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(54) **Frame element for wings, frame, related wing and manufacturing process**

(57) The present invention relates to an improved frame element (10) for wings, in particular for accordion doors wings. The frame element (10) is shaped so as to comprise a first recess (A) arranged to contain devices as hinges arranged to move the wings, a second recess (B) arranged to contain fastening elements, and an intermediate area (C) interposed between the two recesses and arranged to contain supporting elements for fastening devices and elements. The frame element allows to obtain particularly strong frames and in any case panellable alternatively by means of prefabricated panels, by pressing, or by means of rolled sections covers. The invention relates also to the frame, to the wing obtainable with the frame and to the method for realising the wing.

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Description

Technical Field

[0001] The present invention relates, in general, to a frame element for wings, to the frame that use such elements and to the wing that can be realised by means of such a frame. In particular, the present invention relates to frames for wings to be used in folding accordion doors of great dimensions to be installed in industrial buildings.

Background Art

[0002] Folding accordion doors and frames are known in the art, typically made of metal, that allow to realise the several wings that constitute folding doors.

[0003] It is also known that each type of wing is obtained by associating to a certain frame a certain panelling. For instance, according to current state of the art, association of panels to the frame is made at least in three different modes and, for each of such modes, typically it is provided that the frame has frame elements (components) having each a different shape.

[0004] A first example of wing manufacturing mode provides, for instance, use of prefabricated panels of predefined cross-section and suitably shaped to be applied to a frame having frame elements shaped in a predefined mode. In such an embodiment, the frame elements or components 100 (Fig. 1), viewed in cross-section, comprise a base 110 dovetail shaped so as to accommodate, for instance, lateral fastening elements or hinges, first side faces 112, arranged to define the external profile of the frame and second side faces 115, joined to the first ones through sloped parts 114.

Second side faces 115, parallel each other are separated in a predefined mode, so as to contain a prefabricated panel 118 of predefined cross-section.

[0005] Another example of wing manufacturing mode provides, for instance, that a solidifiable plastic material 218, for instance polyurethane, is inserted in a complete frame having four components 200 (exemplified in Fig. 2 by means of a median cross-section of the frame) shaped in a second predefined mode, so as to obtain by means of a single operation a wing of predefined dimensions.

In such a type of embodiment use of a press 210, suitably shaped with two press elements 210a and 210b, arranged to contain the components 200 of the frame and the plastic material 218, and a device 215 arranged to inject the plastic material between the surfaces of the press 210 are provided.

[0006] A further example of wing manufacturing mode provides, for instance, to apply to a frame, having corresponding components shaped in a third mode, laminate sheets arranged to cover the frame.

[0007] A first problem, common to the background art, is that the known frame elements have configurations that typically do not introduce high solidity characteristics and such to grant an optimal and long-lasting in time behaviour.

In particular, the frames made with known frame elements introduce a typical weakness in the right angle joints between the several frame elements.

[0008] A further problem common to the known solutions is that each wings panelling embodiment requires frame elements having shapes each other diversified.

A first consequence to such a problem is that the company or firm that constructs frame elements for wings must have a catalogue of frame elements for wings diversified as a function of the type of wings demanded by customers.

Disclosure of the Invention

[0009] The Applicant, in conclusion, has noticed that the requirement exists to have available frame elements for wings and respective frames simple, particularly solid, less expensive and usable in the several possible panelling manufacturing modes.

[0010] Object of the present invention is, therefore, to overcome the problems outlined above of the background art in manufacturing panelled wings to be used, in particular, for large-sized folding doors.

[0011] The object is achieved by means of the frame element for wings as claimed.

[0012] The present invention relates also to a frame for wings that uses frame elements according to the invention, to the wing that uses the frame according to the invention and to the related method.

[0013] Claims are an integral part of the teaching of the present invention.

[0014] According to a preferred embodiment the frame element has a cross-section that comprises at least a first recess arranged to contain, for instance, hinges for moving the wing, at least a second recess, opposed to the first recess and arranged to contain fastening devices of the wing, for instance to a column, and an intermediate space between the two recesses arranged to contain elements or devices arranged to reinforce the anchorage.

[0015] According to a further feature of the present invention, the profile of the frame elements is shaped so as frames may be panelled in the several modes provided in the art without the necessity of any adaptation.

Brief Description of Drawings

[0016] These and further features and advantages of the present invention will appear more clearly from the following detailed description of preferred embodiments, provided by way of non-limiting examples with reference to the attached drawings, in which components designated by same or similar reference numerals indicate components having same or similar functionality and construction and wherein:

Fig. 1 shows a frame element for accordion door and a first panelling method according to the background art;
Fig. 2 shows a second panelling method according to the background art;
Fig. 3a shows a perspective view of frame elements according to the invention;
Fig. 3b shows a cross-section view of a frame element according to the invention;
Fig. 4 shows a first embodiment of a wing realised by using the frame elements according to the invention;
Fig. 5 shows a second embodiment of a wing realised by using the frame elements according to the invention;
Fig. 6 shows a third embodiment of a wing realised by using the frame elements according to the invention.

Best mode for Carrying Out the Invention

[0017] With reference to Fig. 3a a frame, for instance for folding doors, comprises, in the preferred embodiment of the present invention, four frame elements (components) 10, each having, for instance, the same shape and cross-section, and a length definable at will.
In particular, each frame element (component) 10, for instance realised in a known way by means of a rolled metal section, is shaped, in the preferred embodiment, so as to comprise a dovetail surface (dovetail) 12 (Fig. 3a, Fig. 3b), one pair of specular surfaces at "L" (L external surfaces), respectively 14a and 14b, joined to the sides of dovetail 12 and a further pair of specular surfaces at "L" (L inner surfaces), respectively 15a and 15b, folded, as it will be disclosed later on in detail, inside to the respective L external surfaces, 14a and 14b.
Dovetail 12, preferably, has a face 22, in particular the central face of the dovetail, substantially parallel to respective pairs of faces 23a, 23b and 26a, 26b pertaining, respectively, to L surfaces 14a, 14b, 15a and 15b; moreover, preferably, the face 22 is substantially orthogonal to respective pairs of faces 24a, 24b and 25a, 25b pertaining, respectively, to L surfaces 14a, 14b, 15a and 15b of component 10.
The shape of the cross-section of component 10 is preferably symmetrical relative to a median plane orthogonal to the dovetail 12; faces 25a 25b of the surfaces 15a and 15b, preferably, are folded internally to the faces 24a and 24b, and have both equal length and lower than the length of the faces 24a and 24b and are arranged to determine a predetermined distance "D2" between such faces 25a and 25b, for instance a distance apt to accommodate a prefabricated panel of predetermined width.
Faces 26a and 26b of surfaces 15a and 15b have too, a length, preferably each other identical; the above length is such to leave a gap "D1" of predetermined width between the ends of the faces 26a and 26b, for instance a width apt to grant a threaded rod of a bolt to pass therebetween.

[0018] In summary, the cross-section of component 10 is shaped so that the dovetail surface 12 realises a first recess "A", that represents or determines a first side of component 10, and that is apt to contain, in a known way, devices like hinges arranged to grant wings movement. The surface defined by the "L" specular surfaces respectively 15a and 15b and opposed to the dovetail surface, represents or determines a second recess "B" apt to contain, for instance, fastening elements, as it will be disclosed later on in detail.
The first and second recess, respectively "A" and "B" are separated by a free area or space "C" having a predetermined thickness "D3" apt to allow to insert, for instance, elements as counterplates arranged to strengthen anchorage of locking mechanical elements, as fastening angle bars or plates for columns.
Advantageously, the inner faces 25a and 25b, being substantially in contact with the respective external faces 24a and 24b determine two lateral surfaces having substantially a single surface usable, as it will be disclosed later on in detail, for executing panelling of wings in different modes, still being identical the component 10.

[0019] Components 10 are arranged to realise, in the preferred embodiment, a rectangular frame for an accordion door, by connecting each other the same components and taking advantage, for instance, of the presence of the second recess "B" as disclosed.
In particular, the end of a first component 10 can be, for instance, joined to the end of a second component 10, identical to the first one, by placing an angular module (angle bar) 31, of known type, having a width "DM" greater than the D1 gap, on the faces 26a and 26b of the two components 10, and by placing respective counterplates 33, 33', of known type, having width "DC" greater than the D1 gap, in the free area having predetermined thickness D3.
Still more in particular, preferably, the angle bar 31 comprises, for instance, a pair of threaded holes by side and the counterplates, 33 and 33', and, in an equivalent way, faces 22 of two components 10, equivalent each other, comprise through holes in corresponding positions so as to allow fastening the angle bars by means of threaded bolts and the consequent locking of the two components 10 in orthogonal position.
Obviously, in further connection configurations, fastening of two components 10 can be also realised in other ways, for instance by modifying the number or direction of the locking bolts, or in equivalent modes, for instance by welding the ends of the two components at 45° without for this departing from the scope of the invention as disclosed.

[0020] On the basis of the above disclosure it is therefore possible to realise rectangular shaped frames preferably usable for constructing wings 30 (Fig. 7), for instance doors wings, in particular wings of industrial type accordion doors.

[0021] For instance, the rectangular shaped frame can

be used for making panelled wings 30 by means of prefabricated panels 40 (Fig. 4, Fig. 7).

In particular, for obtaining a wing by means of prefabricated panels 40 having, for instance, width equal to the distance "D2" between the inner faces 25a and 25b, it is sufficient, for instance, to provide three components 10 of the frame interconnected in one of the described modes so as to define a structure in which, by inserting the prefabricated panel 40 and by subsequently fastening the fourth component 10, it is possible to realise the intended wing having a prefabricated panel 40.

Further more in particular, it is also possible to provide in the panel 40 a central flaring arranged to accommodate, for instance, angle bars 31.

[0022] As easily comprehensible to a technician in the field, panel 40, in this manufacturing mode rests on the second recess "B" and therefore it does not interfere with the first recess "A" so as to allow use of the first recess "A" and of the free area having predetermined thickness "D3" for fastening the angle bars by means of counterplates 33 and 33'.

[0023] The rectangular shaped frame can also be used for realising panelled wings by means of solidifiable plastic material (solidifiable material) 50 (Fig. 5), as for instance expanded polyurethane.

In this embodiment, it is sufficient to realise a complete frame having four components 10 interconnected each other and to insert the frame, in a known way, in a press of the type represented in Fig. 2.

Such an embodiment is feasible because the external faces, 24a and 24b (Fig. 2, Fig. 3a, Fig. 3b) respectively, are apt to adhere to the surfaces 210a and 210b of the press 210, and the second recess "B" comprising a void gap "D1" allows the plastic material to enter in the free area of predetermined thickness "D3" so as to guarantee a good seal to the solidified plastic material.

In particular, as easily comprehensible to a technician in the field, according to this embodiment an injection hole is provided in at least one of the components 10 on at least one surface, for instance on the dovetail surface 12; such an injection hole is apt to allow to a device 215, of known type, to inject the plastic material 50 between the surfaces 210a and 210b of the press 210 and in the frame.

Also in such an exemplary embodiment the injected plastic material 50 does not interfere with the first recess "A" so as to allow use of the recess "A" for fastening, for instance, in a known way, the necessary hinges required for mutually moving the wings.

Moreover, the presence of the two recesses "A" and "B" allows to fasten the angle bars before the injection of the plastic material, by interposing, for instance, in the free area of predetermined thickness "D3", one or more counterplates apt to strengthen or support the angle bar fastening.

[0024] The rectangular shaped frame can also be used for realising panelled wings by means of laminate sheets 60 apt to cover the frame itself.

In this embodiment it is provided that the frame comprises an inner panel 61, for instance made of polystylene (or similar materials), fastened to the frame by the same modes as provided for the prefabricated panels, and that to this inner panel 61 laminate sheets 60 are glued. Obviously, the laminate sheets are also fastened, for instance by gluing, to the frame so as to realise the wing.

[0025] Also according to this exemplary embodiment, as easily comprehensible to a technician in the field, the panel 61 and laminate sheets 60 do not interfere to a suitable and strength fastening of both the angle bars and hinges, in a way equivalent to that already described for the wings realised by means of prefabricated panels.

[0026] In summary the components according to the present invention allow to realise any type of wings, for instance for industrial accordion doors.

[0027] The component 10, as described, by comprising two opposed recesses, allows also to use one of the recesses, for instance the recess "B", for fastening the wing to a column. As a matter of fact, as easily comprehensible to a technician in the field, it is sufficient for realising a door wing to be fastened to a column, to provide a counterplate inserted in the free area of predetermined thickness "D3", to fasten to the counterplate a fastening or anchorage element or module 38 apt to be fastened or anchored to the column, and to use the first recess "A" for fastening one or more hinges 35.

[0028] In the description the component 10 has been shown as obtained by a single rolled section, but, as easily comprehensible to a technician in the field, the suggested section can also be obtained in other ways without modifying the characteristics of the described matter.

[0029] In the description, for the cross-section of the component, surfaces preferably parallels or orthogonal each other have been suggested, but, as easily comprehensible to a technician in the field, the surfaces may have also angles little different from those suggested as preferable.

[0030] Obvious changes and/or variations to the above disclosure are possible, as regards dimensions, shapes, materials, components and connections as well as details of the described construction and operation method without departing from the scope of the invention as defined by the claims that follow.

Claims

1. Frame element for wings (30) comprising

- at least one first recess (A) arranged to contain first wing devices (35);
- at least one second recess (B), opposed to said first recess (A) and arranged to contain second wing devices (31, 38);

characterised by

- a free space (C) of predetermined thickness (D3) interposed between said at least one first recess (a) and said at least one second recess (b).

2. Frame element according to claim 1 **characterised in that**

- said first devices comprise at least one hinge (35) arranged to allow the movement of at least said wing.

3. Frame element according to claim 1 or 2 **characterised in that**

- said second devices comprise devices selected in the group comprising:
- angular modules (31) arranged to connect frame elements (10) to other frame elements;
- at least one fastening module (38) arranged to fasten said frame element to a door column.

4. Frame element according to any one of previous claims **characterised in that**

- said space (C) of predetermined thickness (D3) comprises supporting means arranged to support the anchorage of said second wing devices (31, 38).

5. Frame element according to claim 1 **characterised in that** said at least one first recess (A) is a surface having a dovetail shape (12).

6. Frame element according to claim 1 **characterised in that** said at least one second recess (B) comprises one pair of L specular surfaces (15a, 15b) shaped so as to realise said second recess (B).

7. Frame element according to claim 6 **characterised in that** said at least one second recess (B) comprises a gap (D1) between said L specular surfaces (15a, 15b) arranged to make communicating said second recess (B) and said space (C).

8. Frame element according to any one of previous claims **characterised in that** it is at least panellable alternatively

- by means of prefabricated panels (40);
- by means of solidifiable plastic material (50);
- by means of laminate sheets (60) glued on plastic material (61).

9. Frame for wings (30) comprising at least four frame elements (10) arranged to shape a rectangle in which each frame element (10) comprises

- at least one first recess (A) arranged to contain first wing devices (35);
- at least one second recess (B), opposed to said first recess (A) and arranged to contain second wing devices (31, 38);

characterised in that each of said frame elements (10) comprises

- a free space (C) of predetermined thickness (D3) interposed between said at least one first recess (A) and said at least one second recess (B).

10. Frame according to claim 9 **characterised in that**

- said first devices comprise at least one hinge (35) arranged to allow the movement of at least said wing (30).

11. Frame according to claim 9 or 10 **characterised in that**

- said second devices comprise devices selected in the group comprising

  - angular modules (31) arranged to connect said frame elements (10) to other frame elements;
  - at least one fastening module (38) arranged to fasten said frame element (10) to a door column.

12. Frame according to any one of claims 9 to 11 **characterised in that**

- said space (C) of predetermined thickness (D3) comprises supporting means arranged to support the anchorage of said second wing devices (31, 38).

13. Frame according to any one of claims 9 to 12 **characterised in that** said at least four frame elements (10) are arranged to shape a wing at least panellable alternatively

- by means of prefabricated panels (40);
- by means of solidifiable plastic material (50);
- by means of laminate sheets (60) glued on plastic material (61).

14. Wing, in particular for accordion door, comprising

- a frame;
- a panel (40, 50, 60, 61) associated to the frame;

characterised in that said frame comprises at least four frame elements (10) arranged to shape a rec-

tangle in which each frame element (10) comprises

- at least one first recess (A) arranged to contain first wing devices (35);
- at least one second recess (B), opposed to said first recess (A) and arranged to contain second wing devices (31, 38); and
- a free space (C) of predetermined thickness (D3) interposed between said at least one first recess (A) and said at least one second recess (B).

15. Wing according to claim 14 **characterised in that**

- said space (C) of predetermined thickness (D3) comprises supporting means arranged to support the anchorage of said second wing devices (31, 38).

16. Wing according to claim 14 or 15 **characterised** to be at least panellable alternatively

- by means of prefabricated panels (40);
- by means of solidifiable plastic material (50);
- by means of laminate sheets (60) glued on plastic material (61).

17. Method for realising a wing, in particular a wing for an accordion door, **characterised by** the step of

- realise frame elements having

  - at least one first recess (A) arranged to contain first devices for wing (35);
  - at least one second recess (B), opposed to said first recess (A) and arranged to contain second wing devices (31, 38); and
  - a free space (C) of predetermined thickness (D3) interposed between said at least one first recess (A) and said at least one second recess (b).

18. Method according to claim 17 **characterised by** the further steps of

- fastening said frame elements to other frame elements so as to shape a rectangle;
- at least panelling said frame alternatively

  - by means of prefabricated panels (40);
  - by means of solidifiable plastic material (50);
  - by means of laminate sheets (60) glued on plastic material (61).

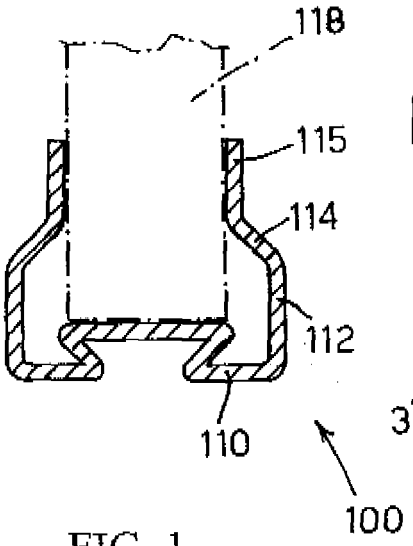

FIG. 1

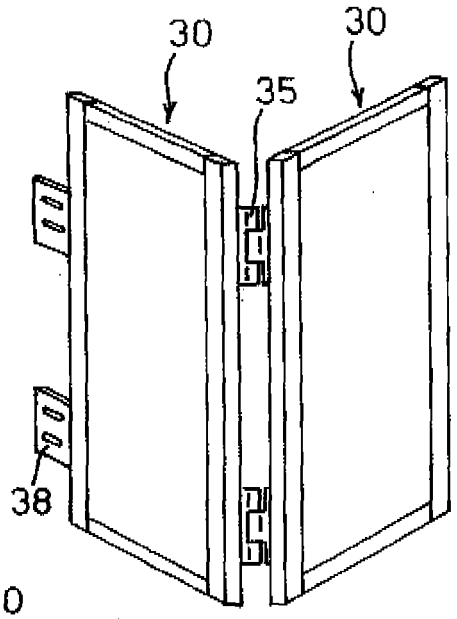

FIG. 7

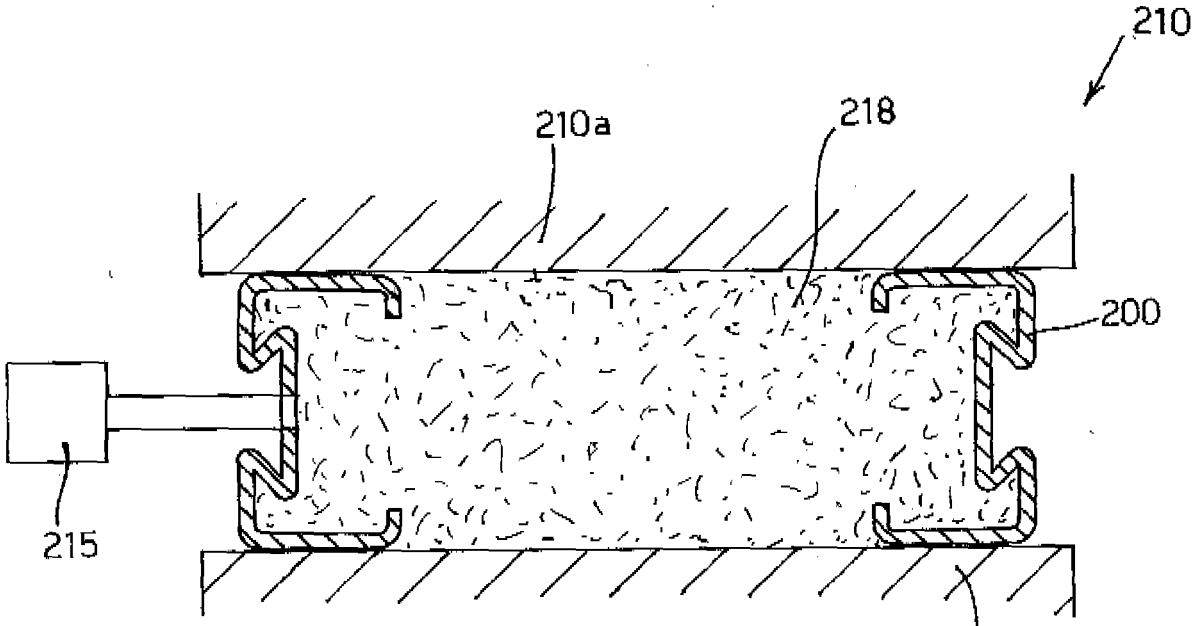

FIG. 2

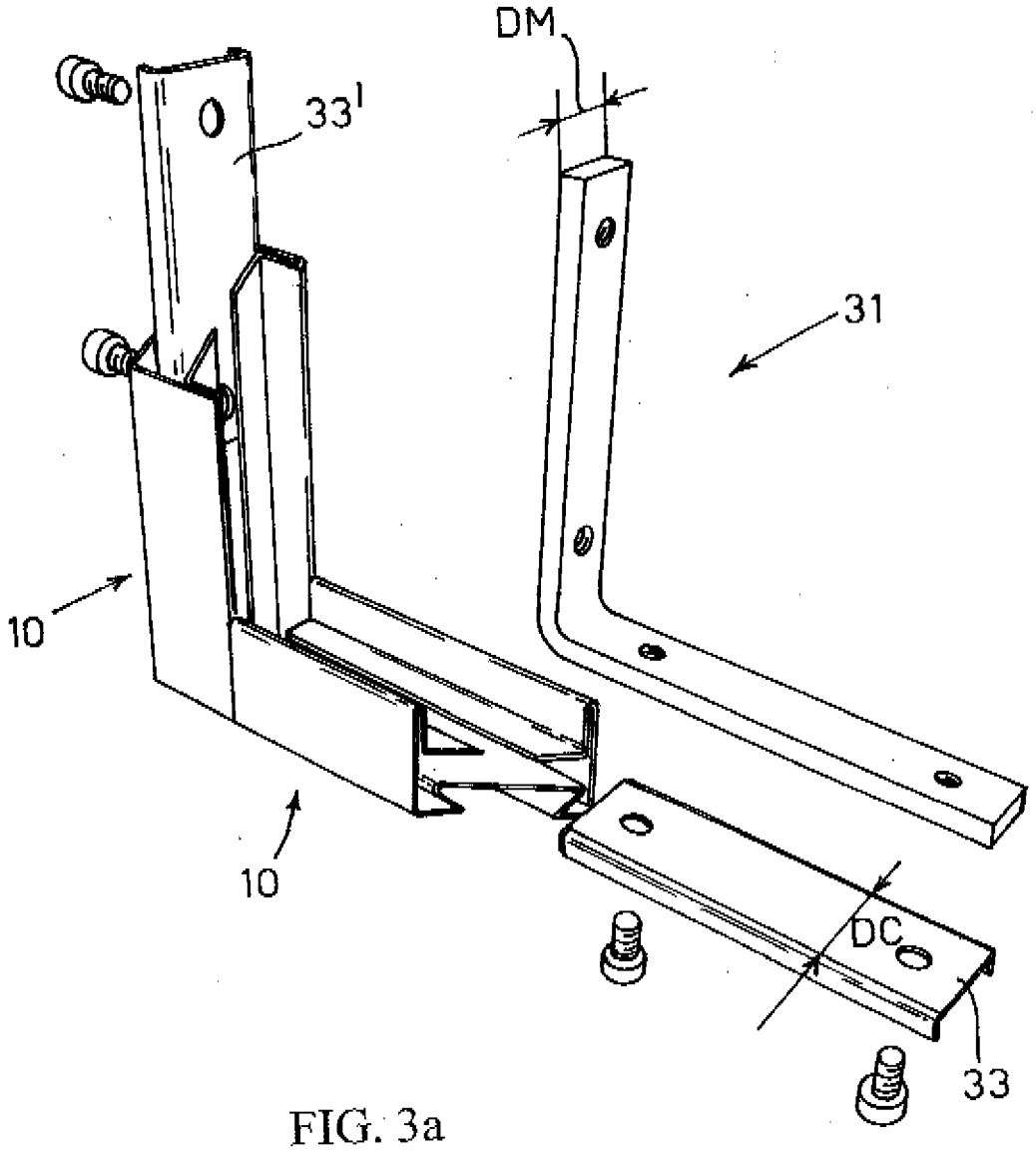

FIG. 3a

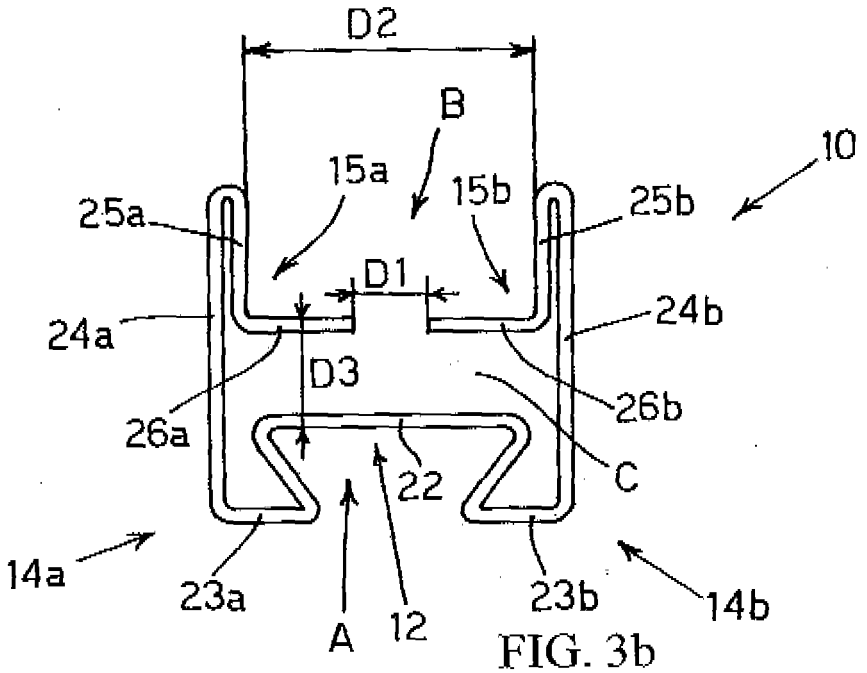
D2
B
10
15a
15b
25a
25b
D1
24a
24b
D3
26a
26b
C
22
14a
23a
A
12
23b
14b

FIG. 3b

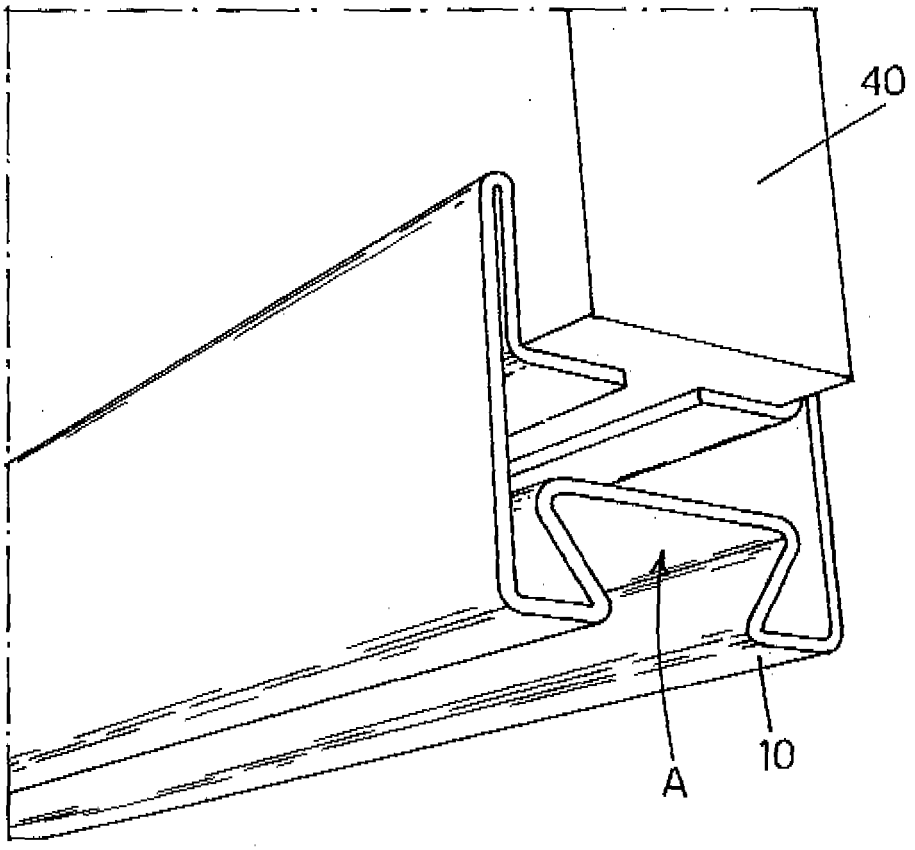
40
A
10

FIG. 4

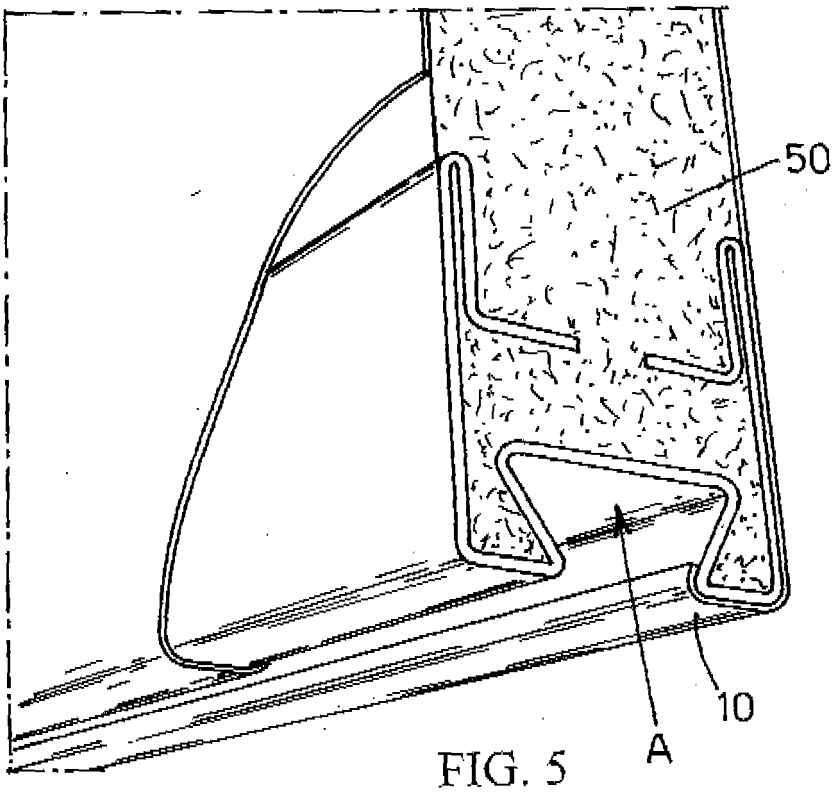

FIG. 5

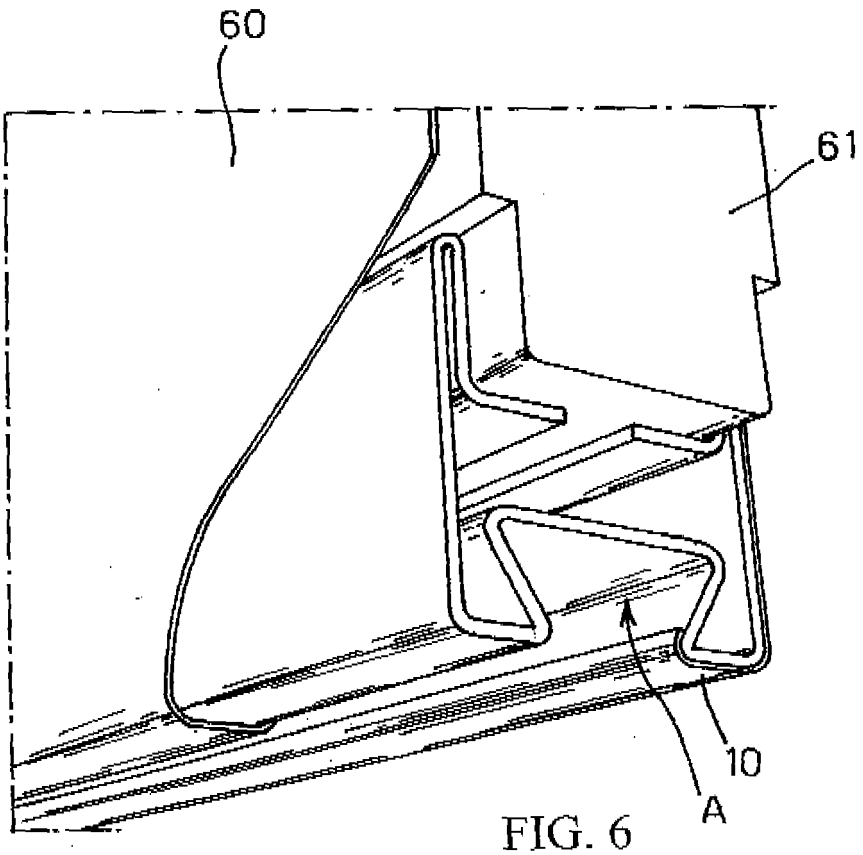

FIG. 6

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EUROPEAN SEARCH REPORT

Application Number
EP 06 12 1323

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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X	EP 1 298 277 A2 (POLYMER ENGINEERING LTD [GB]) 2 April 2003 (2003-04-02) * figure 4 *	1,2,14, 17	

TECHNICAL FIELDS SEARCHED (IPC)

E06B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	22 December 2006	Verdonck, Benoit

CATEGORY OF CITED DOCUMENTS

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22-12-2006

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