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(54) Modular wall comprising uprights and panels

(57) A modular wall comprising a plurality of upright means (2) intended to be vertically erected for supporting panels (3, 33). Each upright means (2) comprises at least two longitudinal seats (4, 5; 6, 7) whose openings are oppositely oriented. At least a first seat (4, 5) of said longitudinal seats (4, 5, 6, 7) has a first depth (F) and at least an opposite oriented second seat (6, 7) of said longitudinal seats (4, 5, 6, 7) has a second depth (S) bigger than the first depth (F).

In an assembled condition of the wall, the distance between the bottom of a second longitudinal seat (6, 7) of an upright means (2) and the edge of a facing first longitudinal seat (4, 5) of an adjacent upright means (2) is smaller than the distance between two vertical edges of a panel (3, 33); and the distance between the edges of said longitudinal seats first (4, 5) and second (6, 7) of said adjacent upright means (2) is smaller than said distance between two vertical sides of the interposed panel (3, 33).

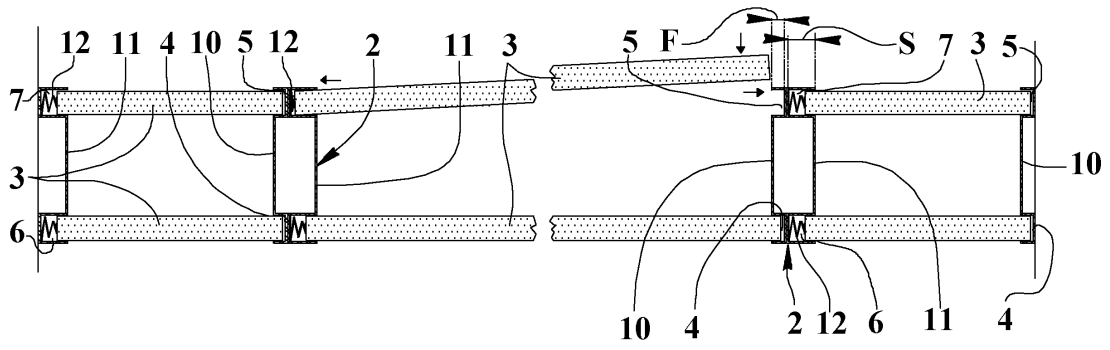

FIG.4

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Description

[0001] The present invention relates to furnishings and building and it refers to a modular wall fit to carry out walls, separators, ceilings and building elements and furniture in general, also demountable, using panels made with usual materials derived from wood or the like, single and double transparent panels and fireproof panels.

[0002] In the movable partition walls field, there is a known economical wall usually so-called "building yard wall" that it uses metallic uprights fixed to the floor and to the ceiling, to which are fixed by means of the metallic section bars, usually so-called "Ω-shaped" bars (omega-shaped section bars), coating panels generally melamine coated panels. The values of this wall are that it allows the use of bifacial panels, or panels with faces in various colour, in order to change the finishing of the wall reversing the face of the panel and it requires the simple and economical cut according to the sizes of the panels, without necessity of expensive squaring, rims and holes on said panels, because the above-mentioned "Ω-shaped" section bars can fix beside the panels, they cover also the edges.

[0003] A drawback of said known walls consists in that each "Ω-shaped" section bar, which is fixed by screws to the upright, it fixes two contiguous panels; in order to mount or to demount one of said panels, it is necessary to demount also the contiguous panels.

[0004] Another drawback consists in that the "Ω-shaped" section bars are fixed to the uprights by means of the screws, the heads of the screws are visible in the interspaces formed between two adjacent panels. To remedy this drawback, it is necessary to use covering section bars, with aesthetic results which are not very delightful.

[0005] A further drawback consists in that the uprights of the so-called building-yard walls are fixed in rigid manner between the floor and the ceiling and they can be deformed and damaged in case of thermal expansion or adjustment and settlings of the works to which they are fixed.

[0006] An object of the present invention is to propose a modular wall that, besides to allow a simple and fast assembly of panels and bifacial panels and without finishing the edges, it allows the assembly and demounting of the single panels without necessity to act on the contiguous panels.

[0007] Another object is to propose a wall which does not need covering section bars.

[0008] An additional object is to propose a wall tolerating the thermal expansions and the adjustments.

[0009] Another object is to propose a wall which comprises a small quantity of sections bars to carry out the uprights and the remaining structural elements.

[0010] The wall comprises structural uprights which, in virtue of their constructive characteristics and of the particular method used, can anchor the front panels without using anything else for their fixing and they allow to mount also crystal panels, without using apposite frame. This feature provides, besides the evident practicality, also the advantage of a considerable economy, because in the glazed walls the cost of the glass frame (almost always made of aluminium) represents a very important part of the expense.

[0011] The uprights comprise two elongated half-shell shaped steel plates, mutually fixed by means of welding or gluing and preferably pre-painted. The half-shells, when they are used separately, serve as wall and ceiling starting section bars, while when they are coupled, they become the structural upright. These half-shells have the seats where the end of the vertical panels will be housed. One half-shell has the seats which is double so deep in respect to the seat of the opposite half-shell. The deeper seats will be provided with extensible elements, for example spring or elastic seals or any other thing which can be compressed and extended.

[0012] The characteristics of the invention are evidenced as followings with particular reference to the attached drawings, in which:

- figure 1 shows a front and partial view of a modular wall, object of the present invention, and delimited by two side walls, by a floor and by a ceiling;
- figure 2 shows a sectional view according to the plane II - II of figure 1;
- figure 3 shows a side and partial view of an upright of figure 1 in which some parts have been removed to better evidence others;
- figure 4 shows a sectional view according to the plane IV-IV of figure 1;
- figures 5 and 6 show sectional views according to planes V-V and VI-VI of figure 2;
- figure 7 shows a front view of a modular glazed wall object of the present invention;
- figure 8 shows a sectional view according to the plane IIX - IIX of figure 7;
- figure 9 shows an enlarged view of a particular of figure 8.

[0013] With reference to figures from 1 to 6, numeral 1 indicates the modular wall, object of the present invention, which comprises a plurality of upright means 2 fit to be installed vertically, between a floor and a ceiling synthetically shown in the figures as horizontal segments protruding laterally from the wall.

[0014] The upright means are fit to support panels 3, 33, for example made of wood or material derived from wood, of natural or synthetic materials eventually with one or both coated faces, or panels 3, 33 made of plasterboard or of the type for building or furniture or made of glass or of other transparent material.

[0015] Each of the upright means 2 comprises four longitudinal seats 4, 5; 6, 7. Two first seats 4, 5 of said longitudinal seats 4, 5, 6, 7 are placed at a side face of the upright means 2 and have a first depth F; two second seats 6, 7 of said longitudinal seats 4, 5, 6, 7 are placed

at the side face of the upright means opposite to that having the first seats 4, 5 and said second seats have a respective second depth S which is deeper in respect to the first depth F. Said longitudinal seats 4, 5, 6, 7 are parallel and the longitudinal openings of the first seats 4, 5 are oriented in opposite direction in respect to the longitudinal openings of the second seats 6, 7.

[0016] Preferably the second depth S of the second seats 6, 7 is about the double of the first depth F of the first seats 4, 5.

[0017] In an assembled condition of the wall 1, the distance between the bottom of a second longitudinal seat 6, 7 of an upright means 2 and the edge of a opposite first longitudinal seat 4, 5 of an adjacent upright means 2 is smaller than the distance between two vertical edges of a panel 3, 33, in other words of the width of said panel, and the distance between the edges of said longitudinal seats first 4, 5 and second 6, 7 of said adjacent upright means 2 is smaller than said width of the interposed panel 3, 33. In this manner, it is possible to assemble the wall fixing first of all the upright means to a mutual distance according to the above mentioned conditions and, later, to install each panel inserting a vertical edge thereof until the bottom of a second longitudinal seat 6, 7, aligning, by means of a twiddle, said panel to the corresponding first longitudinal seat 4, 5 and translating it to insert the remaining longitudinal edge in said first longitudinal seat 4, 5.

[0018] In order to prevent the longitudinal edge of the panel comes out from the respective first longitudinal seat in an unwanted manner, the bottom of each second longitudinal seat 6, 7 is equipped with a longitudinal pushing means 12 comprising at least one between springs, elastic gasket means, pins or screw means, wedges or tilted plane mechanical means acting against the respective panel 3, 33 in the exit direction from the second longitudinal seat 6, 7 and therefore towards the opposite and respective first longitudinal seat 4, 5. In case of lightweight panels, the longitudinal pushing means 12 can consist in a springs preferably of helical and conical type, in case of thin or heavy panels, for example consistent in glass or crystal plates, the pushing means 12 can consist in elastic gasket means that, opportunely made, besides to prevent involuntary translations of the panel prevent passages of airflows.

[0019] Such walls include therefore two parallel layers of panels separated by an air space; as an alternative each upright means can be provided with only one first longitudinal seat and of only one second longitudinal seat to carry out single layer panels walls.

[0020] Each of the upright means 2 that presents two first longitudinal seats 4, 5 and two second longitudinal seats 6, 7, it includes a first section bar 10, having the two first longitudinal seats 4, 5 to their longitudinal edges, and a second section bar 11, having the two second longitudinal seats 6, 7 to their longitudinal edges. Said section bars 10, 11 are mutually fixed by means of welding or by means of sticking materials, for example epoxy resin.

[0021] The cross section of each section bar 10, 11 is approximately "Ω-shaped" (omega-shaped) with the longitudinal edges folded upward.

[0022] The upright means 2, made by said section bars, comprises a longitudinal tubular intermediate portion whose sides have mutually fixed strips and that they end with the longitudinal seats 4, 5, 6, 7.

[0023] The section bars 10, 11 are made of cut steel sheet, longitudinally bent and mutually fixed preferably by means of spot-welding or by means of mechanical means such as rivets or screws or by means of structural sticking. As an alternative the first section bar 10 and second section bar 11 can be made of plastic, for example of extruded PVC, or of composite material, for example glass reinforced plastic, and are mutually fixed with epoxy resin or by means of similar sticking or can be integral, made in single body, by means of a single extrusion through a forming die for the production of the monolithic upright means 2.

[0024] As further alternative, the invention provides that the section bars first 10 and second 11 are made of nonferrous metallic material, preferably of aluminium or its alloys. Said section bars first 10 and second 11 can be made in single body by means of a single process, for example of extrusion, for the shaping of an aluminium monolithic upright means 2.

[0025] The section bars first 10 and second 11 and the upright means 2 made of plastic, of composite material or aluminium or its alloys provide the advantage that they can be easily cut at precise length, also in the installation place, by means of economic and lightweight portable tools.

[0026] The monolithic upright means 2 are without of the welds or of the longitudinal junctions, therefore they have visible sides perfect aesthetically that they do not need covering section bars or other finishing elements.

[0027] The wall can be of short height, of the type for the partial subdivision in the open-spaces and it can be fixed only to floor; more in general it comprises a plurality of lower and upper fixing means 15, 16 respectively fit to fix, by means of screw means 17, 18, for example screws and expansion plugs for walls, the lower end of an upright means 2 to a floor and its upper end to a ceiling.

[0028] Each upper fixing means 16 is provided with two vertical slots 19 blindingly engaged by stems and/or head portions and/or by bushes of screws fixed at the upper end of the respective upright means 2 for its sliding connection in order to allow the wall to absorb the thermic expansions and/or to adjust its height to possible settlings or adjustments of the building to which it is associated.

[0029] The wall comprises a plurality of "U" shaped lower 20 and upper 21 channel means for housing and hiding the lower and upper edges of the panels 3, 33.

[0030] The bottom of each "U" shaped upper channel means 21 is equipped with similar longitudinal pushing means 12 to those of the second longitudinal seats 6, 7 and assigned to press the "U" shaped upper channel

means 21 against the ceiling for hiding and for compensating possible irregularities of the panels or the parallelism between floor and ceiling. The wall is also equipped with a plurality of spacer means, whose simplicity does not require respective figure, having different thicknesses and assigned to be interposed between the bottom of the "U" shaped lower channel means 20 and the lower edges of respective panels 3, 33 for the vertical orientation of its sides. The spacer means can consist of discs or rectangles having main dimensions compatible with their positioning onto the bottom of the lower "U" shaped channel means 20; for example a plurality of such spacer means can have a single unit thickness, another plurality can have a triple unit thickness and a further plurality can have a thickness which is five times of the unit to allow to carry out all the required thicknesses easily and with a few pieces.

[0031] The spacer means are made of magnetic materials and the lower "U" shaped channel means 20 are made of magnetisable materials to maintain the position of the spacer means, also superimposed, with respect to the lower "U" shaped channel means 20 also during the movement of the latter. In this way it is possible to setup the spacer means into the "U" shaped channel means and to engage the edges of the panels into said "U" shaped channel means before their engagement to the upright means 2.

[0032] For fixing the wall 1 to the side walls, or columns or the like building structures, there are first section bar 10 and second section bar 11 mutually separated and assigned to be screwed by means of plugs to such walls or structures for connecting to the latter the side edges of the side panels 3, 33 of the wall 1.

[0033] In case of monolithic upright means 2, made of plastic, of composite material or of aluminium alloy, the first section bar 10 and second section bar 11, for fixing the sides of the wall 1 to walls or the like, can be made by means of respective moulding processes or by means of longitudinal sectioning of an upright means 2.

[0034] The wall in figures 7 . 9 comprises thin lower panels, for example made of glass, and upper panels 3, 33, for example made of thick plates of material derived by wood and it comprises horizontal beam means 30 for the connection of said upper panels to the lower panels. Each beam means 30 comprises a section bar 10, 11 where each back of the respective longitudinal seats 4, 5, 6, 7 is fixed to the back of a respective "U" shaped channel means 20, 21 and where the seats and/or the housings, of the beam means 30 assigned to glass panels 33 or to other thin plates, are equipped with respective elastic filling means 31, for example consisting of rubber-like, spongy or silicon material cords.

[0035] The "U" shaped upper and lower channel means 21, 20 as well as the horizontal beam means 30 are interposed between the upright means and they are detached from them and they are engaged to the upper and lower edges of the panels 3, 33.

[0036] As seen, the operation of the wall allows an easy and fast assembly also with panels of different natures, which do not require the precise cutting in perfect manner and do not require the finishing of the edges. It is furthermore possible to mount or to demount each panel without involving the adjacent panels.

[0037] An advantage of the present invention it is to provide a modular wall that, besides to allow a simple and fast assembly of panels and bifacial panels and without finishing the edges, it allows the assembly and demounting of the single panels without necessity to act on the contiguous panels.

[0038] Another advantage is to provide a wall which does not need covering section bars.

[0039] An additional advantage is to provide a wall tolerating the thermal expansions and the adjustments.

[0040] Another advantage is to provide a wall which comprises a small quantity of sections bars to carry out the uprights and the remaining structural elements.

Claims

1. Modular wall comprising a plurality of upright means (2) assigned to be vertically erected for supporting panels (3, 33); said wall being **characterized in that** each upright means (2) comprises at least two longitudinal seat (4, 5; 6, 7) whose openings are opposite oriented; at least a first one (4, 5) of said longitudinal seat (4, 5, 6, 7) has a first depth (F) and at least an opposite oriented second one (6, 7) of said longitudinal seat (4, 5, 6, 7), has a second depth (S) bigger than the first depth (F); in an assembled condition of the wall, the distance between the bottom of a second longitudinal seat (6, 7) of an upright means (2) and the edge of a facing first longitudinal seat (4, 5) of an adjacent upright means (2) is smaller than the distance between two vertical edges of a panel (3, 33) and the distance between the edges of said longitudinal seats first (4, 5) and second (6, 7) of said adjacent upright means (2) is smaller then said distance between two vertical sides of the interposed panel (3, 33).

2. Wall according to claim 1 **characterized in that** each upright means (2) has two first longitudinal seat (4, 5) and two second longitudinal seat (6, 7) and comprises a first section bar (10), having the two first longitudinal seat (4, 5) at its longitudinal edges, and a second section bar (11), having the two second longitudinal seat (6, 7) at its longitudinal edges.

3. Wall according to claim 2 **characterized in that** the transversal section of each section bar (10, 11) is approximatively shaped as an "Ω" with folded up longitudinal edges and the upright means (2) has a median longitudinal tubular portion whose sides have mutually fixed flaps ending with the longitudinal seat (4, 5, 6, 7).

4. Wall according to claim 1 **characterized in that** the bottom of each second longitudinal seat (6, 7) is provided with longitudinal pushing means (12) comprising at least one among springs, resilient sealing means, pin or screw means, wedge or inclined plane mechanical means and acting against the respective panel (3, 33) in the exit direction from the second longitudinal seat (6, 7).

5. Wall according to claim 1 **characterized in that** it comprises a plurality of lower (15) and upper (16) fixing means respectively assigned to fix, by means of screw means (17, 18), the lower end of a upright means (2) to a floor and the upper end thereof (2) to a ceiling; the upper fixing means (16) being provided with at least one vertical slot (19) for the sliding connection to said upright means (2).

6. Wall according to claim 1 **characterized in that** it comprises a plurality of lower (20) and upper (21) channel means whose transversal section is "U" shaped for housing the upper and lower edges of the panels (3, 33); the bottom of the "U" shaped upper channel means (21) being provided with longitudinal pushing means (12) comprising at least one among springs, resilient sealing means, pin or screw means, wedge or inclined plane mechanical means and assigned for matching the "U" shaped upper channel means (21) against the ceiling.

7. Wall according to claim 6 **characterized in that** it comprises a plurality of spacer means having different thickness and assigned to be interposed between the bottom of the "U" shaped lower channel means (20) and the lower edge of a respective panel (3, 33) for the vertical orientation of the sides thereof.

8. Wall according to claim 7 **characterized in that** the spacer means are made of magnetic material and the "U" shaped lower channel means (20) are made of magnetizable material for keeping the position of the spacer means in respect to the "U" shaped lower channel means (20) also when moving the latter.

9. Wall according to claims 2 and 6 **characterized in that** it comprises horizontal beam means (30) to connect lower and upper panels (3, 33); each beam means (30) comprises a section bar (10, 11) where each back of the respective longitudinal seats (4, 5, 6, 7) is fixed to the back of a respective "U" shaped channel means (20, 21) were the seats and/or housings of the beam means (30) assigned to house a thin or glass panel (33) is provided with a respective resilient filling means (31).

10. Wall according to claim 2 **characterized in that** it comprises mutually detached first section bars (10) and second section bars (11) and assigned to connect the lateral sides of the side panels (3, 33) of the wall to lateral building walls.

11. Wall according to claim 2 **characterized in that** the section bars first (10) and second (11) are made of steel, aluminium, metal alloys, plastic materials or composite materials.

12. Wall according to claim 11 **characterized in that** the section bars first (10) and second (11) of each upright means (2) are mutually fixed by means of welding, of sticking, of mechanical fixing or are made integral, in single body.

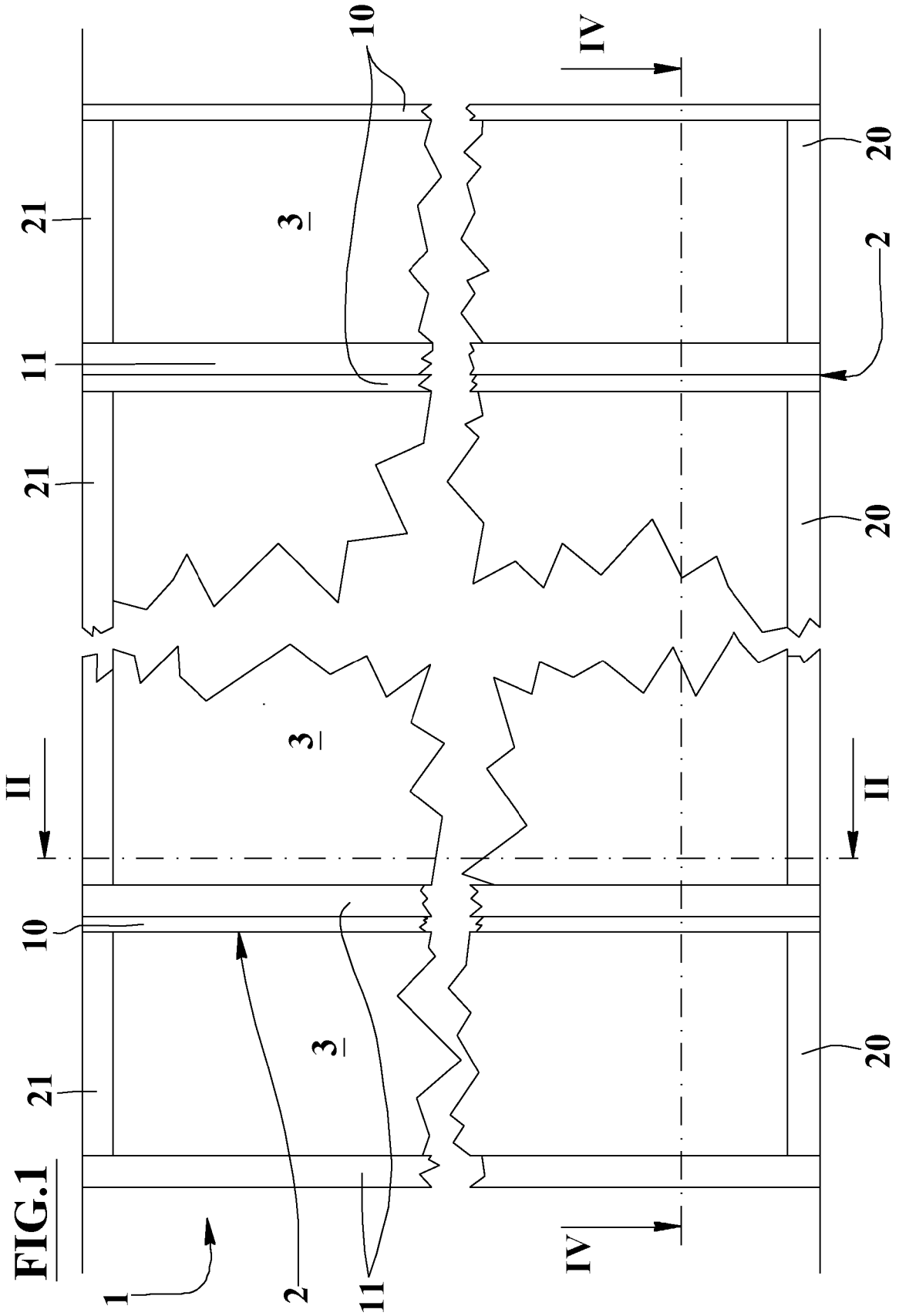


FIG.1

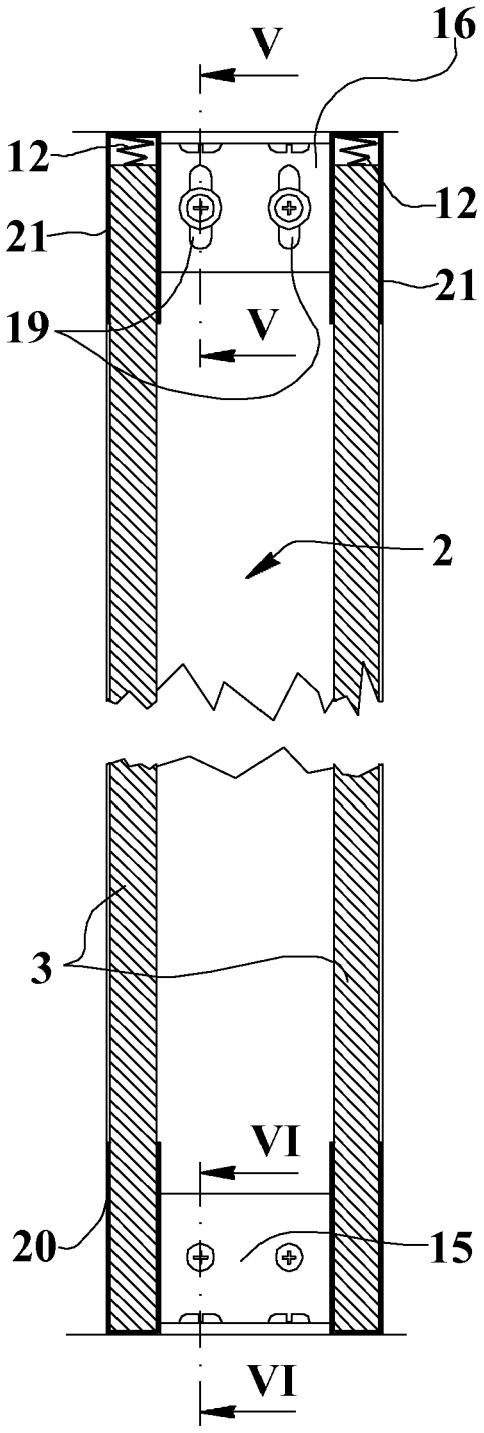


FIG.2

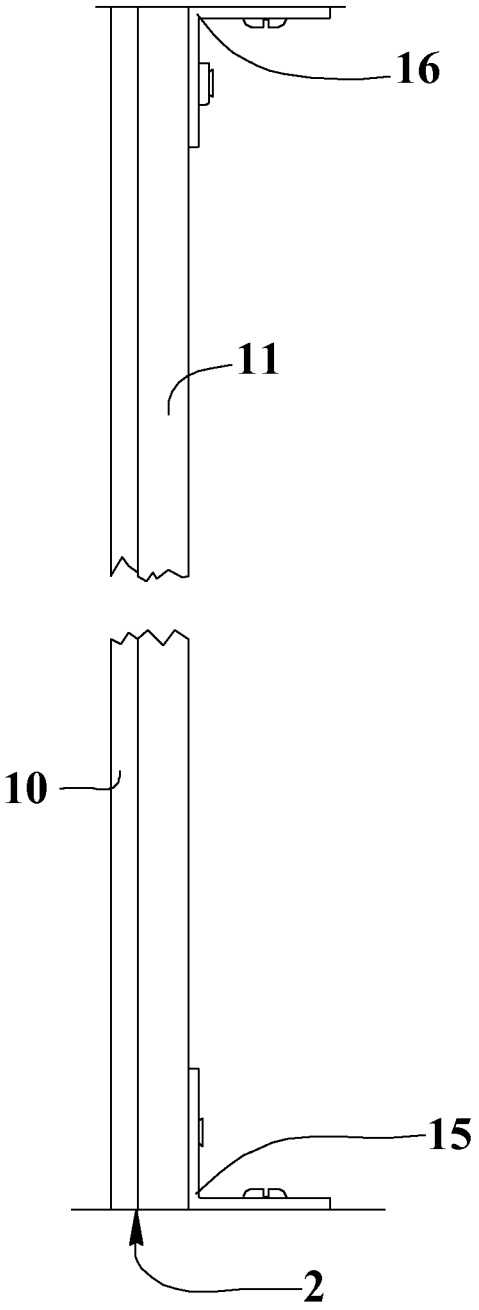


FIG.3

FIG.4

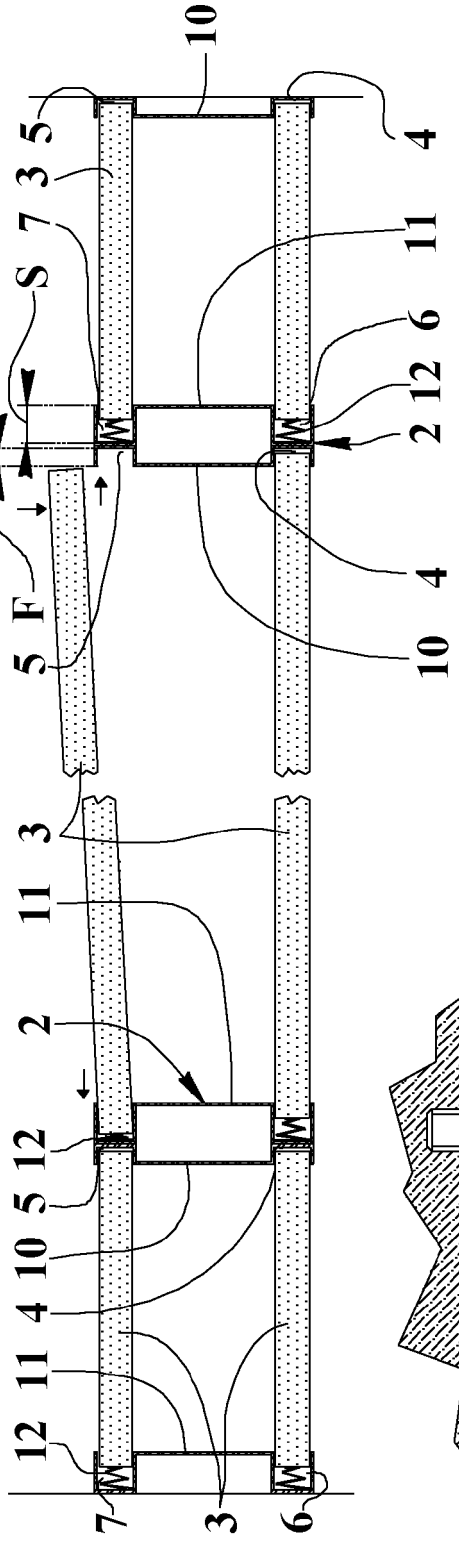


FIG.9

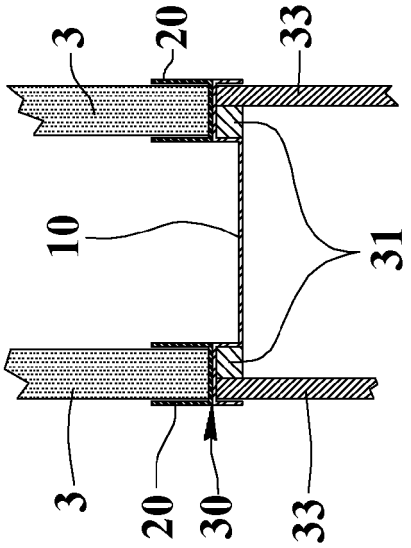


FIG.6

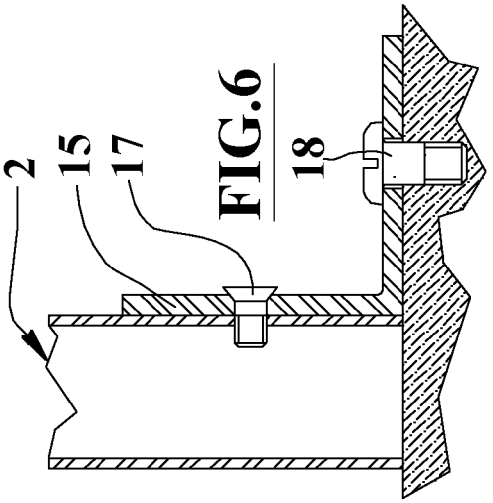
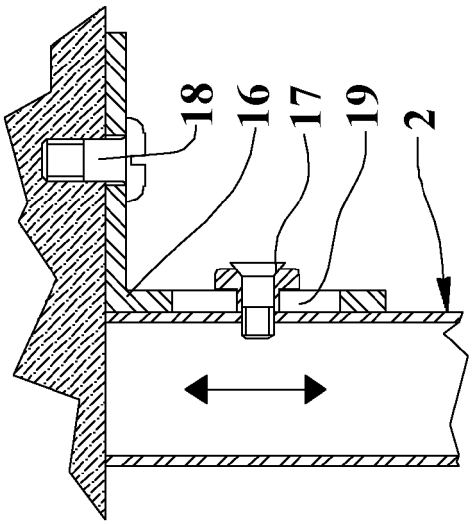


FIG.5



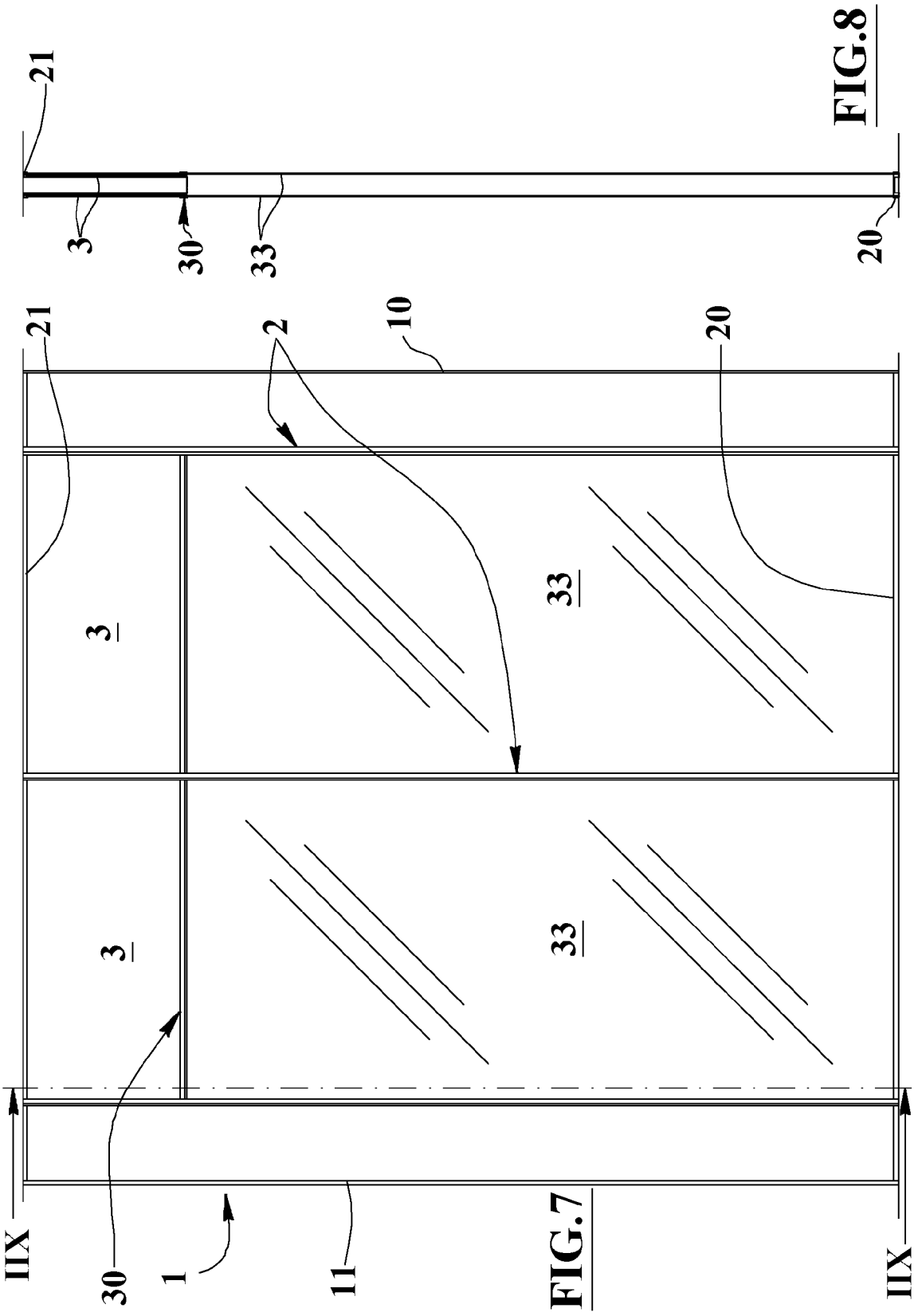


FIG.8

FIG.7

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EUROPEAN SEARCH REPORT

Application Number
EP 10 15 0010

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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			TECHNICAL FIELDS SEARCHED (IPC)
			E04B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	5 May 2010	Khera, Daljit

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