



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
07.10.2009 Bulletin 2009/41

(51) Int Cl.:
E04B 2/74 (2006.01)

(21) Application number: **09100215.4**

(22) Date of filing: **31.03.2009**

(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 MK MT NL NO PL PT RO SE SI SK TR
Designated Extension States:
AL BA RS

(71) Applicant: **Deal S.r.l.**
61100 Pesaro (IT)

(72) Inventor: **Paffumi, Alessandro**
I-61100, PESARO (IT)

(74) Representative: **Negrini, Elena**
Agazzani & Associati S.r.l.
Via dell'Angelo Custode 11/6
40141 Bologna (IT)

(30) Priority: **01.04.2008 IT BO20080203**

(54) **Modular wall device**

(57) A modular wall device comprises a structure (2) provided with uprights (3) and/or traverses (4) equipped with side slots (5, 6) for the support, by a plurality of fastening elements (8), of a panel ensemble. Each fastening element (8), comprises at least: a respective hook (9) indented to engage at least a slot (5, 6) of an upright (3) or traverse (4) of said structure (2); a fixed plaque (10) connected to the hook; a mobile plaque (11) turned in

opposite direction to the fixed plaque (10) and connected to this latter and/or to the hook (9) by means of an elastic element (12).

At least two lateral opposite edges of each panels (7) have respective concave seat ensemble (13) fit to house, on one hand, fixed plaques (10), and on the other hand mobile plaques (11) of the respective fastening elements (8).

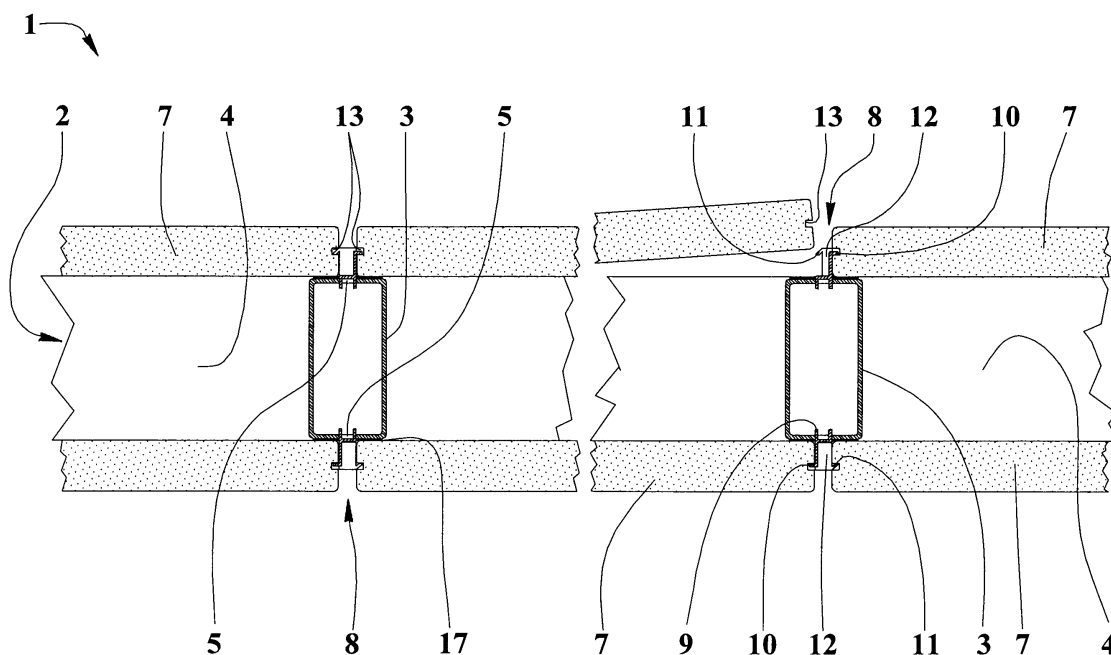


FIG.1

Description

[0001] The present invention refers to furnishings and building and relates to a modular wall device fit for carrying out walls, ceilings, separating devices and building and furnishing elements in general, also detachable.

[0002] There are known detachable partition walls essentially constituted by a reticulate metallic structure, comprising uprights and traverses, and by covering or closing panels fixable in removable manner on such structure. On a panel face of said known walls hooking means are applied, for example of bayonet type or of other kind.

[0003] The main drawbacks of said known walls are the following:

- one of the two panel main faces has the hooking means and thus the panel cannot be turned, for example to change colour or to hide defects or wear marks on the visible face;
- the panel weight is supported by the hooking means which must be suitably dimensioned;
- the leakage alignment, or the interstitial spaces between adjacent panels, can be unsatisfactory;
- the panel assembly and disassembly require ability, much time, special tools and/or suckers and it is necessary to lift the panel, in case this latter is fixable by hooking means of hook type;
- the presence of the hooking means inside the interspace delimited by two opposite panels imposes a shaping to the possible plates of insulating material interposed between said panels;
- the presence of the hooking means on a panel face produces encumbrances, storing difficulty and damage risks during the transport.

[0004] An object of the present invention is to propose a modular wall device fit for supply a fast, simple and sure fixing of the panels.

[0005] Another object is to propose a wall device easily demountable.

[0006] Further object is to propose a wall device with panels without hooking means fixed to one of their main face and which allows to apply or reassemble the panels, also with main faces of different colour, with one of any two visible main faces for changing the wall colour and/or for exposing non damaged faces.

[0007] Another object is to charge the weight of the upright mounted panels only on the transverse elements of the metallic structure, with consequent perfect leakage alignment and with load reduction on the hooking elements.

[0008] Another object is to propose a wall fit for panels almost of all type and material, also glass, provided or not with perimetric frame.

[0009] Another object is to propose a wall device with hooking elements associable to uprights, traverses, long and/or short sides, vertical and/or horizontal, for example

to avoid bulging in rectangular panels mounted with the long sides horizontally placed.

[0010] Further objects are to allow the panel assembly and dismounting without using particular tools, suckers and screws and without lifting the same panels; other objects are to be able to insert, between the wall panels, plates of insulating not shaped material; further objects are to facilitate the panel storing and to reduce their installation times.

[0011] The panel fastening elements to the structure of the wall device, object of the present invention, include hooks intended to jointly engage side slots of uprights or traverses of said structure and include particular elastic members with mobile end plaques fit to be inserted into suitable seats preliminarily made in the panel edges. The fastening elements include, moreover, fixed plaques, also fit to be inserted into the seats of the panel edges. Such seats can be made by recesses alternated with constant pitch, or by continuous recesses such as head panel grooves. As the internal parts of the wall, between the opposite plates, remain free, in the interspaces phone-insulating not-shaped plates can be inserted.

[0012] The elastic members have longitudinal development and can have sufficient lengths to obtain suitable runs of the plaques, respecting the usual width of the leakages.

[0013] The end mobile plaques of the elastic element are inclined, in order to allow the application of a panel wall with frontal push, after having inserted the opposed side into the relative plaques by longitudinal sliding.

[0014] The wall device also includes supporting means intended to be jointly inserted into slots of the metallic traverses, or uprights, of the structure for matching from the bottom the panel edge supporting the weight.

[0015] In case of horizontal assembly of the wall device, for example to carry out a ceiling, the elastic members will be preferably inserted onto the traverses, which correspond to the long sides of the panels, to avoid bulging. In such horizontal assembly case, the supporting means are not necessary.

[0016] To avoid accidental unhooking, stop means can be inserted into the leakages, for example made by thicknesses fit for avoiding the elastic lamina deflection and risks of undesired panels unhooking.

[0017] The characteristics of the invention are in the following evidenced with particular reference to the joined drawings in which:

- figure 1 shows a partial view of the modular wall device, object of the present invention and vertically mounted, sectioned by a cross horizontal plane and in which a panel is at a hooking phase to a fixing element connected to an upright;
- figure 2 shows a partial and front view of a traverse to which four supporting means are associated, traverse which is associated to an upright, to which a fixing element is fixed, and two panels during the hooking;

- figure 3 shows a view, partial and sectioned by a cross vertical plane, of a traverse with two opposite supporting means and matching lower edges of respective reciprocally parallel panels and overlooking and hooked, by of respective fastening elements, to opposite sides of an upright.
- figures 4 and 5 show side views of the fixing element of figure 1;
- figure 6 shows a sectional view of the fixing element of figure 4;
- figures from 7 to 9 show side views of one of the supporting means of figure 2;
- figures 10 and 11 show views by respective sides of a variant of the fixing element of figure 4, made in single body by cutting and bending a plate;
- figures 12 and 13 show views by respective sides of a variant of the supporting means of figure 7, made in single body by cutting and bending a plate;
- figures 14 and 15 show the plate respectively cut and bent to carry out the variant of the fixing element of figure 10;
- figures 16 and 17 show the plate respectively cut and bent to carry out the variant of the supporting means of figure 12.

[0018] With reference to figures 1-9, numeral 1 indicates the wall modular device, object of the present invention, comprising a structure 2 provided with uprights 3 and/or traverses 4 provided with side slots 5, 6 for the support, by a plurality of fastening elements 8, by a panel ensemble 7, for example rectangular.

[0019] The illustrated structure 2, is vertically installed and comprises moreover a plurality of supporting means 14 intended, in correspondence with a vertical assembly, to be fixed to the horizontal traverses 4 for supporting the lower edges of the panels 7. It is also provided that this structure and the device may be installed inclined or horizontal, for example to carry out a ceiling. In this last horizontal assembly case, the supporting means 14 are not used and, preferably, the fastening elements 8 are associated to the major sides of the panels to avoid "bulging" of these last.

[0020] Each fixing element 8 includes at least:

- a respective hooking 9 intended to engage at least a slot 5, 6 of an upright 3 or traverse 4 of said structure 2;
- a fixed plaque 10 connected to the hook
- a movable plaque 11 directed in the opposite direction of the fixed plaque 10 and connected to this latter and/or to the hook 9 by an elastic element 12.

[0021] Two opposite side edges of each panel 7 have respectively sets of concave seats 13 intended to house, on one hand, fixed plaques 10, and on the other hand movable plaques 11 of the respective fastening elements 8. As an alternative, all the edges of the panels 7 can be provided with respective concave seats.

[0022] Such concave seats 13 can be made by fissures or spaced grooves made on the respective edges at the fixing points to the structure.

[0023] Preferably the concave seats 13 have grooves made along all the development of the respective edges. Such grooves are preferably with cross "U" section, rounded or squared to right angles, or "V" section and are made, starting from the edge sides of the panels perpendicular to the main faces, in the thickness of the same panels, for example by milling. As an alternative the concave seats 13 can be made of profiles with shaped section, for example in metallic or plastic material, fixed to the edges of the panels.

[0024] Each supporting means 14 comprises at least a respective hook 15 intended to engage a slot 5, 6 of a traverse 4 of said structure 2 and a supporting arm 16 intended to match with a lower border of a panel 7.

[0025] Each of the hooks 9 of the fastening elements 8 and each of the hooks 15 of the supporting means 14, has a couple of teeth intended to jointly engage the slots 5, 6 of the uprights 3 or of the traverses 4 of the structure 2 to prevent undesired unthreading and clearances for fixing to the structure.

[0026] The device includes moreover locking means, not shown, intended to match removably the movable plaque 11 or the elastic element 12 near this movable plaque 11 to prevent the exit from the respective concave seat 13 in an assembly condition.

[0027] Each locking means has a side intended to match with an edge of a panel adjacent to that engaged by the respective movable plaque 11 locking this last or, preferably, each locking means has teeth or a protrusion intended to removably fixing into a slot 5, 6 to match with the movable plate 11 so locking it.

[0028] The device includes moreover a plurality of insulating plates 17, for example of acoustic insulation type, having plan form almost equal to that of the panels 7 or corresponding to a portion of these last. Such acoustic insulating plates 17 are intended to be interposed and blocked between the same panels and the structure 2.

[0029] The invention provides that the two main panel faces may be coloured, decorated or finished in a different way to modify the aspect or the characteristics of the wall device by simple overturning of the same plates. This overturning, allowed by the invention characteristic combination, also allows hiding the panel damaged faces.

[0030] The invention provides moreover that the structure uprights and the traverses are provided with slots at both sides for fixing the plates on the two sides of the device as disclosed in the figures 1-3.

[0031] The supporting means 14 can be made fixing, for example by welding, nailing, riveting or with screws, the elastic element 12 having the movable plaque 11 with a section bar piece in which the respective hook 9 and the fixed plaque 10 are obtained.

[0032] The fixed plaque 10 is orthogonal with respect to the own fixing element 8.

[0033] The movable plaque 11 is preferably inclined with respect to the own fixing element 8 to carry out a plane opportunely inclined and oriented to flex the elastic element 12 when said movable plaque is frontally pressed by the panel 7 to facilitate the same movable plaque insertion 11 into the respective concave seat 13 of said panel.

[0034] The effectiveness for the vertical installation of the wall device provides to apply to the structure uprights and to the traverses respectively the fastening elements 8 and the supporting means 14, in this way each structure panel, sideways delimited by portions of two contiguous uprights and delimited on the upper part and below by portions of two contiguous traverses, it has on one hand two or more fixed plaques and on the other hand two or more movable plaques. The panel fixing in this panel occurs by inserting the fixed plaques into the grooves of a panel side slightly inclined and with the edge matching with one or more supporting means 14 and, in sequence, pushing the other panel side against the movable plaques whose inclination allows the insertion into respective grooves in consequence of the same pressure. The successive insertion of the locking means prevent the undesired movable plaque exit from the respective panel grooves.

[0035] As an alternative the assembly can take place engaging initially the concave seats 13 of a the side of the panel 7 to the respective movable plaques 11, translating in their direction the same panel and flexing the elastic members 12 of these movable plaques until allowing the panel to align also with the fixed plaques 10 engaging themselves into the grooves of the concave seats 13 of the other side of the panel in consequence of the same panel translation due to the elastic return of the elastic members 12.

[0036] The panel detachment can takes place, for example, taking away the locking means, flexing with a lever or with a screwdriver the elastic element 12 of a movable plaque at a time, in order to lock it to the structure to allow freeing a panel side from the respective movable plaques.

[0037] Alternately it is possible to push the whole panel, parallel to itself, into the movable plaque direction up to disengage it from the fixed plaques and to remove it with a light rotation and removal.

[0038] In the fixing element variations of the figures 10 and 11, 14 and 15 and of the supporting means of the figures 12 and 13, 16 and 17, such fastening elements 8 and supporting means 14 are made in single body by cutting and bending of a metal plate.

[0039] An advantage of this invention is to supply a modular wall device fit to supply a fast, simple and sure panel fixing.

[0040] Another advantage is to supply a wall device that can be easily dismantled.

[0041] Further advantage is to supply a wall device with panels without hooking elements fixed to one of their main face and that allows applying or reassembling the

panels, also with different colour main faces, with any of two main visible faces for changing the wall colour and/or for exposing non damaged faces.

[0042] Another advantage is to charge the weight of the vertically mounted panel only on the transverse elements of the metallic structure, with consequent perfect alignment of the leakages and load reduction on the hooking elements.

[0043] Other advantage is to supply a wall fit for panels of almost type and material, also of glass, provided or not with perimetrical frame.

[0044] Other advantage is to supply a wall device with hooking elements associable to uprights, to traverses, to long and/or short sides, vertical and/or horizontal, for example to avoid bulging in rectangular panels mounted with the long sides horizontally placed.

[0045] Further advantages are: to allow the panel assembly and dismounting without using particular tools, suckers and screws and without having to lift the same panels; to be possible to insert, between the wall plates, insulating material not shaped; to facilitate the panel storing and to reduce their installation time.

Claims

1. Modular wall device comprising a structure (2) provided with uprights (3) and/or traverses (4) equipped with side slots (5, 6) for the support, by means of a plurality of fastening elements (8), of a panel (7) ensemble; said device (1) being **characterised in that** each fixing (8) element comprises at least:

- a respective hook (9) fit to engage at least a slot (5, 6) of an upright (3) or traverse (4) of said structure (2);
- a fixed plaque (10) connected to the hook;
- a movable plaque (11) directed with direction opposite to the fixed plaque (10) and connected to this latter and/or to the hook (9) by an elastic element (12);

and that at least two opposite side edges of each panel (7) have respectively sets of: concave seats (13) intended to house, on one hand, fixed plaques (10), and on the other hand movable plaques (11) of the respective fastening elements (8).

2. Device according to claim 1 **characterised in that** the concave seats (13) consist of fissures or spaced grooves made on the respective edges.

3. Device according to claim 1 **characterised in that** the concave seats (13) consist of grooves made along all the length of the respective edges.

4. Device according to claim 1 **characterised in that** it comprises moreover a plurality of supporting

means (14) intended, in correspondence with a vertical assembly, to be fixed to the horizontal traverses (4) to support the panel lower edges(7).

acterised in that the fixed plate (10) is orthogonal or inclined with respect to its fixing element (8).

5. Device according to claim 4 **characterised in that** each supporting means (14) comprises at least a respective hook (15) fit to engage at least a slot (5, 6) of an upright (3) or of a traverse (4) of said structure (2) and a supporting arm (16) fit to match with a lower edge of a panel (7). 5
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6. Device according to claim 5 **characterised in that** each of the hooks (9) of the fastening elements (8) and of the hooks (15) of the supporting means (14) has a couple of teeth intended to jointly engage the slots (5, 6) of the uprights (3) or of the traverses (4) of the structure (2). 15
7. Device according to claim 1 **characterised in that** the fastening elements (8) are made in single body by cutting and bending a metal plate. 20
8. Device according to claim 4 **characterised in that** the supporting means (14) are made in single body by cutting and bending a metal plate. 25
9. Device according to any of the previous claims **characterised in that** comprises locking means intended to removeably match with the movable plaque (11) or the elastic element (12) near this movable plaque (11) to prevent its exit from the respective concave seat (13) in an assembly condition. 30
10. Device according to claim 9 **characterised in that** each locking means has a side intended to match with a panel edge adjacent to that engaged by the respective movable plaque (11) by locking this latter. 35
11. Device according to claim 9 **characterised in that** each locking means has teeth or a protrusion intended to removeably fix into a slot (5, 6) to match with the movable plaque (11) by locking it. 40
12. Device according to any of the previous claims **characterised in that** comprises a plurality of insulating plates (17) having plan form almost equal to that of the panels (7) and intended to be interposed and locked between these last and the structure (2). 45
13. Device according to any of the previous claims **characterised in that** the movable plaque (11) is inclined with respect to its fixing element (8) to carry out an inclined bending plane of the elastic element (12) when frontally pressed by the panel (7) to facilitate the insertion of the same movable plaque (11) into the respective concave seat (13) of said panel. 50
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14. Device according to any of the previous claims **char-**

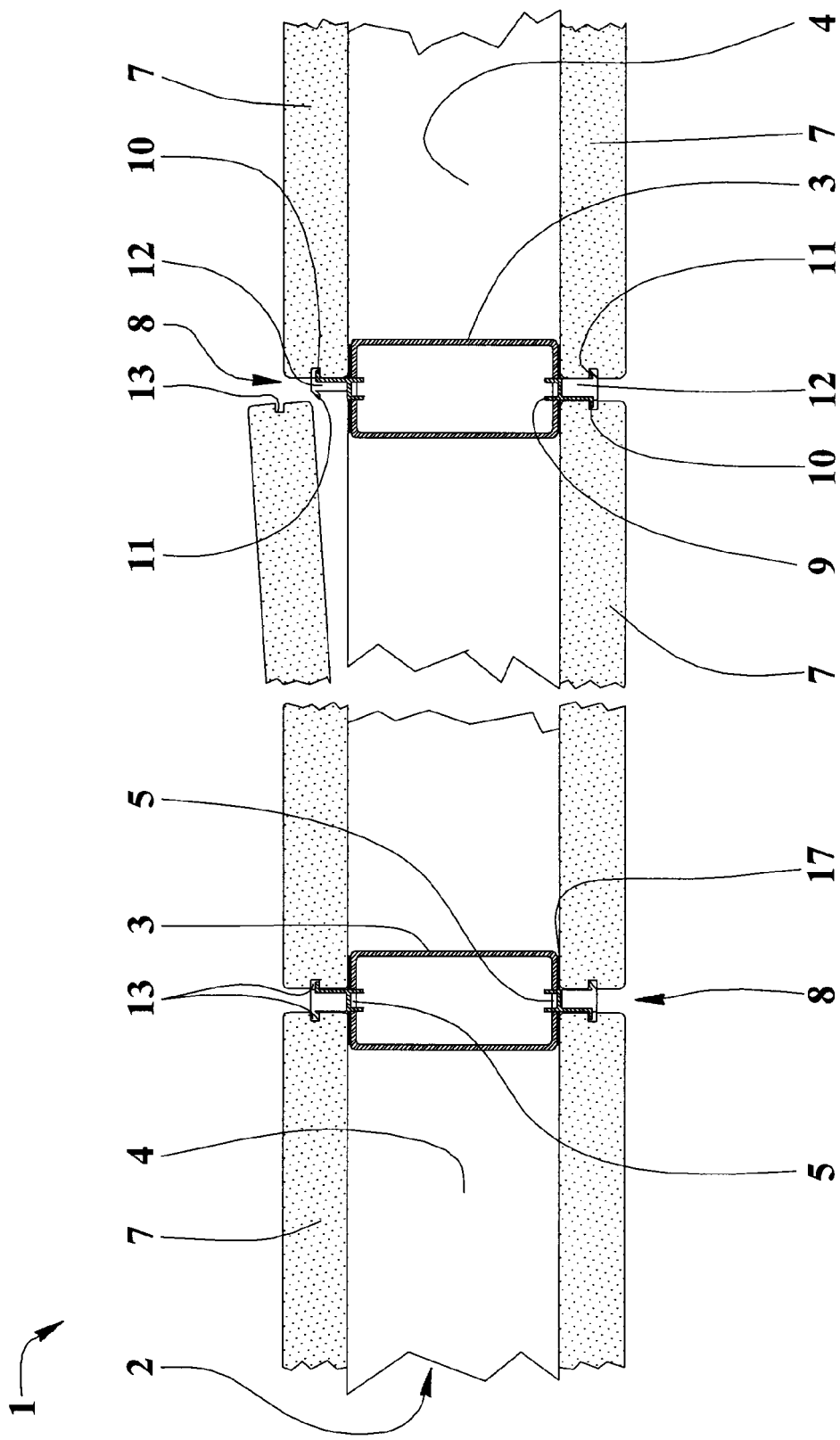


FIG.1

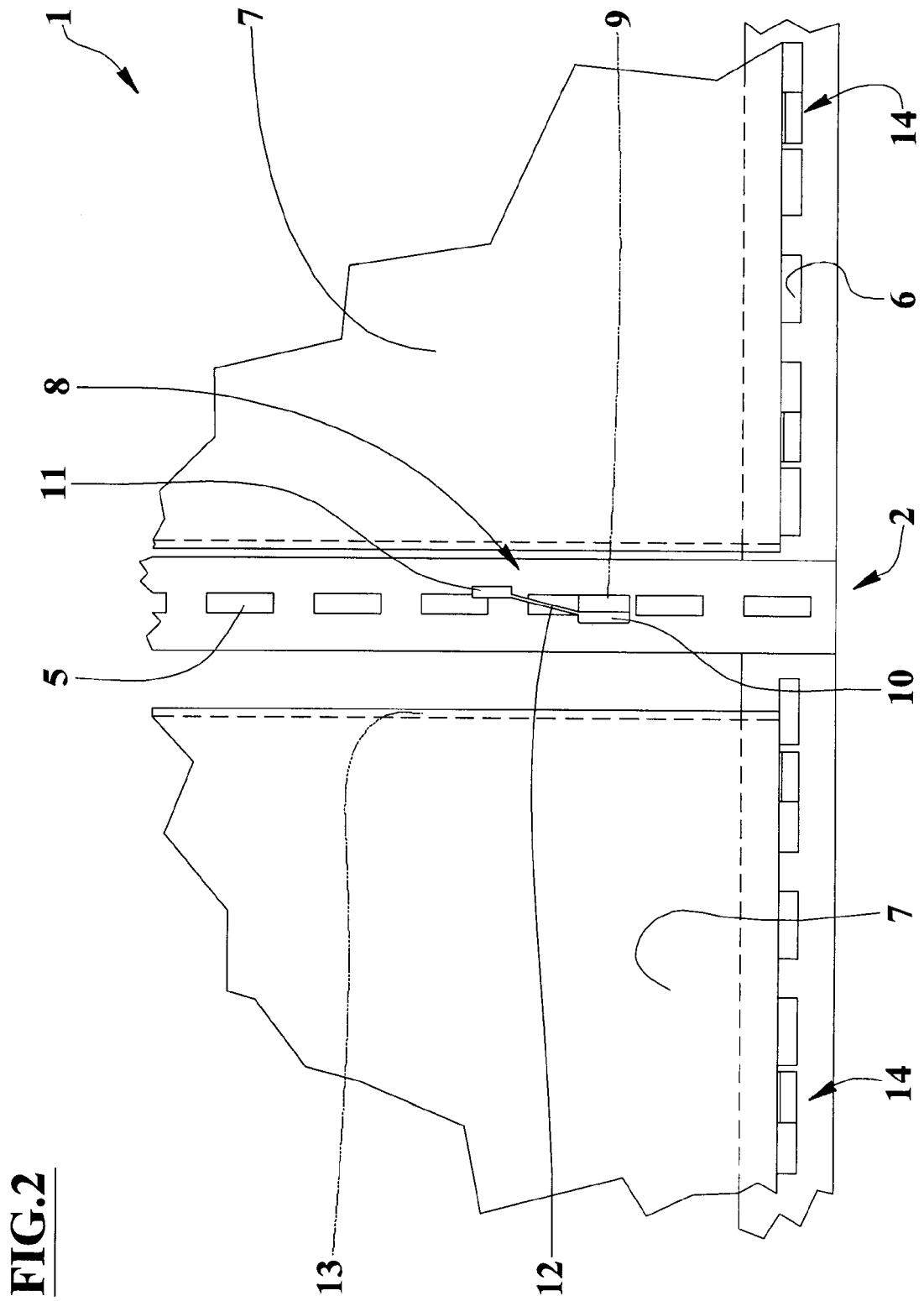


FIG.3

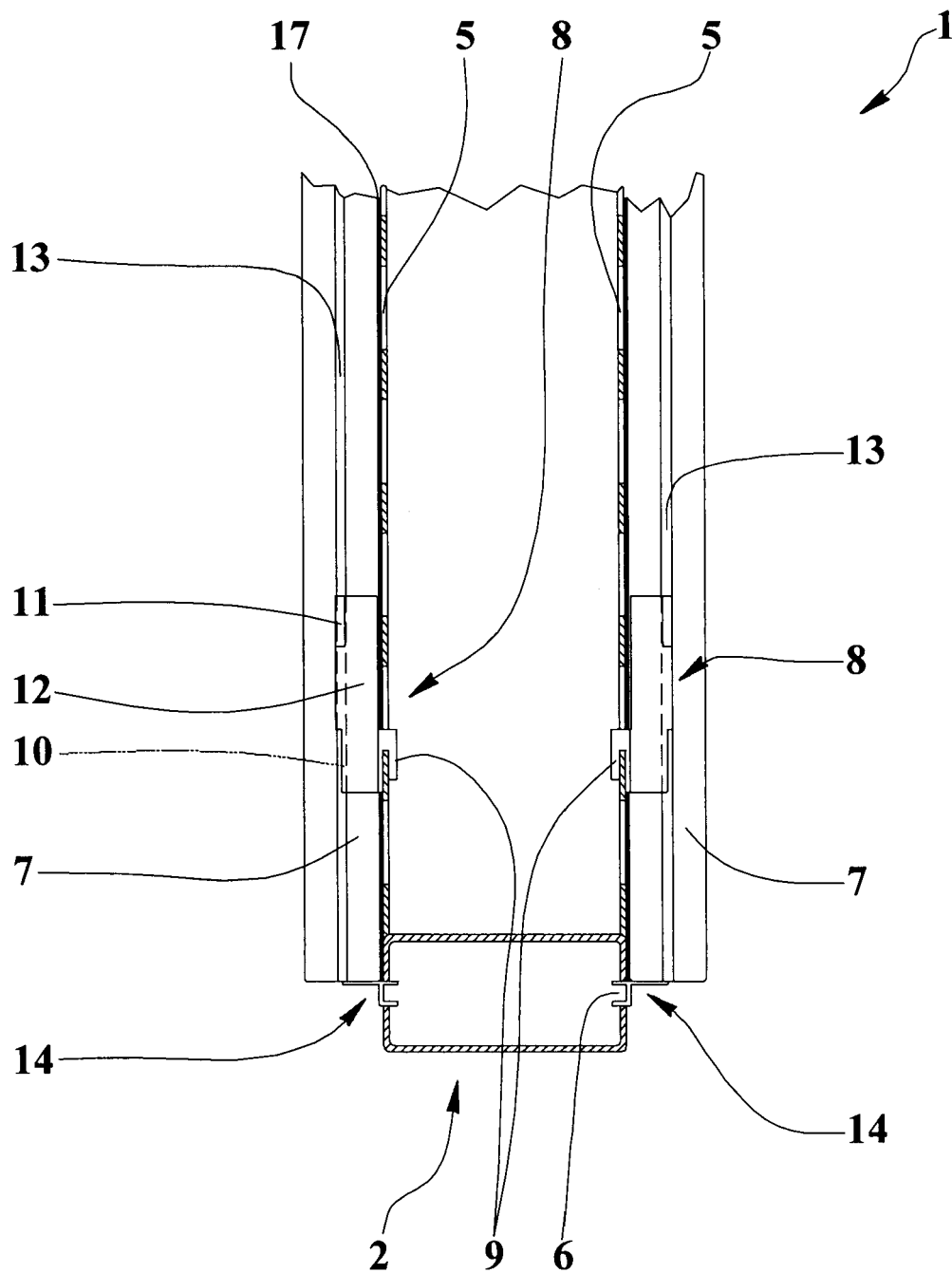


FIG.9

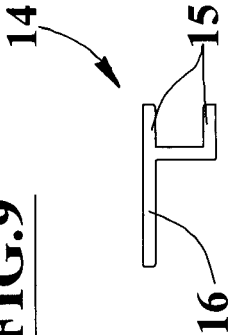


FIG.7

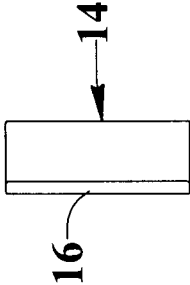


FIG.8

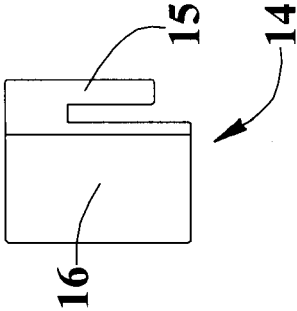


FIG.4

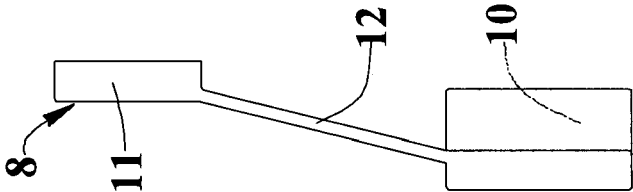


FIG.5

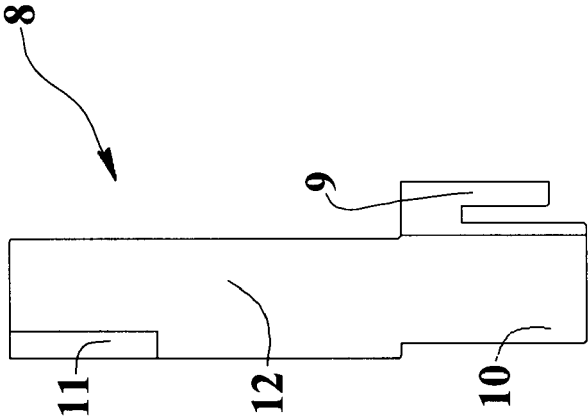
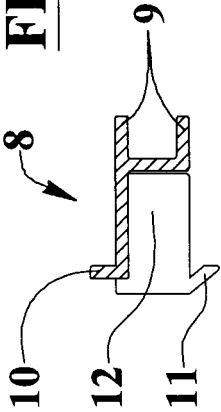


FIG.6



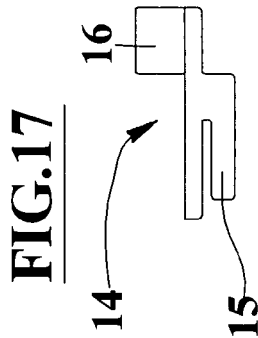
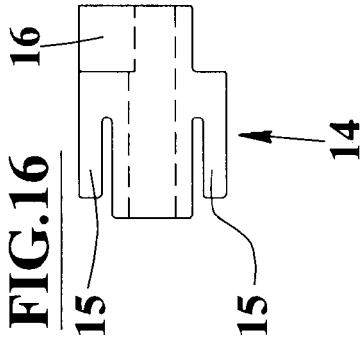
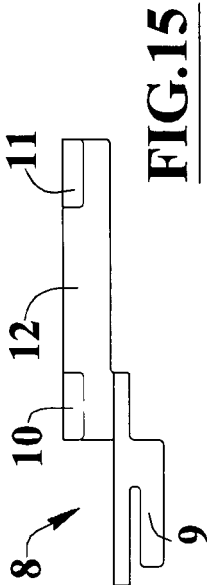
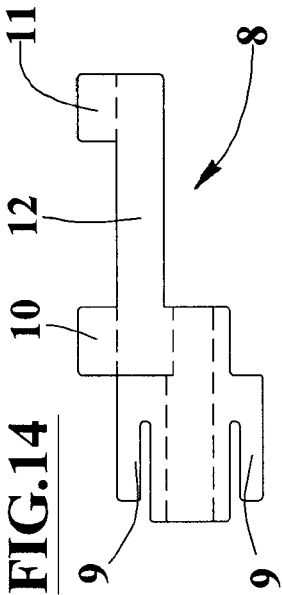


FIG.10

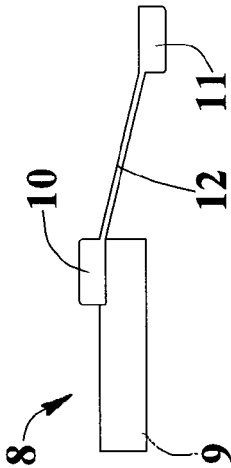


FIG.11

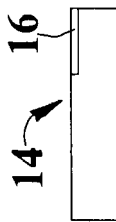
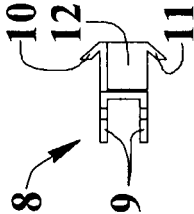


FIG.12

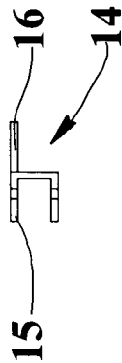


FIG.13