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(54) **Support panel for furnishings in commercial vehicles, in particular for shelving, and a method for the manufacture thereof**

Haltetafel für Einrichtungen in gewerblichen Fahrzeugen, insbesondere für Regale und Herstellungsverfahren dafür

Panneau support pour meubles dans des véhicules commerciaux, en particulier pour des étagères et son procédé de fabrication

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(73) Proprietor: **Francom S.P.A.
36022 Cassola (VI) (IT)**

(72) Inventor: **Comunello, Luca
36022, Cassola (VI) (IT)**

(74) Representative: **Gallo, Luca
Gallo & Partners S.r.l.
Via Trieste 49
35121 Padova (IT)**

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Description

Field of application

[0001] The present invention relates to a support panel for furnishings in commercial vehicles, in particular for shelving, and to a method for the manufacture thereof.

[0002] The panel in question falls within the sector of furnishings for vehicles and is intended in particular to be installed inside said vehicles in order to form shelving of various kinds for containing small objects or equipment.

Background art

[0003] As is known, at present the shelving with which vans are fitted are supported by structures which must withstand mechanical stresses of a static nature in order to bear the weight of the equipment contained on the shelves, but also of a dynamic nature in order to withstand the stresses transmitted by the chassis of the van due to roughness of the ground.

[0004] Various designs of structures are known, these generally using frames which are formed by columns and cross-members which can be connected together by means of male/female interfitting joints and fixing means such as screws or welds. These frames form only the skeleton of the structure on which it is then necessary to mount the shelves and the drawers with their own walls and own doors in order to define the spaces containing the objects to be housed therein such as equipment and small items.

[0005] The free spaces defined by the frames are closed, mainly for aesthetic reasons, by means of paneling made of metal or more frequently plastic. The shelves and the drawers generally concealed by the abovementioned panels on three sides are fixed directly to the frame using adjustable interfitting means which allow, during assembly, versatile fixing thereof in the desired position so as to obtain the desired furnishing depending on the shape of the vehicle compartment.

[0006] The solutions of the known type which use a supporting frame mainly have the drawback that they are somewhat complicated to assemble and require a side closing panel which is arranged over the drawer containing walls, constituting an additional cost for the furnishing.

[0007] A support structure which, in place of a metal frame formed by columns and cross-members, uses a frame formed by sheet-metal panels with reinforcing edges obtained by means of folding is also known.

[0008] In greater detail solutions comprising reinforcing edges formed with several folds, as indicated by way of example in Figure A so as to form a perimetral tubular reinforcement, are known. The last end portion of the fold is arranged on top of the panel and is fixed to it by means of spot or seam welding. This solution is somewhat expensive because the production process is made particularly complicated by the numerous folding operations

and welding operations. Moreover, the tubular edge deprives the drawers or shelves of useful space.

[0009] Another solution for a panel with a reinforcing edge is shown in Figure B where each side of the panel is reinforced with only one right-angled fold.

[0010] This solution requires the use of fairly large thicknesses for the sheet metal of the panel in order to achieve the required mechanical strength.

[0011] This fact results in an increase in the weight of the furnishing mounted in the vehicle with an ultimate increase in the level of fuel consumption.

[0012] Document US 4,535,898 discloses a shelf having a structure of the kind which is assembled from a number of vertical elements and interconnected horizontal elements. Such shelves are conventionally formed from sheet metal, comprising a horizontal shelf panel and flanges extending vertically downwardly from the shelf panel on at least two sides thereof, each flange being folded backwardly on itself to increase the strength of the flange. In accordance with this invention, each flange is so folded as to provide a pocket in which an elongate reinforcing member is positioned, such reinforcing members engaging the underside of the shelf panel. In particular, each flange comprises a first portion extending downwardly from the panel, a second portion folded inwardly so as to extend towards the underside of the shelf panel generally parallel to, and spaced from the first portion, the reinforcing member being located between said first and second portions, transmitting load from the shelf by virtue of its engagement with the underside of the shelf and transmitting such load to an intermediate portion between said first and second portions. The shelves disclosed in this document have the inconvenience that do not disclose how to strictly mechanically connect the flanges of adjacent wall.

Disclosure of the invention

[0013] In this situation, therefore, the object of the present invention is to eliminate the drawbacks of the known art mentioned above, by providing a support panel for furnishings in commercial vehicles, in particular for shelving, which satisfies the required mechanical strength requirements, while having a lower weight.

[0014] Another object of the present invention is to provide a support panel for furnishings in commercial vehicles, in particular for shelving, which is operationally entirely safe and reliable.

[0015] Another object of the present invention is to provide a support panel for furnishings in commercial vehicles, in particular for shelving, which is simple and allows rapid assembly.

[0016] Another object of the present invention is to provide a method for manufacturing a support panel for furnishings in commercial vehicles, in particular for shelving, which is simple and low-cost.

Brief description of the drawings

[0017] The technical characteristics of the invention, in accordance with the abovementioned objects, may be clearly determined from the contents of the claims indicated below and the advantages thereof will emerge more clearly from the detailed description which follows, provided with reference to the accompanying drawings, which show a purely exemplary and non-limiting example of embodiment thereof, in which:

- Figures 1 and 2 show two views of shelving mounted inside a vehicle and provided with support panels according to the present invention;
- Figures 3 and 4 show two perspective views of the support panel according to the present invention;
- Figures 5, 6 and 7 show three perspective views of an enlarged detail of the support panel according to the present invention relating to an angle portion;
- Figure 8 shows a perspective view, from above, of a metal plate intended to form the support panel according to the present invention;
- Figure 9 shows a perspective view of a detail of shelving with two support panels according to the present invention connected together and to a shelving containing panel.

Detailed description

[0018] With reference to the accompanying drawings, 1 denotes overall a metal shelving for vehicles and 2 a support panel according to the invention, respectively.

[0019] The shelving 1 is intended to be mounted inside the loading compartment of a commercial vehicle V such as, for example, a van, in accordance with the examples shown in Figures 1 and 2.

[0020] The shelving 1 is preferably arranged next to one or both the sides F of the vehicle V and has the function of containing equipment, components or small objects for any operating service for which the vehicle may be furnished.

[0021] Obviously, the shelving 1 is rigidly fixed to the chassis of the vehicle V in a manner conventional per se in order to prevent any movement during travel so as to ensure the safety of the vehicle.

[0022] The panel 2 for furnishings in commercial vehicles according to the present invention, although mainly intended to form the support shoulders for the shelving 1, as can be clearly seen in Figures 1 and 2, may alternatively be intended for other furnishings inside the vehicle such as, for example, a wheel arch covering, shelves or the like.

[0023] It comprises in a manner conventional per se a thin-rolled plate 3 made of metal with several sides 4 and preferably with a rectangular shape as in the examples shown.

[0024] From each side 4 of the plate 3 a reinforcing edge 5 obtained by means of folding of a peripheral end

portion of the thin-rolled plate 3 extends continuously with a 90° fold.

[0025] The edge 5 is provided with openings 6 for allowing fixing means consisting for example of screws 7 to be associated with the panel.

[0026] According to the idea forming the basis of the present invention the reinforcing edge 5 is formed on each side of the panel 2 by two at least partly superimposed portions, comprising a first portion 8, which extends at right angles and peripherally from the thin-rolled plate 3, and a second portion 9, which is arranged at least partly over the first portion 8 and joined to it continuously by means of a 180° fold 10.

[0027] In greater detail, this fold 10 causes the second portion 9 to be arranged in the inner part of the panel 2 delimited by the reinforcing edge 5.

[0028] The openings 6 mentioned above are of the through-type and are obtained by means of the superimposition, due to the fold 10, of first openings 6' provided on the first portion 8 and second openings 6" provided on the second portion 9.

[0029] Advantageously, a tongue 12 extends at right angles from the lateral border zone 11 of the first portion 8 of a side of the reinforcing edge 5 and preferably from both the border zones of the short side of the panel, said tongue being inserted inside a counter-shaped recess 13 formed in the second portion 9 of the edge of the adjoining side of the panel 2 along the adjacent lateral border zone.

[0030] This tongue 12 is also provided with a first opening 6' which is arranged over the second opening 6" formed in the second portion 9 of the edge of the adjoining side of the panel 2.

[0031] The present invention also relates to a method for manufacturing a panel 2 for furnishings in vans of the type described above, which method will be described hereinbelow, retaining the reference numbers mentioned above.

[0032] The method envisages performing a cutting operation on a piece of sheet metal, in particular made of steel, in order to obtain a shaped plate 14 which is shown in Figure 8.

[0033] This operation may advantageously be performed using laser ray technology.

[0034] Then it is envisaged performing a first folding operation aimed at arranging, along each side of the panel 2, the second portion 9 on top of the first portion 8 by means of a 180° fold so as to form the reinforcing edge 5.

[0035] Furthermore, by means of a second folding step, to be performed before or after the first folding step, the projecting tongues 12 provided are folded through 90°, thereby orienting them vertically upwards.

[0036] Then, by means of a third folding step, the reinforcing edge 5 is folded through 90° with respect to the plane of lie of the thin-rolled plate 3.

[0037] The panel 2 with the reinforcing edge 5 obtained structurally as mentioned above and with the production process described allows a substantial reduction in the

thickness of the metal plate 3, resulting in a notable saving in terms of weight, in turn leading to a substantial reduction in the level of fuel consumption during travel of the van.

[0038] For example, in accordance with a preferred solution of the present invention, a thickness in the range of 0.8 mm - 1.6 mm has been envisaged, i.e. well below the thicknesses used hitherto for the manufacture of support panels for vehicles V.

[0039] Moreover, and in particular, by means of the tongues 12 described above, it is possible to fasten together the reinforced edges 5, increasing the mechanical strength of the panel 2.

[0040] In the present description it has been advantageously envisaged folding the peripheral end portion of the panel 2, arranging two portions on top of each other; however, without thereby departing from the scope of protection of the present patent it must be understood that, in order to increase further the rigidity of the panel 2, it is possible to provide a greater number of portions folded onto each other by means of a corresponding number of folds and by means of suitable shaping of the plate, in particular so as to take account of the thickness of the metal sheet.

[0041] Figure 9 shows two panels 2 according to the present invention which are mounted on top of each other and fixed together by means of the same fixing screw 7, along with a panel for containing the shelving 1.

[0042] Preferably, the abovementioned panels in accordance with an advantageous feature of the present invention are arranged on top of each other with the reinforced edges 5 making contact against each other (see Fig. 9) in order to form the supporting shoulders for the shelving, with the function of both supporting and containing the equipment inserted inside special drawer compartments. For this purpose, the individual panels 2 arranged on top of each other have different dimensions preferably decreasing upwards so as to follow the internal profile of the sides of the vehicle V.

[0043] The invention thus conceived therefore achieves the predefined objects.

[0044] Obviously it may assume, in its practical embodiment, also forms and configurations different from that shown above without thereby departing from the present scope of protection.

[0045] Moreover, all the details may be replaced by technically equivalent elements and the dimensions, forms and materials used may be of any nature according to requirements.

Claims

1. Support panel for furnishings in commercial vehicles, in particular for shelving, which comprises:

- a thin-rolled metal plate (3) with several sides (4) ;

- a reinforcing edge (5) extending along each side peripherally and at right angles from said thin-rolled plate (3) and obtained by means of folding of a peripheral end portion of said thin-rolled plate (3); said reinforcing edge (5) being provided with openings (6) for allowing fixing means (7) to be associated with said panel (2);

said reinforcing edge (5) being formed on each side by two at least partly superimposed portions, comprising a first portion (8), which extends at right angles and peripherally from said thin-rolled plate, and a second portion (9), which is arranged at least partly over the first portion (8) and joined to it continuously by means of a 180° fold (10) which arranges said second portion (9) onto said first portion (8) and in the inner part of said panel (2) delimited by said reinforcing edge (5); **characterized in that** a tongue (12) extends at right angles from a lateral border zone (11) of said first portion (8) and is inserted inside a recess (13) formed along the adjacent lateral border zone of the second portion (9) of the edge (5) of an adjoining side of said panel (2).

2. Support panel according to Claim 1, **characterized in that** said recess (13) is formed counter-shaped in respect of said tongue (12).

3. Support panel according to Claim 1, **characterized in that** said openings (6) comprise at least first openings (6') provided on said first portion (8) and second openings (6'') provided on said second portion (9), said first and second openings (6', 6'') being arranged on top of each other by means of said 180° fold (10) so as to form through-openings (6).

4. Support panel according to Claim 3, **characterized in that** said tongue (12) is provided with at least one first opening (6') which is arranged over the second opening (6'') formed in the second portion (9) of the edge (5) of the adjoining side of said panel (2).

5. Method for manufacturing a panel according to claim 1, **characterized in that** it comprises the following operating steps:

- a step involving cutting a piece of sheet metal (3) in order to obtain a shaped plate provided with said tongues (12), with said recess (13) and with said openings (6', 6'') ;
- a first folding step where, along each side, said second portion (9) is arranged on top of said first portion (8) by means of a 180° fold (10), thereby forming a reinforcing edge (5); by means of said 180° fold (10) said first openings (6') provided on said first portion (8) and second openings (6'') provided on said second portion (9) being arranged on top of each other so as to form

through-openings (6);

- a second folding step where said tongues (12) are folded through 90°, thereby orienting them vertically upwards;

- a third folding step where said reinforcing edge (5) is folded through 90° with respect to the plane of lie of said shaped plate; by means of said 90° fold said tongues (12) introducing into said recesses (13).

Patentansprüche

1. Trägerplatte zur Ausrüstung von Nutzfahrzeugen, insbesondere für Regale, umfassend:

- eine geschliffene Metallplatte (3), die mit mehreren Seiten (4) versehen ist;

- eine Verstärkungs-kante (5), die sich an jeder Seite peripher und rechtwinklig von der geschliffenen Platte (3) erstreckt und durch Biegen eines Randes der geschliffenen Platte (3) erzielt wird; wobei die Verstärkungs-kante (5) mit Öffnungen (6) versehen ist, um eine Verbindung an der Platte (2) mit Befestigungsmitteln (7) zu ermöglichen;

wobei die Verstärkungs-kante (5) an jeder Seite aus zwei sich mindestens teilweise überschneidenden Anteilen gebildet wird, wobei sich ein erster Anteil (8) rechtwinklig und peripher aus der geschliffenen Platte erstreckt und ein zweiter Anteil (9) mindestens teilweise den ersten Anteil (8) überschneidet und mittels 180°-Biegung (10) ununterbrochen mit diesem verbunden ist, durch die der zweite Anteil (9) auf dem ersten Anteil (8) innerhalb der von der Verstärkungs-kante (5) begrenzten Platte (2) angeordnet wird;

dadurch gekennzeichnet, dass sich von einem seitlichen Rand (11) des ersten Anteils (8) rechtwinklig eine Rippe (12) erstreckt, die sich in einen Einschnitt (13) einschiebt, der beginnend vom seitlichen, angrenzenden Rand des zweiten Anteils (9) der Kante (5) einer anliegenden Seite der Platte (2) herausgearbeitet ist.

2. Trägerplatte nach Anspruch 1, **dadurch gekennzeichnet, dass** der Einschnitt (13) auf die Rippe (12) bezogen gegengeformt ist.

3. Trägerplatte nach Anspruch 1, **dadurch gekennzeichnet, dass** die Öffnungen (6) mindestens erste Öffnungen (6'), die auf dem ersten Anteil (8) vorgesehen sind, und zweite Öffnungen (6'') umfassen, die auf dem zweiten Anteil (9) vorgesehen sind, wobei sich die ersten und die zweiten Öffnungen (6', 6'') mittels 180°-Biegung (10) überschneiden, um durchgehende Öffnungen (6) zu bilden.

4. Trägerplatte nach Anspruch 3, **dadurch gekennzeichnet, dass** die Rippe (12) mit mindestens einer ersten Öffnung (6') versehen ist, die die zweite Öffnung (6'') überschneidet, die auf dem zweiten Anteil (9) der Kante (5) der anliegenden Seite der Platte (2) herausgearbeitet ist.

5. Verfahren zur Herstellung einer Platte nach Anspruch 1, **dadurch gekennzeichnet, dass** es folgende Arbeitsphasen umfasst:

- eine Phase des Schneidens des Metallbleches (3), um eine schablonierte, mit der Rippe (12), dem Einschnitt (13) und den Öffnungen (6', 6'') versehene Platte zu erhalten;

- eine erste Phase des Biegens, in der auf jeder Seite der zweite Anteil (9) mittels einer 180°-Biegung (10) über den ersten Anteil (8) gelegt wird, wodurch eine Verstärkungs-kante (5) hergestellt wird, wobei mittels einer 180°-Biegung (10) die im ersten Anteil (8) vorgesehenen ersten Öffnungen (6') und die im zweiten Anteil (9) vorgesehenen zweiten Öffnungen (6'') sich überschneiden, um durchgehende Öffnungen (6) zu bilden;

- eine zweite Phase des Biegens, in der die Rippen (12) um 90° gebogen werden, wodurch sie vertikal nach oben ausgerichtet werden;

- eine dritte Phase des Biegens, in der die Verstärkungs-kante (5) um 90° bezogen auf die Auflageebene der schablonierten Platte gebogen wird, wobei sich die Rippen (12) durch die 90°-Biegung in die Einschnitte (13) einschieben.

Revendications

1. Panneau porteur pour l'aménagement de véhicules commerciaux, en particulier pour étagères, lequel comprend :

- une plaque amincie en matériau métallique (3) pourvue de plusieurs côtés (4) ;

- un bord de renfort (5) s'étendant le long de chaque côté de manière périphérique et orthogonale à partir de ladite plaque amincie (3) et obtenu par le biais d'un pliage d'une lèvre périphérique de ladite plaque amincie (3) ; ledit bord de renfort (5) étant pourvu d'ouvertures (6) pour permettre d'associer des moyens de fixation (7) avec ledit panneau (2) ;

ledit bord de renfort (5) étant formé sur chaque côté par deux portions au moins partiellement superposées, dont une première portion (8), s'étendant de manière périphérique et orthogonale à partir de ladite plaque amincie, et une deuxième portion (9), superposée au moins partiellement avec la première

portion (8) et unie à celle-ci sans solution de continuité par le biais d'un pliage (10) à 180° qui dispose ladite deuxième portion (9) sur ladite première portion (8) et dans la partie interne dudit panneau (2) délimitée par ledit bord de renfort (5) ;
caractérisé en ce que, à partir d'une limite latérale (11) de ladite première portion (8), s'étend orthogonalement une ailette (12) qui s'insère dans une entaille (13) ménagée à partir de la limite latérale adjacente de la deuxième portion (9) du bord (5) d'un côté contigu dudit panneau (2).

au plan de disposition de ladite plaque profilée ; par le biais dudit pliage à 90°, lesdites ailettes (12) s'insèrent dans lesdites entailles (13).

2. Panneau porteur selon la revendication 1, **caractérisé en ce que** ladite entaille (13) est formée avec un profil complémentaire par rapport à ladite ailette (12).
3. Panneau porteur selon la revendication 1, **caractérisé en ce que** lesdites ouvertures (6) comprennent au moins des premières ouvertures (6') prédisposées sur ladite première portion (8) et des deuxième ouvertures (6'') prédisposées sur ladite deuxième portion (9), lesdites premières et lesdites deuxième ouvertures (6', 6'') se superposant par le biais dudit pliage (10) à 180° pour réaliser des ouvertures transversantes (6).
4. Panneau porteur selon la revendication 3, **caractérisé en ce que** ladite ailette (12) est pourvue d'au moins une première ouverture (6') laquelle se superpose à la deuxième ouverture (6'') ménagée dans la deuxième portion (9) du bord (5) du côté contigu dudit panneau (2).
5. Procédé pour la réalisation d'un panneau selon la revendication 1, **caractérisé en ce qu'il** comprend les phases opérationnelles suivantes :
 - une phase de découpe d'une feuille de matériau métallique (3) pour obtenir une plaque profilée munie de ladite ailette (12), avec ladite entaille (13) et avec lesdites ouvertures (6', 6'') ;
 - une première phase de pliage dans laquelle, pour chaque côté, ladite deuxième portion (9) est superposée avec ladite première portion (8) par le biais d'un pliage (10) à 180°, en réalisant ainsi un bord de renfort (5) ; par le biais dudit pliage (10) à 180° desdites premières ouvertures (6') prédisposées sur ladite première portion (8) et de deuxième ouvertures (6'') prédisposées sur ladite deuxième portion (9) en se superposant pour réaliser des ouvertures transversantes (6) ;
 - une deuxième phase de pliage dans laquelle lesdites ailettes (12) sont pliées de 90°, en les orientant ainsi verticalement vers le haut ;
 - une troisième phase de pliage dans laquelle ledit bord de renfort (5) est plié à 90° par rapport

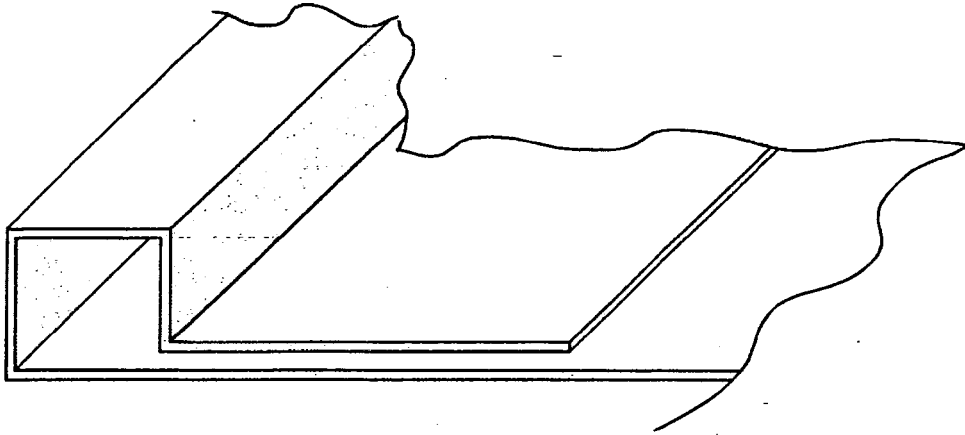


Fig. A

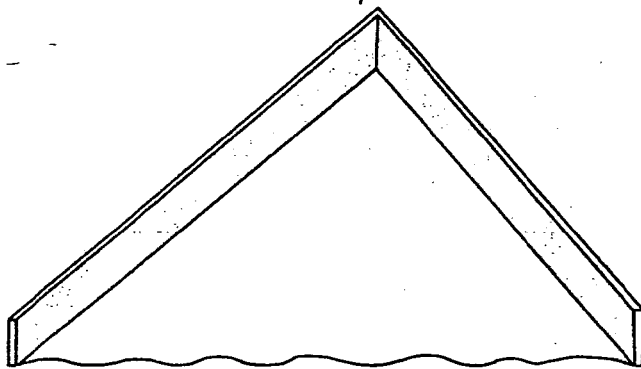


Fig B

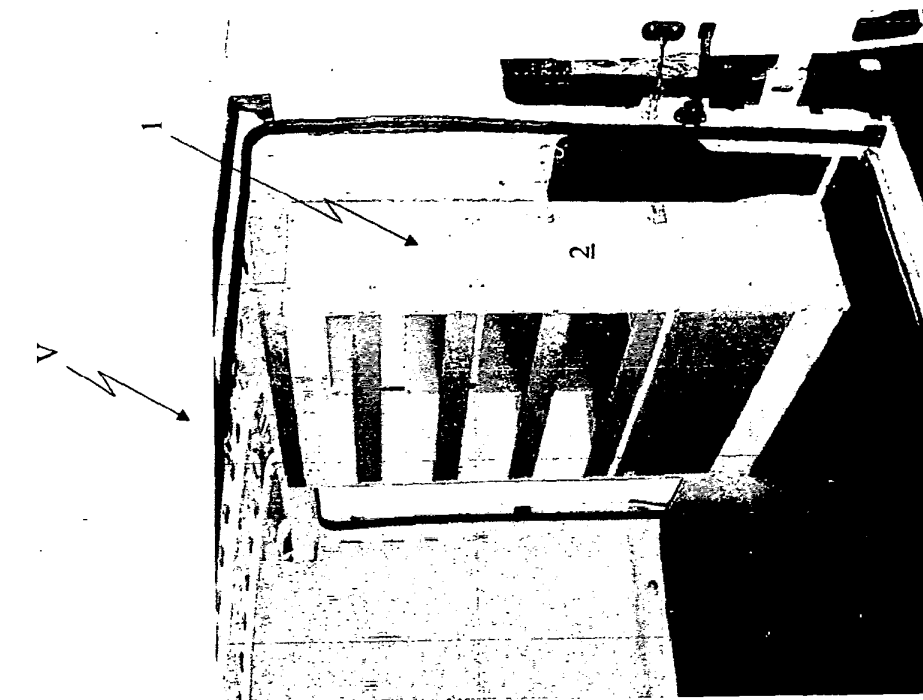


Fig. 2

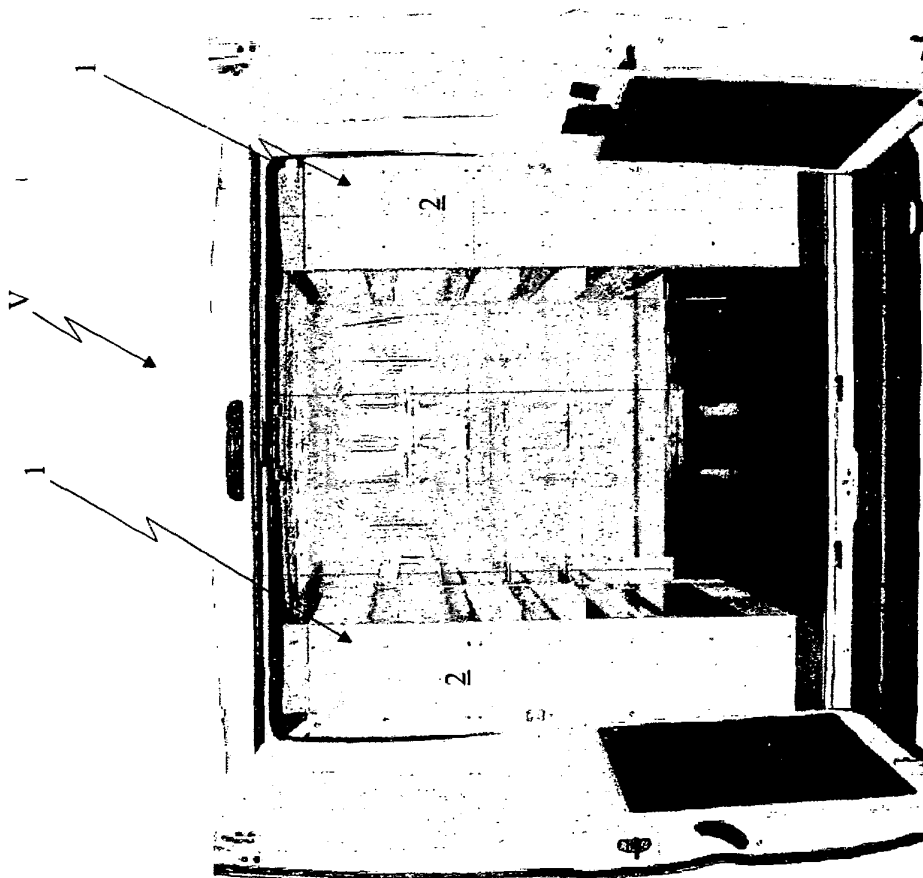


Fig. 1

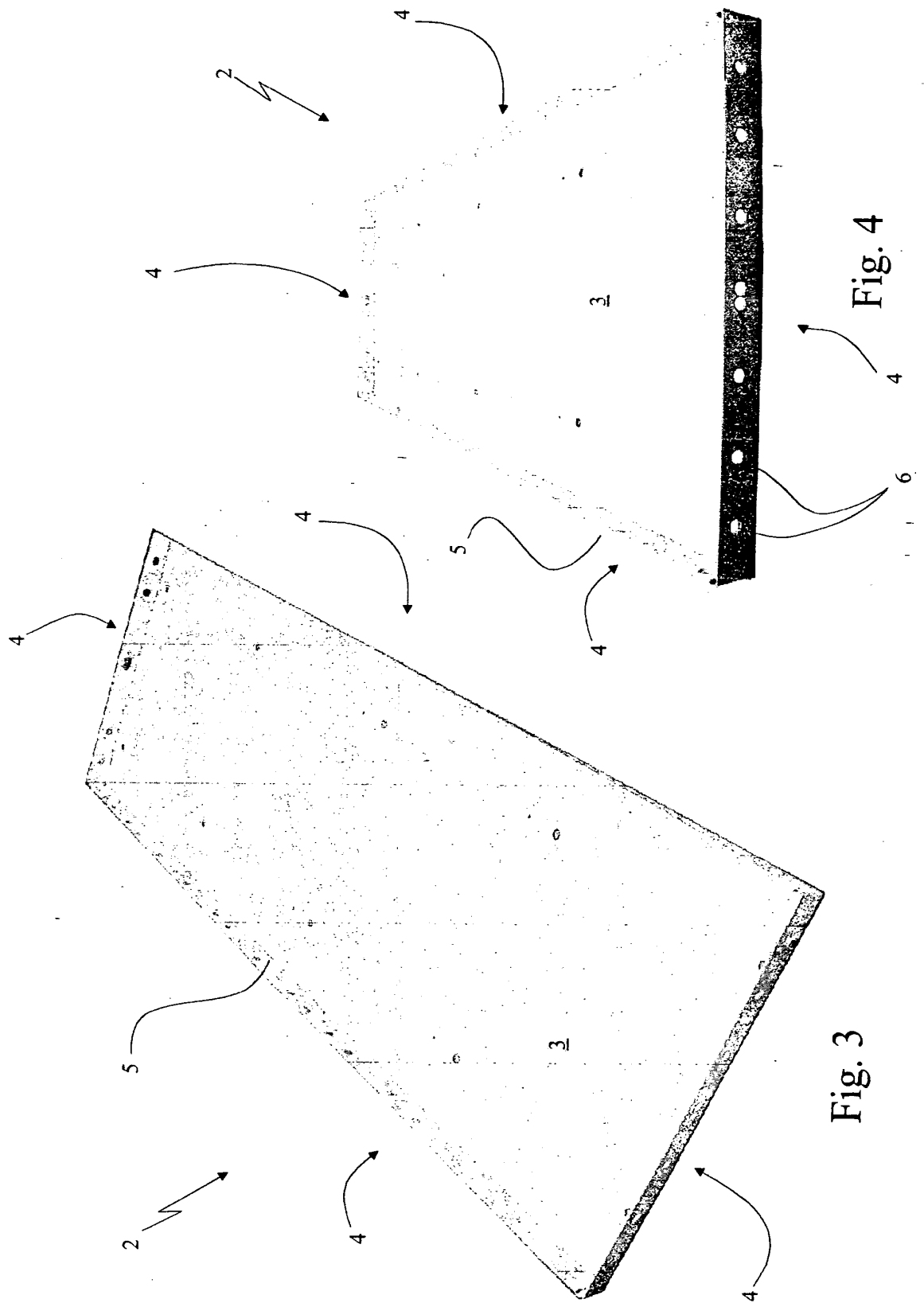
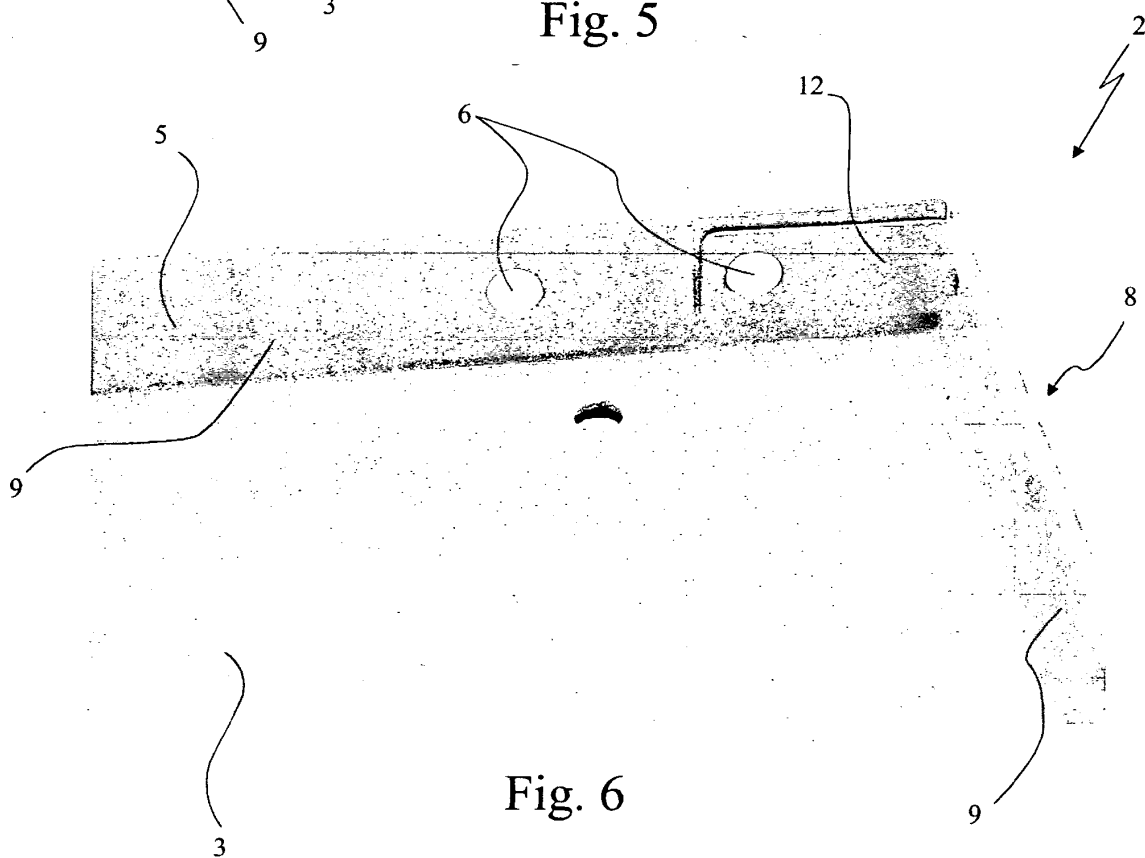
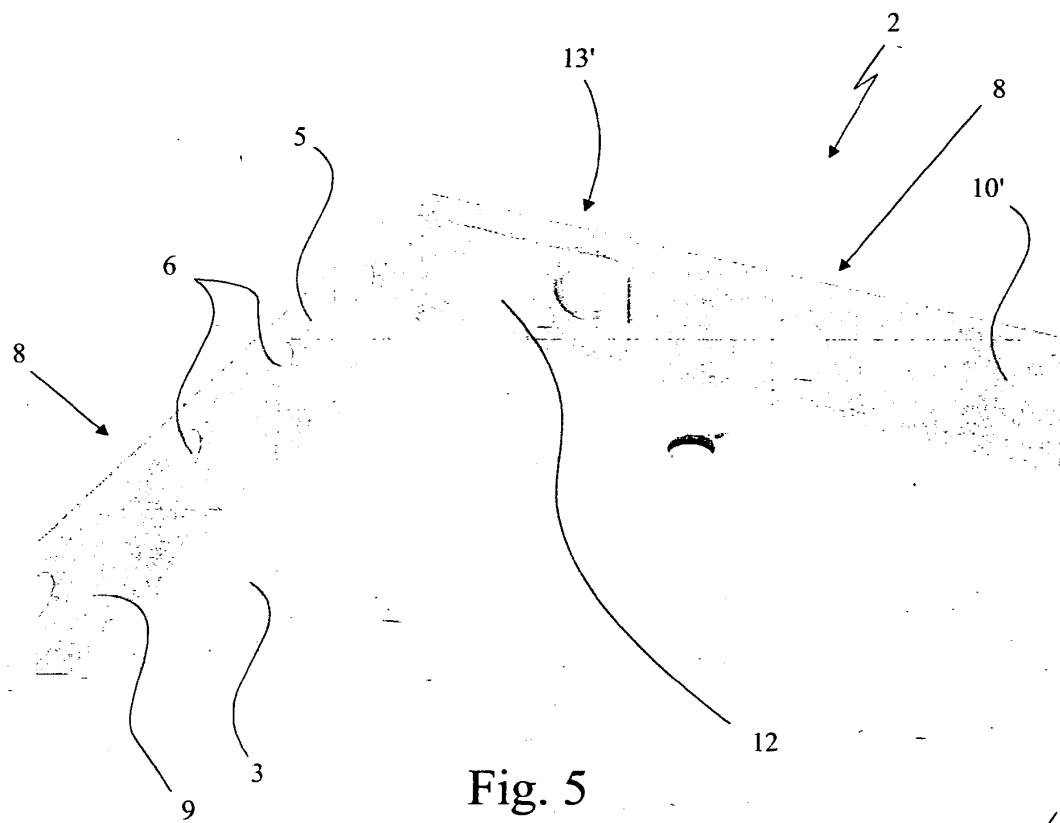
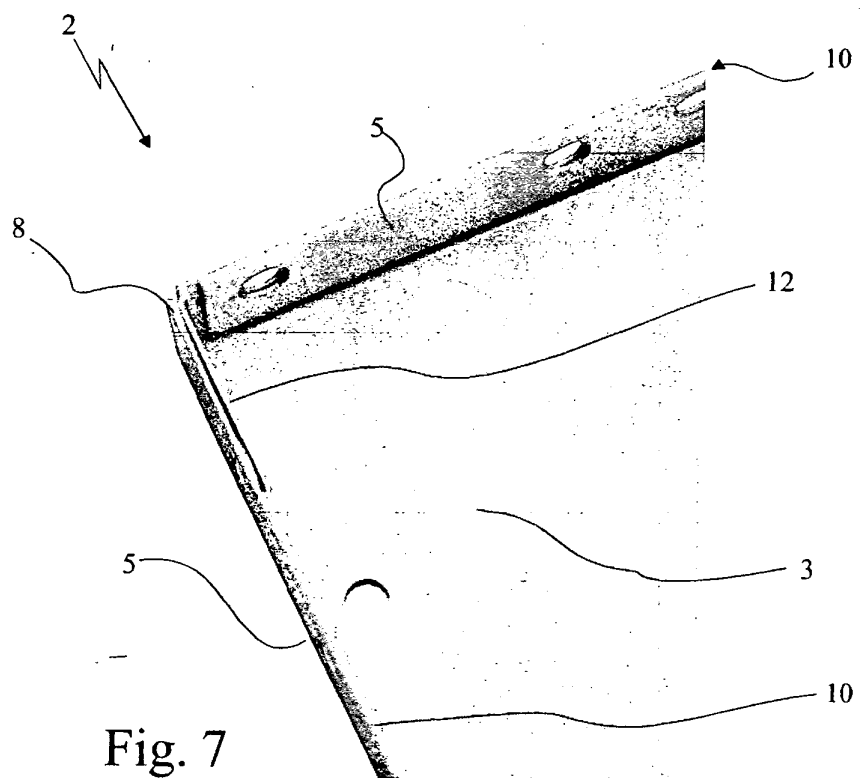
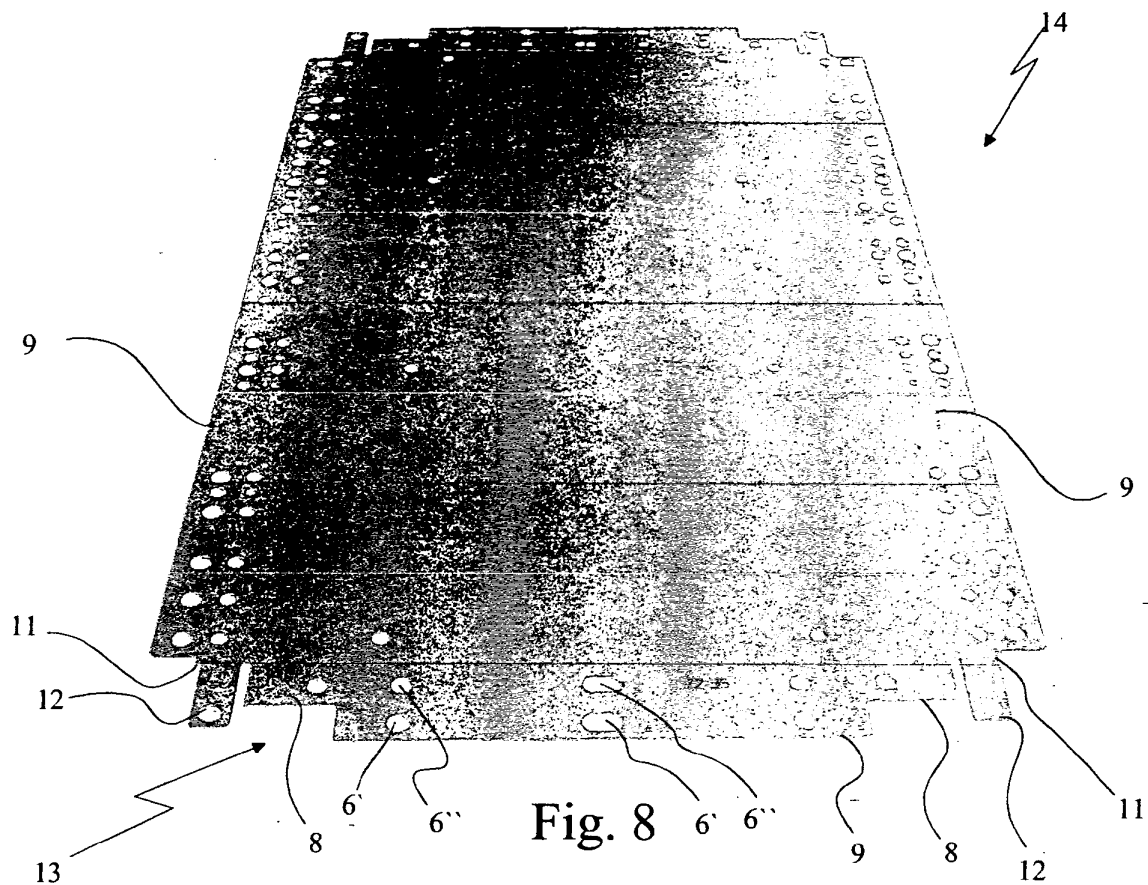


Fig. 3

Fig. 4





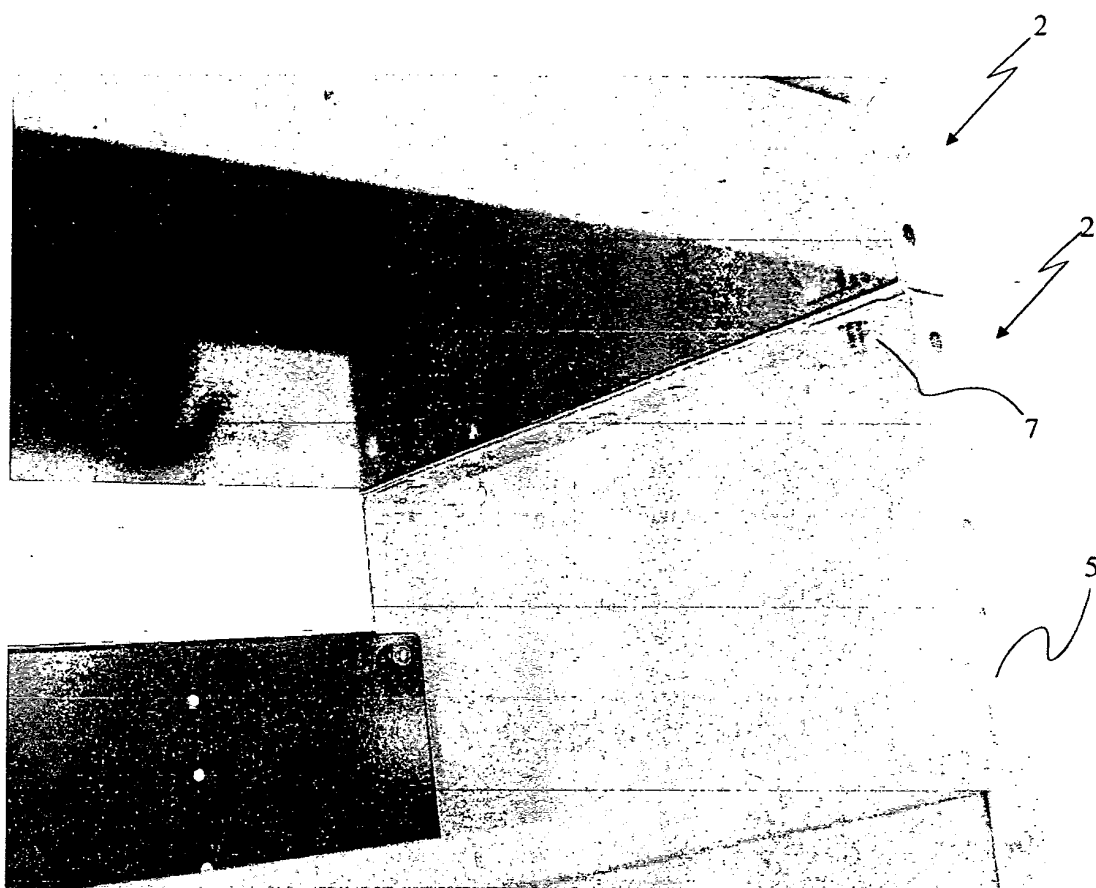


Fig. 9

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

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