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## EUROPEAN PATENT APPLICATION

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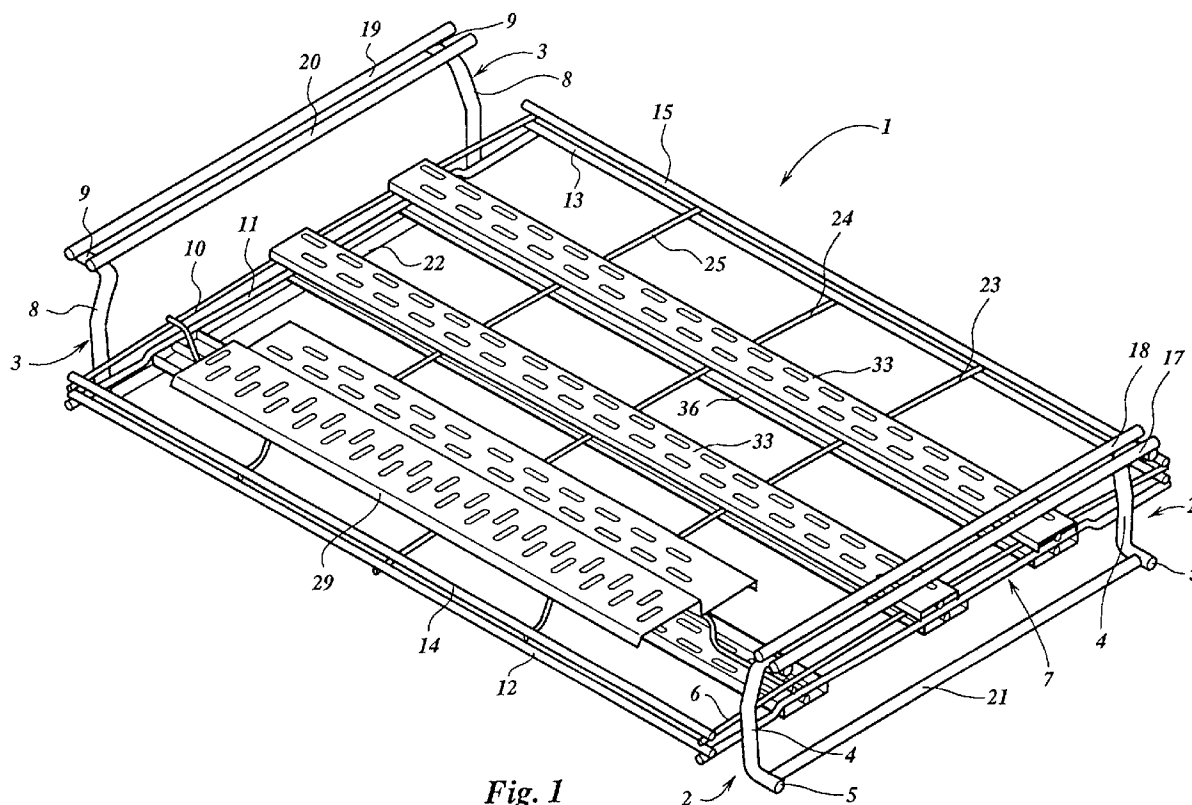
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### (54) A support for supporting ceramic products

(57) The invention relates to a support (1) for supporting ceramic products, in particular roofing tiles. The support (1) is built up of a framework consisting of interconnected longitudinal wires (12-15) and cross wires

(6,7,10,11), to which supporting elements (29,32,33) for locally supporting the ceramic products during the drying process are attached. The support is thereby provided on each of its sides with two wires which are disposed one above the other.



*Fig. 1*

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## Description

[0001] The invention relates to a support for supporting ceramic products, in particular roofing tiles.

[0002] Such supports are used for supporting ceramic products, such as roofing tiles, during the drying process.

[0003] European patent application no. 0 513 422 describes a support for ceramic products, which is made up of a U-section container, on a bottom plate of which a tile pressed from clay or a similar material, which is to be dried and/or baked, can be placed. At least one surface of the tile is practically entirely screened by the bottom plate in question thereby, so that it is not possible to effect an omnilateral flow of drying air or hot air round the tile. In addition to that it is necessary to heat such a U-shaped support in its entirety when baking the product, which means that a great deal of energy is used up in a manner which is not useful.

[0004] European patent application no. 0 676 605 discloses a support for ceramic products which is folded from a perforated plate-shaped material, in such a manner that said support is in the shape of an upside-down U, seen in sectional view. Also the manufacture of a support of this kind requires the use of a comparatively great deal of material, partially in order to obtain a sufficiently stable construction of the support, whilst the product which is supported by such a support is still screened over a comparatively large area by the support.

[0005] Also from French patent no. 769,630 a support for roofing tiles is known, which is built up of two lateral supports and relatively wide slats extending between said lateral supports. The supports must be additionally supported by a main framework. The slats support the tiles during the drying process. The slats must provide a relatively large supporting area in order to support the tiles, which still deform easily during the first stages of the drying process, in such a manner that the tiles will not deform. Since the slats constitute connecting elements between the lateral supports, they must be of relatively heavy construction in order to make the support sufficiently stiff.

[0006] The object of the invention is to obtain a support of the above kind, wherein drawbacks of the known supports can be lessened and/or avoided.

[0007] According to the invention, this objective can be accomplished in that said support is built up of a self-supporting framework consisting of interconnected longitudinal wires and cross wires, to which plate-shaped supporting elements for locally supporting the ceramic products during the drying process are attached.

[0008] When the construction according to the invention is used, the framework can be built up of comparatively few wires whilst obtaining a strong construction of the support, which takes up little space, whilst the selection of the shape and the arrangement of the plate-shaped supporting elements can be optimally adapted to the shape of the products to be supported, so that a

product will be supported in an effective manner by the support, whilst a maximum area of the product will be exposed to drying and/or heating air flowing past said product.

[0009] The interconnected wires provide a self-supporting framework, which is sufficiently strong to bear the weight of the roofing tiles to be dried. The relatively thin wires do not provide a sufficiently large supporting area for the tile, however, as a result of which the wires would penetrate into the tile, which is relatively soft prior to drying, which is undesirable. By the plate-shaped parts the tile is supported over a relatively great area. The shape of the supporting elements can be optimized for providing an adequate support whilst minimizing the tile area that is being supported, whereby no undesirable deformations of the tiles will occur. The framework can be optimized so as to be sufficiently strong to bear the weight of the tile whilst minimizing the amount of space the construction occupies.

[0010] The invention will be explained in more detail hereafter with reference to an embodiment of a support according to the invention which is diagrammatically illustrated in the figures. It is noted that in some figures, parts which are shown in other Figures have been left out for easy reference.

[0011] Figure 1 is a perspective view of a possible embodiment of a support according to the invention.

[0012] Figures 2A and 2B jointly show a plan view of the support.

[0013] Figure 3 is a view of the support, seen in the direction indicated by arrow III in Figure 2.

[0014] Figure 4 is a view of the support, seen in the direction indicated by arrow IV in Figure 2.

[0015] Figures 5A and 5B jointly show a bottom view of the support shown in Figure 2.

[0016] Figure 6 is a view of Figure 5, seen in the direction indicated by arrow VI in Figure 5.

[0017] The support 1 which is shown in the figures is substantially rectangular, seen in plan view. Disposed near each of the two short sides of the support are two U-shaped brackets 2 and 3 respectively, which have been bent from a wire. The intermediate pieces 4 of the brackets 2, which interconnect bracket legs 5 extending parallel to each other, are thereby secured to two wires 6 and 7, which are disposed one above the other near the respective short side of support 1. Similarly, intermediate pieces 8 of brackets 3, which interconnect the two parallel legs 9 of the brackets in question, are secured to two wires 10 and 11, which are disposed one above the other near the respective short side of support 1 (Figure 4). As will be apparent from Figures 3 and 6, the ends of the wires 6, 7, 10 and 11 thereby project beyond brackets 2 and 3.

[0018] Wires 12 and 13 extending in the longitudinal direction of support 1 are disposed between the vertically spaced-apart ends of wires 6 and 7 and the similarly vertically spaced-apart ends of wires 10 and 11. Wires 14 and 15, which are disposed directly above

wires 12 and 13 and which extend in the longitudinal direction of the support, rest on the ends of the upper (seen in Figure 3) wires 6 and 10 respectively. A wire 16 extending parallel to wires 12 - 15 is disposed near the centre of the support, with the ends of said wire 16 being disposed between wires 6, 7 and 10, 11 respectively.

**[0019]** It will be apparent that in this manner a strong, substantially rectangular (seen in plan view) framework of the support has been built up by means of the wires 6, 7 and 10 - 16, which have been coupled together by welding.

**[0020]** As will furthermore be apparent, in particular from Figure 4, legs 5 of brackets 2 and legs 9 of brackets 3 respectively are bent outwards with respect to the other part of support 1. Two wires 17 and 18 extending parallel to each other and parallel to the short, transverse side of the support are thereby secured to the upper legs 5 of the two brackets 2, seen in Figures 3 and 4. Parallel wires 19 and 20, which rest on the upper legs 9 of brackets 3, seen in Figure 4, are secured to said legs in a similar manner. A wire 21 extending parallel to wires 17 and 18 is furthermore disposed between the lower legs 5, seen in Figures 3 and 4, of the two brackets 2, and a wire 22 extending parallel to wires 19 and 20 is furthermore disposed between the lower legs 9, seen in Figures 3 and 4, of brackets 3.

**[0021]** The construction is thereby such that, seen in the plan view of Figure 2, wire 21 is positioned centrally between wires 17 and 18, and the distance between wires 17 and 18 is equal to or slightly larger than the diameter of wire 21. Similarly, wire 22 is positioned centrally between wires 19 and 20, seen in the plan view of Figure 2, whilst the distance between wires 19 and 20 is equal to or slightly larger than the diameter of wire 22. As is furthermore shown in Figure 3, the distance between the upper legs 5 of the two brackets 2 is smaller than the distance between the lower legs 5 of the respective brackets 2, seen in Figure 3. In order to effect this, the part 4 of the respective brackets 2 connecting the legs 4 is bent as shown (Figure 3).

**[0022]** The brackets 3 are shaped similarly, so that also the upper legs 9 of brackets 4, seen in Figure 4, are positioned closer together than the lower legs 9.

**[0023]** The above-described arrangement of wires 17 - 22 and the above-described shape of the brackets 2 and 3 makes it possible to stack the supports 1, in such a manner that wires 21 and 22 of one support will be positioned between wires 17, 18 and 19, 20 respectively of the other support, with the ends of wires 21 and 22 being supported on legs 5 and 9 respectively, to which the ends of the respective wires 17, 18 and 19, 20 are secured. The ends of legs 5 and 9, between which wires 21 and 22 are disposed, will be positioned beside the ends of wires 17, 18 and 19, 20 respectively. It will be apparent, that the stacked supports are thus secured against movement in their longitudinal direction as well as in a direction transversely thereto by means of the parts of the above-mentioned wires being in contact with

each other, which form mating stops.

**[0024]** Various supporting elements can be attached to the framework of the support thus built up of wires, depending on the ceramic products to be dried, in particular roofing tiles.

**[0025]** The illustrated embodiment comprises three wires 23 - 25 extending between the long sides made up of wires 12, 14 and 13, 15 of the support, which wires 23-25 are provided partially for the purpose of providing supporting elements. The wire 24 present near the centre of the support has substantially the same configuration as the wires 7 which are positioned at the ends, that is, it comprises a horizontal central portion 26, which extends over the largest width of the support, and likewise horizontally extending end portions 27, seen in Figure 3, which are positioned slightly lower than central portion 26. Wires 7, 11 and 24 lie in one common plane, which extends perpendicularly to the plane of the drawing of Figure 3.

**[0026]** The two wires 23 and 25 comprise the same upwardly curved configuration, seen in Figure 3, along the main part of their length as the wires 6 and 10 positioned at the ends of the support, whereby also said curved portions of the wires 6, 10, 23 and 25 lie in one common plane, which extends perpendicularly to the plane of the drawing.

**[0027]** Wires 23 and 25 comprise an upwardly curved, U-shaped portion 28 at their left-hand ends, however, seen in Figure 3.

**[0028]** Said portions of wires 23 and 25, which have been bent to a U-shape, support an upper part of an elongated, stepped-section supporting element 29 folded from sheet material. A wire 30 extending in the longitudinal direction of the support is furthermore provided near the bend, seen between the higher part of supporting element 29 and the lower part of said supporting element 29, which wire functions to support said supporting element. Said wire 30 rests on the upper sides of wires 23 and 25. The parts 31 of wire 30 that project beyond the ends of supporting element 29 are bent to a U-shape, as is shown in Figure 4, whereby the free ends of wire 30, which are positioned at the same level as the part of the wire 30 positioned under supporting element 29, rest on the upper sides of wires 6 and 10.

**[0029]** Wires 6 and 10, together with wires 23 and 25, furthermore support elongated U-section supporting elements 32 folded from sheet material, which are resting thereon. Said supporting elements are furthermore supported near their centre by further wires 33 supported by wires 6, 10, 23 and 25. As is furthermore apparent, in particular from Figure 2, a large number of slotted holes 34 and 35 or similar perforations are provided in supporting elements 29 and 33 respectively, which have been folded from a plate-shaped material.

**[0030]** Three U-section supporting elements 36, which have been folded from a plate-shaped material, are attached to the bottom side of the higher portion 26 of wire 7, seen in Figure 3, with the free ends of their

parallel legs. Supporting wires 37 extending in the longitudinal direction of said supporting elements are disposed near the centre of the supporting elements, between said supporting elements and wires 7, 11 and 24.

**[0031]** Also said supporting elements 36 will preferably be provided with a large number of slotted holes 38 or similar perforations.

**[0032]** Further supporting elements 39 extending perpendicularly to said supporting elements 36, which have been folded from a plate-shaped material, and which are preferably also provided with a large number of slotted holes or the like, may furthermore be attached to said supporting elements 36.

**[0033]** The shape and the arrangement of the above-described supporting elements will largely depend on the shape, the weight and the dimensions of the ceramic products to be dried.

**[0034]** The above-described support may be used for supporting ceramic products present thereon in two positions turned 180° relative to each other, that is, in the position which is shown in Figure 3, wherein ceramic products to be dried and/or baked will be supported by supporting elements 29 and 30, and in the position which is shown in Figure 6, wherein the ceramic products to be dried and/or baked will be supported by supporting elements 36 and/or 39.

**[0035]** Only comparatively little material is required for the solid self-supporting construction of the framework of the support, which is assembled from wires, in order to obtain a strong construction of the support. Consequently, the support will not interfere with the flow of drying and/or heating air to the ceramic products to be supported, whilst furthermore no unnecessary amount of energy will be wasted on the heating of the support in the case that ceramic products are to be baked.

**[0036]** The arrangement and the shape of the supporting element attached to the framework may furthermore be adapted in an efficient manner to the shape of the ceramic products to be supported, so that an optimum support of the ceramic products can be effected in a simple manner, leaving clear a maximum area of the products in question for drying. The wires could e.g. have a diameter smaller as or equal to 15 mm. The supporting elements can be made from sheet material with a thickness smaller as or equal to 3 mm. Said dimensions are relating small with respect to the size of a tile which is e.g. 350 x 500 mm. The wires could have a circular cross-section or a cross-section of other shape.

## Claims

1. A support for supporting ceramic products, in particular roofing tiles, characterized in that said support is built up of a self-supporting framework consisting of interconnected longitudinal wires and cross wires, to which plate-shaped supporting elements for locally supporting the ceramic products

are attached.

2. A support according to claim 1, characterized in that said support is provided on each side with two wires which are disposed one above the other.
3. A support according to claim 2, characterized in that the ends of a wire extending along one side of said support are retained between the ends of two wires being disposed one above the other, which extend along another side of said support extending transversely thereto.
4. A support according to claim 3, characterized in that a wire extending along a long side of said support is retained with its ends between the ends of two wires being disposed one above the other, which extend along a short side of said support, whilst a second wire extending along the respective long side of said support is positioned on the ends of the upper one of the two wires extending along the short side of the support.
5. A support according to any one of the preceding claims, characterized in that a support is provided near two opposite sides with two coplanar wires extending parallel to each other in spaced-apart relationship, as well as with a lower wire extending parallel to said pair of wires, which wire is positioned centrally between the two other wires, seen in plan view, whereby the distance between said two coplanar wires is equal to or slightly larger than the diameter of said third wire.
6. A support according to claim 5, characterized in that said supports are provided with mating stops, which prevent said further wire of a support positioned between the two coplanar wires of another support from moving relative to said other support.
7. A support according to any one of the preceding claims, characterized in that supporting elements, which have been folded from sheet metal, are attached to said framework.
8. A support according to any one of the preceding claims, characterized in that supporting elements are attached to two sides of said framework, in such a manner that said support can be used for supporting products in two positioned turned 180° relative to each other.

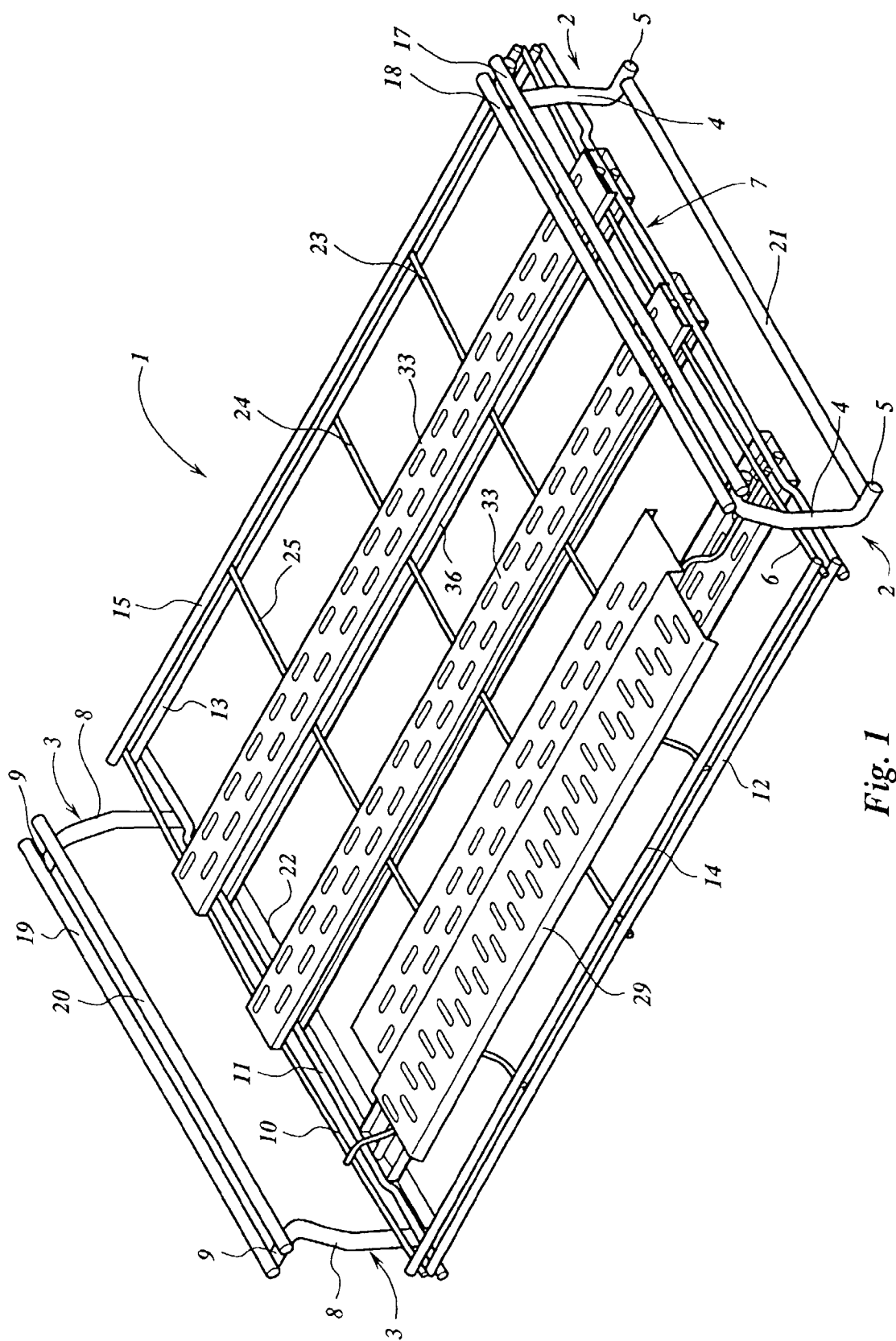
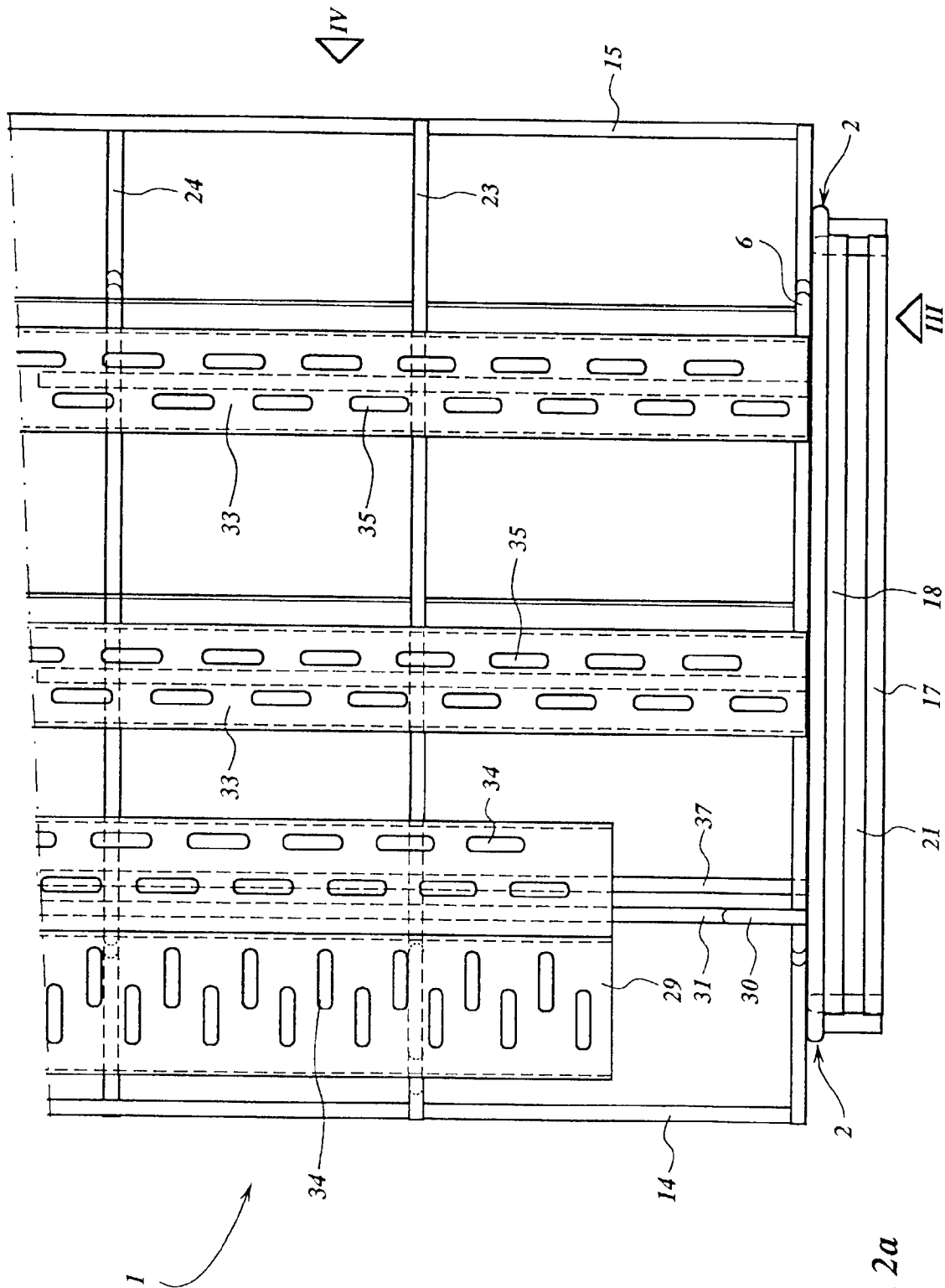


Fig. 1



**Fig. 2a**

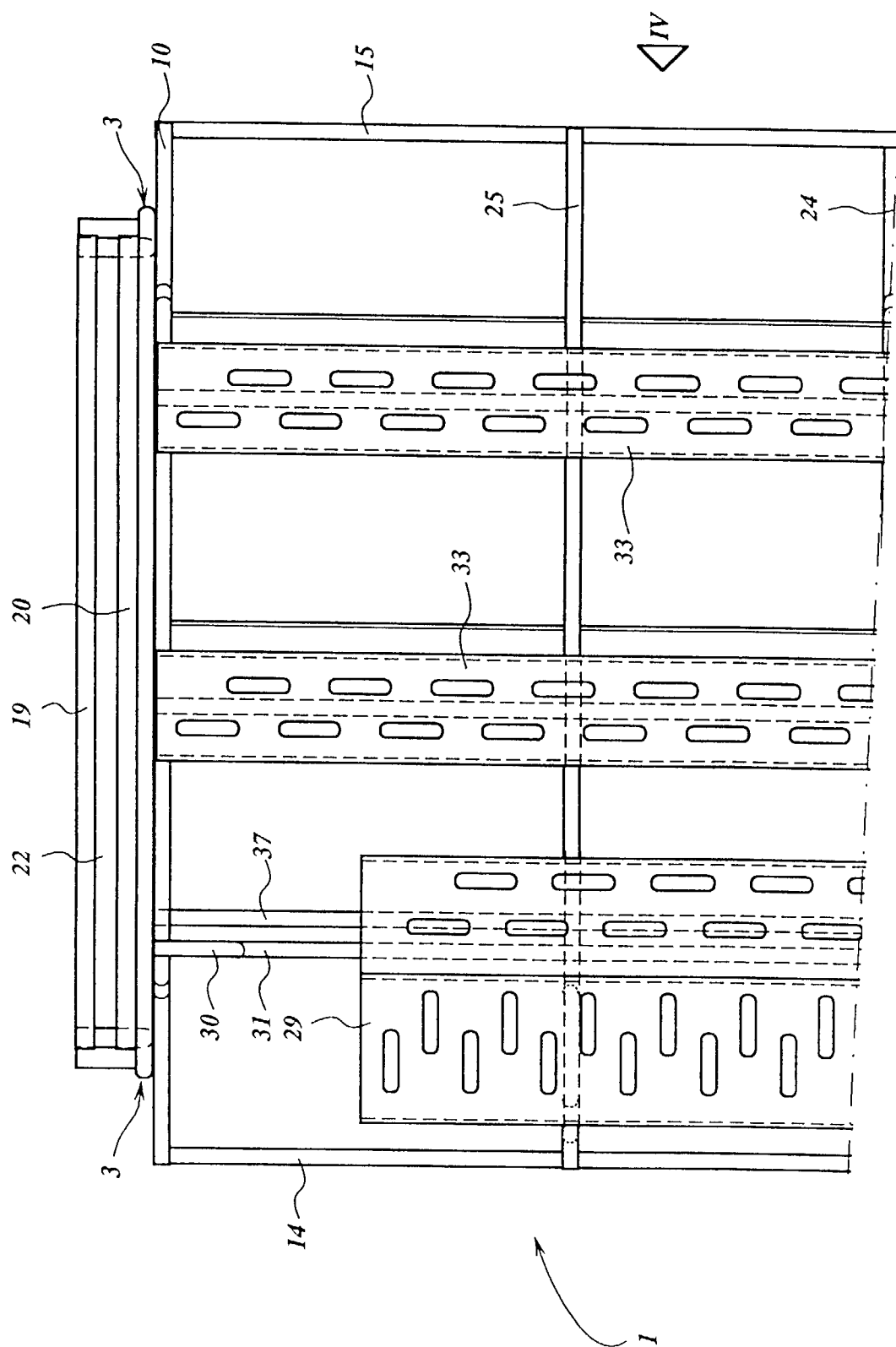


Fig. 2b

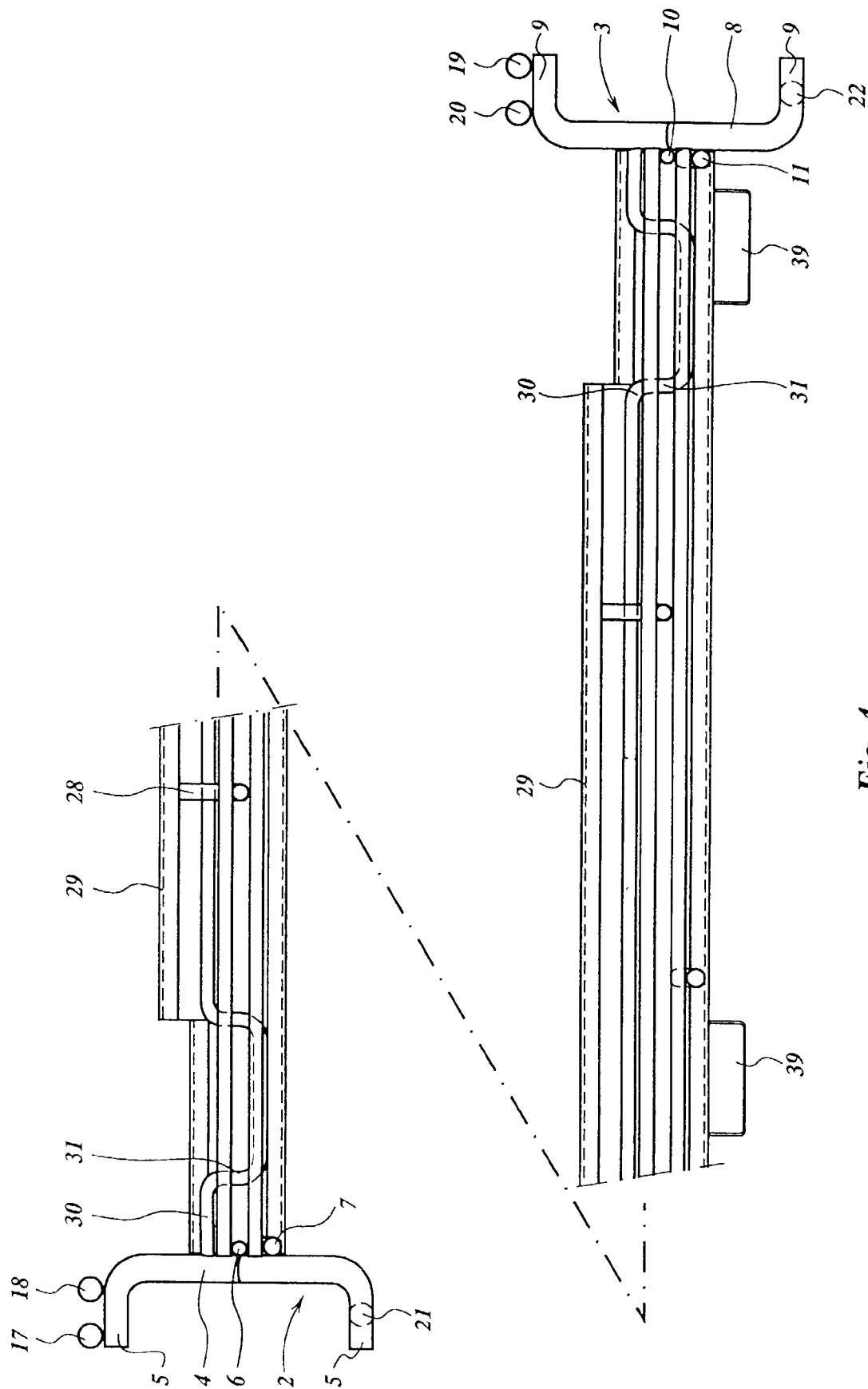


Fig. 4



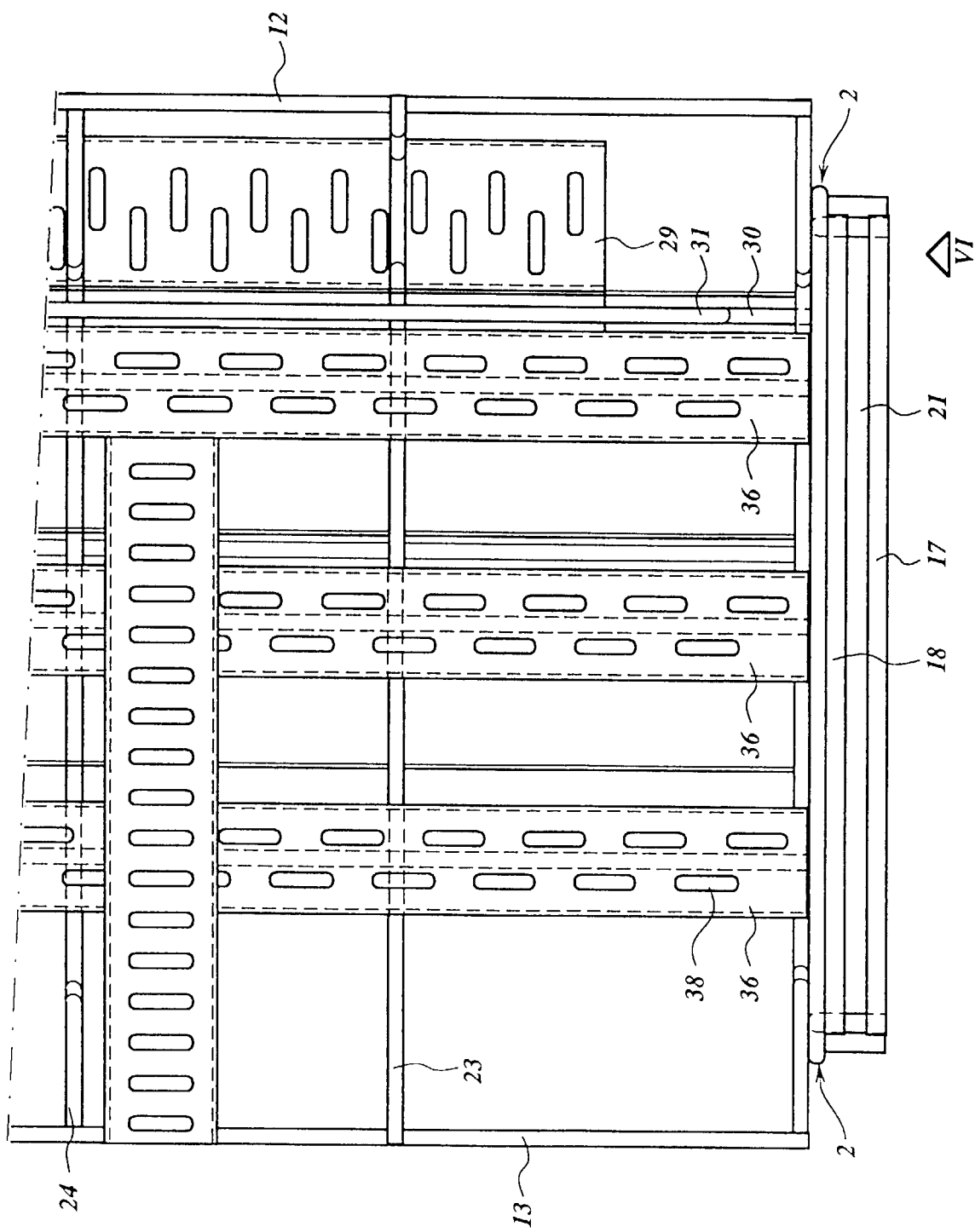


Fig. 5a

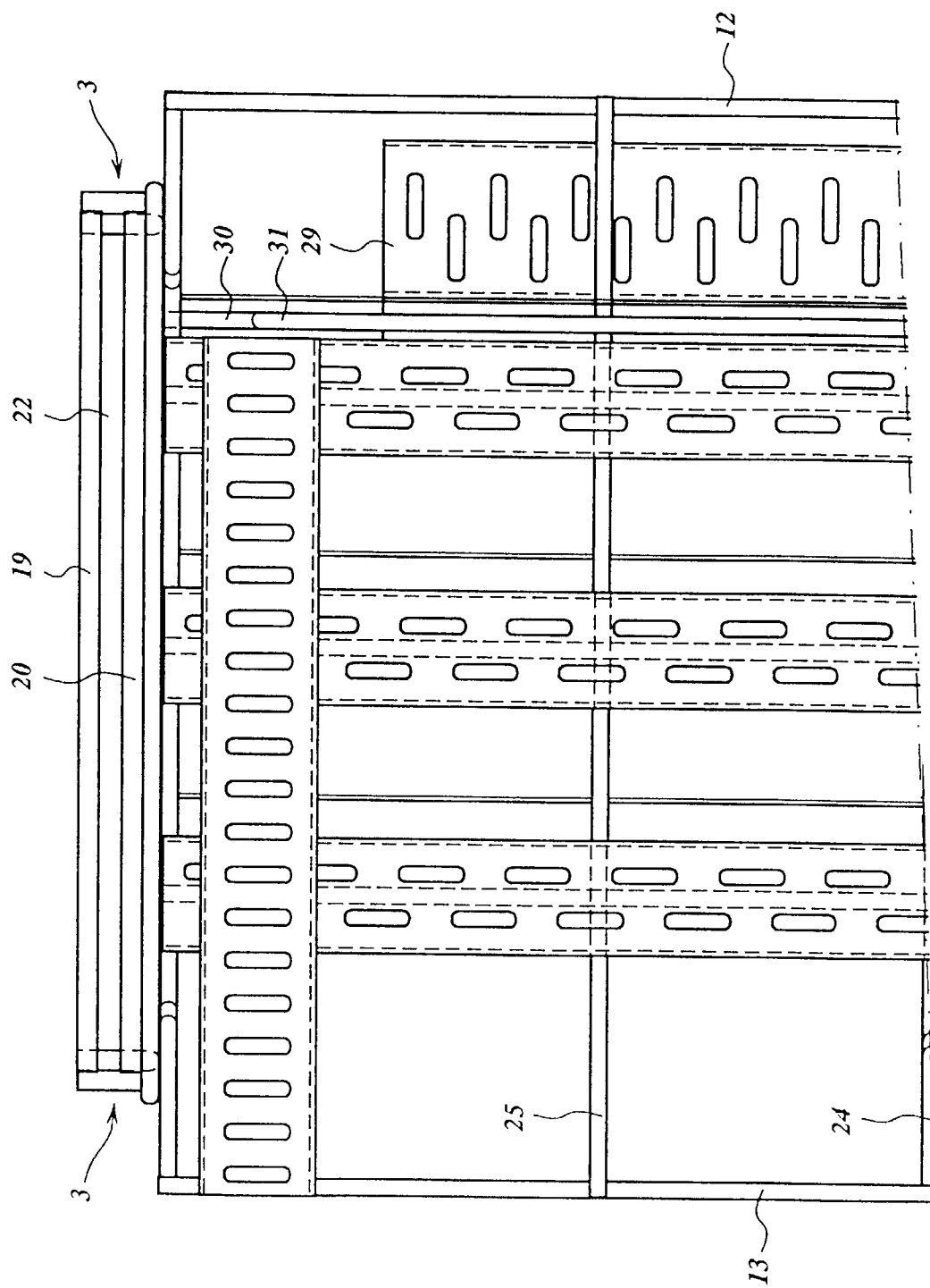
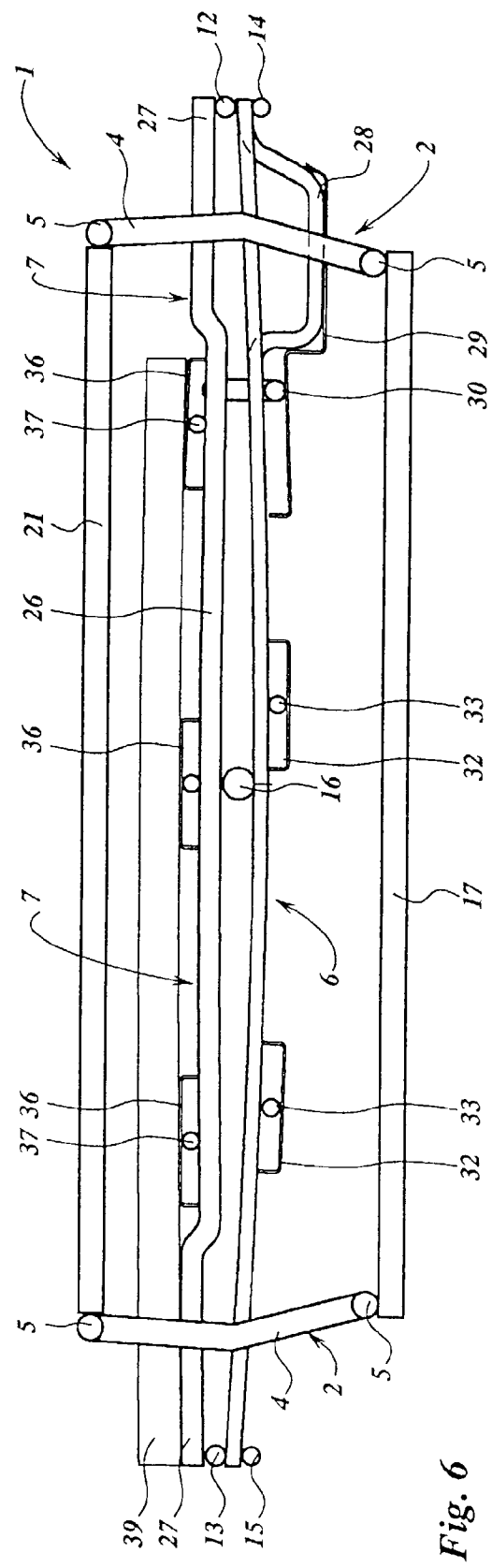
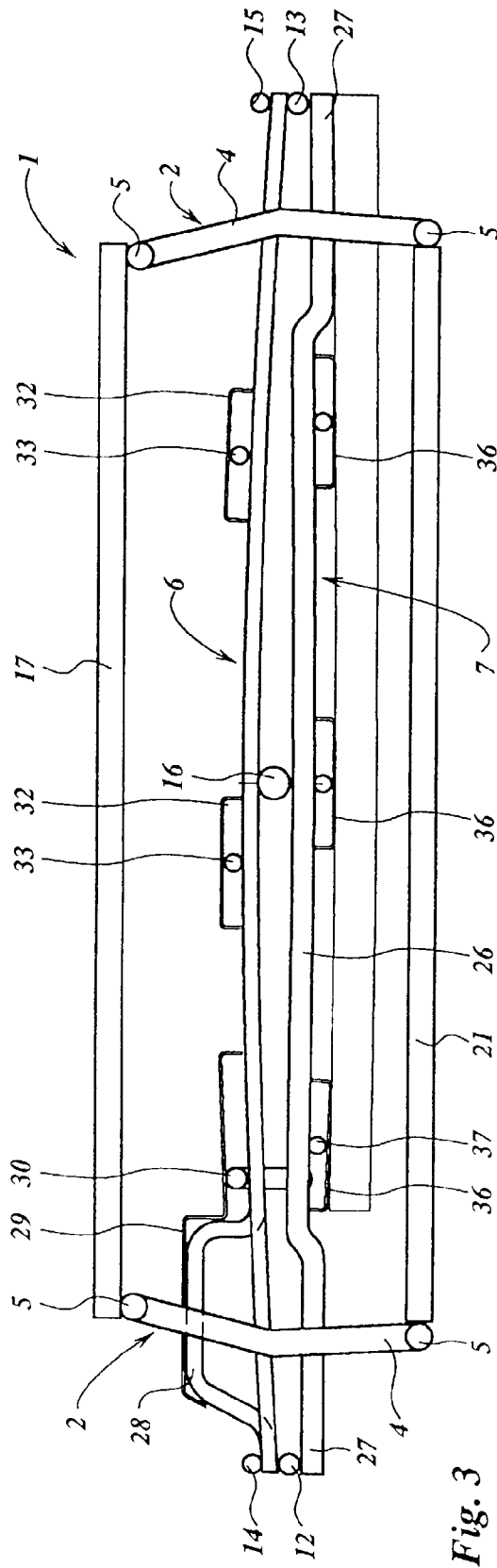


Fig. 5b





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Application Number  
EP 98 20 2887

| DOCUMENTS CONSIDERED TO BE RELEVANT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                    |                                  |                                              |
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| The present search report has been drawn up for all claims                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                    |                                  |                                              |
| Place of search                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                    | Date of completion of the search | Examiner                                     |
| THE HAGUE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                    | 13 November 1998                 | Silvis, H                                    |
| CATEGORY OF CITED DOCUMENTS<br>X : particularly relevant if taken alone<br>Y : particularly relevant if combined with another document of the same category<br>A : technological background<br>O : non-written disclosure<br>P : intermediate document<br>T : theory or principle underlying the invention<br>E : earlier patent document, but published on, or after the filing date<br>D : document cited in the application<br>L : document cited for other reasons<br>& : member of the same patent family, corresponding document |                                                                                                    |                                  |                                              |

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# EUROPEAN SEARCH REPORT

Application Number  
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| DOCUMENTS CONSIDERED TO BE RELEVANT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                |                                                      |                                              |
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| Place of search<br>THE HAGUE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                | Date of completion of the search<br>13 November 1998 | Examiner<br>Silvis, H                        |
| <p>CATEGORY OF CITED DOCUMENTS</p> <p>X : particularly relevant if taken alone<br/> Y : particularly relevant if combined with another document of the same category<br/> A : technological background<br/> O : non-written disclosure<br/> P : intermediate document</p> <p>T : theory or principle underlying the invention<br/> E : earlier patent document, but published on, or after the filing date<br/> D : document cited in the application<br/> L : document cited for other reasons<br/> &amp; : member of the same patent family, corresponding document</p> |                                                                                |                                                      |                                              |

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