Durchgangslöcher (11) in ihren Flanschen (3) aufweisen, wobei die Durchgangslöcher in der Längsrichtung der Ständer beabstandet sind, dass das Stabilisierungselement (8) ein Paar Stangen (12) umfasst, die an ihren zwei Enden einen Abschnitt (13) umfassen, der im Wesentlichen rechtwinklig zu der Längsachse der Stange (12) gekrümmt ist, und der in einem Abstand zu dem Abschnitt (13) ein Ansatzmittel (14) umfasst, wobei der Abstand der Stärke des Flanschs (3) entspricht, wobei die Stangen (12) dazu geeignet sind, in die Durchgangslöcher (11) eingefügt zu sein, sodass sie einander zwischen den Ständern (1) kreuzen. 45 50 55
 9. Freistehende Aufhängevorrichtung nach einem der vorhergehenden Ansprüche 1 bis 4, **dadurch gekennzeichnet, dass** die Ständer (1) ein Paar Durchgangslöcher (11) in ihren Flanschen (3) aufweisen, wobei die Durchgangslöcher in der Längsrichtung der Ständer beabstandet sind, dass das Stabilisierungselement (8) ein Paar paralleler Stangen (12) umfasst, die an ihren zwei Enden einen gekrümmten Abschnitt (13) oder ein hakenförmiges Element (25) und eine Platte (23) umfassen, an der die Stangen (12) befestigt sind, wobei die Stangen (12) dazu geeignet sind, in den Durchgangslöchern (11) angebracht zu sein.
 10. Freistehende Aufhängevorrichtung nach einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** sie außerdem einen Sperrholm (9) umfasst, der an jedem seiner zwei Enden eine Schlitzausbildung (17) aufweist, die dazu geeignet ist, auf die einander zugekehrten Flansche (3) der Ständer (1) an ihrem Ende, das dem Ende gegenüberliegt, welches dazu geeignet ist, an dem Fuß oder den Füßen (2) befestigt zu sein, aufgeschoben zu sein.
 11. Freistehende Aufhängevorrichtung nach einem der vorhergehenden Ansprüche 1 bis 9, **dadurch gekennzeichnet, dass** sie außerdem einen Sperrholm (9) umfasst, der an seinen zwei Enden einen Abschnitt (28) umfasst, welcher gekrümmt oder bogenförmig ist, wobei der Abschnitt (28) eine vorstehende Zunge (27) aufweist, die dazu geeignet ist, in das Ende der Ständer (1) eingefügt zu sein, welches dem Ende gegenüberliegt, das dazu geeignet ist, an dem Fuß oder den Füßen (2) befestigt zu sein.
 12. Verfahren zum Montieren einer freistehenden Aufhängevorrichtung nach einem der vorhergehenden Ansprüche 1 bis 11, **gekennzeichnet durch** die Schritte des
 - (A) Einfügens eines Endes jeden Ständers (1) in den Schlitz (7) der jeweiligen Füße (2);
 - (B) Anordnens von zumindest zwei Ständern (1) auf einer Stütze, sodass die Füße (2) im Wesentlichen rechtwinklig zu der Stütze stehen;
 - (C) Befestigens des Stabilisierungselements (8) an den Ständern (1);
 - (D) Aufrichtens der Aufhängevorrichtung in eine vertikale Position; und
 - (E) auf Wunsch, vor oder nach Schritt (D), Anordnens eines Sperrholms (9) an dem freien Ende der Ständer (1).
 13. Verfahren zum Montieren einer freistehenden Aufhängevorrichtung nach einem der vorhergehenden Ansprüche 1 bis 11, **gekennzeichnet durch** die Schritte des

- (A) Einfügens eines Endes jeden Ständers (1) in den Schlitz (7) der jeweiligen Füße (2);
 (B) Anordnens von zwei Ständern (1) auf einer Stütze, sodass die Füße (2) gegenüberliegend ausgerichtet sind;
 (C) Einführens der gekrümmten Abschnitte (13) von zwei Stangen (12) in die Durchgangslöcher (11) in den Flanschen (3) der Ständer (1), wobei die Stangen (12) einander überkreuzen;
 (D) Drehens der Füße (2) zueinander, sodass sie im Wesentlichen parallel zueinander sind;
 (E) Anordnens eines Sperrholms (9) an dem freien Ende der Ständer (1); und
 (F) Aufrichtens der montierten Aufhängevorrichtung (18) in eine vertikale Position.
14. Verfahren zum Montieren einer freistehenden Aufhängevorrichtung nach Anspruch 13, **gekennzeichnet durch** die folgenden Schritte beim Montieren von zusätzlichen Ständern:
- (G) Durchführen von Schritt (A);
 (H) Anordnen eines zusätzlichen Ständers (1), sodass sein Fuß (2) zu den vorher aufgerichteten Ständern (1) hin gerichtet ist;
 (I) Einführen der gekrümmten Abschnitte (13) der Stangen (12) in die Durchgangslöcher (11) in den Flanschen (3) der Ständer (1), wobei die Stangen (12) einander überkreuzen und die gekrümmten Abschnitte (13) in derselben Richtung wie die Füße (2) der vorher montierten Aufhängevorrichtung (18) ausgerichtet sind;
 (J) Drehen des Fußes (2) des zusätzlichen Ständers (1) weg von der vorher montierten Aufhängevorrichtung (18), sodass er parallel zu den anderen Füßen (2) ist; und
 (K) Anordnen eines Sperrholms (9) an dem freien Ende des zusätzlichen Ständers (1) und eines benachbarten Ständers (1).

Revendications

1. Dispositif de suspension autoporteur pour suspendre des étagères, des paniers ou similaire depuis au moins deux colonnes (1) qui dans leur position élevée sont essentiellement orientées à la verticale, un pied (2) appartenant à chaque colonne (1) et ayant la forme d'un élément allongé qui lorsqu'assemblé à la colonne (1) correspondante, est essentiellement à angle droit avec la direction longitudinale de la colonne, et un élément de stabilisation (8) qui est adapté pour être fixé auxdites colonnes (1) pour les relier de manière solide dans un plan qui est essentiellement à angle droit desdits pieds, dans lequel chaque colonne (1) comprend au moins deux brides (3) mutuellement parallèles qui sont reliées par au moins une âme (4), **caractérisé en ce que** la distance in-

térieure entre les brides (3) correspond à l'épaisseur du pied (2), et **en ce que** le pied (2) présente une fente (7) sur l'une de ses extrémités, dans laquelle fente la colonne (1) est adaptée pour être insérée avec son âme (4), les brides (3) enjambant le pied (2) de manière à le serrer.

2. Dispositif de suspension autoporteur selon la revendication 1, **caractérisé en ce que** la colonne (1) est formée en un profil en U avec des fentes ou des rainures (5) qui sont agencées par paire dans l'âme (4) de la colonne (1) dans la direction longitudinale de l'âme.
3. Dispositif de suspension autoporteur selon la revendication 2, **caractérisé en ce que** la colonne (1) comprend deux âmes (4) mutuellement parallèles.
4. Dispositif de suspension autoporteur selon la revendication 3, **caractérisé en ce que** les deux âmes (4) de la colonne (1) sont adaptées pour être insérées dans les fentes respectives (7) d'une paire de pieds (2) positionnés à l'opposé l'un de l'autre.
5. Dispositif de suspension autoporteur selon l'une quelconque des revendications précédentes, **caractérisé en ce que** l'élément de stabilisation (8) présente sur ses deux extrémités une paire de pinces espacées (22) ou de trous traversants qui sont adaptées pour être glissées sur lesdites colonnes (1).
6. Dispositif de suspension autoporteur selon l'une quelconque des revendications 2 à 4, **caractérisé en ce que** l'élément de stabilisation (8) présente sur ses deux extrémités une courbure en U (24) qui est adaptée pour entourer partiellement de manière serrée les colonnes respectives (1), et des éléments en forme de crochet (25) qui sont adaptés pour être insérés dans lesdites fentes ou rainures (5) dans les colonnes respectives (1).
7. Dispositif de suspension autoporteur selon l'une quelconque des revendications 2 à 4, **caractérisé en ce que** l'élément de stabilisation (8) présente sur ses deux extrémités au moins deux éléments en forme de crochet (25) qui sont adaptés pour être insérés dans lesdites fentes ou rainures (5) dans les colonnes respectives (1).
8. Dispositif de suspension autoporteur selon l'une quelconque des revendications 1 à 4, **caractérisé en ce que** les colonnes (1) ont une paire de trous traversants (11) dans leurs brides (3), lesquels trous traversants sont espacés dans la direction longitudinale des colonnes, que l'élément de stabilisation (8) comprennent une paire de barres (12) qui sur leurs deux extrémités comprennent une partie (13) qui est courbée essentiellement à angle droit par rap-

port à l'axe longitudinal de la barre (12) et qui, à distance de ladite partie (13), comprend un moyen d'ergot (14), laquelle distance correspond à l'épaisseur de la bride (3), les barres (12) étant adaptées pour être insérées dans lesdits trous traversants (11) de façon à se croiser l'une avec l'autre entre les colonnes (1).

9. Dispositif de suspension autoporteur selon l'une quelconque des revendications 1 à 4, **caractérisé en ce que** les colonnes (1) ont une paire de trous traversants (11) dans leurs brides (3), lesquels trous traversants sont espacés dans la direction longitudinale des colonnes, que l'élément de stabilisation (8) comprend une paire de barres parallèles (12) qui sur leurs deux extrémités comprennent une partie courbée (13) ou un élément en forme de crochet (25), et un plateau (23) sur lequel les barres (12) sont fixées, les barres étant adaptées pour être fixées dans lesdits trous traversants (11).
10. Dispositif de suspension autoporteur selon l'une quelconque des revendications précédentes, **caractérisé en ce qu'il** comprend également une poutre de verrouillage (9) qui sur chacune de ses deux extrémités comprend une formation fendue (17) qui est adaptée pour être glissée sur les brides (3) qui se font face mutuellement des colonnes (1), sur leur extrémité opposée à l'extrémité adaptée pour être fixée audit pied ou auxdits pieds (2).
11. Dispositif de suspension autoporteur selon l'une quelconque des revendications 1 à 9, **caractérisé en ce qu'il** comprend également une poutre de verrouillage (9) qui sur ses deux extrémités comprend une partie (28) qui est courbée ou arquée, laquelle partie (28) présente une languette en saillie (27) adaptée pour être insérée dans l'extrémité des colonnes (1) opposée à l'extrémité adaptée pour être fixée audit pied ou auxdits pieds (2).
12. Procédé d'assemblage d'un dispositif de suspension autoporteur selon l'une quelconque des revendications 1 à 11, **caractérisé par** les étapes

(A) d'insertion d'une extrémité de chaque colonne (1) dans la fente (7) du pied respectif (2) ;
 (B) de placement d'au moins deux colonnes (1) sur un support de façon à ce que les pieds (2) soient essentiellement à angle droit par rapport au support ;
 (C) de fixation de l'élément de stabilisation (8) sur les colonnes (1) ;
 (D) d'élévation du dispositif de suspension à une position verticale ; et
 (E) si souhaité, avant ou après l'étape (D), d'agencement d'une poutre de verrouillage (9) sur l'extrémité libre des colonnes (1).

13. Procédé d'assemblage d'un dispositif de suspension autoporteur selon l'une quelconque des revendications 1 à 11, **caractérisé par** les étapes

(A) d'insertion d'une extrémité de chaque colonne (1) dans la fente (7) des pieds respectifs (2) ;
 (B) de placement de deux colonnes (1) sur un support de façon à ce que les pieds (2) soient orientés dans des directions opposées ;
 (C) de passage des parties courbées (13) des deux barres (12) dans les trous traversants (11) dans les brides (3) des colonnes (1) avec les barres (12) qui se croisent l'une et l'autre ;
 (D) de rotation des pieds (2) l'un vers l'autre de façon à ce qu'ils soient essentiellement mutuellement parallèles ;
 (E) d'agencement d'une barre de verrouillage (9) sur l'extrémité libre des colonnes (1) ; et
 (F) d'élévation du dispositif de suspension assemblé (18) à une position verticale.

14. Procédé d'assemblage d'un dispositif de suspension autoporteur selon la revendication 13, **caractérisé par** les étapes

(G) de réalisation de l'étape (A) ;
 (H) de placement d'une colonne supplémentaire (1) de façon à ce que son pied (2) soit dirigé en direction des colonnes (1) élevées préalablement ;
 (I) de passage des parties courbées (13) des barres (12) dans les trous traversants (11) dans les brides (3) des colonnes (1) avec les barres (12) qui se croisent l'une et l'autre et les parties courbées (13) orientées dans la même direction que les pieds (2) du dispositif de suspension assemblé (18) préalablement ;
 (J) de rotation du pied (2) de la colonne supplémentaire (1) à distance du dispositif de suspension assemblé (18) préalablement, de façon à ce qu'il soit parallèle aux autres pieds (2) ; et
 (K) d'agencement d'une poutre de verrouillage (9) sur l'extrémité libre de la colonne supplémentaire (1) et d'une colonne adjacente (1).

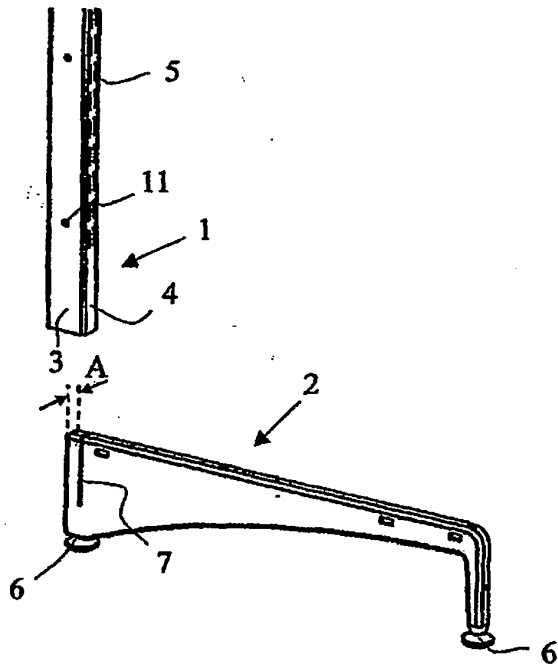


FIG 1

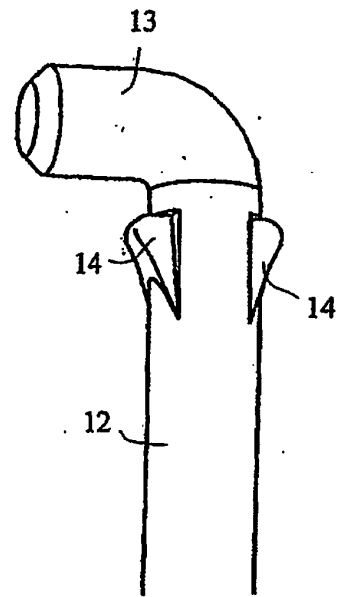


FIG 2

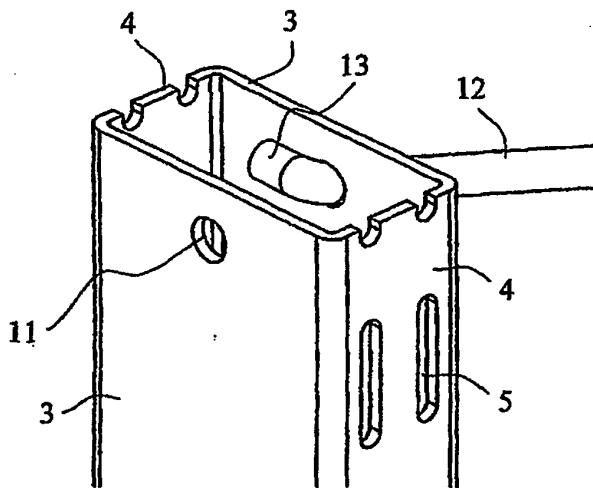


FIG 3

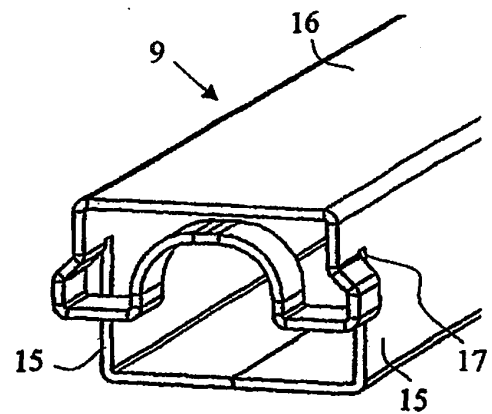


FIG 4

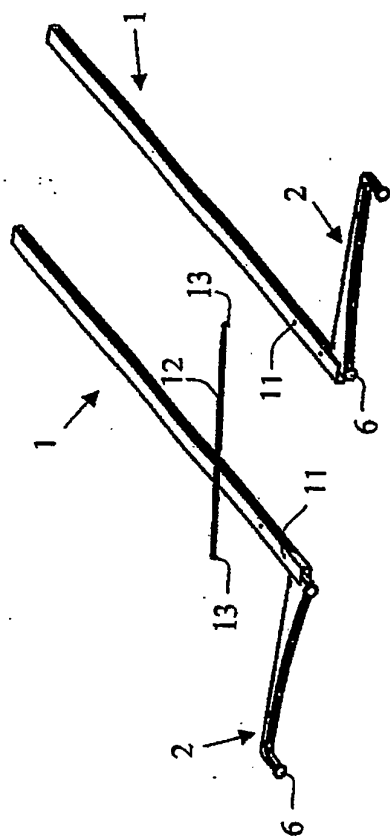


FIG 6

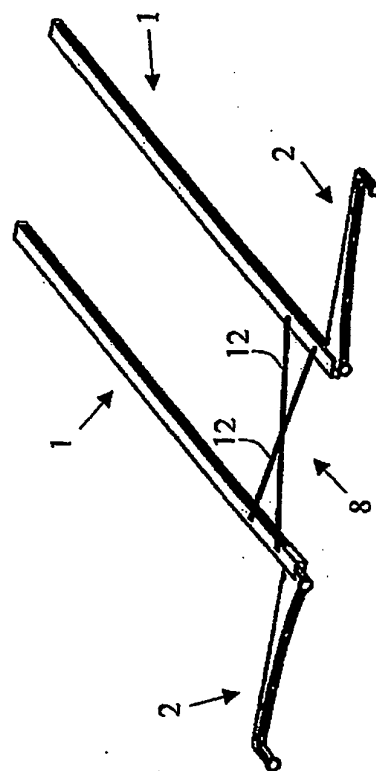


FIG 8

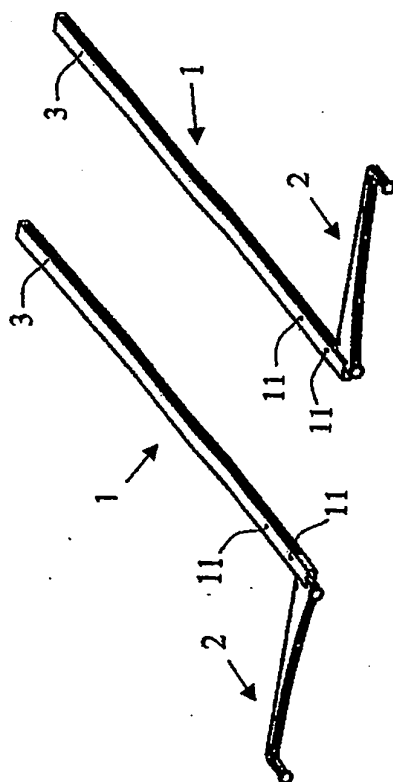


FIG 5

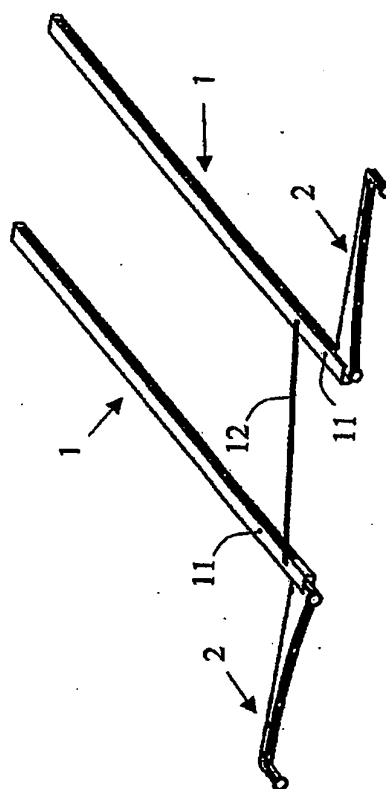


FIG 7

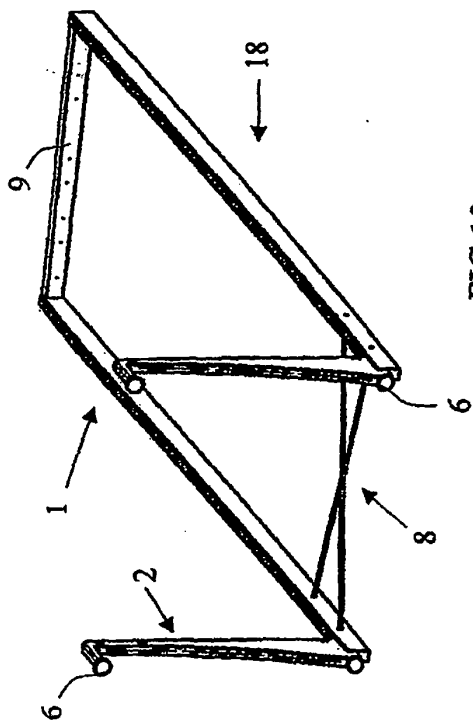


FIG 10

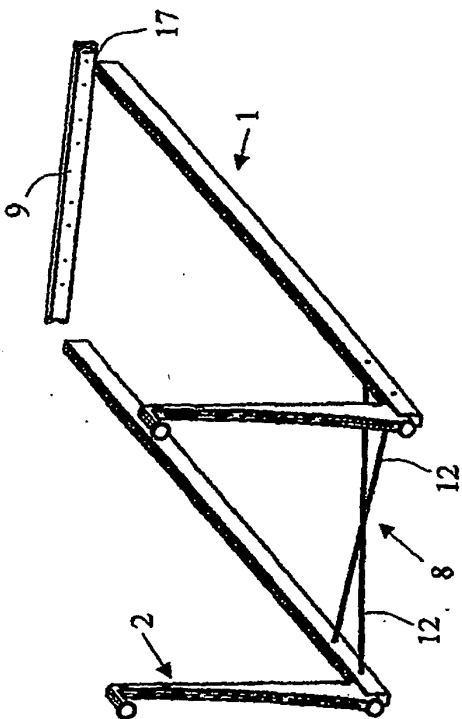


FIG 9

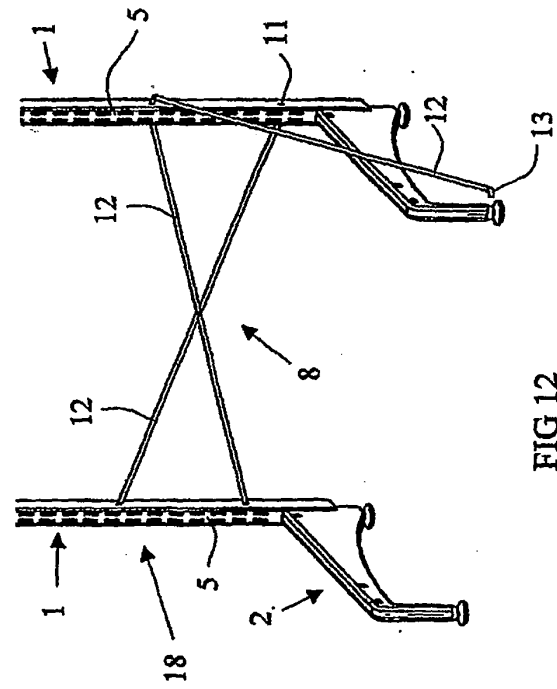


FIG 12

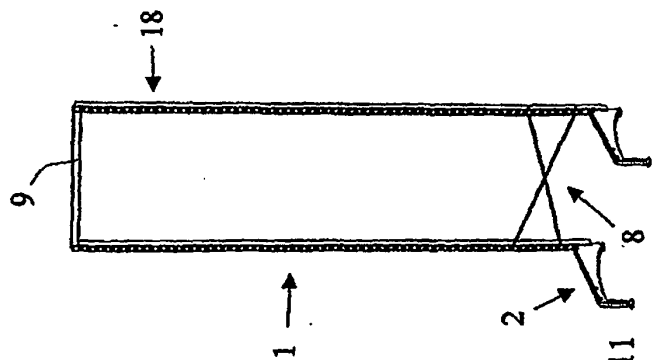


FIG 11

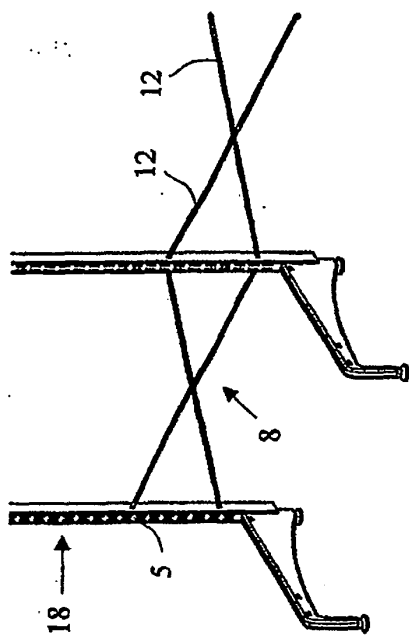


FIG 14

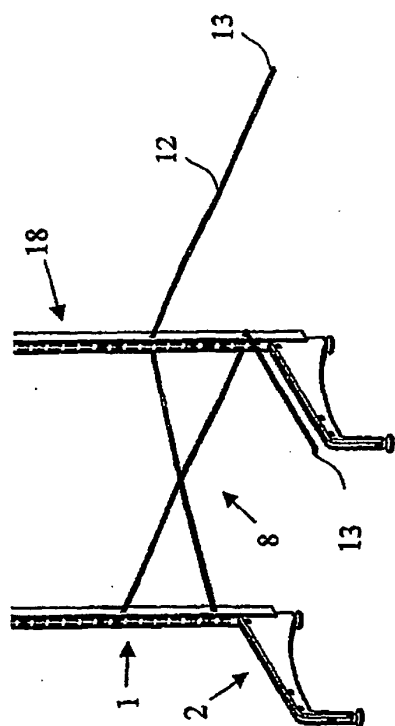


FIG 13

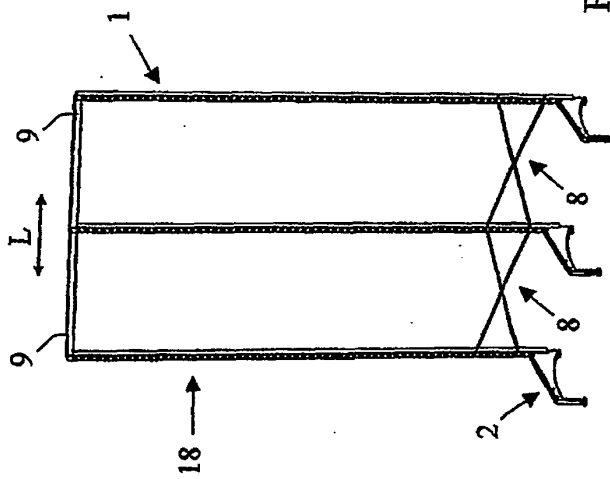


FIG 16

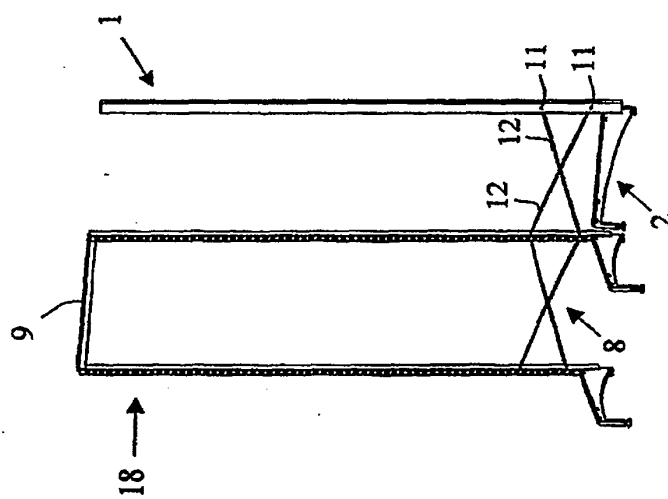


FIG 15

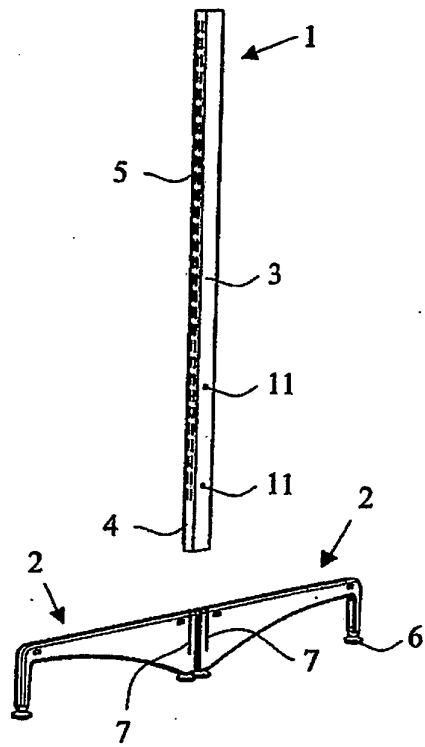


FIG 17

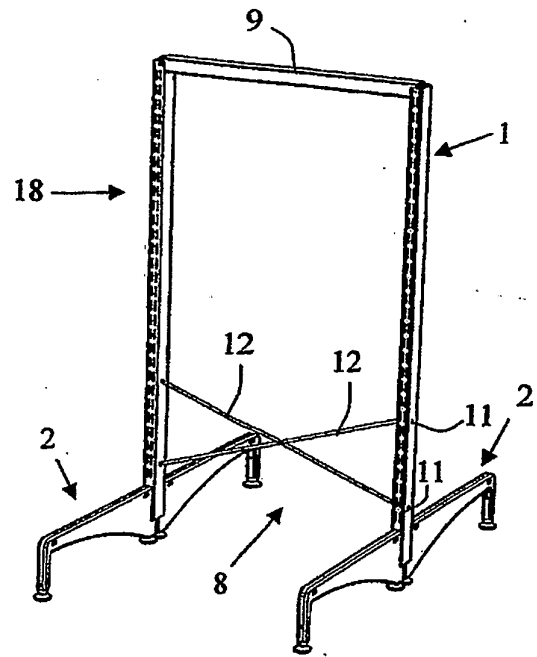


FIG 18

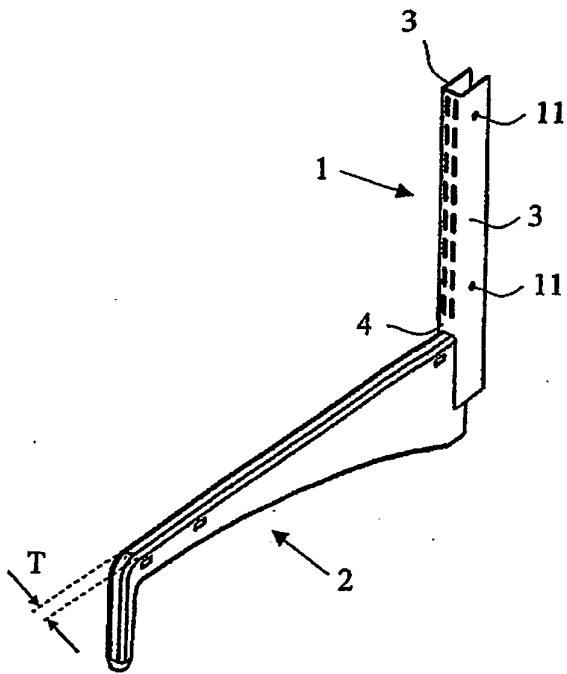


FIG 19

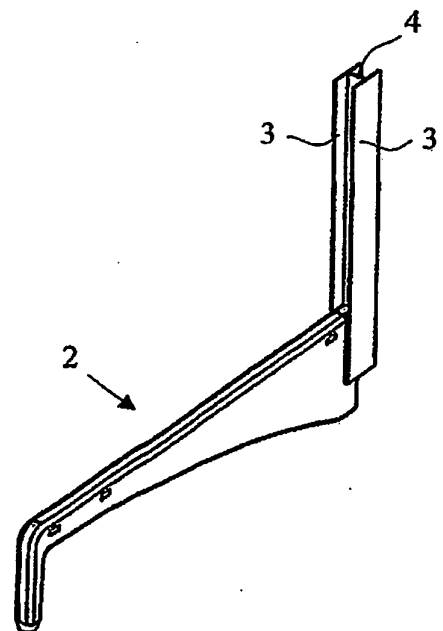
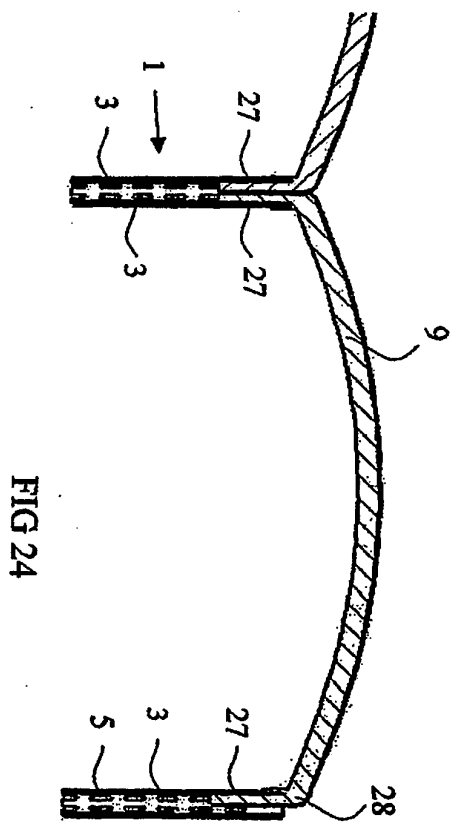
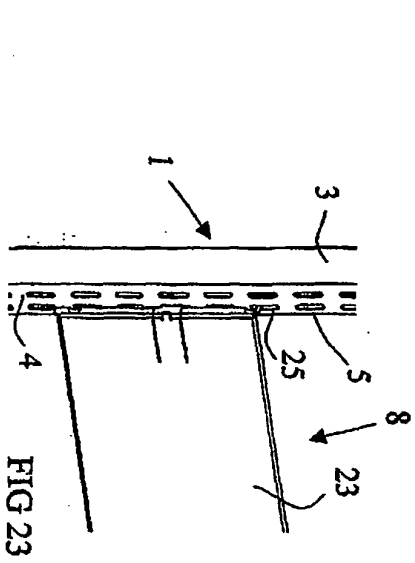
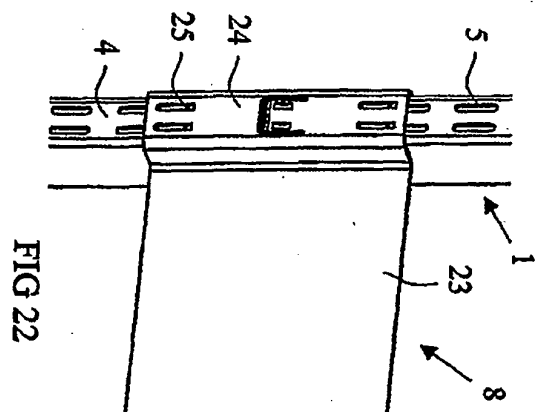
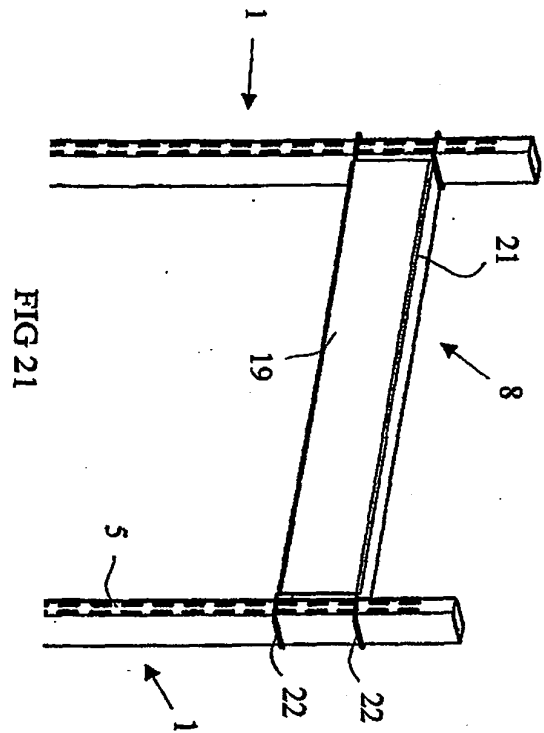


FIG 20



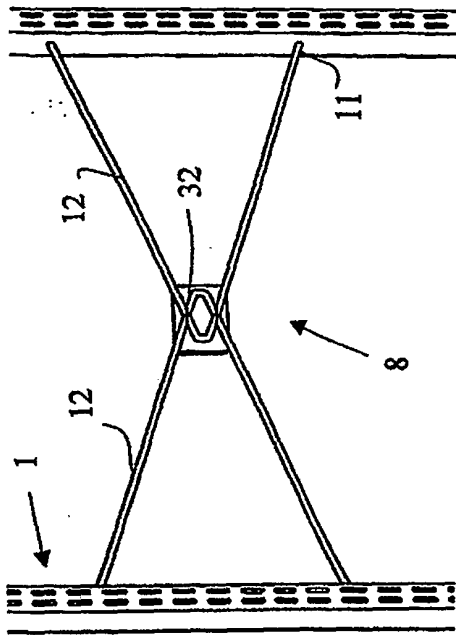


FIG 26

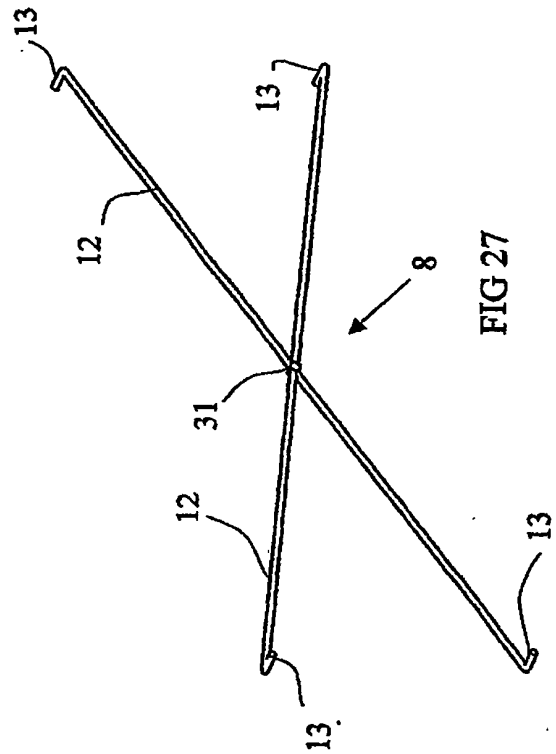


FIG 27

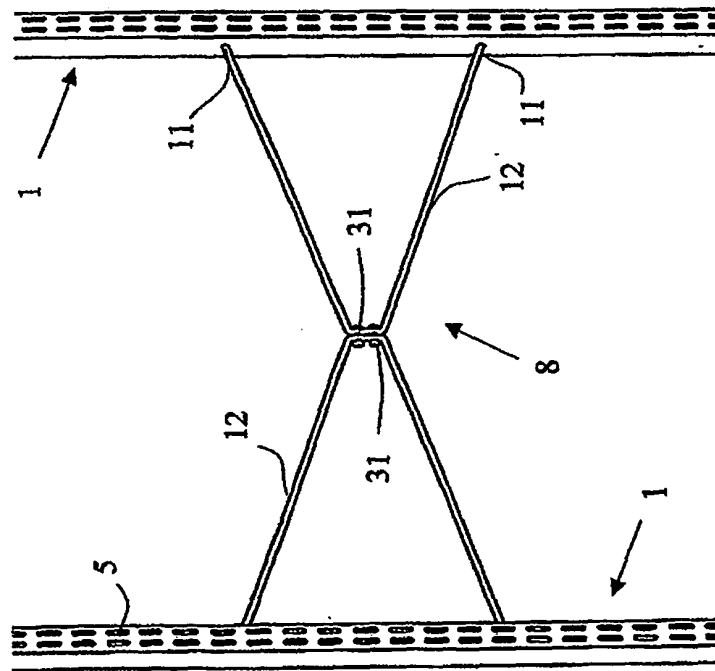


FIG 25

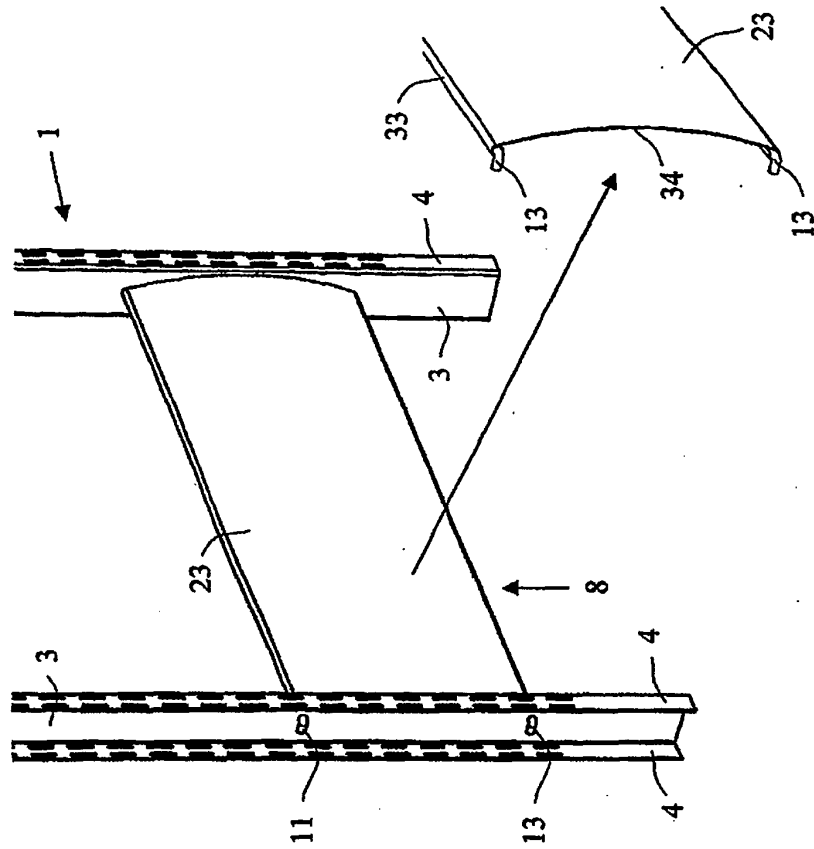


FIG 29

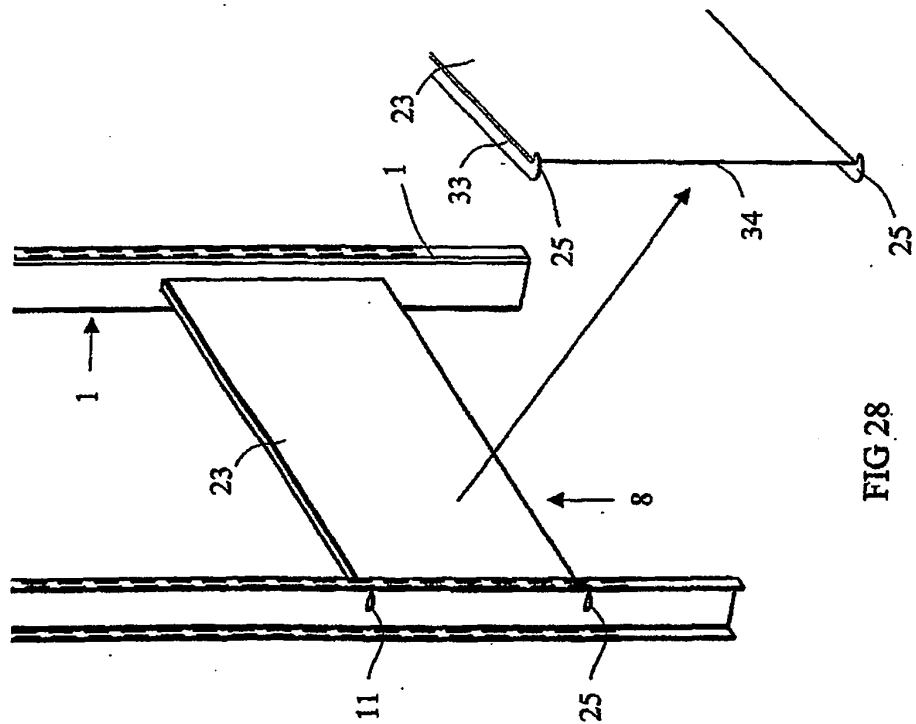


FIG 28

REFERENCES CITED IN THE DESCRIPTION

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