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

(11) **EP 2 063 036 A2**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
27.05.2009 Bulletin 2009/22

(51) Int Cl.:
E04B 2/88 *(2006.01)* ***E04B 2/90*** *(2006.01)*

(21) Application number: **08425736.9**

(22) Date of filing: **19.11.2008**

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

(30) Priority: **23.11.2007 IT BS20070047 U**
26.11.2007 IT BS20070048 U

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(54) **Mounting device for glass sheets and panels of facades or ventilation and/or sun screen structures**

(57) This invention concerns an device for laying elements for the formation of glass curtain walling or ventilation and/or sun screen structures for buildings. It comprises a device body with two vertical flanges (16, 116) which are parallel and joined crosswise, provided on one side with means for attaching it to supporting mullions and on the other by anchoring means (27, 122, 123) for the elements to be supported. The anchoring means can be in the form of vertical plates (27) to fix glass sheets or slots or indents to hold panels in a sloping position.

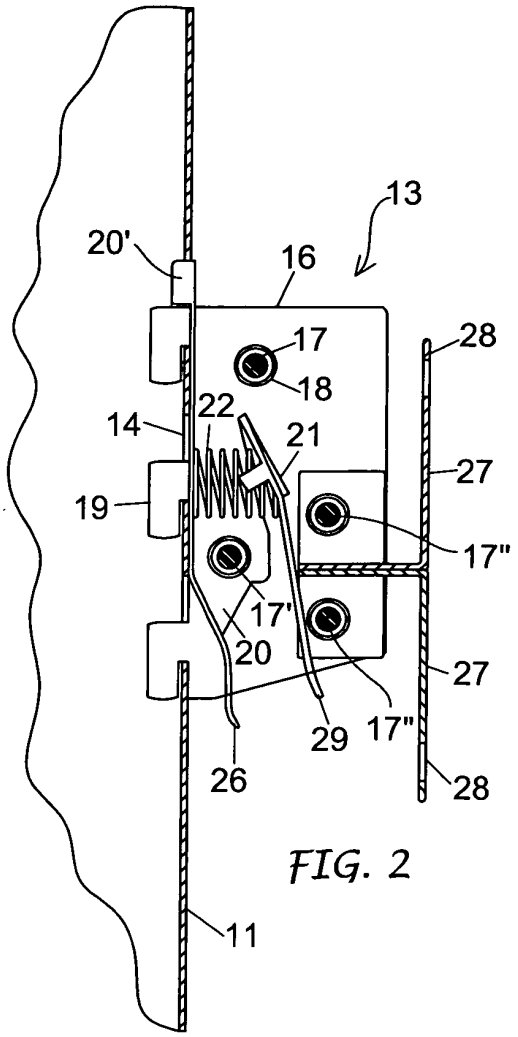

FIG. 2

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Description

[0001] This invention concerns an appliance for mounting glass sheets for curtain walling for buildings, or ventilation and/or sun screen structures for such façades, plus solar or photovoltaic panels.

[0002] On the one hand, various mechanical and non mechanical systems are already known for laying and fixing glass sheets for curtain walling, the same applying for elements, panels or the like designed to allow ventilation and at the same time form a protection against direct solar irradiation of the glass façades of buildings.

[0003] On the other hand, the same applicant has already proposed a type of appliance conceived for connecting and rapid assembly of uprights and transoms of shelving and/or similar structures made of vertical and horizontal elements. Such an appliance was later implemented for use also in assembling solid elements in the form of paving tiles or panels made of different types of material for facing buildings.

[0004] One objective of this invention is to propose a fixing appliance that, connected to some supporting uprights, is able to really simplify and facilitate laying of glass sheets and the like in the formation of curtain walling, guaranteeing the safety and stability of the resulting façade and facilitating disassembly and maintenance where required.

[0005] Another objective of the invention is to propose a supporting appliance able to simplify and facilitate also the laying of elements and panels of various types sloping in regards to the vertical and horizontally and vertically arranged for the formation, in front of the glass façades of buildings, of a barrier with a structure able both to allow ventilation and to create a barrier against direct solar irradiation of the façades themselves.

[0006] A further objective of the invention is to supply an appliance also suitable for assembling solar or photovoltaic modules arranged vertically or sloping on relative supporting structures.

[0007] These objectives and evident advantages that stem from them are achieved in compliance with the invention, with a hook appliance according to the introduction in claim 1, and where the body of the appliance has two vertically parallel and transversely joined flanges, and said flanges are provided with constraining for the elements to support.

[0008] According to a way of construction such constraining means include at least a vertical base plate on which the glass sheets are laid and fixed to form a curtain wall.

[0009] According to another way of constructing said constraining means comprising basically U shaped slots or indents provided in the vertical flanges, spaced in parallel, opening in opposite directions, one towards the top and one towards the bottom, and equally sloping with regards to the vertical, and said slots house and support parts of the opposite horizontal sides of the sloping elements and panels designed to form a ventilation and/or solar irradiation barrier to be laid at the front of glass façades of buildings.

[0010] The invention will however be described in greater detail in the continuation made in reference to the enclosed illustrative and not limitative drawings, in which:

Fig. 1 shows a view in perspective of the appliance for supporting vertical glass sheets:

Fig. 2 shows a vertical section view of the appliance in Fig.1 applied to a supporting mullion;
Fig. 3 shows the front view of a part of the curtain wall constructed using the appliance in Figs. 1 and 2;
Fig. 4 shows a side view in partial section of the façade in Fig. 3;
Fig. 5 shows a view in perspective of the appliance for supporting sloping elements or panels;
Fig. 6 shows a vertical section of the appliance in Fig. 5 applied to a mullion;
Fig. 7 shows a front view of a part of the ventilation and/or solar irradiation barrier constructed using the appliance in Figs. 5 and 6; and
Fig. 8 shows a vertical section view of the barrier in Fig. 7.

The example indicated in Fig. 1- 4 under num.15 shows one of the supporting uprights for laying and fixing the glass sheets 12 for the formation of glass curtain walls with the help of a connecting appliance 13 according to the invention.

[0011] Each mullion 11 can be made of metal with a section of any shape and it is provide on at least one side with a number of pairs of coplanar slots 14.

[0012] Each glass sheet 12, normally quadrilateral, is provided as a precaution with at least a bore 15 near the apex of each one.

[0013] The appliance 13 comprises a body with two parallel vertical flanges 16 joined crosswise between them by pins or screws 17 with interposition of corresponding spacers 18.

[0014] The flanges 16 of said body have, along one of their rear vertical sides, some hooks 19 paired horizontally and provided to be inserted and connected to respective pairs of coplanar slots 14 provided along an mullion 11.

[0015] Between the two flanges 16 of the body of the appliance are assembled a blocking lever 20 and a possible safety lever 21 both placed basically vertical and with a spring 22 placed between them.

[0016] The blocking lever 20 is assembled on one of the intermediate pins 17' between the flanges 16 and is oscillating between an operating blocking position and an inoperative released position. On the upper part, said blocking lever 20 has a pair of pawls 20' that are facing towards the hooks 19 of the flanges and which are co-

planar, and for example, just above the pair of upper hooks 19. Lower, the blocking lever 20 has an engaging and thrust tang 26.

[0017] The possible safety lever 21 can have two lateral fins 24 at the top housed and constrained in apertures 25 provided in the flanges 16 so as to be basically hanging from said flanges and susceptible to oscillating between an active and an inactive position, to respectively stop and release the blocking lever 20. The safety lever 21, moreover, can be prepared to engage with its lateral fins in notches 25' provided in one side of the apertures 25 to stop it in the inactive release position of the release lever 20. Also the safety lever 21 can have an engaging tang 29.

[0018] The spring 22 is positioned so as to act and maintain the blocking lever 20 normally in its blocked position and the safety lever 21, where provided, in its active position.

[0019] In front of the flanges 16 of the body of the appliance is provided an anchoring plate 27, preferably quadrilateral, placed vertically and provided with at least a bore hole 28 each proximal to its apex. The anchoring plate 27 can be one piece or, as shown in the drawings, it can be made up of two opposite elements 27, 27 associated between them, fixed between the flanges 16, for example, by means of a pair of pins 17" and each one having at least a pair of bore holes 28, 28.

[0020] In order to operate, the connecting appliance 13 is attached to the slots 14 of the mullion 11, at the required height. When the hooks 19 are inserted into their respective slots 14 the blocking lever 20 moves into its operating position. The relative stop pawls 20' find space to insert themselves automatically into the same slots 14 in which the upper hooks 19 of the flanges of the appliance (Fig.2) are constricted which hold the upper hooks of the flanges of the appliance (Fig. 2), thus preventing the upwards return movement of the deposit (Fig. 2), thus preventing the return movement upwards towards the appliance 13 making it impossible for it to disengage from the mullion 11. Consequently, the removal of the appliance 13 can only be carried out intentionally by acting on the lower tang 26 of the blocking lever 20 that is to make it move towards the release position, in which the blocking tangs 26 move out of the slots 19.

[0021] Once connected and fixed to the mullion 11, the appliance 13, in plurality with other appliances equally spaced horizontally and in height, assembled in the same way on other mullions 11, it is ready to lay the sheets of glass 12 to construct curtain walls (Figs. 3 and 4).

[0022] The sheets of glass fitting side to side will then be resting against the base plate 27 and fixed to them, perhaps with the interposition of elastomeric material washers, by means of bolts 30 inserted in coincident bores 15, 28, present, respectively, at the tops of the base plates and each glass sheet.

[0023] Also the body of the connecting appliance 113 in Figs. 5-8 comprises; two parallel vertical flanges 116 joined crosswise by means of pins or screws 117 with interposition of corresponding spacers 118; at least two hooks 119 along one of their rear vertical sides, paired horizontally and designed to be inserted and connected in respective pairs of coplanar slots 114 provided along a mullion 1, plus a blocking lever 120, with stopping tangs 120' and a possible safety lever, not shown.

[0024] In this case, each flange 116 of the body of the appliance is equipped with at least two slots or indents 122, 123 basically U shaped, separated in parallel and equally sloped with regard to the vertical. One slot or indent 122 is near the rear side provided with hooks 119, the other slot or indent 123 is near the front side of the flange.

[0025] Said slots and indents are open in opposite directions, the first downwards and the second upwards.

[0026] To operate, the connecting appliance 113 is connected to the slots 114 of the mullion 11, at the height required. When the hooks 119 are inserted in the respective slots 114, the blocking lever 120 and relative stopping tangs 120' move into the operating position -Fig. 6.

[0027] So, the appliance 113, in plurality with other similar appliances spaced horizontally and in height, assembled in the same way on other mullions, is ready to apply elements 112 in the form of sheets or panels placed in order horizontally and in height to form a ventilation and/or solar irradiation. The above mentioned elements 112 are supported and fixed by means of elastomeric material seals 124 inserted in the slots or indents 122, 123 of the body of the appliance 13.

[0028] Practically, every barrier element 112 is assembled and sloping between at least one slot or indent 123 open upwards towards the top of the body of at least a first appliance 113 on the lower level and at least one slot or indent 22 open towards the lower part of the body of at least a second appliance 113, spaced in height above the first appliance 13 as shown in Fig. 8.

[0029] Therefore the elements forming the required barrier are all sloping correspondingly with regards to the vertical forming between them openings 25 for the circulation of air and therefore the ventilation of the rear façade.

[0030] It should be pointed out that both of the appliances described can also be adapted and used to install other types of flat elements, such as modular sun or photovoltaic modules in sloping or vertically positions.

Claims

1. Device for supporting plate elements (12, 112), such as glass sheets, panels, solar or photovoltaic modules, on supporting mullions (11, 111) for building façades, where each mullion has at least one side provided with pairs of slots (14, 114) positioned in height and the appliance comprises an appliance body having a series of paired hooks (19, 119) provided to engage with the pairs of slots of a mullion and at least some blocking means interacting with

said mullion to prevent the hooks from disengaging from said slots, **characterized in that** the device body (13) has two vertical flanges (16, 116) parallel and joined crosswise to each other, and **in that** said flanges are provided with anchoring means (27, 122, 123) for supporting elements in a vertical or sloping position.

2. Device according to claim 1, **characterized in that** said anchoring means comprise a base plate (27) provided with bore holes (28) matching with the bore holes (15) which are provided with means for anchoring and blocking said elements to said plate.

3. Device according to claim 1 or 2**, characterized in that** the hooks (19) designed to engage in the slots (14) of said mullion (11) are positioned along one vertical side of each of said flanges (16), and said base plate (27) is at the end of said flanges (16) opposite the vertical sides provided with hooks..

4. Device according to claim 3, **characterized in that** said base plate (27) is one piece, inserted and fixed in front of the vertical flanges (16) of the device body.

5. Device according to claim 3, **characterized in that** said base plate (27) is made up of two facing elements, associated and anchored in front of the vertical flanges (16) of the device body.

6. Device according to claim 1, **characterized in that** the two flanges (116) of the device body (113) have basically U shaped slots or indents (22, 23) spaced in parallel, open in opposite directions, either towards the top or bottom, and equally sloping with regards to the vertical, and **in that** said slots or indents (122, 123) position and hold the devices (113) spaced in height along the mullions (11).

7. Device according to claim 6, **characterized in that** each plane element to be supported (112) is supported between at least one slot or indent (122, 123) open in the direction of the body of at least a first device (113) and **in that** at least one slot or indent (123, 122) open in the opposite direction of the body of at least a second device (113) spaced in height with regard to the first device (113).

8. Device according to claim 6 or 7, **characterized in that** each plane element to be supported (112) is inserted with one of its sides in the slots or indents (122, 123) of the body of each device (113) with the interposition of elastomeric material seals (124).

9. Device according to any one of the previous claims, wherein said blocking means include a blocking lever (20, 120) assembled oscillating on a pin extending between the flanges of the device body and with a pair of stop tangs (20', 120')) provided to engage with the slots of the mullion housed in said pair of hooks so as to prevent the latter from being released.

10. Device according to any one of the previous claims, wherein a possible safety lever may be provided positioned between said flanges of the device body and oscillating, between an active stop position and an idle release position of the blocking lever.

11. Device according to claims 8 and 9, in which the blocking lever and safety lever are stressed by the same spring positioned between them.

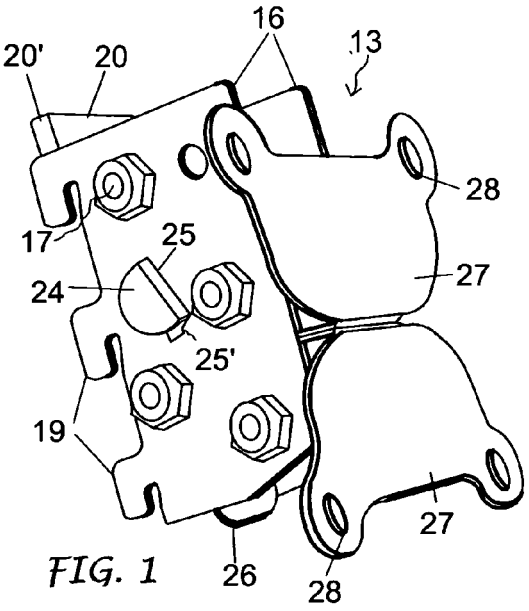
16
13
20'
20
28
17
25
27
24
25'
19
27
26
28

FIG. 1

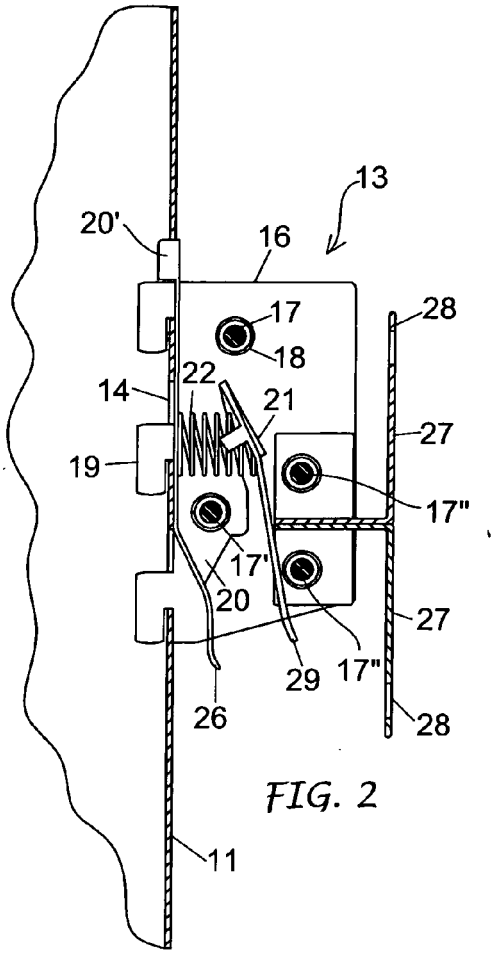
13
20'
16
17
28
18
22
14
21
27
19
17"
17'
20
27
29
17"
26
28
11

FIG. 2

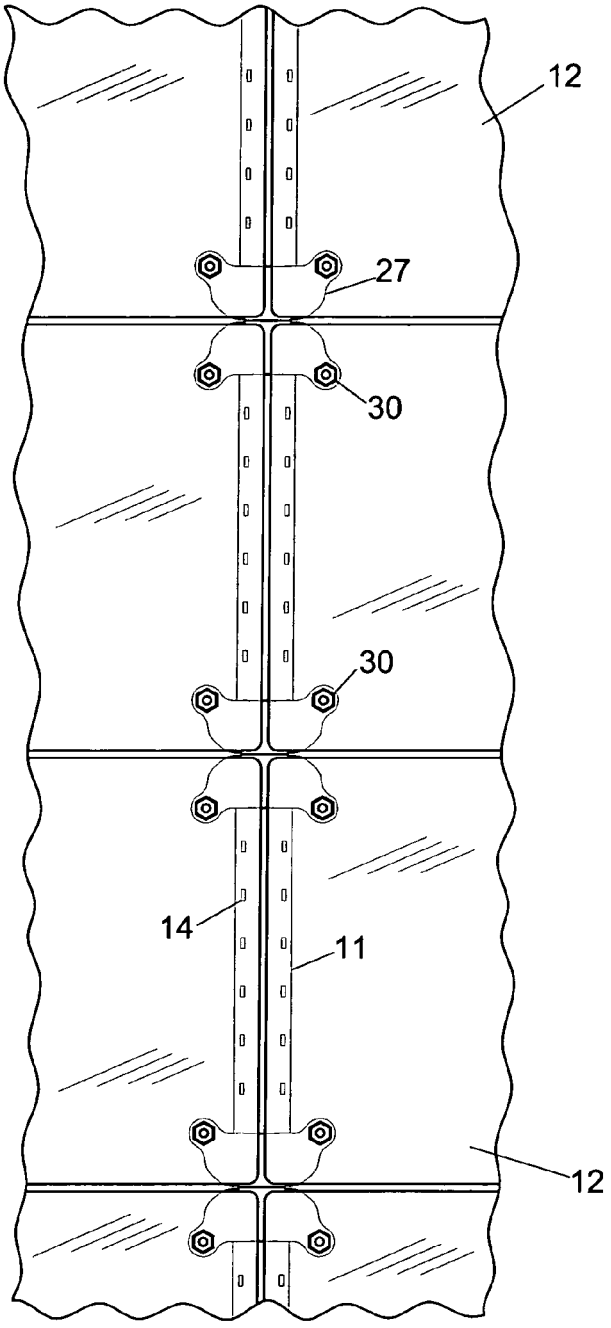

FIG. 3

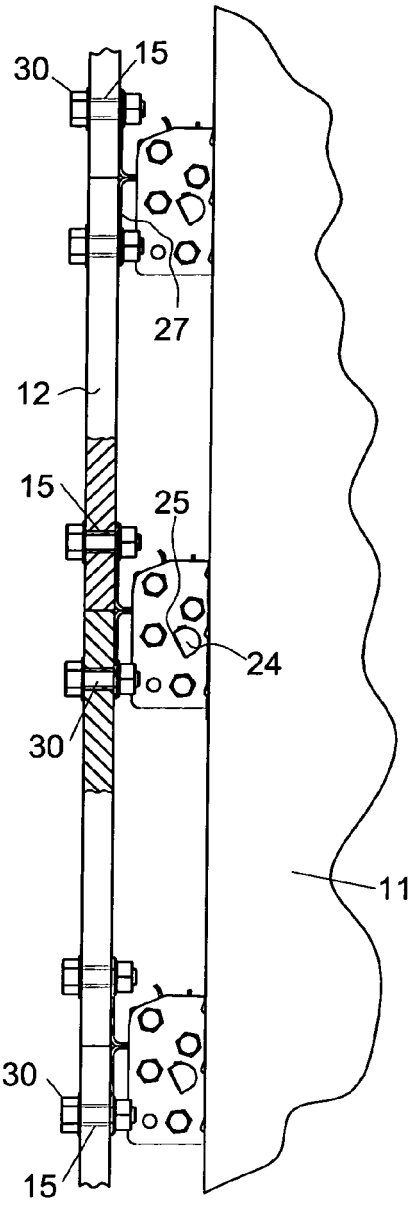

FIG. 4

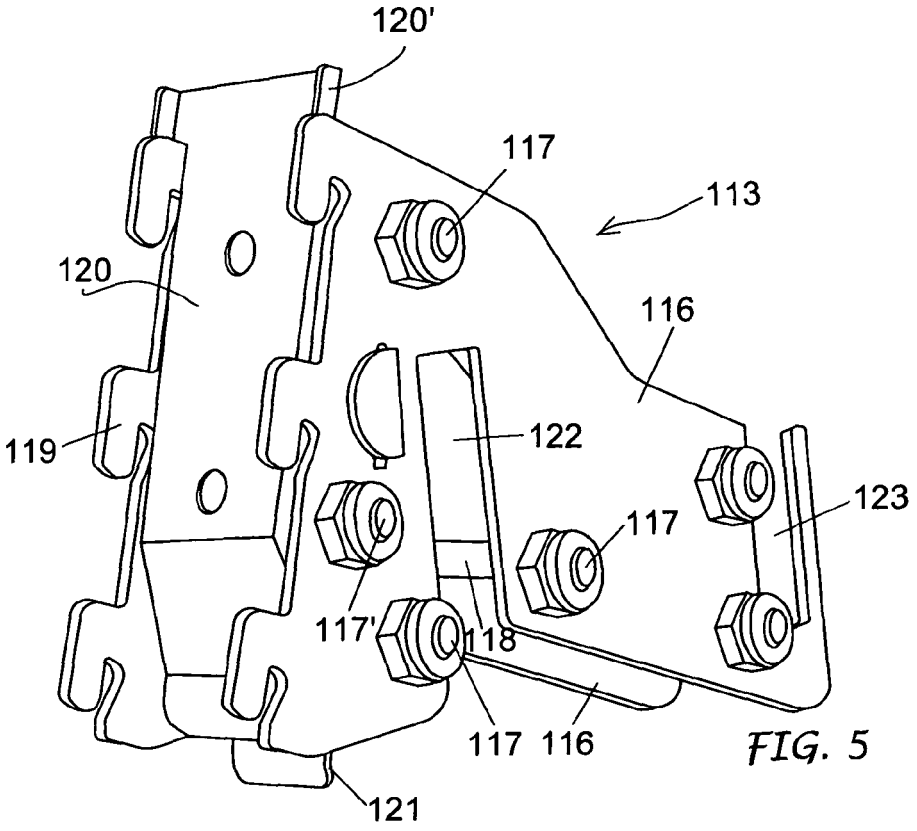
120'
117
113
120
116
119
122
123
117
117'
118
117
116
121

FIG. 5

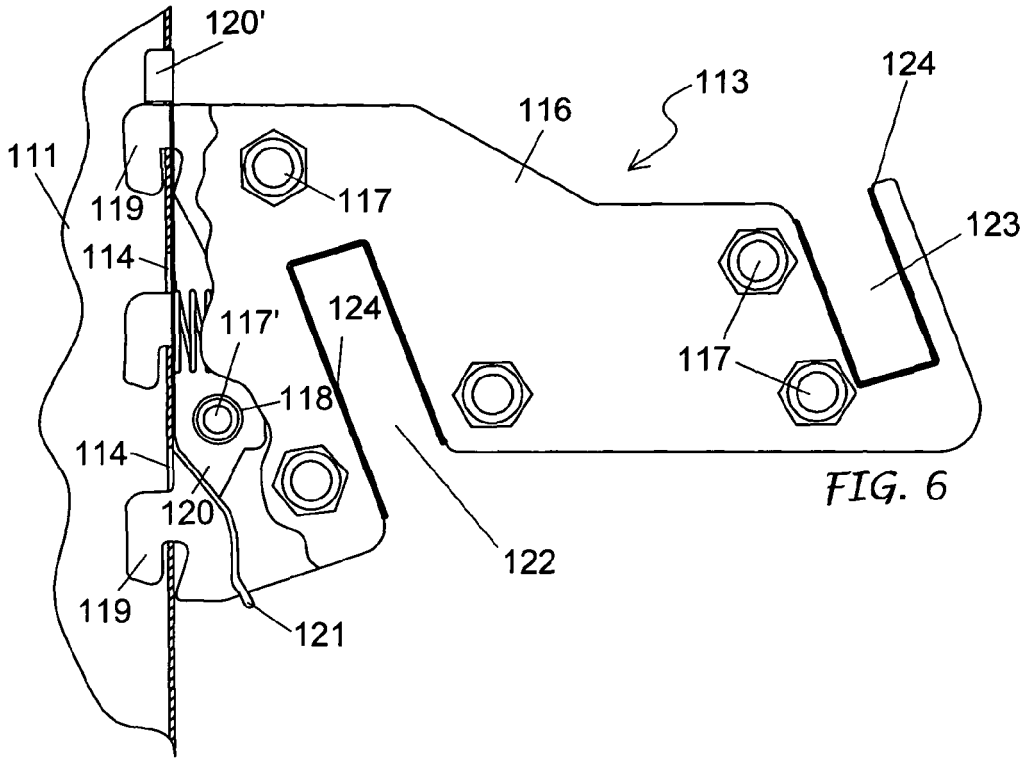
120'
124
113
116
111
119
117
123
114
124
117'
117
118
114
120
122
119
121

FIG. 6

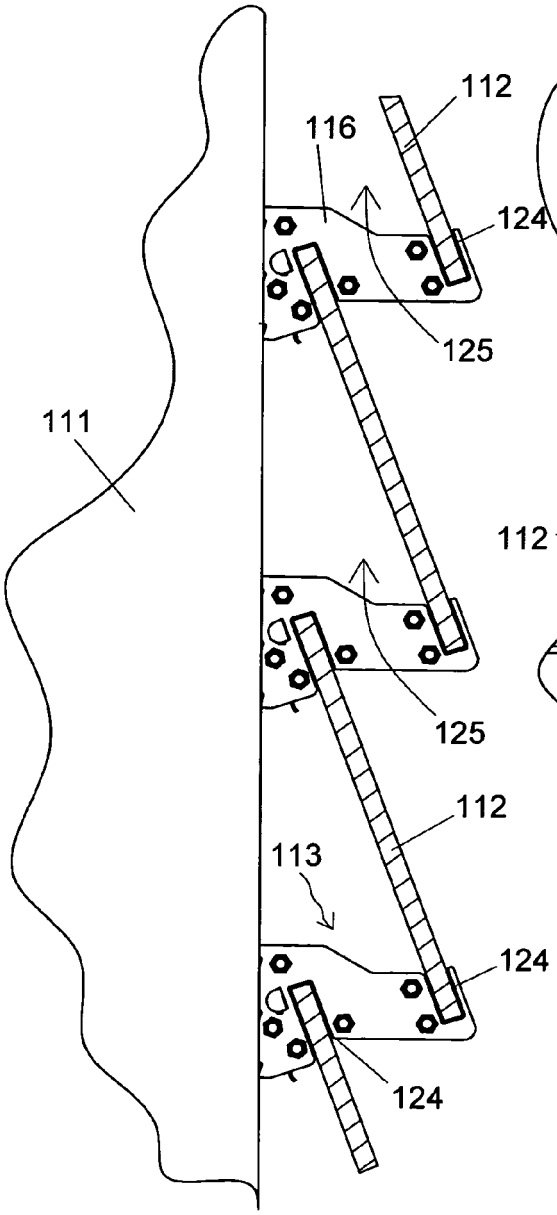

FIG. 8

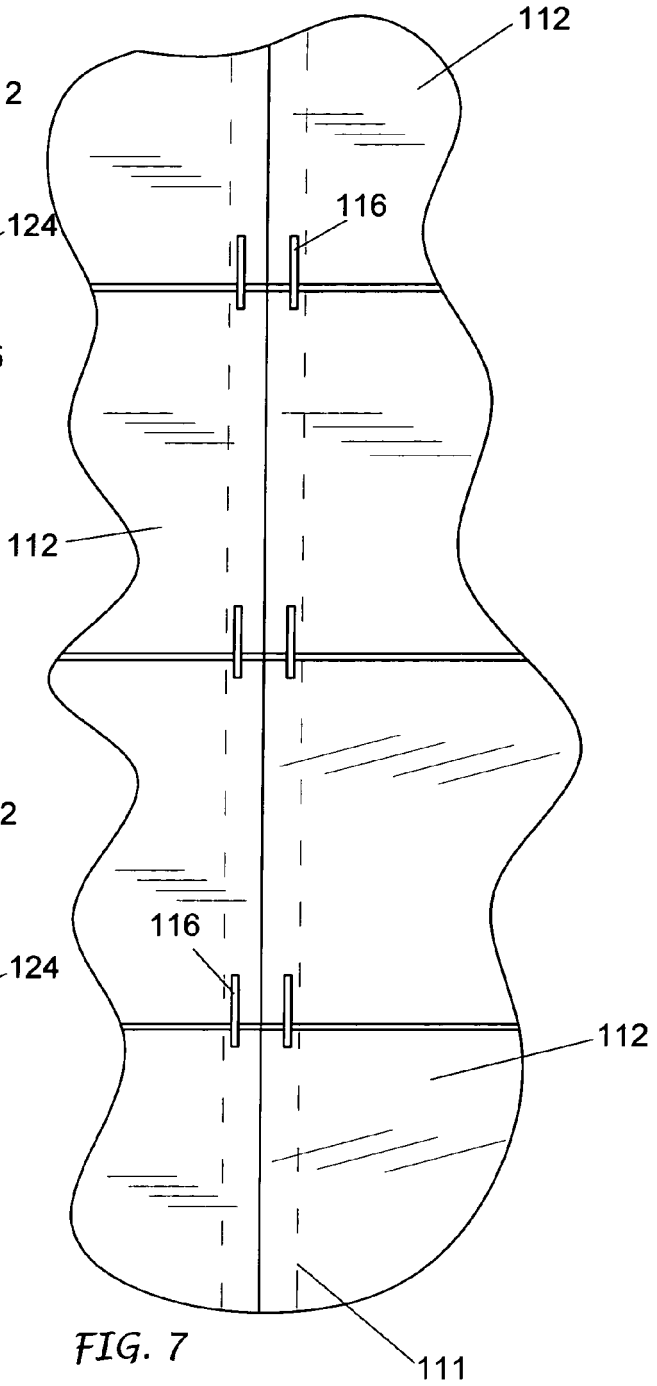

FIG. 7