

Description

[0001] The invention relates to a cassette cladding system, preferably a single skin cassette panel and attachment means.

Such cladding system and panels are known from amongst others EP 0,882,853. The cladding system of EP 0,882,853 shows panels that are attached to vertical carriers. The carriers extend vertical and parallel to each other behind the panels. The carriers are attached to a wall. Between the carriers and the panels are the panel support brackets. The support brackets are slidably adjustable along the vertical carrier to which they are attached.

EP 0,882,853 describes and shows panels that are hung from their vertical sides from brackets that are positionable in vertical direction along the vertical carriers. EP 0,882,853 further describes a system of hanging panels by their reinforced corners on brackets on vertical carriers. The uses of the corner-reinforcements each have bottom sides of one of their vertical flanges that is used to hook the panel into the bracket. This way the panel is hung by their vertical sides. And it is mentioned that 'complicated constructions for retaining the top edges of the . panels are not necessary'.

[0002] It is an object of this invention to provide a panel mounting system that does neither require additional fasteners to fix the panel rim to the bracket, nor a corner-reinforcement to facilitate hanging the panel from a bracket.

[0003] The façade cladding system of the invention provides for a panel mounting system that uses only opposite panel rims for mounting the panel to top and bottom support brackets, at least one bracket including a blocking ensuring that the panel is secured against unwanted movement in direction of the horizontal or vertical joints and in the direction perpendicular to the substructure.

[0004] In accordance with this invention, it has been proposed to provide a façade cladding system and cladding panel, said system including

at least one panel having a panel body with left side flange, right side flange, top flange and bottom flange, the top and bottom flanges include respective top and bottom inturned rims extending parallel to the panel body, and

a substructure including at least one top support bracket and a least one bottom support bracket for supporting the panel, each of the top and bottom brackets including a base plate and at least one flange projecting perpendicularly from the base plate, the flange including a vertically extending slit for receiving in installed condition the respective top or bottom inturned rim of a panel, wherein at least one of the top and bottom support brackets includes a blocking member adjacent the at least one flange, which blocking member prevents movement of the panel in at least one of two orthogonal directions.

[0005] The blocking member including an outer wall parallel to and spaced away from the at least one flange such that when the panel is installed by its inturned top or bottom rim in the slit, the outer wall abuts an inner surface of an adjacent one of the left or right side flanges of the panel, thus preventing movement of the panel in horizontal direction towards the opposite left or right side flange.

[0006] The outer wall of the blocking member being such that the outer wall of it falls completely within the top or bottom flange of an installed panel.

[0007] Another embodiment being that the outer wall of the blocking member extends partially outside the top or bottom flange of an installed panel.

[0008] The blocking member can include a lock formation shaped as a generally U-shaped flange comprising a left leg, bottom leg and right leg, the left and right leg extending parallel to the flange and the left leg being attached to the flange, and the right leg forming the outer wall surface.

[0009] The U-shaped lock formation can be integrally formed with the bracket flange.

[0010] The blocking member incased a lock formation formed as a block, which block is attached to the bracket flange.

[0011] The blocking member can be an insert including a mounting foot and a lock formation in the form of a block extending therefrom, the block including the outer wall of the blocking member.

[0012] A panel suitable for a blocking member where the outer wall extends partially outside the shaped top or bottom flange of an installed panel, the panel including cutout portions in top and bottom inturned rims allowing the outer wall of the lock formation block to extend beyond the inturned rims

[0013] The substructure can include parallel vertical support beams wherein the support brackets are slidably engaged along the support beams to be fastened in any desired position.

[0014] The façade cladding system wherein when the at least one top and bottom brackets are attached to the substructure they define horizontal and vertical joints, and wherein the top inturned rims of the at least one panel is shaped such that it can pass through the horizontal joints for mounting to the relevant bracket

[0015] The façade cladding system wherein the top inturned rim of each panel is shorter than the bottom inturned rim.

The facade cladding system wherein an intermediate top or bottom bracket can be provided, the intermediate top or bottom bracket without blocking member.

[0016] The façade cladding system wherein the at least one bracket (40,60) is provided with an abutment member (479) for ensuring a predetermined vertical distance between vertically adjacent top and bottom brackets.

The façade cladding system wherein the abutment member is a vertical extension of the bracket base plate

The façade cladding system wherein the abutment member is a vertical extension from the blocking member.

The façade cladding system wherein the abutment member includes a lift stop which prevents movements in vertical direction from a panel hung from a top bracket. The façade cladding system wherein the lift stop including a tab that extends from the top of the abutment member slanting down and outward.

The façade cladding system wherein each of the at least one top and bottom bracket (40,60) includes a second flange extending from the bracket base, the second flange extending parallel to the at least one flange and the blocking member being positioned between the two flanges.

[0017] Further aspects of the invention will be apparent from the detailed description below of a particular embodiment and the drawings thereof, in which:

Figure 1, is a perspective front view of a number of assembled cladding panels, carriers and mounting brackets.

Figure 1A front view of a piano for a cladding panel, dotted lines presenting fold lines for the sides of the panel;

Figure 2 is a perspective, front view of a partial carrier beam;

Figure 3 is a perspective, exploded front view of a bracket including a blocking member;

Figure 4 is a perspective view of a second embodiment of a bracket;

Figure 5 is a perspective view of a third embodiment of a bracket;

Figure 5A is a perspective view of an insert with a blocking member;

Figure 5B is a perspective view of an insert without blocking member;

Figure 6A is a perspective view of the fourth embodiment of a bracket;

Figure 6B is an elevation of a piano for a cladding panel for use with the fourth embodiment bracket, dotted lines presenting fold lines for the sides of the panel;

Figure 7 is a perspective front view detail of a partial carrier beam, bottom and top brackets and one assembled panel corner;

Figure 8 is a perspective front view of a carrier beam showing a bottom bracket including a temporarily locking member preventing the bracket from sliding down, as well as a panel mounted to a top bracket; and

Figure 9 is a perspective front view of a carrier beam and fifth embodiment bracket and a panel mounted to a top bracket.

[0018] Figure 1 shows a partially completed building façade formed of identical cladding panels 3A, 3B, 3C e.g. Aluminum single skin cassette type panels, mount-

ed on a plurality of identical parallel carrier beams 80A-E, by a plurality of top and bottom corner brackets 40A-E, 60A-60E. Between the panels are horizontal and vertical joints 29,31.

[0019] The panels 3A-C as shown in figures 1 and 1A, each include a panel body 11, a top flange 13, bottom flange 15, a left vertical flange 17 and a right vertical flange 19. The top and bottom panel flanges 13,15 extend horizontally and are generally U-shaped, being shaped by folding the top and bottom panel sides twice over 90 degrees inward. Thus the U-shaped flanges 13, 15 have each have a first lateral panel rim 21, 25 that extends perpendicular to the plane of the panel body 11 and a second or inturned panel rim 23, 27 that extends parallel to the plane of the panel body 11. The top inturned rim 23 extends towards the bottom inturned rim 27. Preferably the left and right vertical flanges 17, 19 of the panel are bent over 90 degrees only once and extend perpendicular to the panel body.

[0020] The panels 3 are mounted to the brackets 40,60 by their inturned rims 23,27 of the top and bottom flanges 13,15 only. No additional attachments for the left and right vertical panel flanges 17,19 is required.

[0021] The carrier beams 80 as shown in figures 1 and 2, are generally C-shaped open channel carriers in which the brackets 40,60 are slidably positionable along the entire length of the channel. The carrier beam 80 comprises a base or rear wall 81, a left side wall 83, and a right side wall 85 the side walls extending perpendicular from the base wall 81 along the entire length of the carrier beam 80. The left and right beam side walls 83,85 each include left and right front beam flanges 87,89. The left front beam flange 87 extends towards the right front beam flange 89, both extend parallel to the beam base 81. Between the front beam flanges 87,89 extends the entrance opening 91 of the beam inner channel 93.

A suitable means for mounting the carrier beam 80 to a wall can extend from the back, or the beam can include holes in the base 81 for bolts or the like.

[0022] The brackets 40,60 include top brackets 40 for mounting the top inturned rim 23 of the panels 3 and bottom brackets 60 for receiving the bottom inturned rims 27 of the panels 3. Each bracket includes a separate nut plate 71 needed to mount the top or bottom bracket 40,60 to the carrier beam 80. When the bracket is mounted on the carrier beam 80, the nut plate 71 is within the carrier beam channel 93, and the bracket 40,60 is outside the channel 93. The front beam flanges 87,89 are caught between the nut plate 71 and the bracket 40,60. A bolt 73 attaches the nut plate 71, beam 80 and bracket 40,60 together. The nut plate 71 can have a serrated front surface that will enhance the connection between front surface of the nut plate 71 and the inner surfaces of the front beam flanges 87, 89. The bolt 73 when passed through a bracket 40,60 and the nut plate 71, and can keep the nut plate 71 in latched connection to the beam 80 and bracket 40,60, allowing the bracket 40,60 and nut plate 71 to slide along the

carrier beam 80. The bolt 73 can also keep the nut plate 71 in locked condition for securely locking the bracket 40,60 in the desired position on the beam 80.

[0023] The top brackets 40 can be top corner brackets 40A,40B, or top intermediate brackets 40C, the bottom brackets 60 can likewise be bottom corner brackets 60A, 60B and bottom intermediate brackets 60C. Only wide panels will need intermediate brackets for additional intermediate support.

[0024] The top corner 40A bracket shown in Figure 3 is for holding a top corner of a panel, it includes a base 41 and a pair of parallel extending left and right bracket flanges 43, 45, the flanges projecting perpendicular from the base. For good alignment of the bracket base 41 with carrier beam channel opening 91 the bracket base 41 can have a guiding block 42 extending rearward from the rear surface of the bracket base. The guiding block 42 will ensure alignment with the channel opening 91 and provide added contacting surface with the nut plate 71. Each bracket flange 43,45 is a generally rectangular plate and includes a left or right panel mounting slit 47,49 extending vertically down from the top edge of the flange. The inturned top rim 23 of the panel 3 is mounted in the mounting slit 47,49. The vertical depth of the slit 47,49 is greater than the vertical height of the inturned panel rim, ensuring space for vertical expansion.

Similar to the top corner bracket of Figure 3, a bottom corner bracket will be shaped including a base, a guiding block, left and right bracket flanges. For a bottom corner bracket the panel mounting slits will extending from the bottom edge of the flange vertically upwards for receiving the bottom inturned panel rim of a panel.

[0025] A top or bottom corner brackets 40,60 will typically carry two adjacent panels, e.g. a left panel 3A and a right panel 3B, this can be seen in Figure 1. Each panel is mounted in either the left or the right flange of the corner bracket. A corner bracket will also typically include a blocking member for one of the panels it carries. To illustrate this Figure 3 shows a top corner bracket 40 with blocking member 51. The blocking member 51 is a sliding lock that will prevent the inturned panel rim from sliding horizontally. In order to allow for heat expansion in horizontal direction of the panel, only one top corner bracket per panel will include a blocking member.

In the same manner a bottom corner bracket can include a blocking member. Also in view of possible heat expansion only one bottom corner bracket per panel will include a blocking member.

[0026] Figure 3 shows top corner bracket 40 including blocking member 51. The bracket is shown having base 41, guiding block 42, left flange 43, right flange 45, left mounting slit 47, right mounting slit 49, and blocking member 51. As can be seen from this figure the blocking member 51 has a lock formation 53 shaped by twice bending left flange 43 over 90 degrees, shaping an inward turned U-channel, comprising a left wall 53A, a front wall 53B and a right wall 53C. The left wall 53A is

integral with a portion of the bracket left flange 43 beyond the slit 47 and extending away from bracket base 41. When a panel is installed to the left bracket flange 43, its inturned panel rim 23,27 will be inserted in left slit 47. The lateral top panel rim 21 and right panel flange 19 of panel 3 will enclose the U-shaped channel lock formation 53. An inner surface of right vertical panel flange 19 will abut the outer surface of a right channel wall 53C of the U-shaped channel lock formation 53. So the right vertical panel flange 19 together with the right channel wall 53C make up the blocking member 51 preventing the panel 3 from sliding horizontally of the top corner bracket 40. The top corner bracket 40 of figure 3 can easily be made suitable for use as a bottom corner bracket 60 by providing alternate or additional mounting slits 47', 49' in the bottom of the left and right flanges 43,45. They are indicated by dotted lines in figure 3.

[0027] Figure 4 shows a second embodiment of the top corner bracket with like parts having like referral numbers by addition of 100.

[0028] The bracket 140 is shown having base 141, guiding block 142, left flange 143, right flange 145, left mounting slit 147, right mounting slit 149, and blocking member 151. The blocking member is for preventing the panel from sliding horizontally. A lock formation 153 in the form of a block is attached to the inner surface of the portion of the left flange 143 extending outwardly beyond mounting slit 147. The lock formation block 153 includes a left wall 153A (not visible), a front wall 153B and right outer side 153C. Like with the first embodiment of the bracket when a panel is installed to the left bracket flange 143, its inturned panel rim will be inserted in left slit 147. The lateral top panel rim and right vertical panel flange of a mounted panel will enclose the lock formation block: The inner surface of right vertical panel flange will abut the outer surface of the right outer side 153C of lock formation block 153. The lock formation block 153 is shown as a solid block but can also be hollow by having a central opening. The lock formation block 153 can be made of a suitable plastic, by injection moulding. Since with this embodiment separate top and bottom corner brackets have to be made, it is suggested to use an insertable blocking member as is showed in figure 5 to selectively form a top or bottom bracket from identical elements.

[0029] Figure 5 shows a third embodiment of the bracket with like parts having like referral numbers as bracket 40 greater by 200.

A top corner bracket 240 is shown having a base 241, a guiding block 242, a left flange 243, a right flange 245, a left mounting slit 247, a right mounting slit 249, and a blocking member 251. The blocking member 251 is in the form of an insert (see figure 5A) including a mounting foot 255 and a lock formation 253 in the form of a block. The lock formation block 253 includes a left wall 253A (not visible), a front wall 253B and right outer side 253C. The mounting foot 255 of the blocking member 251 is generally U-shaped and included a front leg 255B, a rear

leg 255D and a slit 255X between the front and rear legs 255B, 255D for mounting the panel into. The mounting foot 255 also includes a mounting groove 257 extending vertically along front and rear legs 255A, 255D. The groove 257 is for mounting the mounting foot 255 in slit 249 of left flange 243 of the bracket. The mounting foot 255 of the blocking member 251 is fitted within the mounting slit 247 by conventional means, such as adhesive, or a form or sliding fit including a locking bead or the like. The lock formation block 253 extends along a right wall of the front leg 255B of the mounting foot 255 beyond the slit 247 of the left bracket flange 243 and towards the right bracket flange 245.

When a panel is installed to the left bracket flange 243, its intumed top panel rim will be inserted in insert slit 255X. The lateral top panel rim and right panel flange of a panel will enclose the lock formation block 253 of blocking member insert 251. Rear wall 255D of the insert mounting foot 255 extending from the insert slit 255X towards the bracket base 241 will not be covered by the panel. The inner surface of right vertical panel flange will abut the right outer wall surface 253C of the lock formation block 253.

[0030] When a blocking member insert 251 is used for the left bracket flange 243 it is preferred to also use an auxiliary insert 275 for the right bracket flange 245. This auxiliary insert 275 basically is similar to the foot 255 of blocking insert 251. Auxiliary insert 275 includes a front leg 275B, a rear leg 275D, a mounting slit 275X for receiving an intumed panel rim and a groove 277 for mounting the insert in slit 249 of the right flange 245. Insert 275 is meant to hold the intumed top or bottom rim of an adjacent panel and no blocking member is necessary.

[0031] For more structural integrity of the blocking member it is desired that the lock formation 53, 153, 253 of the blocking member 51, 151, 251 is bigger and extends along the inner surface of the left bracket flange 43, 143, 243 on both sides of the mounting slit 47, 147, 247. For this reason a further embodiment of the bracket is proposed, with a second embodiment of the blocking member insert. This fourth embodiment is shown in figures 6 and 7, like parts have been given like numbers corresponding to those in figure 5 greater by 100. A top corner bracket 340 is shown having base 341, guiding block 342, left flange 343, right flange 345, left mounting slit 347, right mounting slit 349, and blocking member insert 351 and an auxiliary insert 375. The blocking member insert 351 is in the form of an insert including a mounting foot 355 and a lock formation 353 in the form of a block. The lock formation block 353 includes a left wall 353A (partly visible), a front wall 353B and right outer side 353C. The mounting foot 355 of the blocking member 351 is generally U-shaped similar to the mounting foot of the insert of figure 5A, and includes a front leg 355B, a rear leg 355D and a slit 355X between the front and rear legs 355B, 355D for mounting the panel into. The mounting foot 355 also includes a mounting

groove 357 extending vertically along front and rear legs 355A, 355D. The groove 357 is for mounting the mounting foot 355 in slit 349 of left flange 345 of the bracket. The lock formation block 353 extends along the right sides of rear and front mounting foot legs 355A, 355D and towards the right bracket flange 345. The distance from right surface of the left flange 343 to the outer right wall 353C of lock formation block 353 is W1. In order to allow the intumed top panel rim 323 as shown figure 6B or intumed bottom panel rim 327 of panel 303 to be inserted into the panel mounting slit 355X of blocking member 351, a cutout portion 323A, 327A has been made in the intumed panel rim. The width Y1 of the cutout portion 323A, 327A is equal or slightly larger than the width W1. So when a panel is mounted, as is shown in figure 7, the lock formation block 353 extends partly within the U-shaped top or bottom panel flange and part of its right outer side 353C can abut with the inner surface of right panel flange 319. A part of the lock formation block 353 which extends along a right side of the rear mounting foot leg 355D and towards the right bracket flange 345, is exposed and not covered by the panel. The purpose of which will be explained in reference to Figure 9.

In Figure 7 on the carrier beam 80 and a vertical distance V1 over the top corner bracket 340 a bottom corner bracket 360 is shown. The bottom corner bracket 360 includes a bottom base 361, a bottom guiding block 362, bottom left and right bracket flanges 363, 365 with mounting slits 367, 369 (not visible), a blocking member insert 351 in the left flange 363 and an auxiliary insert 375 in the right bracket flange 365. The bottom corner bracket 360 is suited for receiving intumed panel bottom rims of two panels adjacent to the panel mounted in the top corner bracket 340 below it. A panel 303 is attached by its top intumed rim 323 to the left flange 343 of the top corner bracket 340. The lock formation block 353 of the top corner bracket 340 is partly visible and partly covered by the panel, as described above. The vertical distance V1 between bottom bracket 360 and top bracket 340 is chosen such the top intumed panel rim 323 can pass between the adjacent top and bottom brackets 340, 360 for installing.

[0032] Figure 8 shows a fifth embodiment where the top or bottom bracket is provided with a vertical abutment member 479, like parts have been given like numbers corresponding to those in figure 6 and 7 greater by 100. The abutment member 479 ensures that bottom bracket 460 has exactly the correct vertical distance V1 to an adjacent top bracket 440 that is below it on the carrier beam 80. Figure 8 shows a panel 403 installed on a top bracket 440, and a still inoperative bottom bracket 460 is temporarily fixed above it on the carrier beam 80 by a pinch 90. The top and bottom brackets 440, 460 each include auxiliary inserts 475 in each of the slits of the left and right flanges. The brackets 440, 460 in this form are intermediate brackets, and will be used for to give wide panels additional intermediate support.

The bottom bracket 460 includes a vertical abutment member 479, which is an extension of the bracket base 461. The abutment member 479 extends beyond a lower rim of the left and right flanges 463, 465 with the mounting slits. In the case of the bottom bracket 460 the abutment surface 479 therefor extends downward, towards the adjacent top bracket 440. Once an adjacent panel is installed above the already installed panel 403, the bottom bracket is covered by the panel, but not the pinch 90. So this adjacent second panel is preferably first hooked over a top intermediate and corner brackets (the top intermediate bracket is located over the bottom bracket 460 on the carrier beam 80, but not visible in figure 8) after which the pinch 90 is removed and the bottom bracket 460 slides down and into engagement with the bottom inturned rim of the second panel. Then bolt 473 is reachable in the horizontal joint which is created between top and bottom rims of the adjacent panels. It can be turned to lock the nut plate to the carrier beam 80.

[0033] Another possible abutment member is shown in figure 9, like parts have been given like numbers corresponding to those in figure 8 greater by 100. Figure 9 shows a top and a bottom corner brackets 540, 560 each including a blocking member insert 551 in the left bracket flanges 543, 565. The blocking member insert 551 which is only partly visible in this figure includes a mounting foot, having a front leg, a rear leg 555B, a mounting slit and a lock formation block 553 having a left wall, front wall and right outer wall 553C. The lock formation block 553 extends along an inner surface both front and rear legs of the mounting foot and towards the right bracket flange 545. So far the blocking member insert the same as the insert 351 of figures 6A and 7. In figure 9 is shown how an abutment member 579 extends vertically upward from the top the lock formation block 555. The abutment member 579 can be like a rectangular block having a flat top. The tops of the adjacent abutment members 579 will touch when the predetermined vertical distance V1 between the two brackets 540, 560 is reached.

[0034] In order to further enhance the installing qualities of the system, the abutment member of the top corner bracket 540 can include a flexible tab 581 that cantilevers forwardly towards the panel 503. Upon installing of the panel the tab 581 will be resiliently pushed inward by the lateral panel rim 521 at the panel cutout 523A position of the panel 503, and once the panel 503 is in place the tab 581 will flex back. The tab 581 provides for a lock against inadvertent lifting of the panel 503. E. g. inadvertent lifting of the panel could occur during installation, when the bottom bracket is not yet locked in place. The tab 581 for the bottom bracket 560 is directed rearwardly, and thus disabled. This provides for the possibility to use the same blocking member inserts 551 for both top and bottom corner brackets. The bottom corner bracket inherently locks the panel against lifting forces.

[0035] It will be clear from the above and from figures

8 and 9 that the fastening bolt 71 for an intermediate bottom bracket (such as 460 in figure 8) will not be reachable through the horizontal joint (such as 31 in Figure 1) unless it has an abutment surface as extension of the bracket base. And it also has to have the bolt being placed through a hole in the abutment surface.

The bolt of top and bottom corner brackets is always reachable, since it is located within the vertical joints 29 (which is shown in figure 1).

So when two panels are mounted to the corner brackets of figures 2-9 the opening between the two parallel left and right bracket flanges makes up the vertical joint 29 as shown in figure 1. Vertical joint 29 is designed to be wide enough to keep the bolt in the bracket base reachable for a locking tool like an inbus-tool in order to lock the nut plate, even after two adjacent panels are installed.

[0036] It is preferred in the inventive system that the vertical distance V1 between the top of the left and right bracket flanges of a the top bracket and the bottom of the left and right bracket flanges of a bottom bracket which makes up the horizontal joint, and the length of the top inturned rim of a panel are chosen such that the top inturned rim of the panel can pass between the top and bottom brackets to be mounted in the top bracket.

[0037] A method for installing the panels in brackets of the invention can be as follows. The top brackets are pre-installed to the carrier beams at predetermined distances vertically apart (depending on the panel size) for correct mounting of the panels. The bottom brackets are pre-installed on the carrier beams, a predetermined distance away from an adjacent top bracket but are not yet locked by the lock nut at their final location along the length of the carrier beam.

[0038] However the bottom brackets will be temporarily kept in place by a short distance upward from their pre-determined final location by a suitable and easily removable blocking member. The thus pre-assembled carrier beam and bracket assemblies will be attached to the to be clad building surface, e.g. a wall. A first top panel will then be attached to the top brackets by hooking the top inturned panel rim into the bracket mounting slits. When the panel hangs from only the top brackets it is already blocked from sliding in horizontal direction. Then the temporary locking members for the bottom brackets will be removed, and the bottom brackets will slide down under their own weight into co-operation with the upwardly directed bottom inturned panel rims. The bottom brackets will then be locked in place by a bolt which locks the nut plate to the bracket and carrier beam. If the bottom bracket does not slide into place by its own weight, a hooking tool can be used to pull it down. The tool can be inserted into the inner channel of the carrier beam from the horizontal joint and hook behind the locking nut of the bottom bracket. Since the bracket is not locked in place it will easily slide down. The locked in place bottom bracket prevents the panel from lifting out of the top bracket. Also the bottom bracket slits pro-

vide enough space for vertical heat expansion of the panel. After the first panel is installed a next panel can be installed. E.g. a panel below the first panel, by hooking the top intumed rim into the slits of the bracket flanges, and subsequently by sliding the bottom bracket in place over the bottom intumed rim. The optional abutment members can be used for ensuring the perfect vertical distance V1 between adjacent top and bottom brackets. And the optional abutment member as part of the bracket base is advisable for intermediate brackets for wide panels.

[0039] This invention is, of course, not limited to the above-described embodiments which may be modified without departing from the scope of the invention or sacrificing all of its advantages. In this regard, the terms in the foregoing description and the following claims, such as "right", "left", "front", "rear", "vertically", "horizontally", "longitudinally", "upper", "lower", "top" and "bottom", have been used only as relative terms to describe the relationships of the various elements of the panel and framework of the paneling system of this invention. For example, the paneling system of this invention is also applicable to the ceilings of buildings and is not limited to their walls.

Claims

1. A facade cladding system including
 - at least one panel (3A-3C) having a panel body (11) with left side flange (17), right side flange (19), top flange (13) and bottom flange (15), the top and bottom flanges include respective top and bottom intumed rims (23,27) extending parallel to the panel body (11), and
 - a substructure (80A-80E) including at least one top support bracket (40) and a least one bottom support bracket (60) for supporting the panel, each of the top and bottom brackets (40,60) including a base plate (41,61) and at least one flange (43,63) projecting perpendicularly from the base plate (41,61), the flange (43,63) including a vertically extending slit (47,67) for receiving in installed condition the respective top or bottom intumed rim (23,27) of a panel (3A-3C), wherein
 - at least one of the top and bottom support brackets (40,60) includes a blocking member (51) adjacent the at least one flange (43,63), which blocking member prevents movement of the panel in at least one of two orthogonal directions.
2. The façade cladding system of claim 1, where the blocking member (51) includes an outer wall (53C) that is parallel to and spaced away from the at least one flange (43) such that when the panel is installed by its intumed top or bottom rim in the slit, the outer wall (53C) abuts an inner surface of an adjacent one of the left or right side flanges of the panel, thus pre-

venting movement of the panel in horizontal direction towards the opposite left or right side flange.

3. The façade cladding system of claim 2, wherein the outer wall surface of the blocking member only starts after the slit and does not extend beyond the end of the at least one flange, such that the outer wall (53C, 153C, 253C) falls completely within the top or bottom u-shaped flange of an installed panel.
4. The façade cladding system of claim 2 wherein the outer wall surface of the blocking member extends parallel to the flange on both sides of the slit, such that the outer wall (353C) extends partially outside top or bottom u-shaped flange of an installed panel.
5. The façade cladding system of claim 2, 3 or 4, wherein the blocking member (51) includes a lock formation (53) shaped as a generally U-shaped profile including a left leg (53A), a bottom leg (53B) and a right leg (53C), the left leg and the right leg extending parallel to the at least one flange, the left leg being attached to the at least one flange after the slit, and the right leg forming the outer wall surface.
6. The façade cladding system of claim 5 wherein the blocking member (51) is integral with the at least one flange (43).
7. The façade cladding system of claim 2, 3 or 4, wherein the blocking member (151) includes a lock formation that is formed as a block (153), which block (153) attached to the at least one flange.
8. The façade cladding system of claim 2, 3 or 4, wherein the blocking member (251, 351, 551) is an insert including a mounting foot (255,355,555) for mounting in the slit and a lock formation in the shape of a block (253) extending from the mounting foot, the block (253) including the outer wall (253C) of the blocking member.
9. The façade cladding system of any one of claims 4-8, wherein the panel for use in such system includes a top and bottom cutout portion in top and bottom intumed rims, said cutout portions allowing the outer wall of the blocking member to extend outside of the top or bottom flanges of the panel.
10. The façade cladding system of any preceding claim, wherein the substructure includes a plurality of parallel vertical support beams (80A-E), and wherein the support brackets (40,60) are slidably engaged along the support beams to be engaged in any desired position.
11. The façade cladding system of any preceding claim,

wherein when the at least one top and bottom brackets are attached to the substructure they define vertical and horizontal joints (29,31), and wherein the top intumed rim (23) of the at least one panel is shaped such that it can pass through the horizontal joints (31) for mounting to the relevant bracket. 5

12. The façade cladding system of claim 11 wherein the top intumed rim of each panel is shorter than the bottom intumed rim. 10
13. The façade cladding system of any preceding claim, wherein an intermediate top or bottom bracket can be provided, the intermediate top or bottom bracket is without blocking member. 15
14. The façade cladding system of any preceding claim, wherein at least one bracket is provided with an abutment member (479), such abutment member ensuring a predetermined vertical distance between vertically adjacent top and bottom brackets. 20
15. The façade cladding system of claim 14, wherein the abutment member (479) is a vertical extension of the bracket base plate 25
16. The façade cladding system of claim 14, wherein the abutment member (579) is a vertical extension from the blocking member. 30
17. The façade cladding system of claim 16, wherein the abutment member (579) includes a lift stop which prevents movements in vertical direction from a panel hung from a top bracket. 35
18. The façade cladding system of claim 17, the lift stop including a tab that extends from the top of the abutment member slanting down and outward. 40
19. The façade cladding system of any preceding claim, wherein the bracket includes a second flange extending from the bracket base, the second flange extending parallel to the at least one flange and the blocking member being between the two flanges. 45

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Fig. 1.

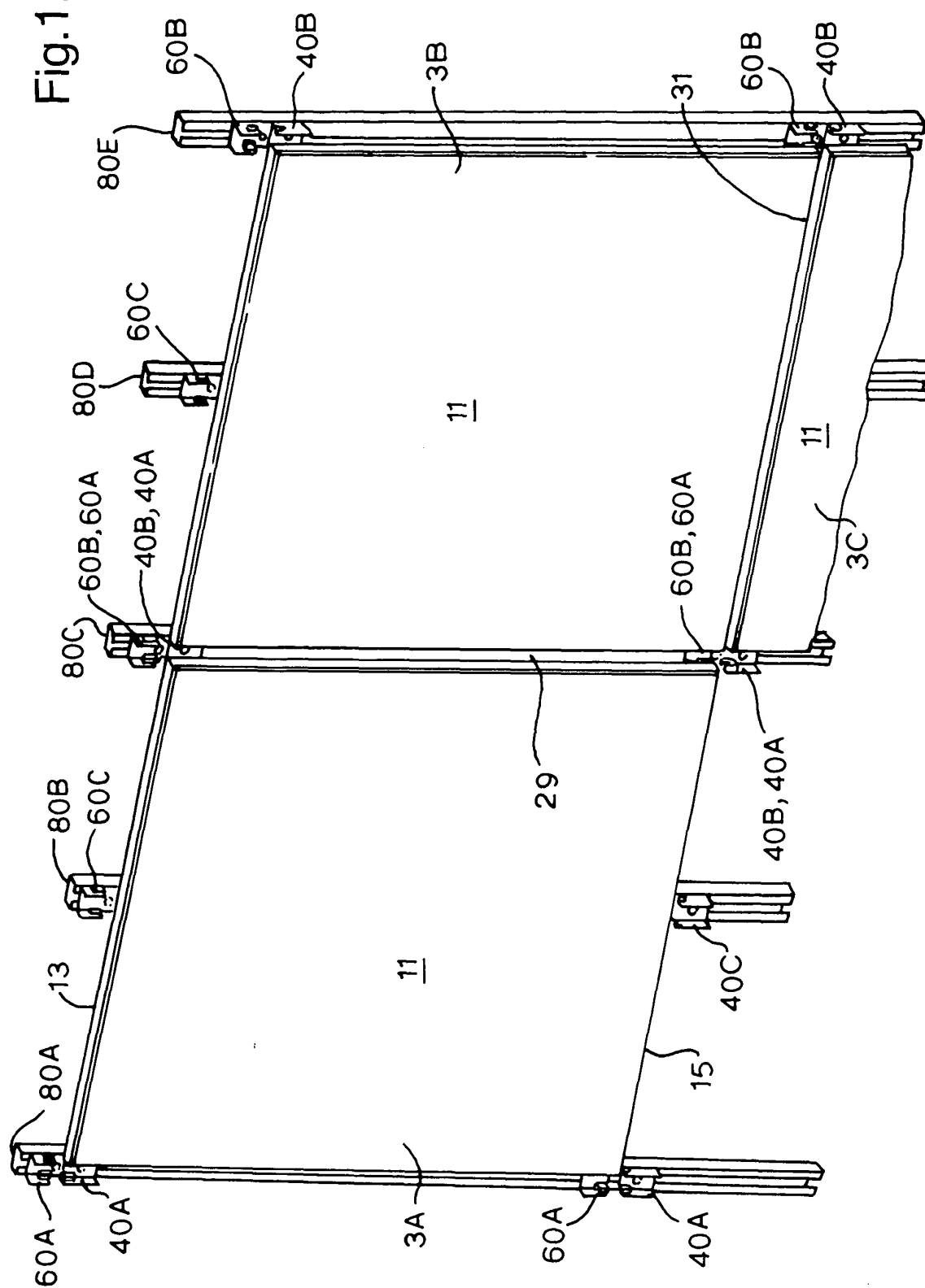


Fig.1A.

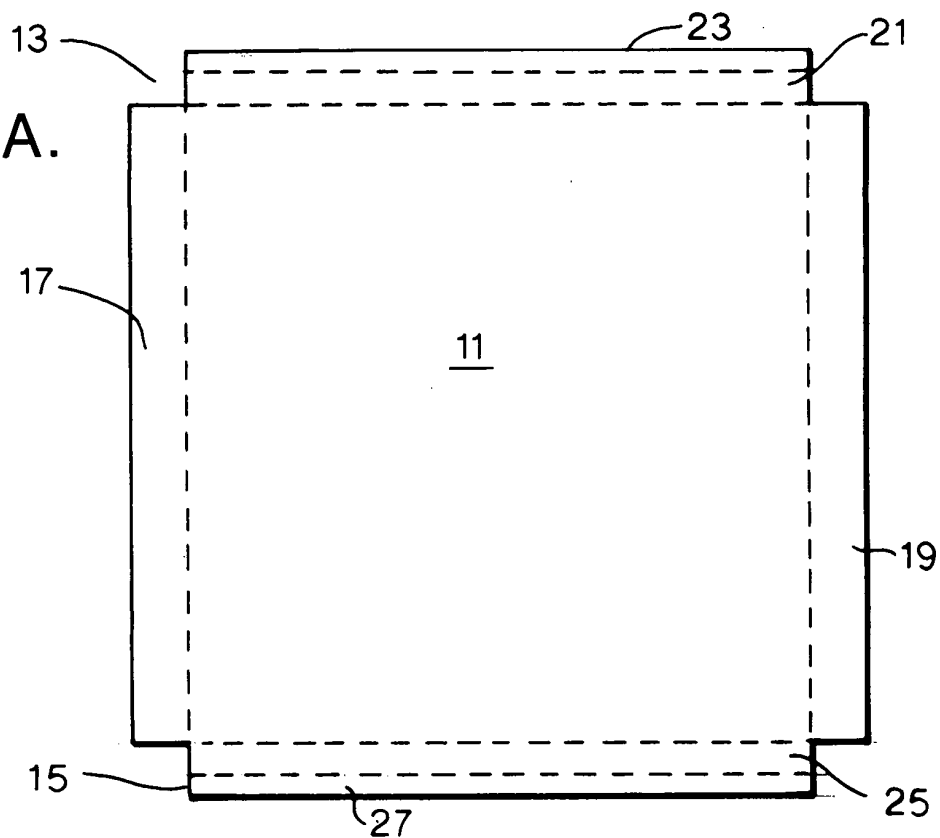


Fig.2.

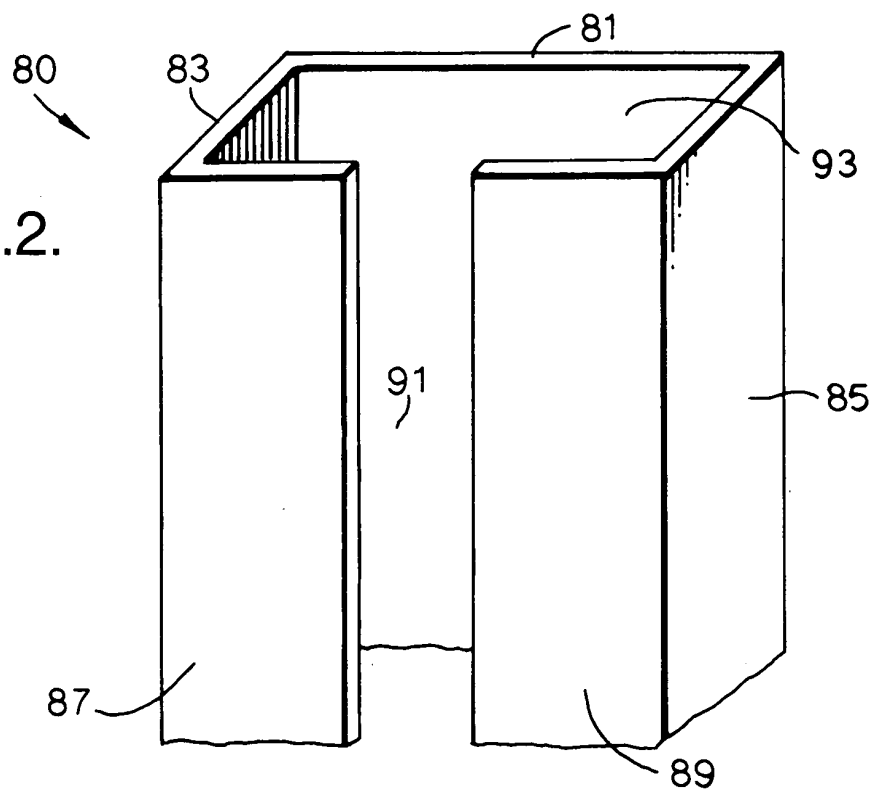


Fig.3.

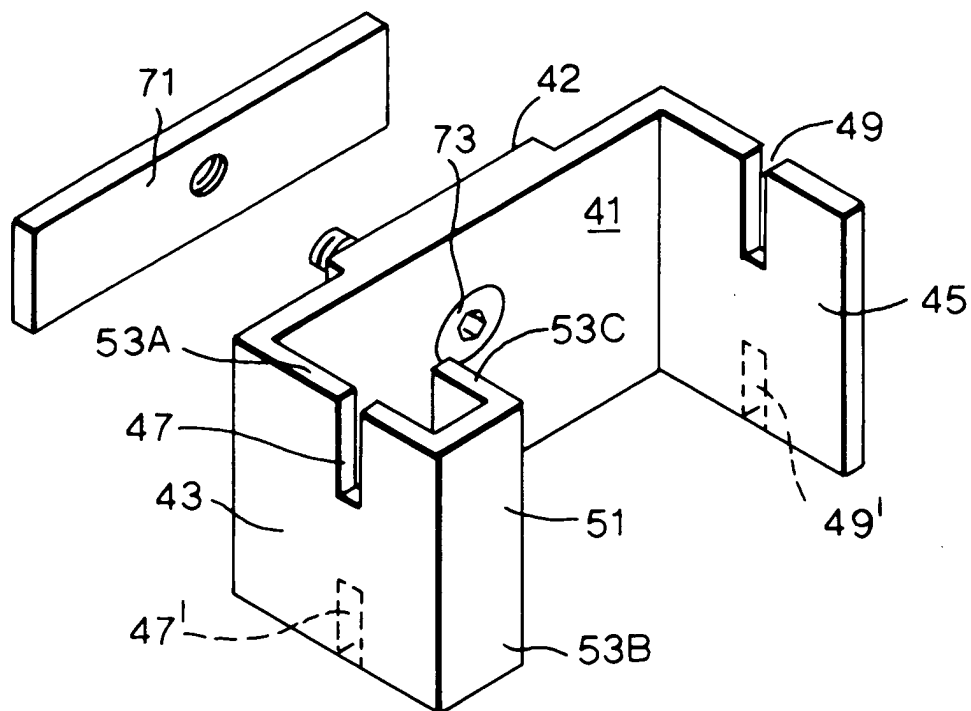
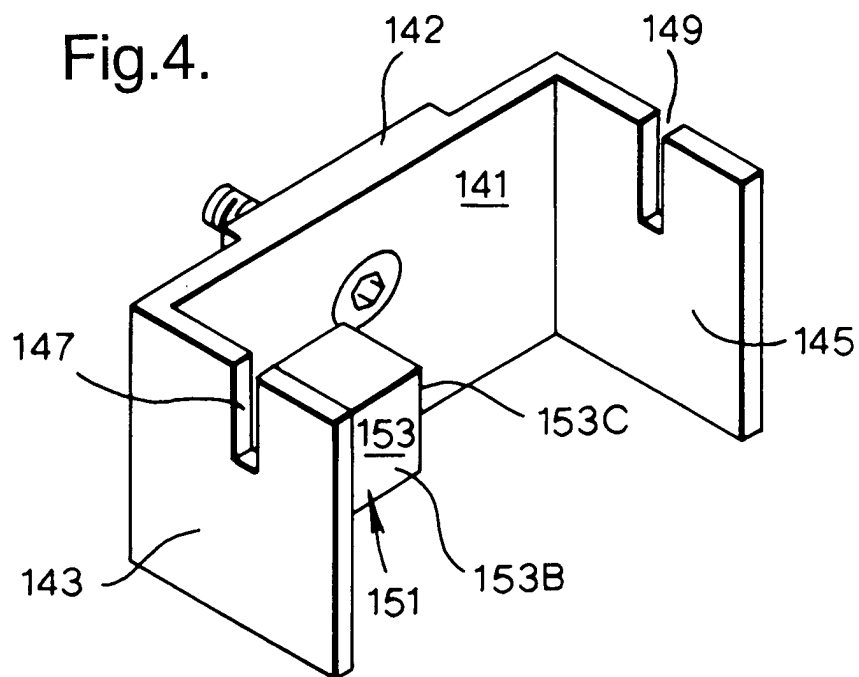


Fig.4.



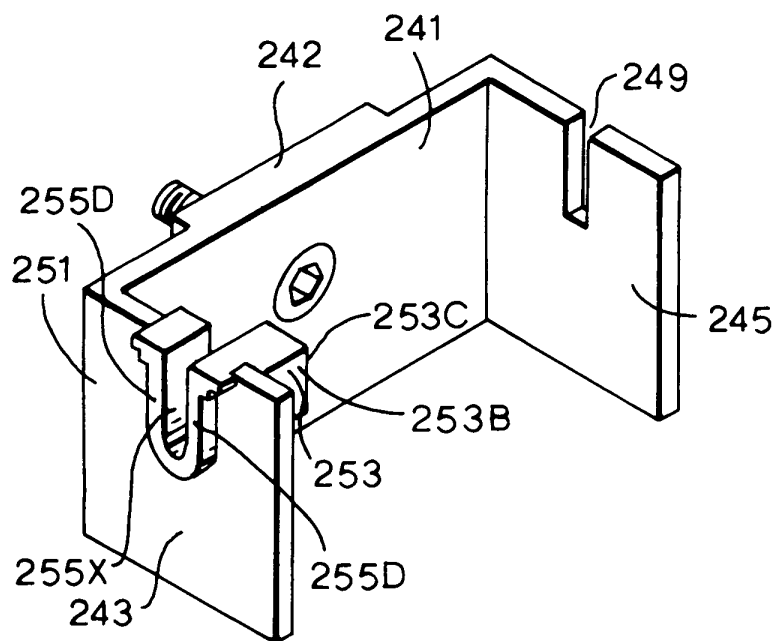


Fig. 5.

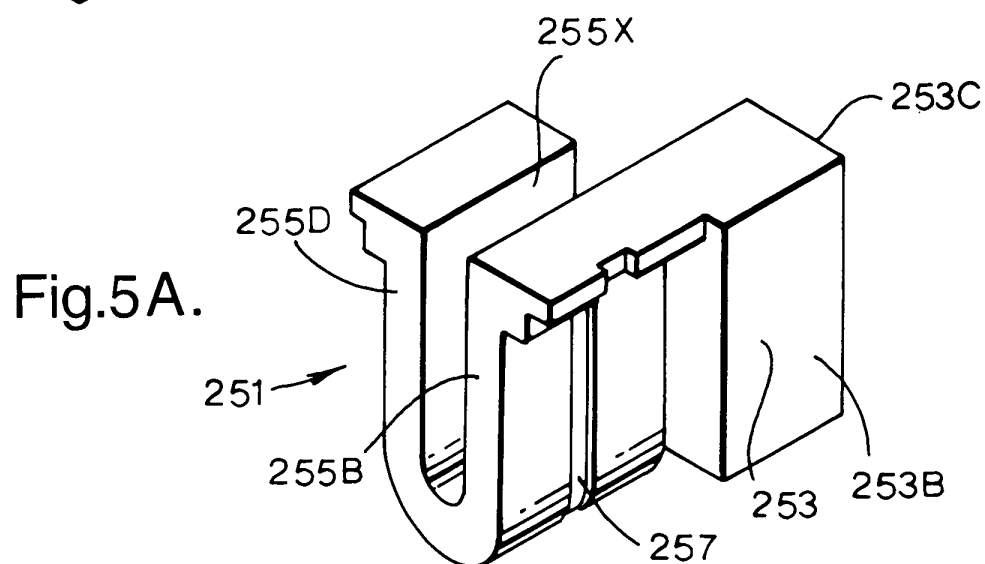


Fig. 5A.

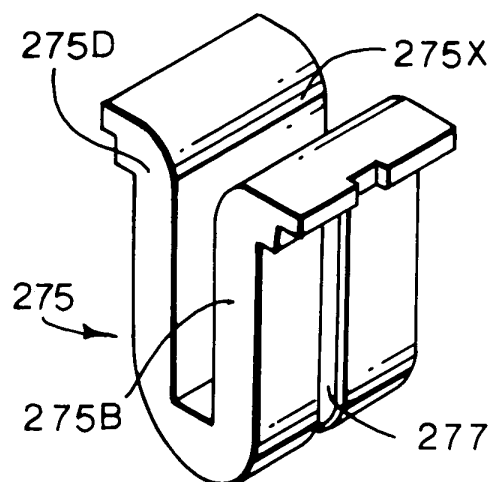


Fig. 5B.

Fig.6 A.

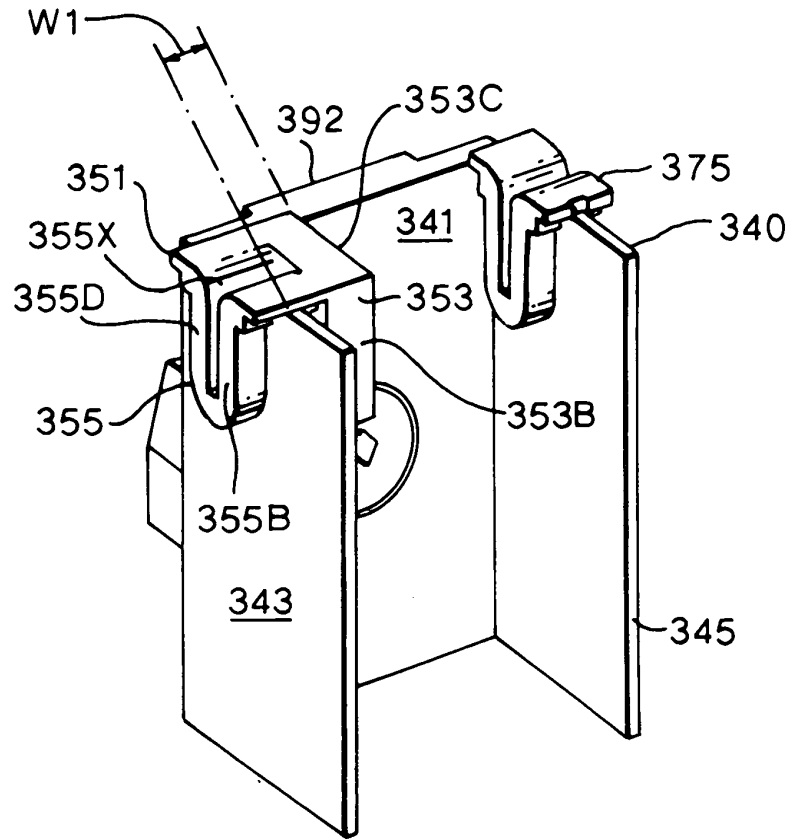


Fig.6 B.

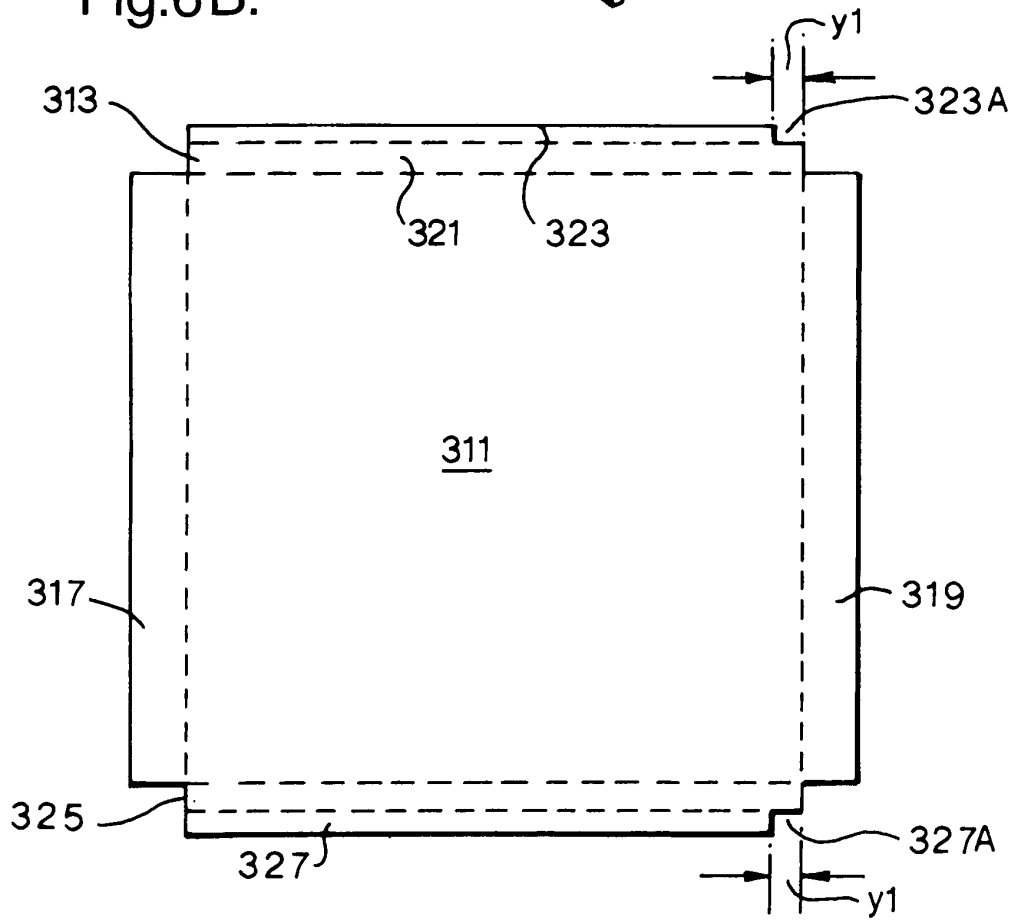
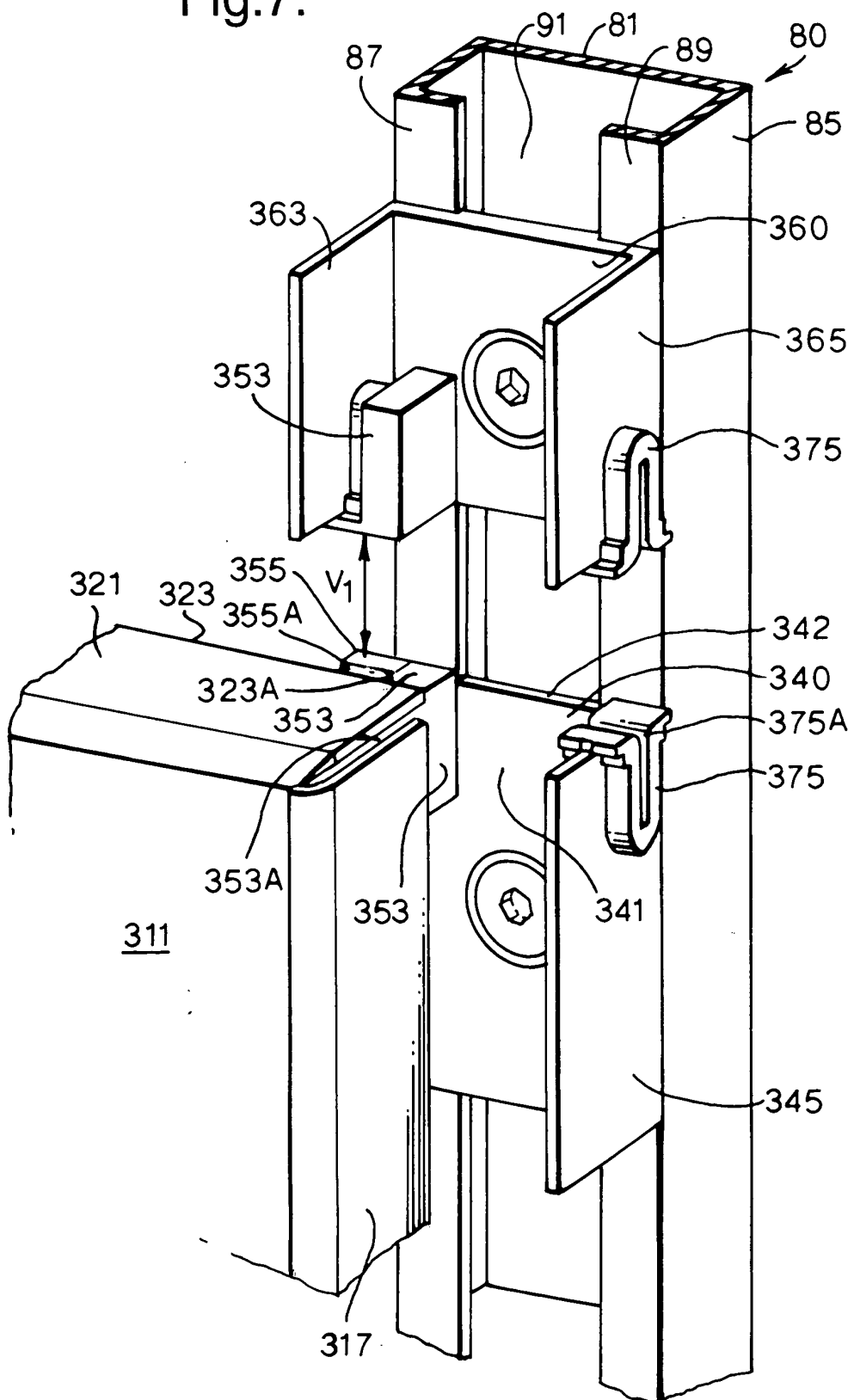


Fig.7.



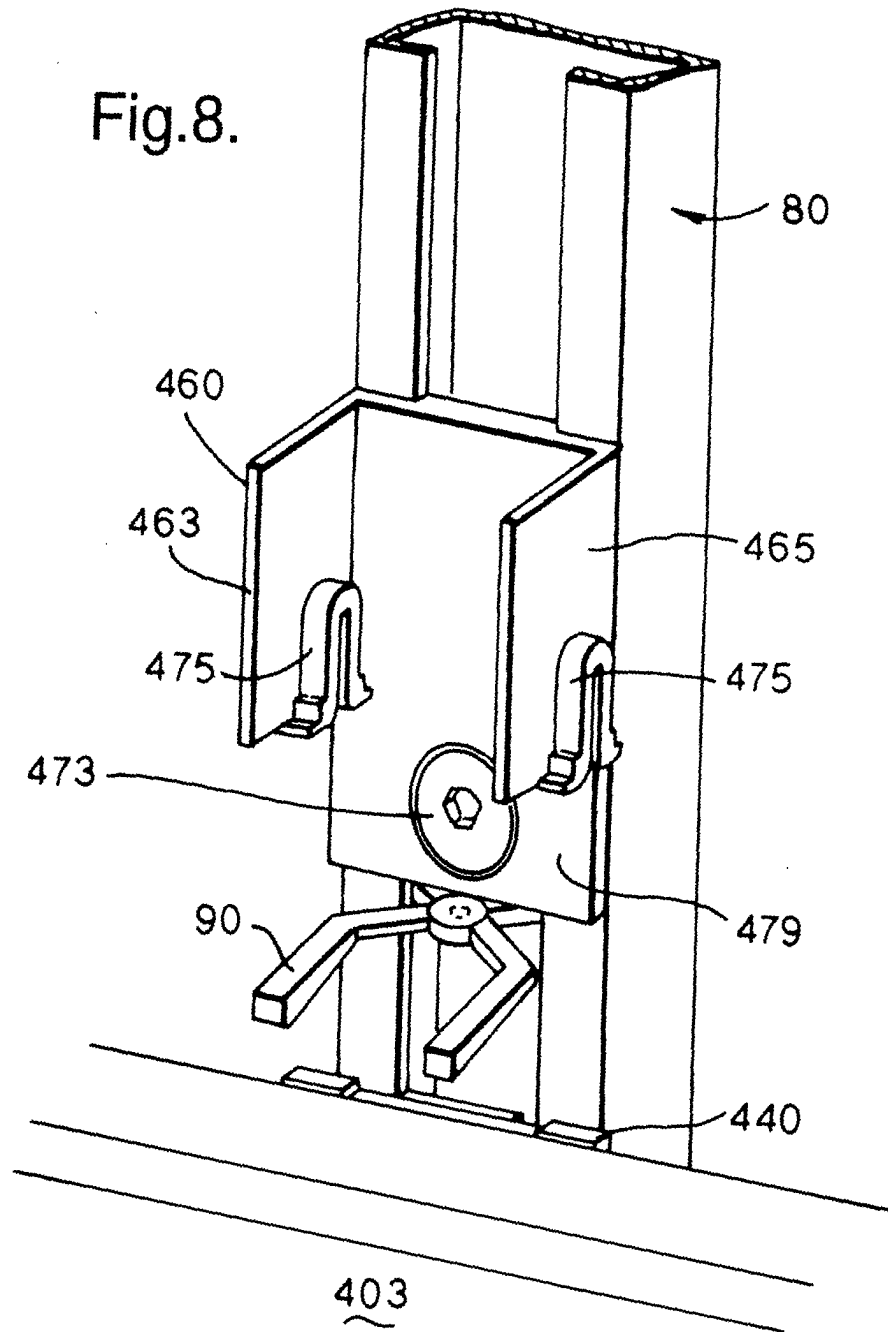


Fig.9.

