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(71) Applicant: **Techlever Engineering S.R.L.**
42122 Reggio Emilia (IT)

(72) Inventor: **Fascari, Massimiliano**
42121 Reggio Emilia (IT)

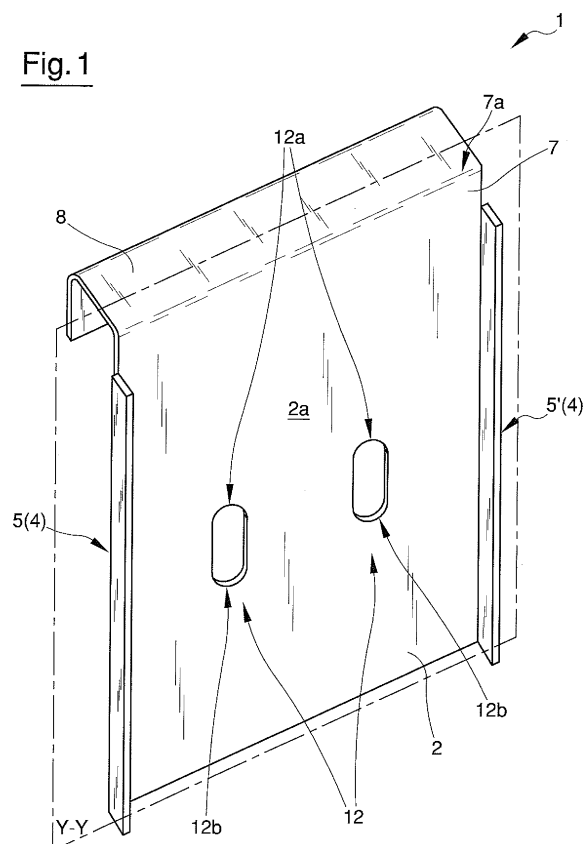
(74) Representative: **Colò, Chiara**
BUGNION S.p.A.
Via P. Borsellino, 22
42124 Reggio Emilia (IT)

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(54) **A connecting device for an anchoring system for slabs and an anchoring system comprising said device.**

(57) The connecting device (1) for an anchoring system (100), destined to constrain slabs (L), exhibits a plate body (2) which can be engaged to the slab (L) by means for anchoring (3), and spacers (4), located restingly on a rear surface (B) of the slab in order to generate, between the slab and the plate body (2), a space (I) which can be engaged by a hook (102) of the support element (101). The anchoring element is also defined by a portion (7) of the plate body (2), exhibiting an appendage (7a) resting on a striker surface (103) of the hook (102) which is solidly constrained to the anchoring system (100).

Fig. 1



Description

[0001] The invention relates to a connecting device for anchoring elements of slab-form bodies.

[0002] The invention also relates to an anchoring system for slab bodies comprising the connecting device.

[0003] The connection and the anchoring system of the present invention are particularly applicable in the construction sector, and more precisely in the construction and laying of ventilated curtain walls.

[0004] In the construction sector the use of cladding walls supported by an anchoring structure, such as curtain walls, is more and more common, not only for new-build constructions but especially in the renovation of older buildings, as cladding gives excellent heat and sound insulation while at the same time rapidly and permanently cladding perimeter walls of buildings.

[0005] The advantages deriving from the use of curtain walls mainly lie in the ability thereof to protect the underlying wall structure from the sun's rays and from temperate weather, while ensuring correct ventilation of the underlying wall and offering a choice of cladding materials to be used.

[0006] The selected cladding material is generally in slab form with a quadrangular edge exhibiting an in-view surface making up the external surface of the building and a rear surface engaged to the structure by special anchoring means.

[0007] The cladding material can be constituted by slabs made of natural material, such as for example stone, marble, granite and others besides, or by slabs made of synthetic material, such as for example asbestos cement, resinous agglomerates, ceramics, glass or others.

[0008] The anchoring structure generally includes a frame, defined by a plurality of uprights and crossbars or only by a plurality of uprights, to which a series of support elements are preferably fixed, each being hook-shaped and destined to constrain the slabs to the frame.

[0009] The anchoring structure and the support elements, preselected for realising the ventilated curtain walls, are strictly dependent on the thickness of the preferred cladding material.

[0010] The support elements are generally defined by hooks, usually L-shaped and exhibiting at least a horizontal portion and a vertical portion connected to the horizontal portion.

[0011] Each hook has the horizontal portion thereof, which is the bearing portion, specially fixed to the rear-lying anchoring structure and the vertical portion, which engages the element, constrainable to the cladding slab.

[0012] In each slab element of a consistent thickness, in order to allow engagement with respect vertical portions of the hooks, at least a groove can be afforded in the upper edge of the slab and at least a groove can be afforded in the lower edge.

[0013] The connection between the hooking portions and the grooves facilitates the solidarity of the slab to the

support element.

[0014] Each slab element is thus superiorly and inferiorly trapped between at least two hooks.

[0015] The above-described anchoring system is known as "hidden" as the engaging portions of the hooks are sunk into the grooves afforded in the body of the cladding slabs.

[0016] Although the realisation costs are high, invisible or hidden systems are preferred precisely because the support elements are not visible from the outside, if not by the personnel actually mounting them.

[0017] This characteristic gives a pleasant aesthetic result, but also makes it very difficult for vandals to gain access to the structure.

[0018] The above-described anchoring system suffers however from the drawback that it cannot use slim cladding materials, as it is not possible to constrain them securely to the anchoring structure by means of hooks inserted in grooves afforded in the actual body of the slabs; for realising ventilated curtain walls, it is instead necessary to make structural modifications to the above-described anchoring system

[0019] With slim materials, such as, in particular, ceramic tiles, it is not possible to realise lateral grooves which have sufficiently resistant lips; for this reason it is necessary to use different support and frame elements.

[0020] The aim of the present invention is to realise a connecting element which can be engaged to anchoring systems for known-type slabs, and which can be used for engaging any slab-form element.

[0021] A particular aim of the present invention is to realise a connecting element that can be engaged on slim slabs, and which nonetheless enables a connection between the tile and the anchoring system of the hidden type.

[0022] A further aim of the present invention is to provide an anchoring system, comprising the connecting element, which is able to realise ventilated curtain walls with any slab element.

[0023] A further aim of the present invention is to realise an anchoring system, comprising the connecting element, which is particularly inexpensive in its application.

[0024] A further aim of the invention is to realise an anchoring system, comprising the connecting element, which is of simple construction and which is characterised by a small number of components.

[0025] A further aim of the present invention is to realise an anchoring system, comprising the connecting element, which facilitates replacement of the cladding slabs, even singly.

[0026] A still further aim of the present invention is to realise an anchoring system comprising the connecting element which enables use of anchoring structures based only on vertical elements or only on cross elements.

[0027] A further aim of the present invention is to realise an anchoring system, comprising the connecting

element, which enables the static weight of the cladding to be unloaded onto the anchoring applied on the back of the slabs.

[0028] The specified technical task and the set aims are substantially attained by a connecting device for anchoring systems for slabs, and by an anchoring system comprising the device, comprising the technical characteristics set out in one or more of the accompanying claims.

[0029] Further characteristics and advantages of the present invention will better emerge from the detailed but non-limiting description that follows of a preferred but not exclusive embodiment of a connecting device, as it is illustrated in the accompanying figures of the drawings, in which:

figure 1 is an axonometric view of a first embodiment of a connecting device for anchoring systems of the invention;

figure 2 is an axonometric view of a second embodiment of the present invention;

figure 3 is an axonometric view of a third embodiment of the present invention;

figure 4 is an axonometric view of a fourth embodiment of the present invention;

figure 5 is an axonometric view of a fifth embodiment of the present invention;

figure 6 is a transversal section of the device of figure 5;

figure 7 is an axonometric view of a sixth embodiment of the present invention;

figure 8 is a lateral view of an anchoring system comprising the connecting device of the present invention;

figure 9 is an exploded lateral view of a detail of the anchoring system of figure 8;

figure 10 is an axonometric view of the device of figure 3, mounted on a rear surface of a slab;

figure 11 is an axonometric view of the device of figure 7 mounted on the rear surface of a slab.

[0030] With reference to the figures, 1 denotes in its entirety a connecting device for anchoring systems 100 for slabs L which is the object of the present invention.

[0031] With reference to the anchoring system 100, the system includes at least a vertical upright 107 having at least a support element 101.

[0032] As can be seen in figure 8, the anchoring system 100 comprises at least an upright 107 on which a plurality of support elements 101 is coupled, in a suitable number.

[0033] Each support element 101 is engageable on an upright 107 by second means for connecting 106.

[0034] The second means for connecting 106 are preferably defined by a first screw 108 crossing the support element 101 and terminating in the upright 107.

[0035] At least a hook 102 is exhibited on each support element 101, which hook exhibits a first portion 104 that is substantially horizontal and a second portion 105 which

is substantially vertical.

[0036] The first portion 104 is connected to the support element 101 and develops in a distancing direction therefrom, defining a striker surface 103 for the connecting device 1.

[0037] The second portion 105, connected to the first portion 104, facilitates the engagement with the connecting element 1.

[0038] The orientation of the hook 102 on the connecting element 101 can be either with the second portion 105 located above the first portion 104 or with the second portion 105 located below the first portion 104.

[0039] In the first case the hook 102 will engage the connecting element 1 inferiorly, the connecting element 1 contacting the striker surface 103 located superiorly on the first portion 104.

[0040] In the second case the hook 102 will engage the connecting element 1 superiorly, the connecting element 1 contacting the striker surface 103 located inferiorly on the first portion 104.

[0041] The slab L is connected to the anchoring system 100 in a vertical lie, in order to form (in a plurality thereof) the curtain wall.

[0042] With reference to the slab L, preferably made of a ceramic material, each slab exhibits an in-view surface A and a posterior surface B.

[0043] The in-view surface A and the posterior surface B are substantially parallel to one another and connected by a plurality of lateral walls S defining the thickness of the slab L.

[0044] The lateral walls S exhibit a height comprised between 3 and 20 mm, preferably 10 mm.

[0045] In other words, the slab L preferably has thicknesses of 1/3 of the thickness of other slabs made of natural materials.

[0046] Each slab affords at least one and preferably four blind-holes F coupled by respective means for anchoring 3 in order to perform engagement of the slabs L with respective connecting elements 1.

[0047] Each means for anchoring 3 is defined by a pin V and a nut D.

[0048] The pin V exhibits a first portion V' which is sunk into the material of the slab L, passing through the posterior surface B, and a second portion V'', projecting from the posterior surface B, engaged to the connecting element 1 and closed by the nut D.

[0049] In a further embodiment, illustrated in figure 11, each slab is without blind-holes and the anchoring means 3, in order to enable the engagement of the slabs L to the respective anchoring elements 1, are defined by chemical adhesive means such as for example glues.

[0050] The connecting element 1 comprises a plate body 2 defining a lie plane Y-Y.

[0051] The lie plane Y-Y is parallel to the posterior surface B of the slab L.

[0052] The plate body 2 exhibits a front side 2a facing the posterior surface B of the slab L and a posterior side 2b, opposite the front side 2a and facing the anchoring

system 100.

[0053] More precisely the posterior side 2b faces the support element 101.

[0054] The plate body 2 further comprises at least a slot 12 which can be engaged to the pin V of the slab L via the anchoring means 3.

[0055] The slot 12 preferably exhibits an elongate shape having two circular portions 12a and 12b which are conjoined to one another.

[0056] With reference to the variant of figure 7 the anchoring body 1 is without a slot 12 thanks to the use of anchoring means in the form of chemical adhesives.

[0057] The connecting device 1 further exhibits spacers 4 located restingly on the posterior surface B of the slab L in order to generate, between the slab L and the plate body 2, a space I which is engageable by the hook 102 of the support element 101.

[0058] In a first embodiment, illustrated in figures 1-4, the spacers 4 are defined by a pair of lateral folds 5, 5', preferably parallel, each having a transversal development direction with respect to the lie plane Y-Y of the plate body 2. More precisely, each fold 5, 5' develops, starting from the front side 2a, in a distancing direction therefrom.

[0059] The pair of folds 5, 5' abuts contactingly on the posterior surface B, generating a space I between the posterior surface B and the lie plane Y-Y of the plate body 2.

[0060] In a further embodiment, illustrated in figures 5 and 6, the spacers are defined by a plurality of ribs 6, 6', preferably obtained via a drawing process.

[0061] Each rib 6, 6' defines a recess 6b on the posterior side 2b and a corresponding projection 6a on the front side 2a.

[0062] The pair of ribs abut contactingly on the posterior surface B, through the projections 6a, generating a space between the posterior surface B and the lie plane of the plate body 2.

[0063] In a further embodiment, not illustrated in the accompanying figures of the drawings, the spacers are defined by a plurality of washers, coupled on the pin V of the slab L, trapped between the plate body 2 and the posterior surface B.

[0064] A portion 7 which is coplanar to the lie plane Y-Y develops from the plate body 2.

[0065] The portion 7 terminates with an appendage 7a which can be in contact with or resting on the striker surface 103 of the hook 102 of the support element 101.

[0066] The appendage 7 proceeds with a first tract 8 having a substantially perpendicular direction of development to the lie plane Y-Y of the plate body 2.

[0067] In a first embodiment, illustrated in figures 4 and 5, the first tract 8 projects from the front side 2a of the plate body 2.

[0068] As can be seen in figure 4, the first tract 8 develops on the same side as the pair of walls 5 and 5'.

[0069] The first tract 8 offers internally thereof a first striker plane 10 for the slab L.

[0070] More precisely, at least one of the lateral walls S, conjoining the posterior surface B and the in-view surface A of the slab L, is arranged in contact on the first striker plane 10 below the first tract 8.

5 **[0071]** The first tract 8 further comprises a window 11 for facilitating the hooking of the device 1 to the hook 102 of the anchoring system 100.

[0072] When the device 1 is anchored to the slab L, the hook 102 is engaged to the device 1, abutting the first portion 104 against the first striker plane 10 and inserting the second portion 105 into the window 11 afforded on the first tract 8.

[0073] In a second embodiment, illustrated in accompanying figures 1-3, the first tract 8 projects from the posterior side 2b of the plate body 2.

15 **[0074]** As can be seen in accompanying figures 1-3, the first tract 8 develops on the opposite side to the pair of walls 4 and 5.

[0075] The first tract 8 is engageable on the striker surface 103 of the hook 102, i.e. on the first portion 104 of the hook 102.

[0076] The connecting device 1 further exhibits at least a tab 9 developing from the apex 7a of the portion 7 in a distancing direction from the front side 2a of the plate body 2.

25 **[0077]** In other words, the at least a tab 9 is located on the same side as the lateral walls 4 and 5 and on the opposite side of the first tract 8.

[0078] The at least a tab 9 defines internally thereof a second striker plane 10' located in contact with the lateral surface S of the slab L.

[0079] The present device offers numerous advantages.

[0080] Firstly, the connecting device of the present invention enables hidden anchoring systems to be realised, also with cladding slabs made of ceramic material or in any case slim slabs.

[0081] In fact, the conformation of the device, together with the posterior surface B of the slab L, enables creation of a space I which performs the same function as the groove afforded in elements having a greater thickness.

[0082] This enables the builder to optimise warehouse stock logistics by stocking a single anchoring system which can be used with any cladding material.

45 **[0083]** The presence of the slot 12 and the first tract 8 below the first striker plane 10 in the first embodiment, or the presence of the slot 3 and the at least a tab 9 below the second striker plane 10' in the second embodiment, enable any eventual production errors to be compensated for.

[0084] In the first embodiment the slab L can be positioned on the connecting device 1 by locating a lateral wall S in abutting position on the first striker plane 10 and thereafter screwing the nut D on the pin V, crossing the slot 12 and tightening the nut D on the posterior side 2b of the plate body 2.

[0085] In the second embodiment the slab L can be positioned on the connecting device 1 by locating a lateral

wall S in an abutting position on the second striker plane 10 and once more tightening the nut D on the posterior side 2b of the plate body 2.

[0086] The simplicity of mounting also enables the builder to decide whether to perform the coupling between the connecting device 1 and the slab L at the work-site, during laying, or directly in the production facility of the cladding materials, i.e. upstream of the curtain wall laying process.

[0087] Finally, if installed upstream of the laying process, the connecting device has the further function of protecting the pin V, solidly constrained to the slab L, during the operations of transport of the cladding slabs.

[0088] The small dimensions of the connecting device 1 do not change the packing methods used for the cladding slabs L, as they do not constitute any further projecting parts on the slabs.

[0089] Indeed, as the thickness of the device 1 is less than that of the projecting part V" of the pin, in order for the pin to exit the connecting device 1 such as to be engaged to the nut 1, the slab L, even if complete with the connecting device 1, does not change in volume.

Claims

1. A connecting device for an anchoring system, designed for constraining slabs (L), comprising:

a plate body (2) defining a lie plane (Y-Y), exhibiting a front side (2a) facing a posterior surface (B) of the slabs (L) and a posterior side (2b) facing a support element (101) of the anchoring system (100) and engageable to the slab (L) by means for anchoring (3), **characterised in that** it comprises:

spacer means (4) located restingly on the posterior surface (B) for generating, between the posterior surface (B) and the plate body (2), a hollow space (I) which is engageable by a hook (102) of the support element (101);

at least a portion (7) of the plate body (2) exhibiting an appendage (7a) resting on a striker surface (103) of the hook (102) which is solidly constrained to the support element (101).

2. The connecting device of claim 1, **characterised in that** the spacer means (4) comprise at least a pair of lateral folds (5, 5') each having a development direction which is transversal to the lie plane (Y-Y), in a distancing direction from the front side (2a) of the plate body (2).
3. The connecting device of claim 1, **characterised in that** the spacer means (4) comprise a plurality of

ribbings (6, 6'), each defining a recess (6b) on the posterior side (2b) and a projection (6a) on the front side (2a).

4. The connecting device of claim 1, **characterised in that** the at least a portion (7) proceeds, at the appendage (7a) thereof, with a first tract (8) having a development direction which is substantially perpendicular to the lie plane (Y-Y) of the plate body (2).
5. The connecting device of claim 4, **characterised in that** the first tract (8) projects from the front side (2a) of the plate body (2).
6. The connecting device of claim 5, **characterised in that** the first tract (8) defines a first striker plane (10) for at least a lateral wall (S) joining the posterior surface (B) and an in-view surface (A) of the slab (L).
7. The connecting device of claim 5, **characterised in that** the first tract (8) exhibits a window (11) engageable by the hook (102) of the support element (101) to facilitate the engagement of the first tract (8) of the striker surface (103) of the hook (102).
8. The connecting device of claim 4, **characterised in that** the first tract (8) projects from the posterior side (2b) of the plate body (2).
9. The connecting device of claim 8, **characterised in that** the first tract (8) is engageable on the abutment (103) of the hook (102).
10. The connecting device of claim 8, **characterised in that** it further comprises at least a tab (9) developing, starting from the appendage (7a) of the at least a portion (7), in a distancing direction from the front side (2a) of the plate body (2) in order to define a second striker plane (10') for at least a lateral wall (S) joining the posterior surface (B) to an in-view surface (A) of the slab (L).
11. An anchoring system (100) for slabs (L), comprising:
 - at least a support element (101) connected to an upright (107) from which at least a hook (102) develops; the hook (102) exhibiting at least a first portion (104), having a prevalently horizontal development, and a second portion (105) having a prevalently vertical development and being connected to the at least a first portion (104);
 - second means for connecting (106), active between the upright (107) and the support element (101) for solid connection thereof;**characterised in that** it comprises an anchoring device (1) as in one or more of the preceding claims.

Fig. 1

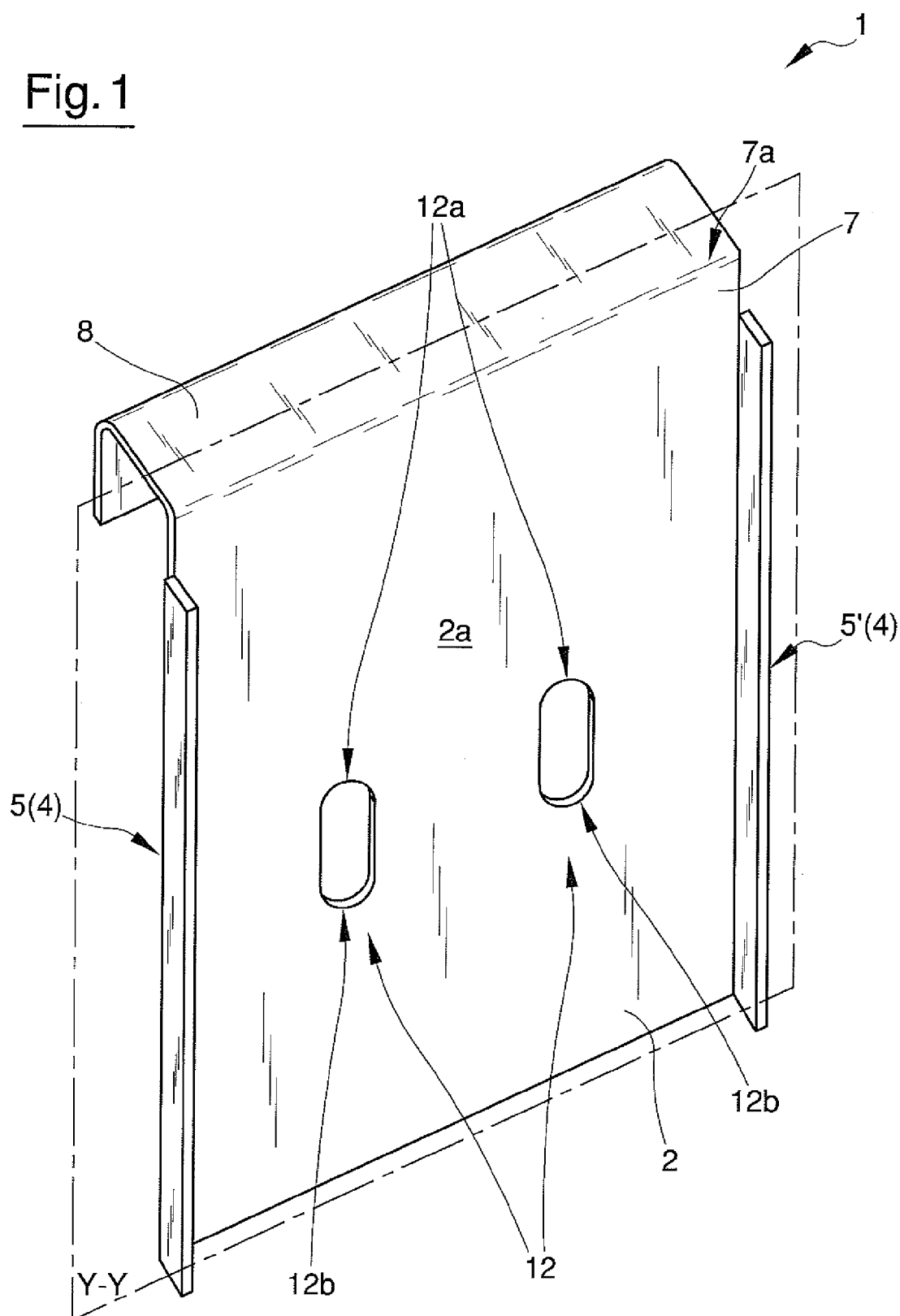


Fig. 2

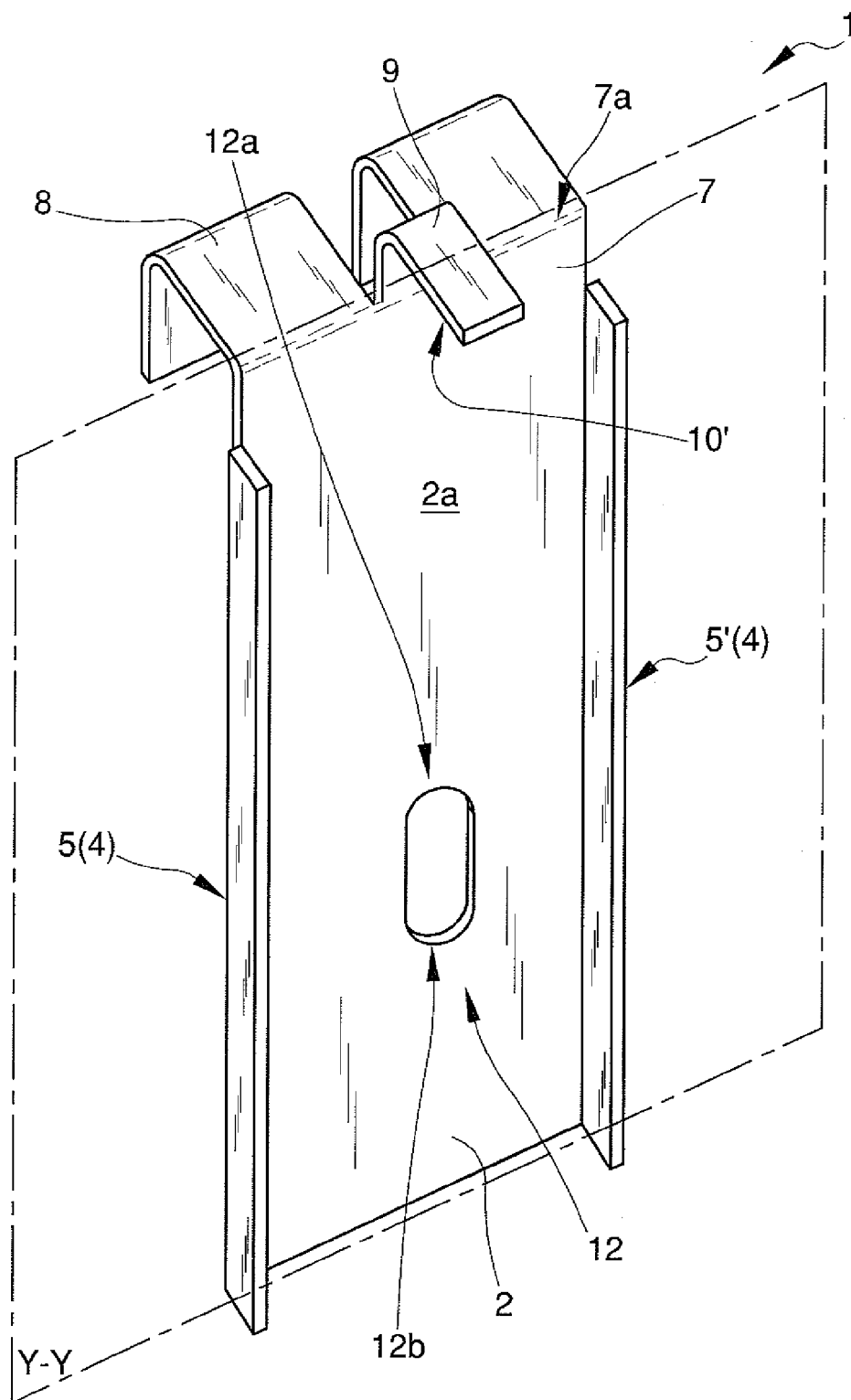


Fig. 3

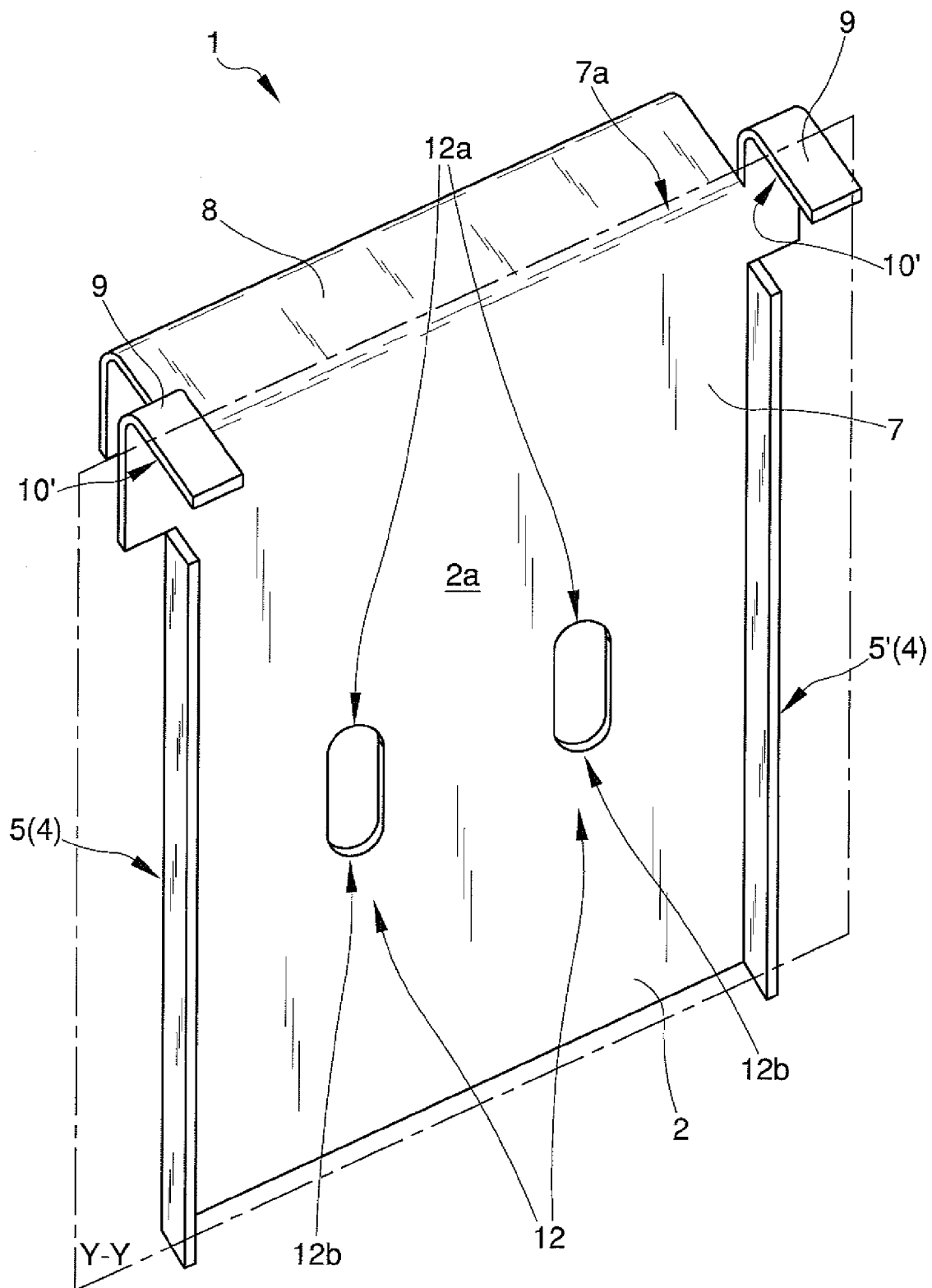
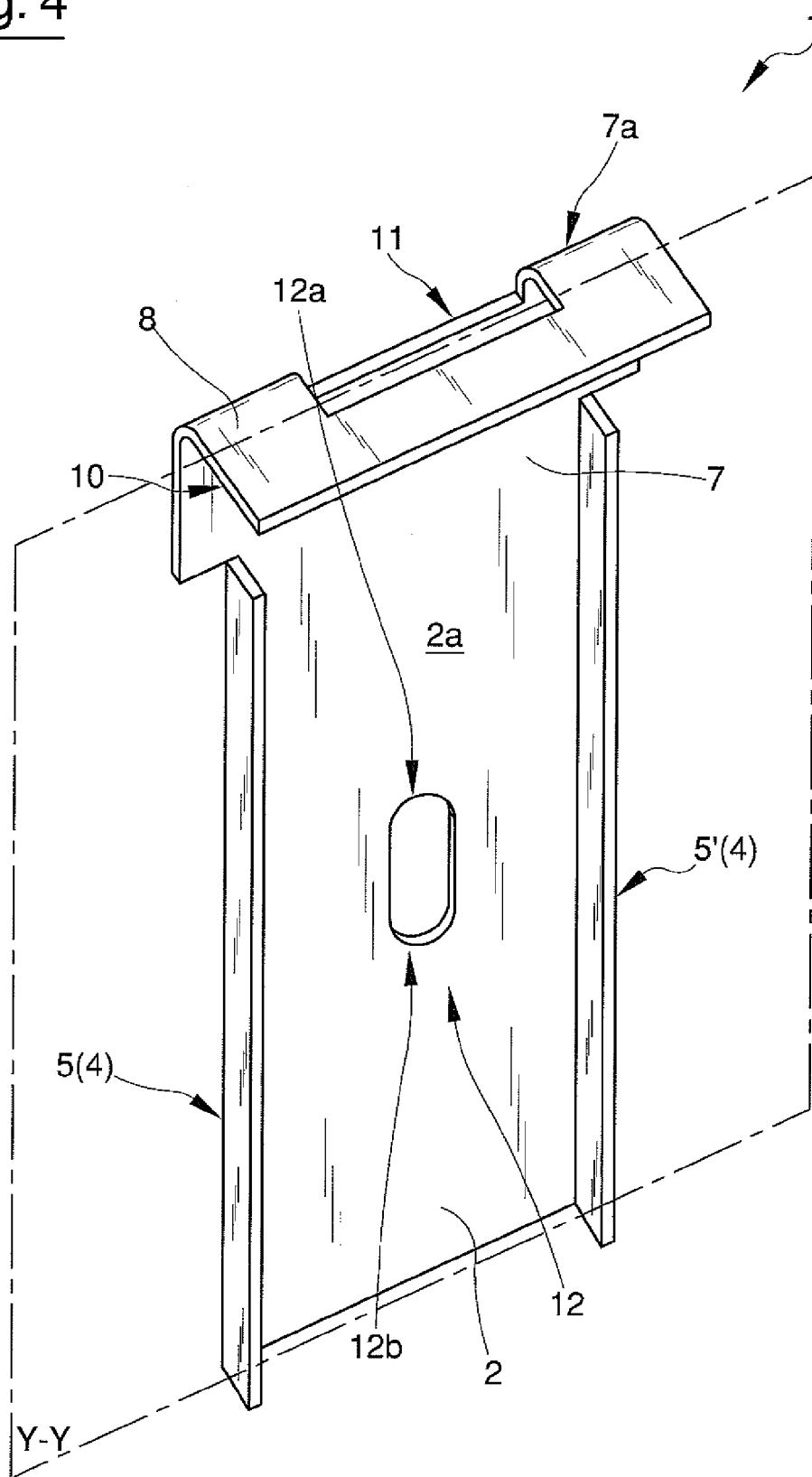


Fig. 4



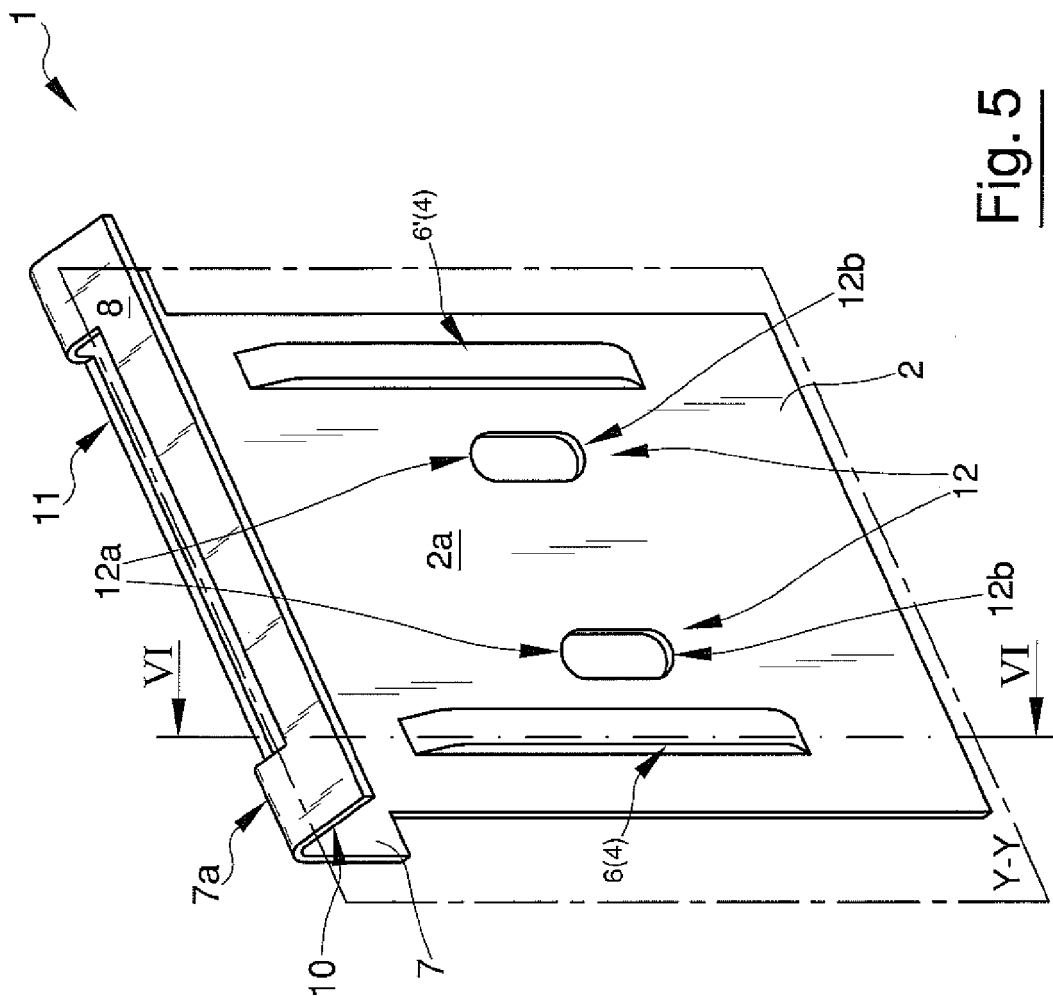


Fig. 5

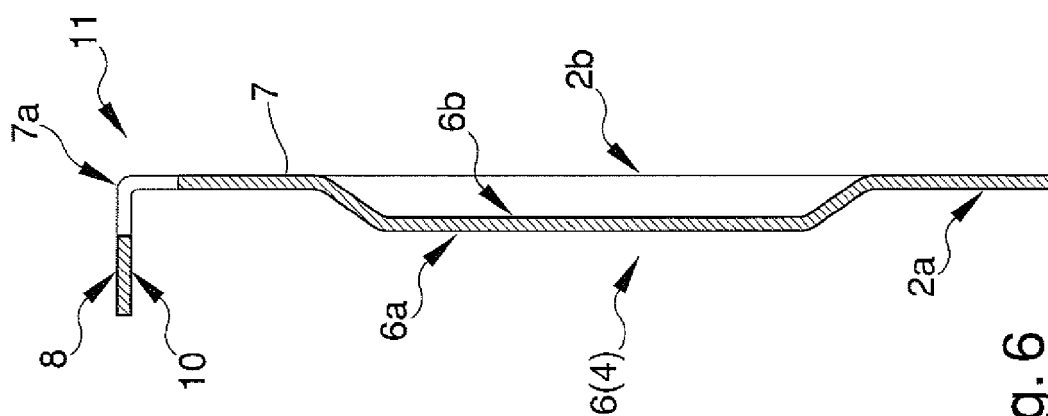


Fig. 6

Fig. 7

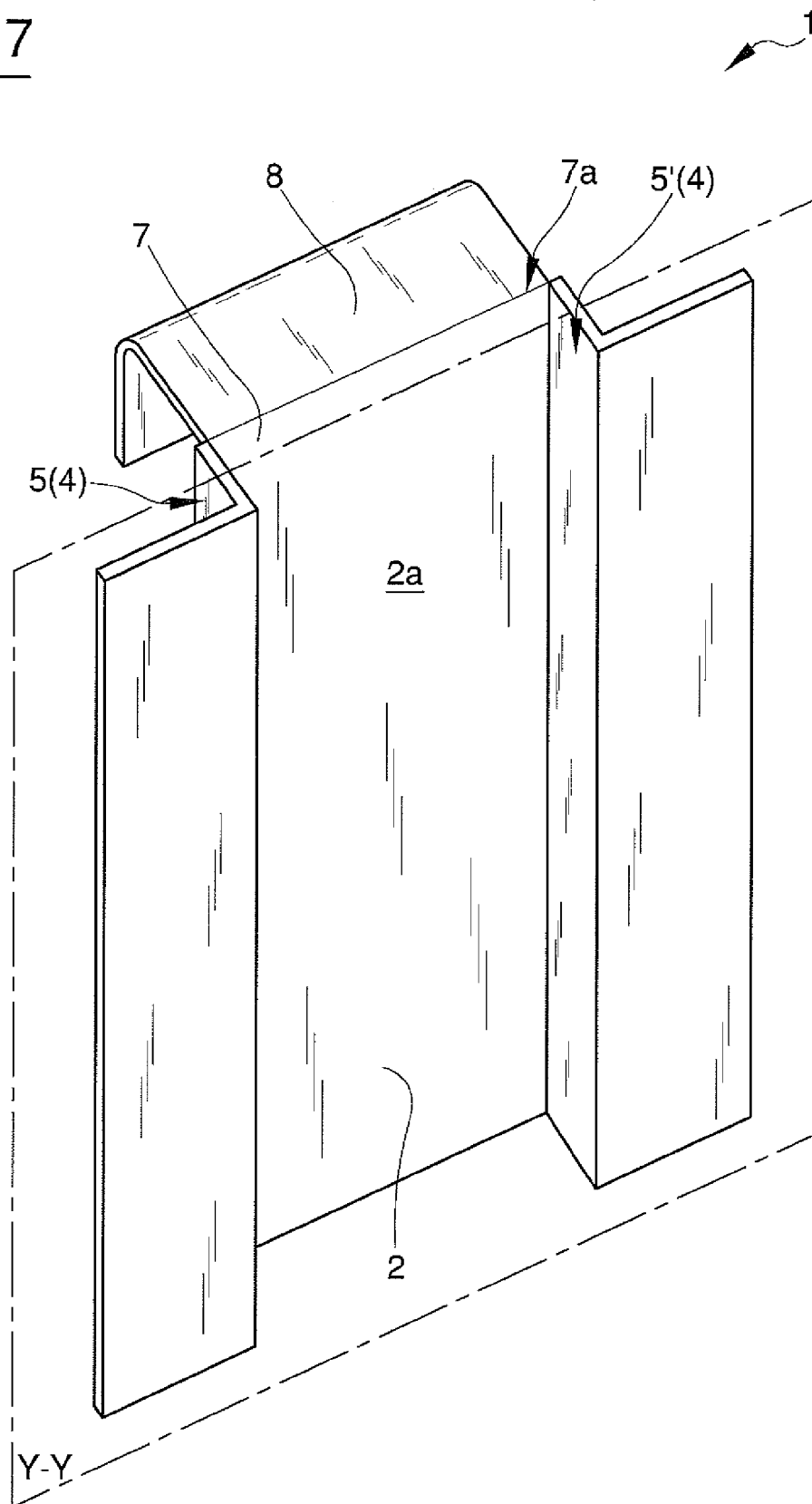


Fig. 8

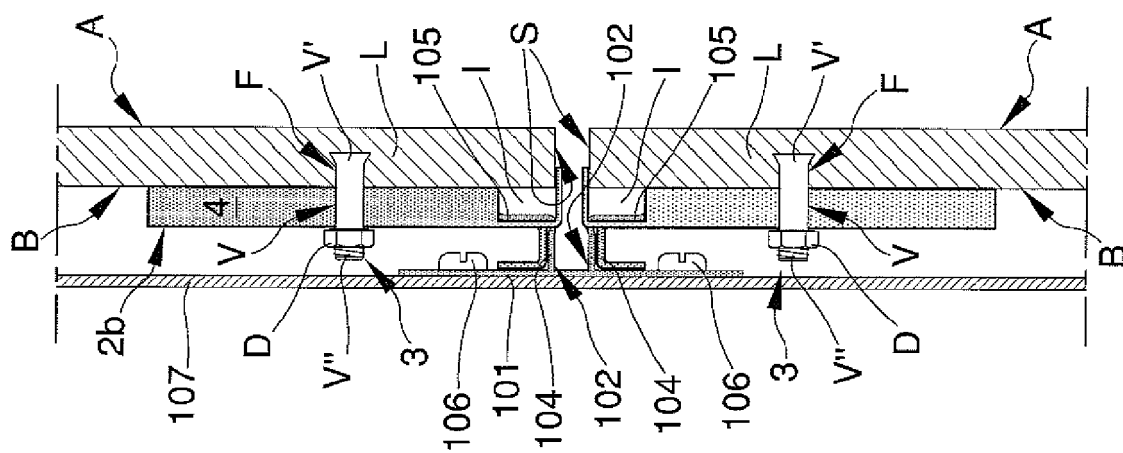
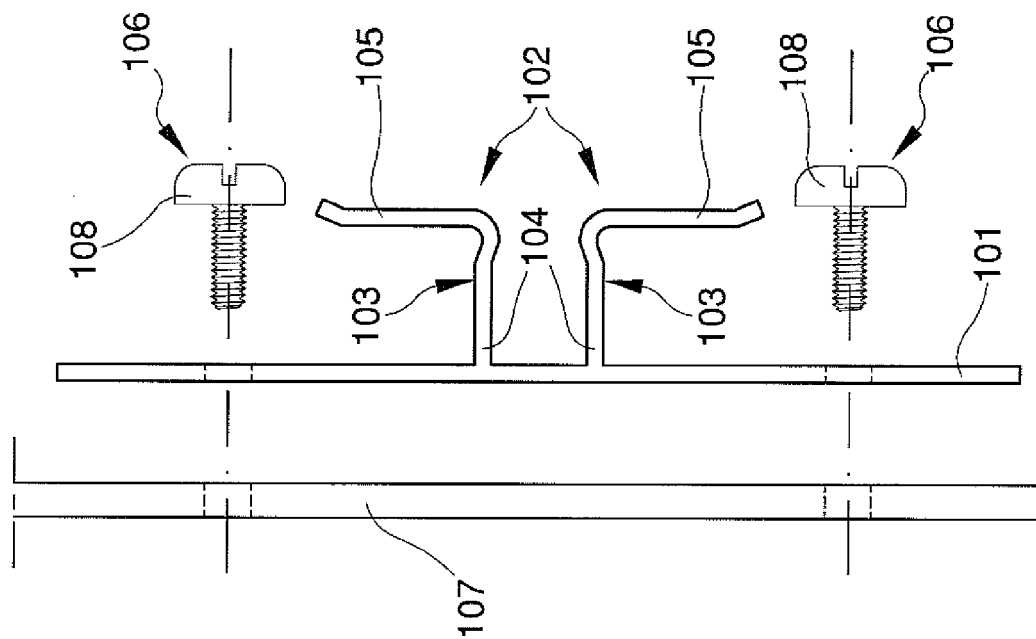


Fig. 9



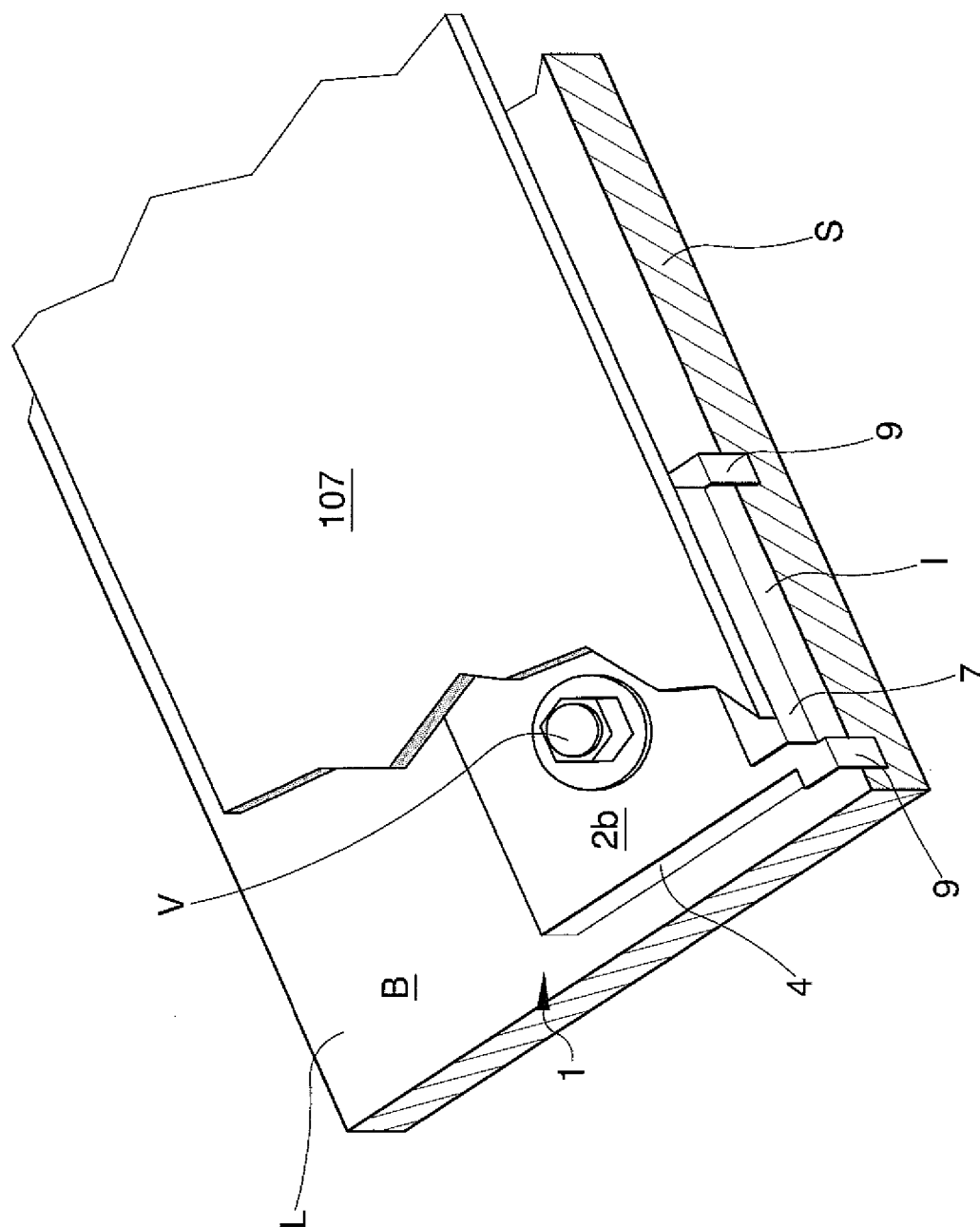


Fig. 10

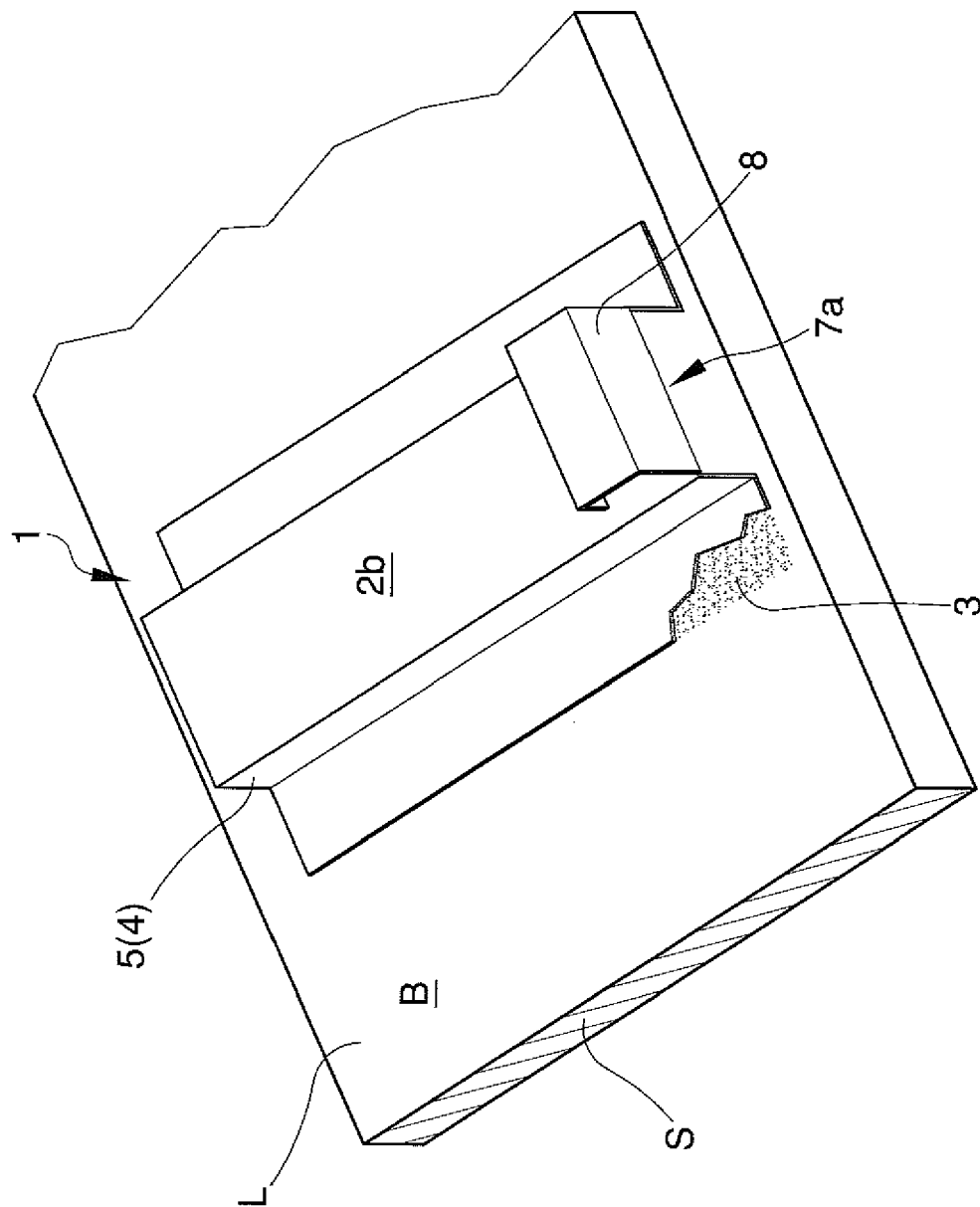


Fig. 11



EUROPEAN SEARCH REPORT

Application Number
EP 09 16 7319

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A	* paragraph [0014] - paragraph [0035] * * figures *	4	
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The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 16 October 2009	Examiner Bouyssy, Vincent
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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**ANNEX TO THE EUROPEAN SEARCH REPORT
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EP 09 16 7319

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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