(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 2 180 106 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
28.04.2010 Bulletin 2010/17

(51) Int Cl.:
E04B 2/74 *(2006.01)* ***E04H 1/12*** *(2006.01)*

(21) Application number: **08018632.3**

(22) Date of filing: **24.10.2008**

(84) Designated Contracting States:
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MT NL NO PL PT RO SE SI SK TR
Designated Extension States:
AL BA MK RS

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(54) Mounting system for panel walls

(57) The invention relates to a mounting system for panels of the type utilized for walls and furnishings in exhibitions, offices and the like. The panels are provided with profiles forming slots in which coupling elements separate from the panel are partially housed. Each coupling element partially engages two slots of two panels.

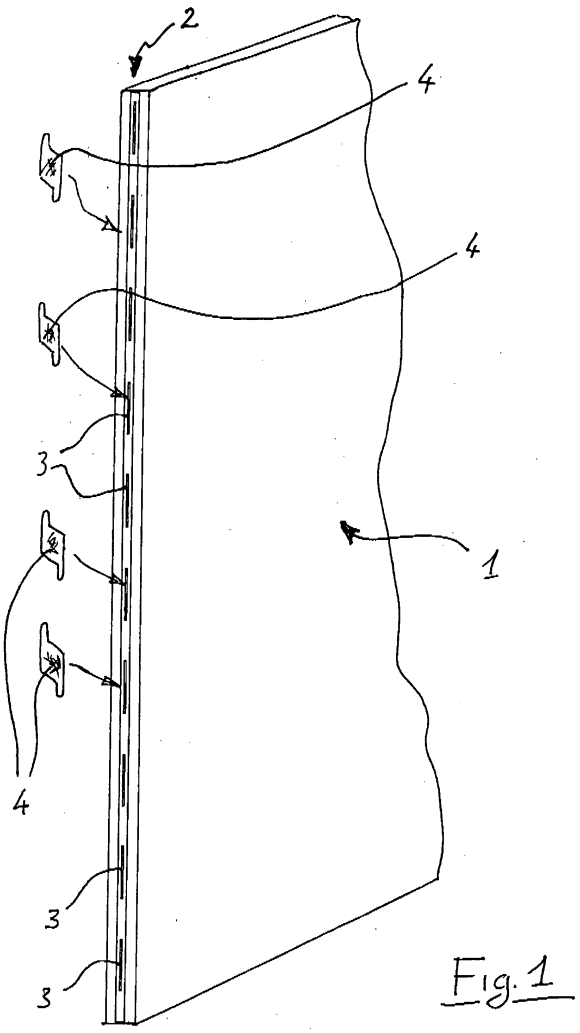

Fig. 1

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Description

[0001] The present invention relates to a mounting system for assembling panel walls. In particular, the invention relates to a system to create walls and furnishings with modular panels of disassemblable and non-permanent type.

[0002] The term "furnishings of disassemblable and non-permanent type" is intended herein as all embodiments in which panels of any type and size are assembled to form furnishing structures such as walls for stands and exhibition spaces in general, partition walls in general, for example on ships, in airports and in open-space offices, furnishings for shops and commercial spaces and the like.

[0003] In the embodiments mentioned above, the walls are obtained by assembling a plurality of panels sufficient to obtain the length desired for the wall. As the walls do not generally have a ceiling, the panels must be capable of remaining upright by means of their assembly system. The main technical problem to overcome in this regard is that of mutually constraining the panels so as to create a wall capable of withstanding the normal stresses of the environment, and in the simplest and most rapid manner possible.

[0004] Moreover, the assembly system must be aesthetically acceptable, i.e. the completed wall must have a pleasing appearance.

[0005] Many types of assembly systems for panels of the type discussed above have been known for some time.

[0006] The simplest and most commonly used method is that of aligning the panels laterally on the ground, mutually constraining them, for example with profiles disposed between two adjacent panels and with clips or other coupling means positioned at the top and bottom of these panels. The wall thus formed is then placed vertically upright. This solution presents the disadvantage of having to move a whole wall from a horizontal position, on the ground, to a vertical position, for use of the wall. As walls, especially in exhibition spaces of exhibition centres and similar locations, can even be of considerably length, it is clear that the system described above has the disadvantage of having to employ many people to be implemented.

[0007] To attempt to solve the aforesaid problems many different types of coupling systems between panels have been presented.

[0008] CH 619278 describes a system in which adjacent panels are mutually constrained by means of profiles having at least two continuous longitudinal grooves engageable by coupling means integral with the panels. This system is complex to make and the panels cannot be assembled upright as they must be inserted in the grooves along the entire length thereof.

[0009] Another system provided with uprights with longitudinal grooves and with coupling plates is known from BE 1009442; this system is also complex to make and to assemble.

[0010] FR 2576764 relates to a panel assembly system in which cylindrical hinges are provided, housed in cylindrical uprights present on the sides of the panels. With this system it is possible to orient the panels with respect to one another in all directions, but it does not solve the problem of the complexity of the step for mutual assembly to form a wall; in fact, according to this document, instead of being disassembled the walls are folded.

[0011] More recently, US 2001/0037612 proposed a panel assembly system to form walls in exhibition areas in which the panels are rigid and are provided along the vertical edges thereof with a profile containing a groove in which reciprocal coupling means are housed. The coupling means comprise a plate provided with a hook and a flat plate which are inserted in the grooves of two adjacent panels and fastened in complementary positions so as to allow the panels to be mutually constrained in a simple and concealed manner. The main problem of this implementation is given by the fact that the coupling means provided are not sufficient to ensure fastening, and therefore the panels must also be mutually constrained with plates or similar means positioned on the edges of the top and bottom ends of these panels and screwed or nailed to said edges. This makes it necessary to once again assemble the wall on the floor and then lift it manually into the vertical position.

[0012] Therefore, it is necessary to provide an assembly system which allows walls formed of a plurality of panels to be assembled and disassembled in a simple and rapid manner, which guarantees the required solidity of the final structure, also in the absence of top or bottom constraining brackets of plates, which is aesthetically acceptable and which allows assembly and disassembly of the panels already disposed in an upright position.

[0013] The object of the present invention is to solve the aforesaid problem. This object is achieved by means of the present invention which relates to mounting system for panels characterized according to claim 1.

[0014] The invention also relates to a panel comprising a profile and a coupling element between panels of the type usable with the system above.

[0015] According to the present invention, the system for mounting walls formed by a plurality of mutually constrained panels comprises panels provided on each vertical side with a plurality of reciprocal coupling means, formed by a plurality of staggered slots on a first and a second vertical side of the panel and a coupling element which is physically separate and normally disengaged from the panel.

[0016] The coupling element is provided with at least two projecting portions to simultaneously engage two slots of two adjacent panels and in this manner mutually constrain them. For this purpose, the slots in a first panel are partially staggered with respect to the corresponding slots on a second adjacent panel, so that after having engaged the slots with the coupling element the panels are at the same level.

[0017] Preferably, the slots are obtained by means of a profile disposed laterally on the vertical sides of the panel and provided with a hollow body with quadrangular section, along which a series of openings are spaced on only one side of the body.

[0018] In a preferential embodiment, the panel is formed by a laminate in which an inner layer in light material such as polystyrene or similar expanded material is coupled with two outer layers, for example made of PVC and is enclosed in a frame that stiffens it and houses a profile with the required openings and slots.

[0019] Preferably, the coupling element comprises a body in the shape of a parallelogram-shaped plate and two portions projecting from opposite and alternate corners of the parallelogram. The dimensions of the slot and coupling element are such that the two adjacent panels are mutually clamped.

[0020] The invention presents numerous advantages with respect to prior art.

[0021] In the first place, it allows the panels to be assembled already in vertical position as the coupling elements distributed along the side of the panel form a structure capable of withstanding possible stresses of the use for which it is intended and it is not necessary to utilize additional devices disposed above and below the panels, as is instead the case in prior art.

[0022] Another advantage is the speed with which the wall can be assembled and disassembled, due to the presence of the coupling elements insertable in and removable from the slots of the profile by hand, that is, without requiring to use tools such as screwdrivers or the like. The speed and ease of assembly and disassembly is such as to reduce by at least 50% the labour costs for these operations.

[0023] A further advantages is that the invention makes it possible to use laminated panels with core in light material, such as expanded materials and in particular sintered polystyrenes, laminated with covering materials and housed in a stiffening frame in which the profiles are in turn housed.

[0024] The invention will now be described in more detail with reference to the accompanying drawings provided by way of non limiting illustration, wherein:

- Fig. 1 is a schematic and perspective view of a panel according to the invention and of some of the coupling and constraining elements;
- Fig. 2 is an enlarged perspective and sectional view of a profile utilizable in the invention;
- Figs. 3 and 4 are cross sections of other multiple profiles according to the invention;
- Fig. 5 is the cross section of the profile of Fig. 2;
- Fig. 6 is a cross section of two panels in the area around two profiles with panels coupled;
- Figs. 7 and 8 are a perspective view and a plan view of the coupling element according to the invention;
- Fig. 9 is a partly sectional view of a coupling element inserted in a slot of a profile, before engagement of the adjacent panel;
- Fig. 10 is a schematic front view of two panels before coupling thereof;
- Fig. 11 is an exploded view of a panel according to the invention.

[0025] With reference to Fig. 1, there is shown a panel made for the wall assembly system according to the invention. The panel 1 shown can be made of any type of material and is provided with a plurality of slots 3 disposed staggered on a first side 2 and a second vertical side (not shown) of the panel. The slots 3 are engageable by a corresponding plurality of coupling elements 4, as indicated in Fig. 1 with the arrows which extend from the elements 4 to the corresponding slots 3; not all the elements 4 are shown in this figure, but it is understood that one slot corresponds to each element and vice versa.

[0026] The coupling or constraining element 4 between two adjacent panels is physically separate from the panels and is normally disengaged from the panel and provided with at least two projecting portions to simultaneously engage two slots of two adjacent panels. Advantageously, the elements 4 are insertable in and removable from the slots by hand, that is, without using tools, as is instead generally the case in prior art.

[0027] The slots 3 must be capable of receiving a part of the corresponding elements 4 and of retaining them. For this purpose, the slots are generally formed by a profile with structure and thicknesses such as to withstand the successive stresses transmitted thereto during use of the panel.

[0028] The profile 5 shown in Figs. 2-5 presents a body 6 generally with a quadrangular section (in the embodiment shown it is rectangular) which is hollow and which presents a series of openings 7 produced staggered on only one side, 8, of said box-shaped body 6. In this manner an extremely solid structure is formed in which the openings 7 give access to the inner part of the hollow body 6 and in this manner form a plurality of slots obtained from a single profile. In other words, the slots are defined by the openings 7 on the side 8 of the profile 5, even if in actual fact there are no interruptions in the body 6 of the profile, which is a continuous structure without inner dividing walls.

[0029] In the embodiment shown, the profile also presents two L-shaped flanges 9, which extend from two adjacent sides of the box-shaped body 6 and have the function of constraining the profile to the panel and of stiffening the structure of the profile. The profile 5 is generally recessed in the vertical side 2 of the panel 1, and is therefore of the concealed type, being used to mutually constrain two panels on the same plane. To attach together panels to form corners the multiple profiles shown in Figs. 3 and 4 are preferably used; in these embodiments, which allow two panels to be mutually disposed at an angle, the body 6 of the profiles are part of a structure 10a and 10b to mutually connect two panels forming an angle. Fig. 3 allows angles of 90° and Fig. 4 angles

of 45° to be obtained.

[0030] Figures 7 and 8 show in greater detail an element 4 for reciprocal coupling of panels according to the present invention.

[0031] The coupling element 4 comprises a body 11 in the form of a parallelogram-shaped plate; two projecting portions 12 and 13 extend from opposite and alternate corners of the body 11, in opposite directions to form an extension of the greater sides of the parallelogram, that is, they extend along the longer sides thereof, and preferably in a symmetrical manner in order to be able to use either one or other of the projecting portions without distinction. The element 4 is partly housed in a slot of a panel and the projecting portions 12 and 13 have the function of each coupling a profile of a panel and maintaining them in contact, as shown in Fig. 7. In substance, each element is housed half in one panel and half in the adjacent panel of the assembled wall.

[0032] As shown in Figures 7 and 9, the portions 12 and 13 have the function of engaging the hollow part of the profile after having been inserted therein through the openings 7; once inserted, one of the portions, for example the portion 12, is positioned in the hollow part of the profile between the walls thereof. The dimensions of the portion 12 (and 13, as it is identical to the portion 12) are such that it can substantially engage the inner walls of the profile and in any case can be inserted in and removed from the body 6 of the profile without difficulty. For example, the ratio between the width L of the projecting portions 12 and 13 (in plan view) and the width L1 of the portion of slot engaged by the projecting portion is in the interval from 0.85 to 0.99. Analogous values are preferably applied to the ratio of the other side, S, of the portions 12 and 13 with the other side, S1, of the body 6. The portions 12 and 13 extend inside the profile for a length sufficient to ensure that they cannot slip out of the body 6 of the profile 5.

[0033] As can be seen in Fig. 9, in which the flanges 9 and the panels corresponding to the two profiles 5 and 5A are not shown for simplicity, the distance L3 between the inner wall 14 and the outer wall 15 from the body 6 corresponds to approximately 50% of the total width L3 of the element 4. In this manner, when the second profile 5A (shown on the right of Figs. 6 and 9) is positioned against the profile 5 and the portion 13 of the coupling element or plate 4 is inserted in the hollow body 6A of the profile 5A, the two profiles, and the corresponding panels, are positioned in close mutual contact, as shown in Fig. 6, which is a bottom sectional view of Fig. 9 after coupling of the profile 5A.

[0034] Preferably, the coupling element or plate 4 has rounded and tapered tips of the projecting portions 12 and 13 (Fig. 8), obtuse angles of the parallelogram in the interval from 160 to 190 degrees, and presents a right-angled portion 16 between the projecting portions 12 and 13 and the oblique side of the body 11.

[0035] To take into account the dimensions of the coupling plate 4 once positioned in a profile, the openings 7 on the two sides of the panel are disposed staggered, so that during assembly the "staggered" profile of a second panel is coupled with each profile of a first panel. Fig. 10 shows the profiles of the two sides of a panel, i.e. the profiles 5 and 5A of two panels (not visible) which will be coupled by means of the coupling elements 4. In general, it is preferable for the distance D1 between two adjacent openings 7 on one side of a panel to be less than the length D2 of the single openings 7.

[0036] Fig. 11 shows a further object of the invention. In this preferred embodiment, the panel is formed by a laminate in which an inner layer 17 made of light material such as polystyrene or similar expanded material is coupled with two outer layers 18 and 19, for example made of PVC optionally coupled with nobler materials such as wood, and is enclosed in a frame 20 which stiffens it and which houses a profile 5 with the required openings and slots.

[0037] This panel therefore combines qualities of lightness and stiffness with all the advantages offered by the mounting system described above and therefore is even simpler to assemble in partition walls.

[0038] The system according to the invention can be used for various types of panels, including transparent glass panels or the like for a wide range of applications, including those for furnishing.

Claims

1. System for mounting walls formed by a plurality of mutually constrained panels, wherein said panels are provided on each vertical side with a plurality of reciprocal coupling means, **characterized in that** said coupling means comprise a plurality of staggered slots on a first and a second vertical side of the panel and a coupling element normally disengaged from the panel and provided with at least two projecting portions to simultaneously engage two slots of two adjacent panels.

2. System according to claim 1, wherein said slots in a first panel are partially staggered with respect to the corresponding slots on a second adjacent panel.

3. System according to claim 1 or 2, wherein said slots are obtained by means of at least one profile.

4. System according to claim 3, wherein said profile has a body with quadrangular section, means for fastening it to the panel and a series of openings produced staggered on only one side of said box-shaped body.

5. System according to claim 4, wherein said profile also has two L-shaped flanges which extend from two adjacent sides of said box-shaped body.

6. System according to one of the preceding claims, wherein said profile is chosen from profiles concealed in the side of the panel and visible multiple profiles.

7. System according to one of the preceding claims, wherein said coupling element comprises a body in the form of a parallelogram-shaped plate and two portions projecting from opposite and alternate corners of said parallelogram body

8. System according to claim 7, wherein the obtuse angles of the parallelogram are in the interval from 160 to 190 degrees.

9. System according to one of the preceding claims, wherein the distance between two adjacent openings on one side of a panel is less than the length of the individual openings.

10. System according to one of the preceding claims, wherein the ratio between the width L of the projecting portions of the coupling element and the width L1 of the portion of slot engaged by the projecting portion is in the interval from 0.85 to 0.99.

11. Panel of a system according to one of the preceding claims.

12. Panel according to claim 11, comprising an inner layer made of a first material and a rigid frame, said frame housing one or more profiles.

13. Profile according to one of claims 4 to 6.

14. Coupling element for panels according to one of claims 7 or 8.

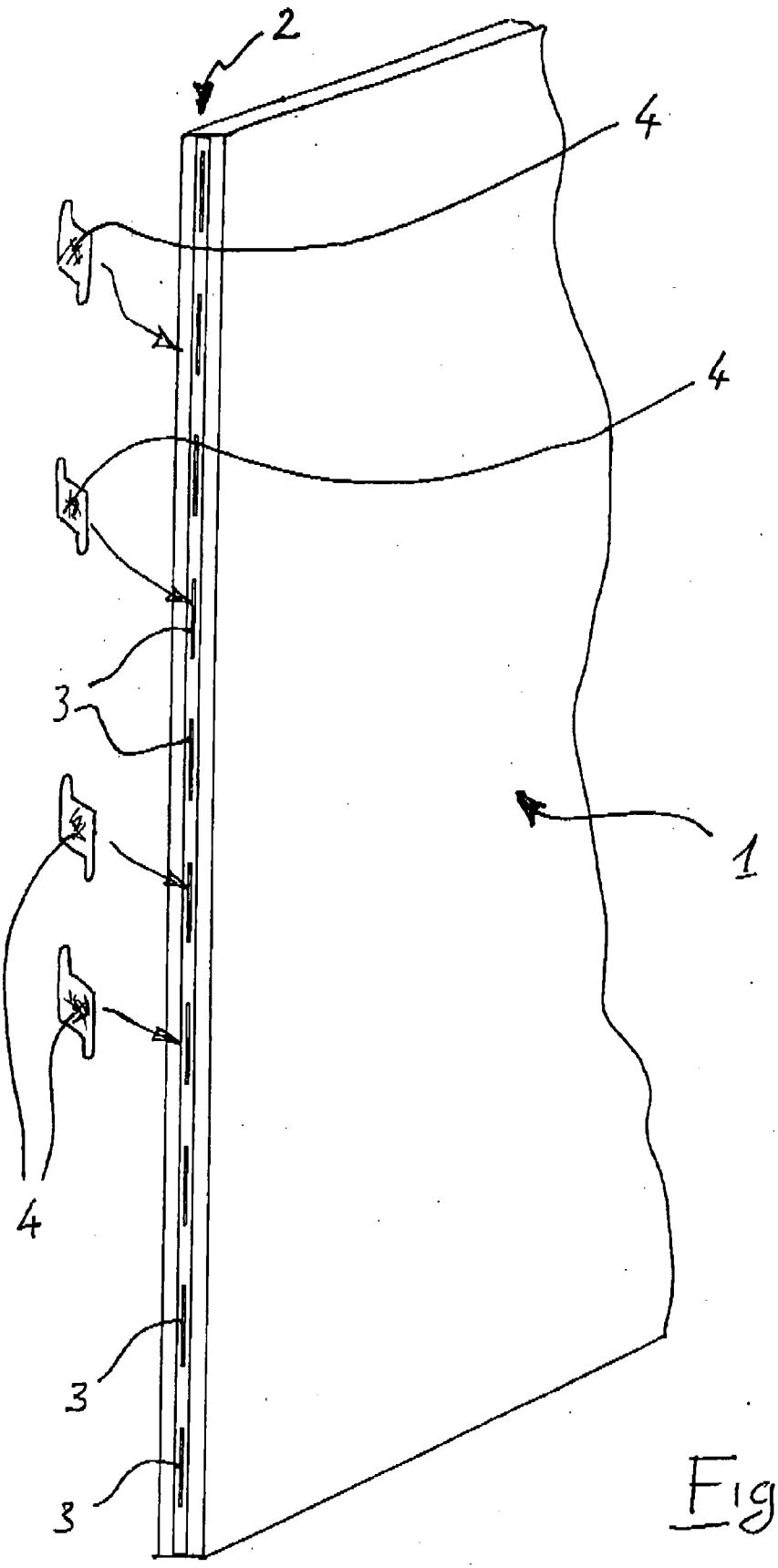

Fig. 1

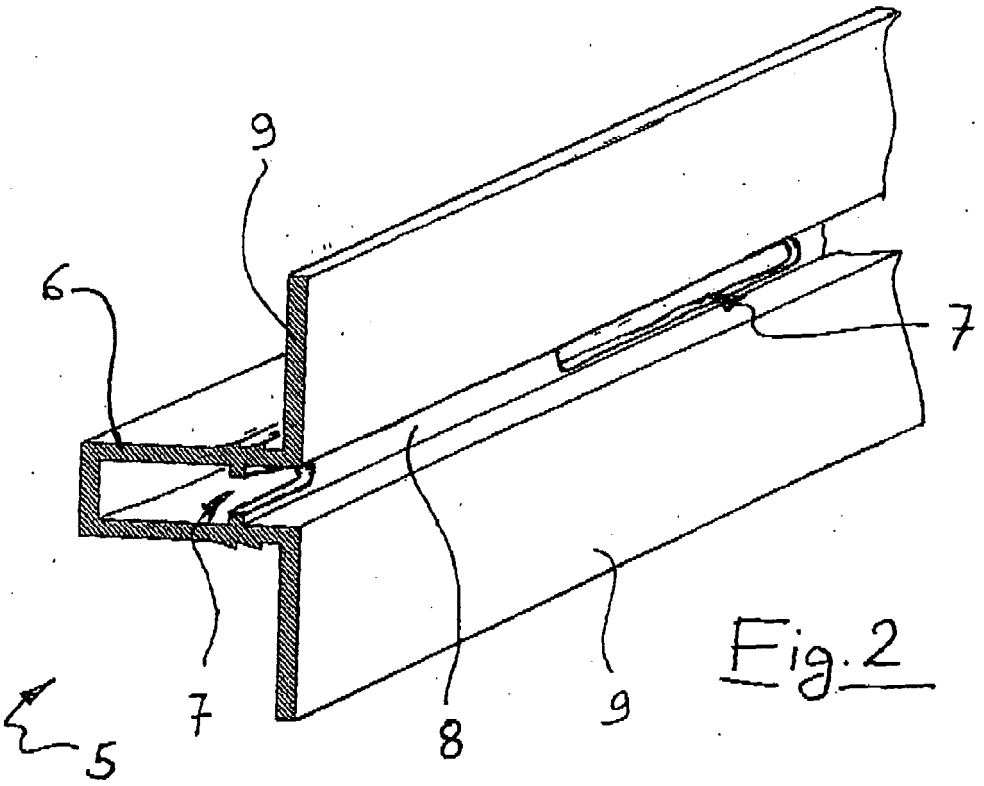

Fig.2

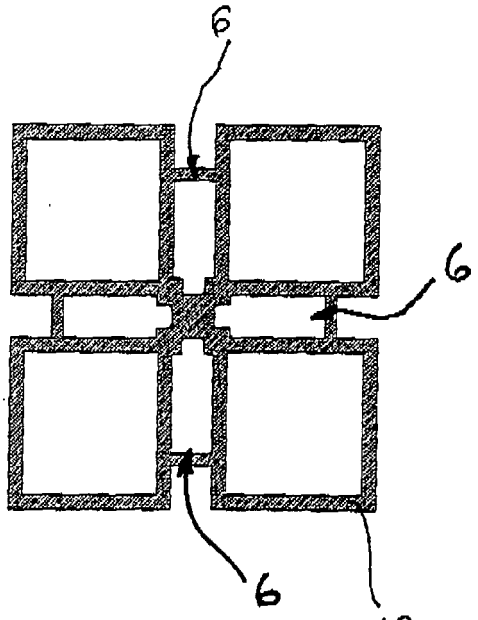

Fig.3

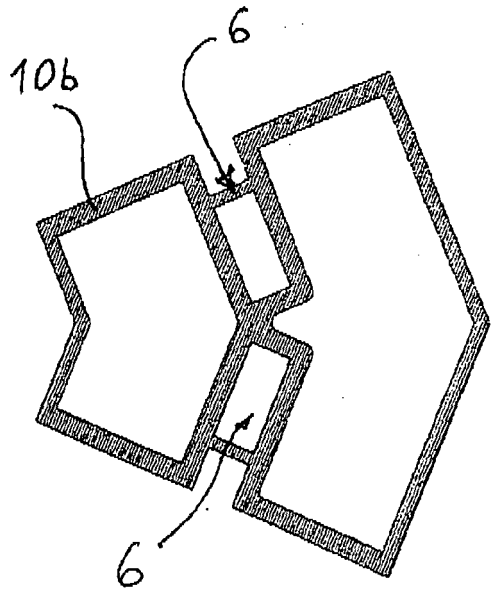

Fig.4

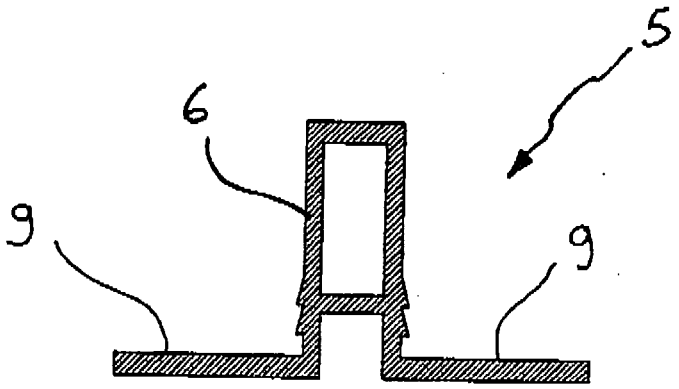

Fig. 5

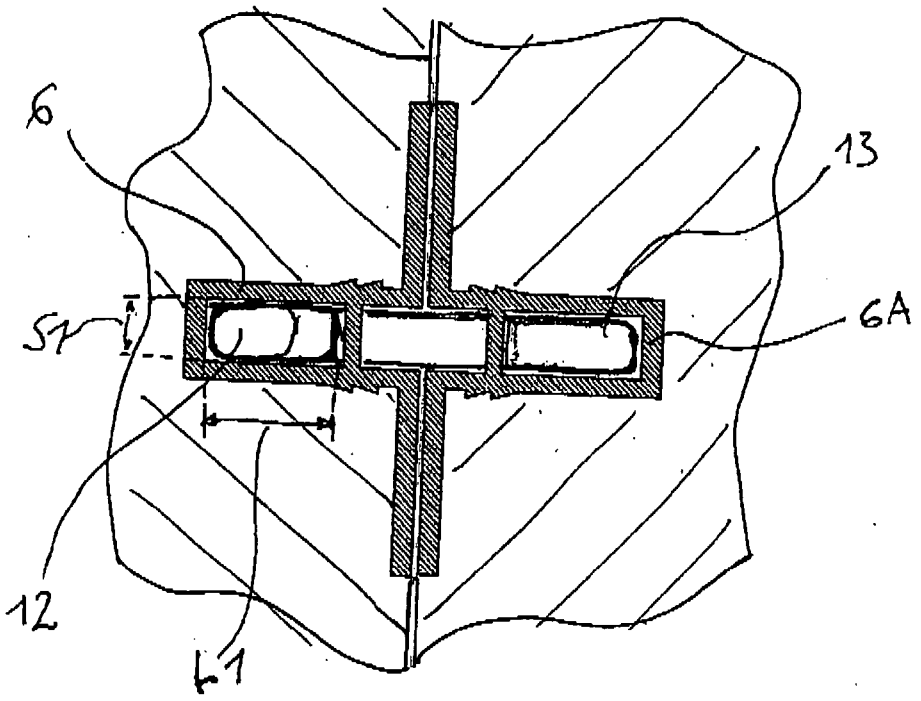

Fig. 6

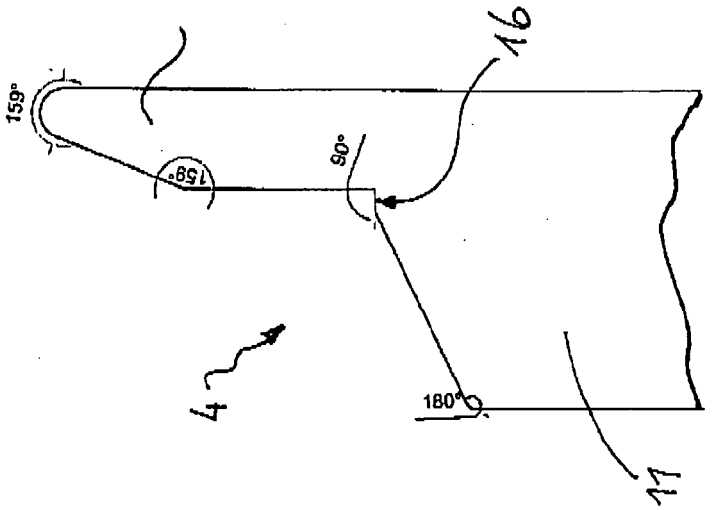

Fig. 8

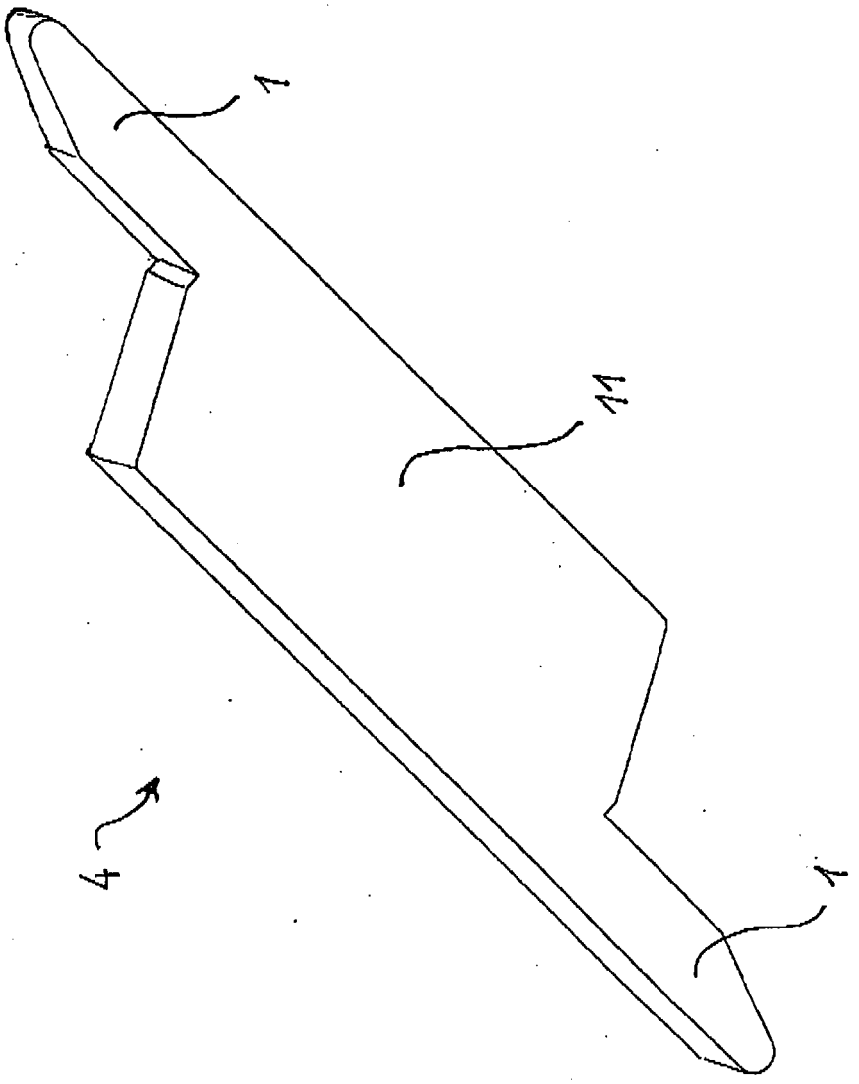

Fig. 7

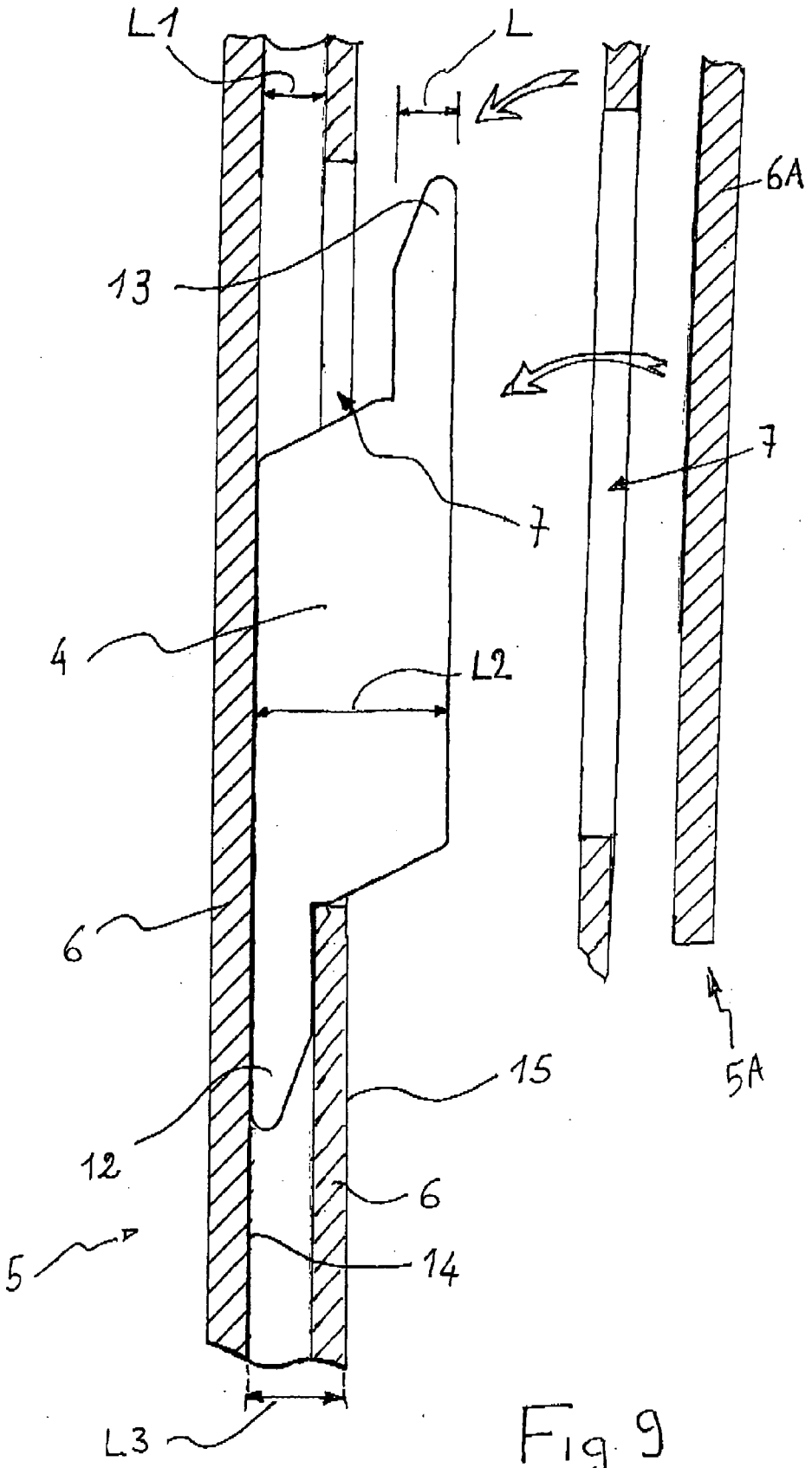

Fig 9

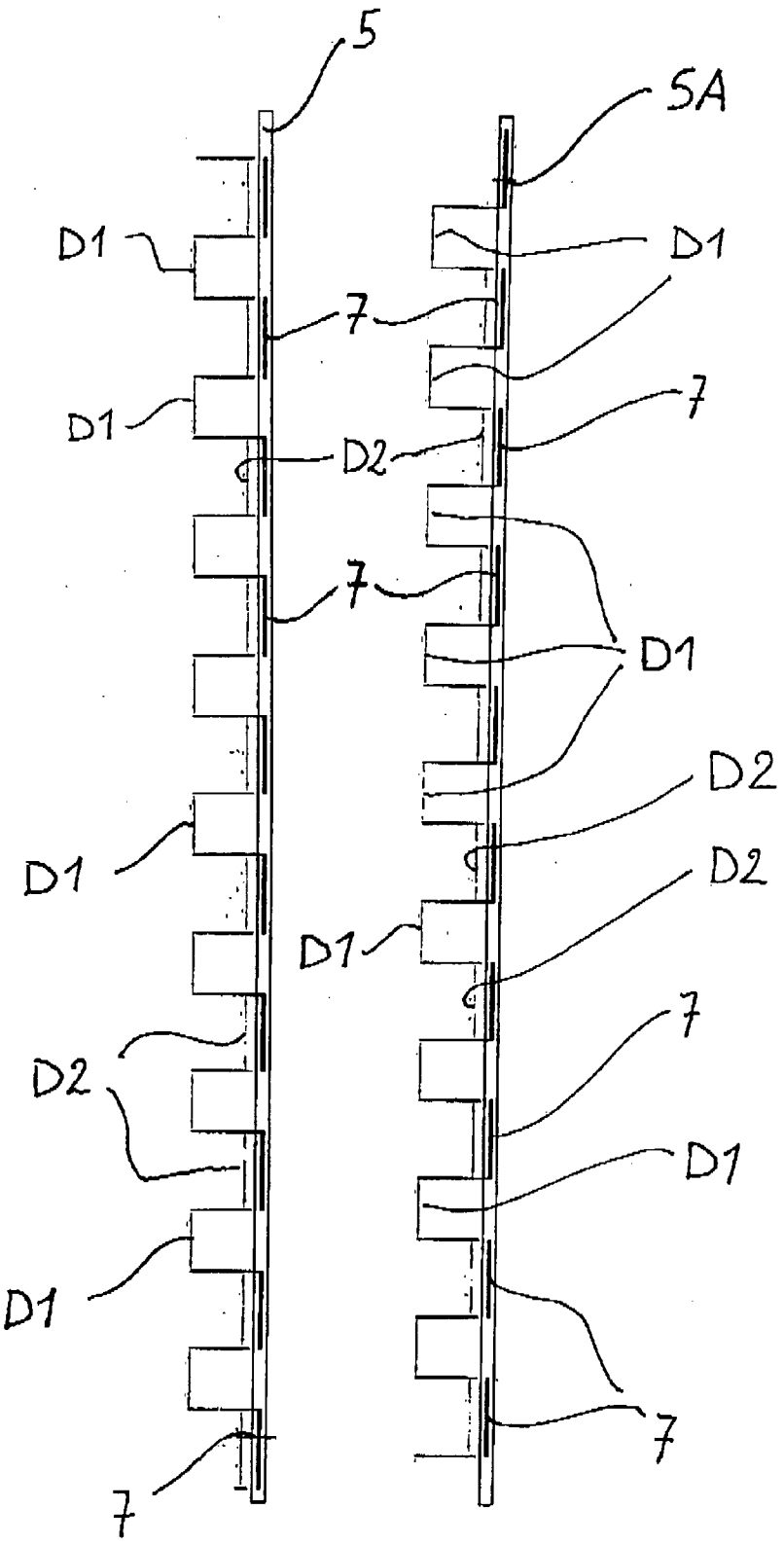

Fig. 10

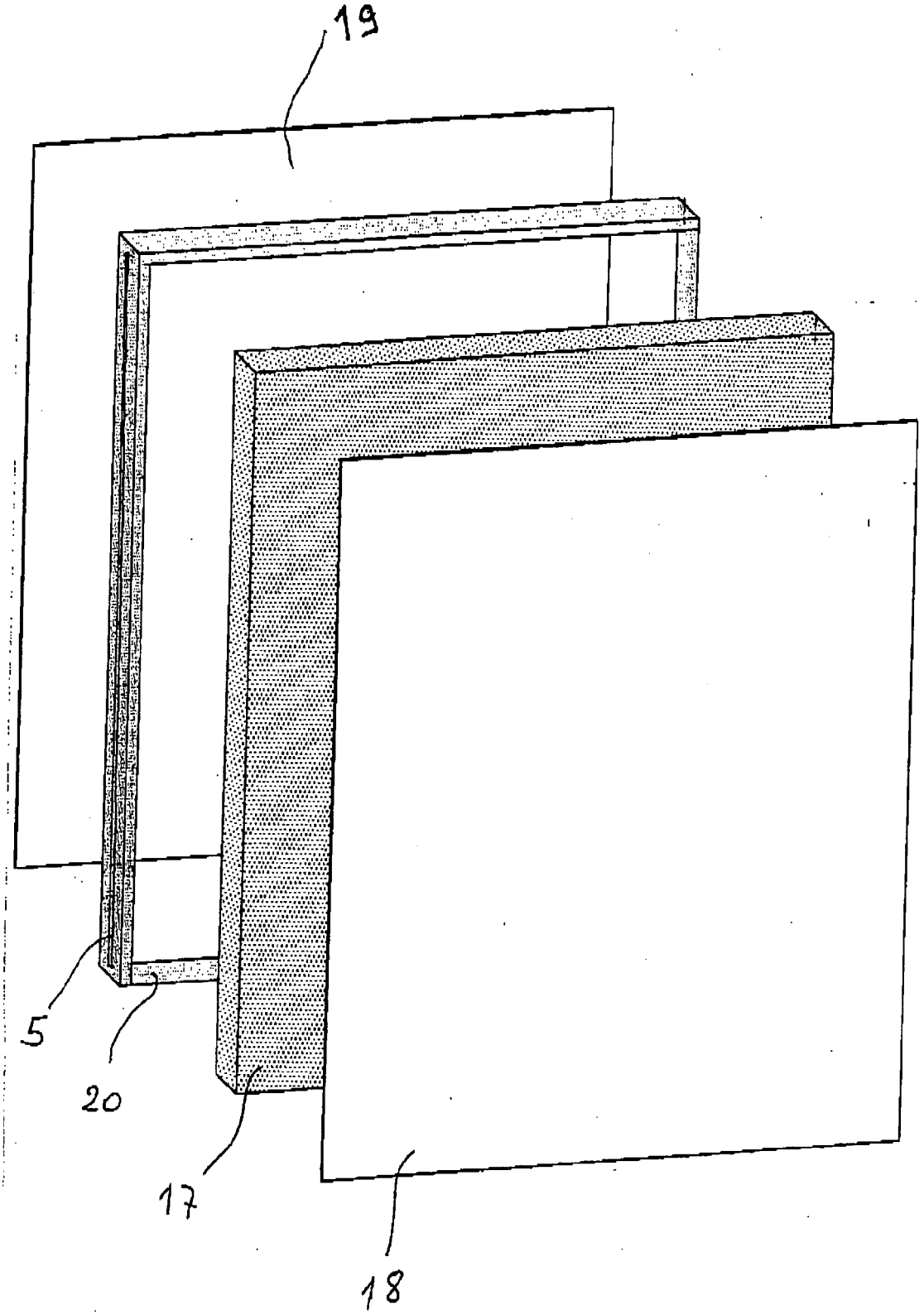

Fig. 11

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EUROPEAN SEARCH REPORT

Application Number
EP 08 01 8632

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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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	31 March 2009	Fordham, Alan

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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