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(54) **Corner joint**

(57) Aligning bracket for joining and moving together a first section (I) and a second section (II) of a window- or door-frame each provided with a longitudinal seat (S). The bracket (1) comprises an angle piece (2) having two arms (3a,3b), each of which is intended to be inserted inside a longitudinal seat (S) of the two sections (I,II) and four locking pieces mounted in seats (5) provided in pairs on each arm (3a,3b). The locking pieces (4) are opera-

tionally forced to move between a release position (A), where they do not intercept the corresponding section (I, II) leaving the arms (3a,3b) free to slide inside the associated longitudinal seat (S), and a locking position (B), where they act on the sections (I,II), forcing them to be joined together. Each locking piece (4) performs a rotary/translatory movement between the two positions, i.e. release position (A) and locking position (B).

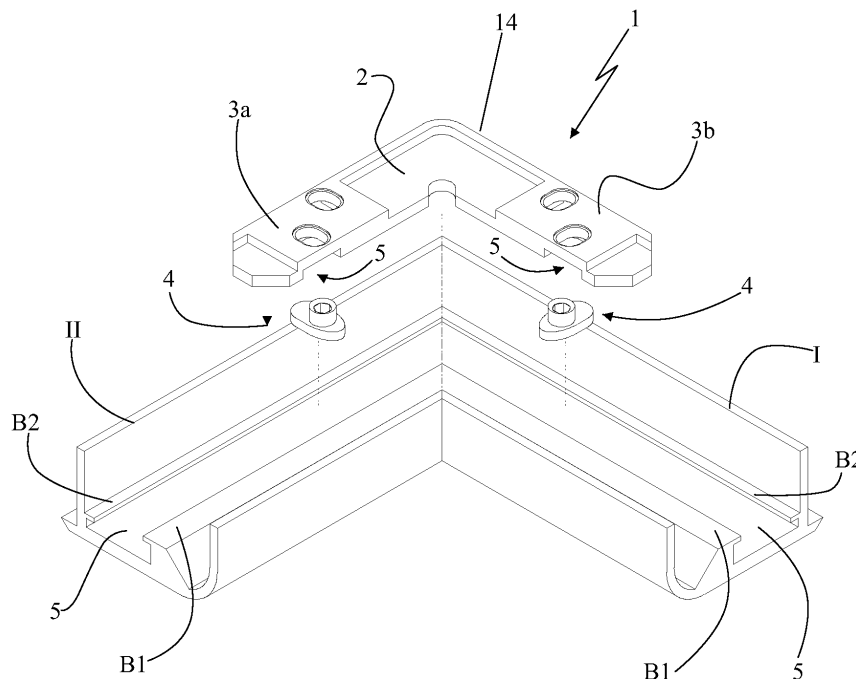


Fig. 1

Description

Field of application

[0001] The present invention relates to an aligning bracket for joining together sections.

[0002] The aligning bracket in question is advantageously intended to be used in the sector for the production of frames, such as door and window fixtures, in order to connect together the sections.

[0003] The invention falls generally within the industrial sector relating to the production of frames and in particular the sector relating to the production of accessories for fixtures.

Background art

[0004] As is known, a frame, whether it be made of metal or PVC, generally consists of several sections which are fixed together in pairs at the ends in the region of the vertices by means of suitable connection means. The latter consist of generally L-shaped angular parts which are made of metal or plastic and are usually known by the name of "tightening brackets" or "force-fitting brackets".

[0005] In greater detail, these angular parts have two arms which are perpendicular to each other, each being able to be slidably inserted inside a seat formed longitudinally in one of the two sections to be joined together. Suitable fixing means, such as screws or bolts for example, are used to fix the arms of the angular parts to the two sections.

[0006] Each angle piece exerts, by means of its arms, a pulling force on the sections to be joined together so as to bring them into contact against each other along the joining cross-section. The angular parts therefore allow the various sections to be assembled together next to each other so as to form the frame, ensuring that the adjacent surfaces thereof have a continuous form and are coplanar with each other.

[0007] In fixtures with a smaller thickness, as, for example, in the case of fixtures of the so-called "cold section" type, the abovementioned angular parts fulfil in a generally adequate manner their function of bringing together in a tight arrangement the sections along the entire joining cross-section.

[0008] In the case of sections with a larger thickness, for example used to form so-called "thermal break" fixtures, the angular parts do not always manage to prevent the sections from splaying along their joining zone. This is due mainly to the fact that the sections used to form the thermal break frames have a cross-section which is greater than that of the sections used for "cold section" fixtures and require the use of other mechanical parts to supplement the pulling force of the tightening brackets.

[0009] In particular, the sections for thermal break fixtures are formed by a main portion, which forms the load-bearing part of the section and is intended to be directed

outwards, and by a secondary portion, which is connected to the main portion by means of a thickness of thermally insulating material and forms the part of the fixture which is intended to be directed inwards. The angular connecting parts are mounted for structural reasons in the zone where the main portions of the two sections are joined together and therefore in a position which is offset with respect to the middle axes of the sections.

[0010] Consequently, the secondary portions of the sections are free to splay, albeit slightly, not being directly fastened together by the angular parts.

[0011] This problem has been solved by inserting suitable alignment means between the abovementioned secondary portions in the section joining zone.

[0012] More generally, the alignment means ensure restoration of the continuity between the surfaces of the sections to be joined together angularly.

[0013] These alignment means consist of connecting parts which are substantially similar to the abovementioned angular connecting parts and are usually referred to in the technical sector in question by the name of "aligning brackets".

[0014] In order to pull and keep the sections arranged next to each other, the abovementioned aligning brackets are inserted into longitudinal seats where they are fixed using fixing means, such as screws or bolts, or, more recently, by means of locking cam parts which are pivotably mounted on the arms of the brackets.

[0015] These cam parts are operationally forced against the edges of the seats of the sections inside which the aligning bracket is inserted.

[0016] In greater detail, each of these cam parts is able to pass from a release position, where it is retracted inside the contour of the arm in order to allow insertion of the latter inside the section, into a locking position, where it is rotated so as to engage with its projecting cam portion against the section so as to pull the latter towards the joining cross-section and fix it in the desired position adjacent to the other section.

[0017] The European patent EP 1048816 describes an embodiment of an aligning bracket provided with cam parts formed by a cylindrical portion inserted inside a special circular seat of the arm and acting as a rotational pin, and a projecting tongue, formed as one piece with the cylindrical portion, from where it extends perpendicularly. The tongue is eccentric with respect to the axis of the cylindrical portion so that, following rotation, it is able to pass from the release position, where it is retracted inside the contour of the arm and does not interfere with the section, into the locking position where, projecting from the contour of the arm, it is forced so as to grip against the section.

[0018] During the rotational movement, the tongue engages with the section, forcing it to slide longitudinally so as to favour movement thereof towards the other section in the joining zone. The tongue has an outer edge which is shaped as a circumferential arc and provided with a series of teeth for increasing the grip on the section.

[0019] The aligning bracket described in the patent EP 1048816 has the drawback that the force exerted by the tongues on the sections is transmitted onto the bracket via the pin and therefore onto a plane which is different from that where gripping against the section occurs, resulting in a moment which may cause extraction of the cam part from its seat in the bracket.

[0020] A further drawback of this known bracket consists in the fact that the locking position of the cam is ensured only by the engagement of the teeth provided on the edge of the tongue against the section. Between the pin and the seat where the force transmitted by the tongue is applied there are in fact no fastening means for preventing the cam from moving backwards and releasing the section.

[0021] This is to the detriment of a stable engagement of the bracket with the section and may result, in particular mechanical stress conditions, to gradual slackening of the locking means and therefore a displacement (or misalignment) of the sections.

[0022] A further drawback consists in the constructional complexity and in the high costs for production of the brackets designed in accordance with the teaching of the patent EP 1048816, where the two cam parts on the two arms are produced as two separate asymmetrical components, each of which is formed so as to operate in an associated different direction of rotation.

[0023] Similar solutions are also described in the patents: DE 2656958, US 4538936, DE 4369274 and US 4547986.

Disclosure of the invention

[0024] In this situation, therefore, the object of the present invention is to eliminate the drawbacks of the known art mentioned above by providing an aligning bracket for joining together sections which ensures more stable engagement.

[0025] Another object of the present invention is to provide an aligning bracket which is operationally entirely failproof and reliable.

[0026] A further object of the present invention is to provide an aligning bracket which is simple and inexpensive to produce.

Brief description of the drawings

[0027] The technical characteristics of the invention in accordance with the abovementioned objects may be clearly determined from the contents of the claims indicated below and the advantages thereof will emerge more clearly from the detailed description which follows provided with reference to the accompanying drawings which show two purely exemplary and non-limiting embodiments thereof, wherein:

- Figure 1 shows an exploded view of a first example of an aligning bracket according to the invention

mounted so as to join together the two sections of a frame;

- Figure 2 shows a first plan view of the aligning bracket according to Figure 1 mounted so as to join together two sections of the frame;
- Figure 3 shows a second plan view of the aligning bracket according to Figure 1 mounted so as to join together two sections of the frame;
- Figure 4 shows a cross-sectional view along the line III-III in Figure 3 of the bracket according to Figure 1 and the section inside which it is inserted;
- Figures 5 and 6 show two exploded perspective views from above and from below of the bracket according to Figure 1;
- Figures 7 and 8 show the two plan views of the bracket according to Figure 1;
- Figure 9 shows a side view of the bracket according to Figure 1;
- Figure 10 shows an exploded view of a second example of an aligning bracket according to the invention mounted so as to join together two sections of a frame;
- Figure 11 shows a first plan view of the aligning bracket according to Figure 10 mounted so as to join together the two sections of the frame;
- Figure 12 shows a second plan view of the aligning bracket according to Figure 10 mounted so to join together the two sections of the frame;
- Figure 13 shows a cross-sectional view, along the line XII-XII shown in Figure 12, of the bracket according to Figure 10 and the section inside which it is inserted;
- Figures 14 and 15 show two exploded perspective views from above and from below of the bracket according to Figure 10;
- Figures 16 and 17 show the two plan views of the bracket according to Figure 10;
- Figure 18 shows a side view of the bracket according to Figure 10.

Detailed description

[0028] With reference to the attached drawings, 1 denotes the aligning bracket for joining together sections according to the invention. This bracket 1 is intended, in particular, for the assembly of frames for thermal break fixtures, but may also be used as a force-fitting bracket during the assembly of frames of any type, form and size and in particular for cold section fixtures, on its own or in addition to other brackets also of the conventional tightening type.

[0029] Each thermal break section is composed of a main portion, intended to form the outer surround of the fixture, and a secondary portion, intended to form the inner surround. The two portions are connected together by a further heat-insulating portion. The aligning bracket 1 according to the invention is mounted, in the non-limiting example of a thermal break frame, in the zone where

the secondary portions of a first and second section I and II are joined together with the aim of moving together the two sections and keeping them in a coplanar relationship. The actual structural connection between the two sections I and II is performed in the region of their main portions by means of an ordinary force-fitting bracket (not shown).

[0030] From an operational point of view, the aligning bracket 1 according to the invention is associated with the two sections I and II at the same time as the abovementioned force-fitting bracket during assembly of the frame. Each section I and II is provided with a special longitudinal seat S formed in the abovementioned inner portion. Said seat extends longitudinally along the entire length of the section I and II and is bounded by two parallel facing edges, one of which, indicated by B2, is situated closer to the inner edge of the section than the other one indicated by B1.

[0031] The aligning bracket 1 according to the invention is formed mainly by an angle piece 2 in the form of a flat plate, preferably made of aluminium alloy or, where appropriate, steel, having two mutually perpendicular arms 3a and 3b forming an L-shaped section. The two arms are intended to be inserted inside the seats S of the first and second section I and II, respectively. This insertion is performed with the sections separated, by means a direct translatory sliding movement longitudinally with respect to the individual section I, II.

[0032] Once mounted, the bracket 1 is therefore situated astride the joining zone of the two sections I and II. Each arm 3a and 3b of the angle piece 2 is provided with suitable means for performing locking with the section I, II, said means being able to lock in position the arm 3a, 3b itself inside the longitudinal seat S and at the same time impart to the section I and II an additional sliding movement towards the joining zone.

[0033] For this purpose, the abovementioned means are formed as a locking piece 4 mounted in a seat 5 provided on each arm 3a, 3b and able to move between a release position A, where it does not intercept the section, leaving the arm 3a, 3b free to slide inside the longitudinal seat S, and a locking position B, where it acts against the section I, II, forcing it to be joined to the other section.

[0034] According to the idea forming the basis of the present invention, each locking piece 4 performs a rotary/translatory movement between the release position A and the locking position B.

[0035] For this purpose, in accordance with a preferred embodiment of the present invention, the locking piece 4 is formed by a head portion 6 and a pin portion 7 which are made as one piece, for example by means of moulding.

[0036] In greater detail, the head portion 4 defines a retaining surface 8 able to grip against the corresponding section I and II and a cam surface 9 able to bear against a sliding surface 10 provided in the seat 5 of the corresponding arm 3a, 3b of the angle piece 2.

[0037] The pin portion 7 is able to slide in a guided manner inside a track 11 provided in the bottom 12 of the seat 5 of the corresponding arm 3a, 3b of the angle piece 2.

5 **[0038]** The locking piece 4 moves with a rotary/translatory movement between the release position A and the locking position B, performed by engagement of the cam surface 9 with the sliding surface 10 and by engagement of the pin portion 7 inside the track 11.

10 **[0039]** Correspondingly, in the two positions A and B, the retaining surface 8 of the head portion 6 is situated inside the contour of the arm 3a, 3b so as to allow the latter to slide freely inside the longitudinal seat S of the corresponding section I, II, and outside of the contour of the arm 3a, 3b so as to grip against the corresponding section I, II.

[0040] The locking piece 4 is preferably mushroom-shaped, with the cap which defines the head portion 6 and the stem which defines the pin portion 7.

20 **[0041]** In greater detail, the head portion 6 has a form which is symmetrical with respect to an axis X passing through the points of engagement of its cam surface 9 and retaining surface 8 with the sliding surface 10 and with the section I, II, respectively. Preferably, this symmetrical form is substantially oval with the axis of symmetry corresponding to the larger axis of the oval.

[0042] The retaining surface 8 and the sliding surface 10 of the head portion 6 are divided in mirror-image fashion by the axis of symmetry, allowing the locking piece to have an identical functional capacity in the two directions of rotary/translatory movement corresponding to mounting on the right-hand or left-hand arm of the angle piece 2.

35 **[0043]** In turn the pin portion 7 has the shape substantially of a cylinder fixed on the axis of symmetry X below the head portion 6. The track 11 has the width of the stem so as to constrain the sliding movement thereof inside it, performed by engagement of the cam surface 9 with the sliding surface 10.

40 **[0044]** The locking piece 4, owing to its symmetry, is able to work correctly in both directions of rotation and therefore it may be arranged equally well on the two arms 3a, 3b of the angle piece 2, resulting in a significant ease of assembly of the bracket 1 which does not require, as in solutions of the known type, the provision of different locking pieces each solely able to be associated with one arm of the bracket. Alternatively, however, the locking piece 4 may also have a non-symmetrical form and the sliding surface 10 may also be formed not parallel to the edge of the arm 3a,3b of the angle piece 2, but suitably angled so as to allow the fastening element to achieve an optimum grip inside the section.

45 **[0045]** Each seat 5, which is intended to receive the locking piece 4, is formed by means of a depression with the bottom 15 situated about halfway along the thickness of the angle piece 2 and is formed in a first surface 12 of the arm 3a, 3b, extending from at least one of its sides 13, 14.

[0046] The abovementioned depression has the form of a step with the riser perpendicular to the bottom 15 and defining in the inner part the sliding surface 10 with a curved progression, which is therefore perpendicular to the plane defined by the angle piece 2.

[0047] The track 11 is realised in the form of a through-cavity formed in the bottom of the depression.

[0048] The seats 5 may be provided both on the inner side 13 and on the outer side 14 or on both sides as in the case of the examples shown in the accompanying figures.

[0049] Preferably, the locking pieces 4 will be provided two in number on each arm 3a, 3b and on a same inner side 13 or outer side 14.

[0050] The provision of the seats also on the side where the locking pieces 4 are not mounted has the aim of minimising the production and storage costs owing to the manufacture of a single part.

[0051] Figures 1-9 show a first example of an aligning bracket 1 according to the invention with the locking pieces 4 mounted on the inner side 13 of the arms 3a and 3b of the angle piece 2, while Figures 10-18 show a second example of an aligning bracket 1 according to the invention with the locking pieces 4 mounted on the outer side 14 of the arms 3a and 3b of the angle piece 2.

[0052] Operationally speaking, once the bracket 1 has been inserted with the arms 3a, 3b of the angular part 2 inside the longitudinal seats S of the two sections I and II with the locking pieces 4 in the release position A, the locking pieces 4 will be forced towards the locking position B by means of a special spanner acting in a special shaped seat 16 provided above the head portions 6 of the said locking pieces 4. In greater detail, when passing from the release position A into the locking position B, the retaining surface 8 of the head portion 6 will project outside the contour of the arm 3a, 3b until it grips against the section I, II as a result of a rotary/translatory movement performed by engagement of the cam surface 9 on the sliding surface 10 and by engagement of the pin portion 7 inside the track 11.

[0053] Advantageously, the profiles of the cam surface 9 and the sliding surface 10 have been designed to determine a pressure which is smaller at the start and greater at the end of the rotary/translatory movement which causes alignment of the sections I and II in an optimum manner.

[0054] Advantageously the force transmitted by the engagement between the retaining surface and the section I, II is transmitted axially by means of the cam surface 9 onto the sliding surface 10 and not onto the track 11 of the pin portion 7.

[0055] Consequently moments able to displace the locking piece 4 outside of the seat 5 are not created. Moreover, the locking position B is particularly stable owing to the dual engagement between the cam surface 9 and sliding surface 10 and between the retaining surface 8 and the section I, II, onto which the entire force is transmitted.

[0056] Advantageously, the retaining surface 8, cam surface 9 and sliding surface 10 are knurled or provided with teeth able to increase the friction.

5 [0057] In accordance with other embodiments not shown here, the two arms 3a and 3b may also not be perpendicular to each other so as to allow the use of the bracket 1 according to the invention also in frames for fixtures forming angles which are not right angles.

10 [0058] The invention thus conceived therefore achieves the predefined objects.

[0059] Obviously, it may assume, in its practical embodiment, also forms and configurations which are different from that illustrated above, without thereby departing from the present scope of protection.

15 [0060] Moreover, all the details may be replaced by technically equivalent parts and the dimensions, forms and materials used may of any nature as required.

20 Claims

1. Aligning bracket for joining and moving together a first section (I) and a second section (II) provided with at least one longitudinal seat (S), comprising:

25 - an angle piece (2) having two arms (3a, 3b), each of which is able to be inserted inside the longitudinal seat (S) of said first and second sections (I, II);

30 - at least one locking piece (4) mounted in a seat (5) provided on each arm (3a, 3b) and able to move between a release position (A), where it does not intercept said corresponding section (I, II) leaving said arm (3a, 3b) free to slide inside said longitudinal seat (S), and a locking position (B), where it acts on said section (I, II), forcing it to be joined to the other section,

35 **characterized in that** each said locking piece (4) performs a rotary/translatory movement between said release position (A) and locking position (B).

40 2. Aligning bracket according to Claim 1, in which said locking piece is shaped with a head portion, which defines a retaining surface able to grip against the corresponding section, and a cam surface, able to slide on a bearing surface provided in the seat of the corresponding arm, a pin portion being able to slide in a guided manner inside a track provided in the seat of the corresponding arm.

45 50 55 3. Aligning bracket according to Claim 2, in which the rotary/translatory movement of said locking piece between said release position and locking position is performed by engagement of said cam surface with said bearing surface and by engagement of said pin portion inside said track, **characterized in that** the retaining surface of said head portion is displaced

correspondingly inside the contour of said arm so as to allow the latter to slide freely inside the longitudinal seat of said corresponding section, and outside of the contour of said arm so as to grip against said corresponding section.

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4. Aligning bracket according to Claim 2, in which said locking piece is shaped in the manner of a mushroom, the cap of which defines said head portion with a shape which is symmetrical with respect substantially to an axis passing through the points of engagement of said cam surface and said retaining surface with said bearing surface and said section, respectively.
5. Aligning bracket according to Claim 4, in which said locking piece is shaped in the manner of a mushroom with the stem defined by said pin portion constrained to slide inside said track with the rotary/translatory movement performed by engagement of said cam surface with said bearing surface.
6. Aligning bracket according to Claim 2, in which said pin portion is substantially cylindrical.
7. Aligning bracket according to Claim 2, in which said seat comprises a depression formed in one side of said arm, extending from its inner side or outer side, and defining said bearing surface.
8. Aligning bracket according to Claim 7, in which said bearing surface is perpendicular to the plane defined by said angle piece.
9. Aligning bracket according to Claim 7, in which said track is realised in the form of through-cavity formed in the bottom of said depression.
10. Aligning bracket according to Claim 2, in which one or more of said retaining surface, cam surface and bearing surface are knurled or provided with teeth able to increase the friction.

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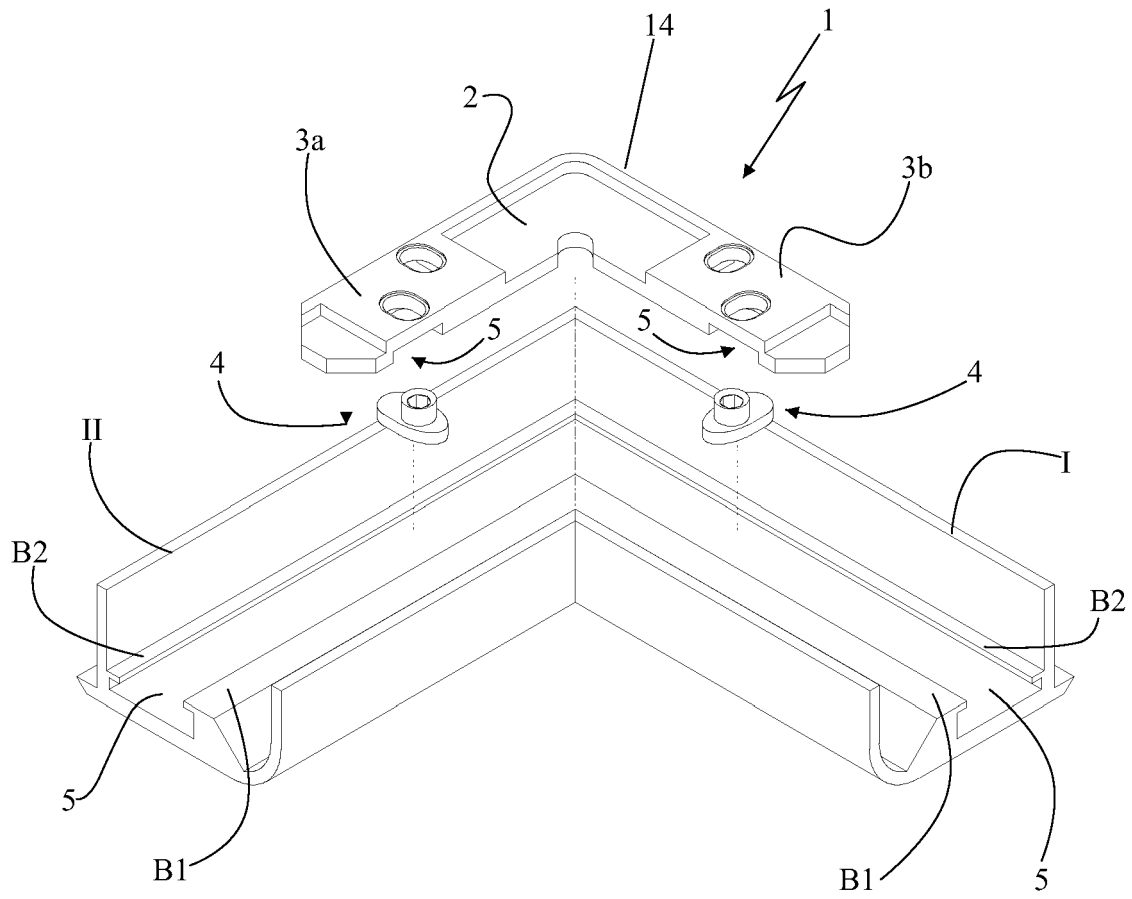


Fig. 1

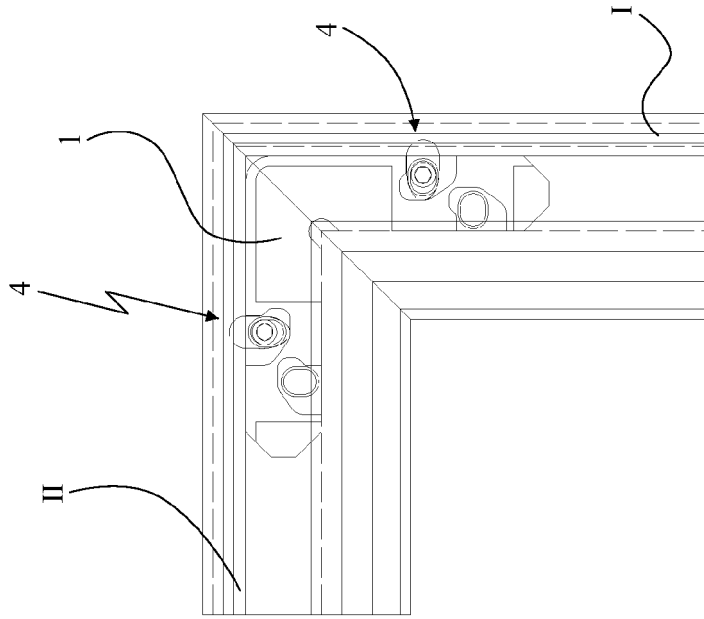


Fig. 2

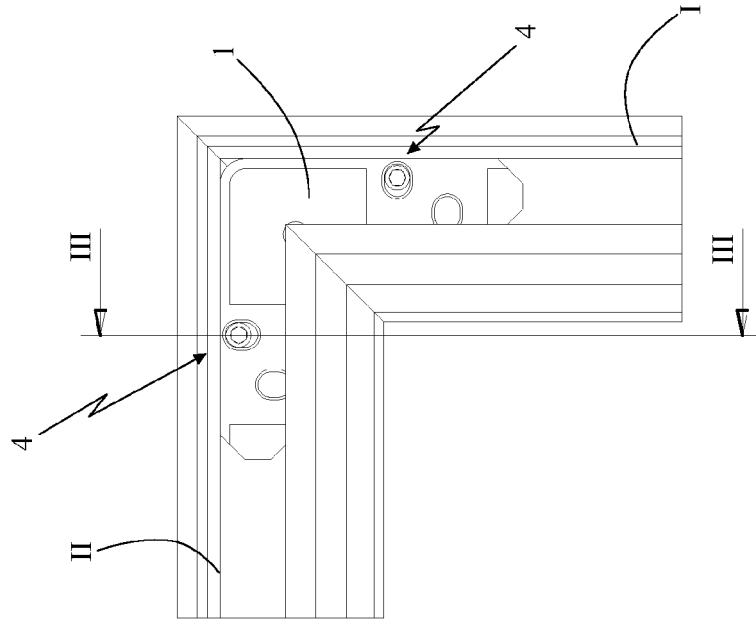


Fig. 3

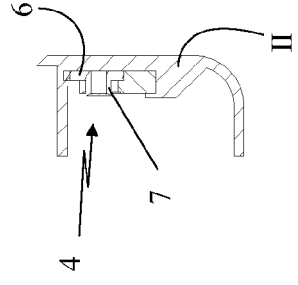
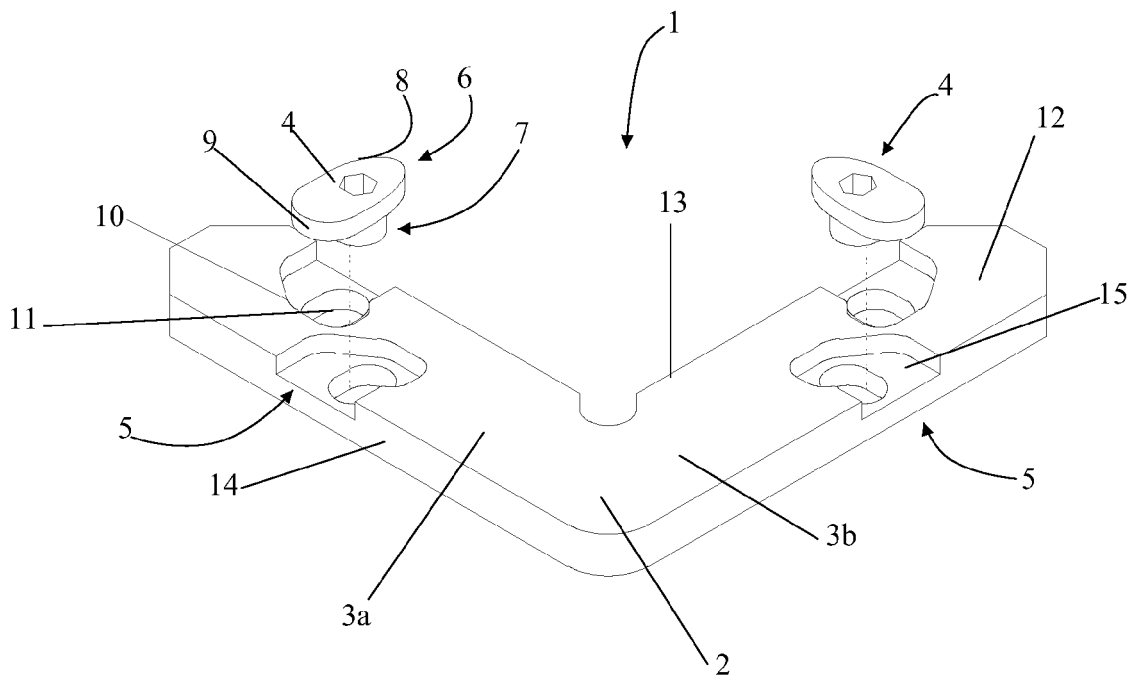
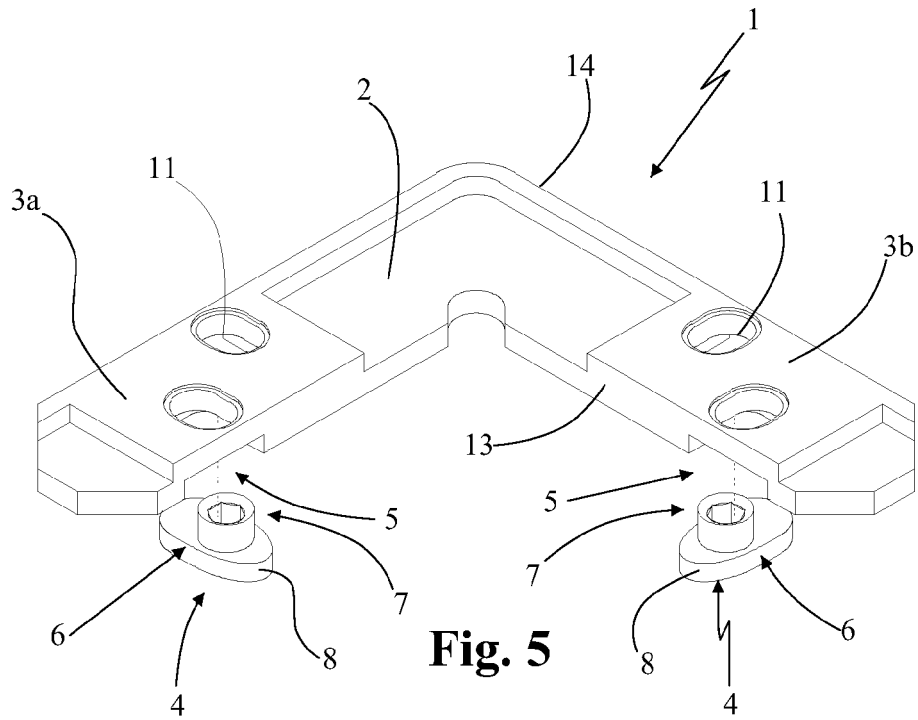


Fig. 4



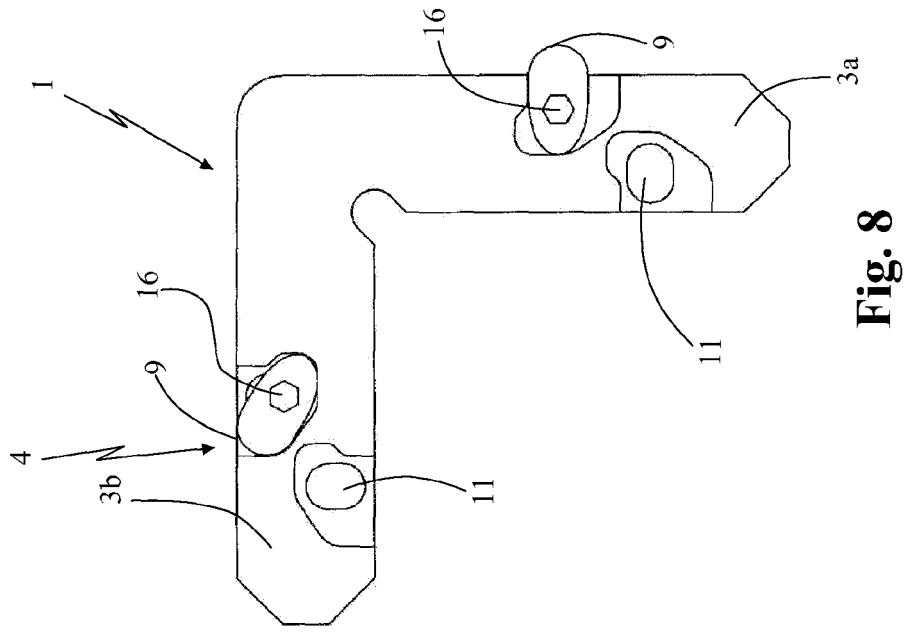


Fig. 8

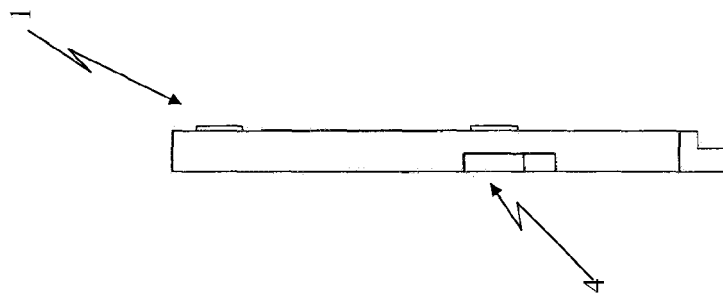


Fig. 9

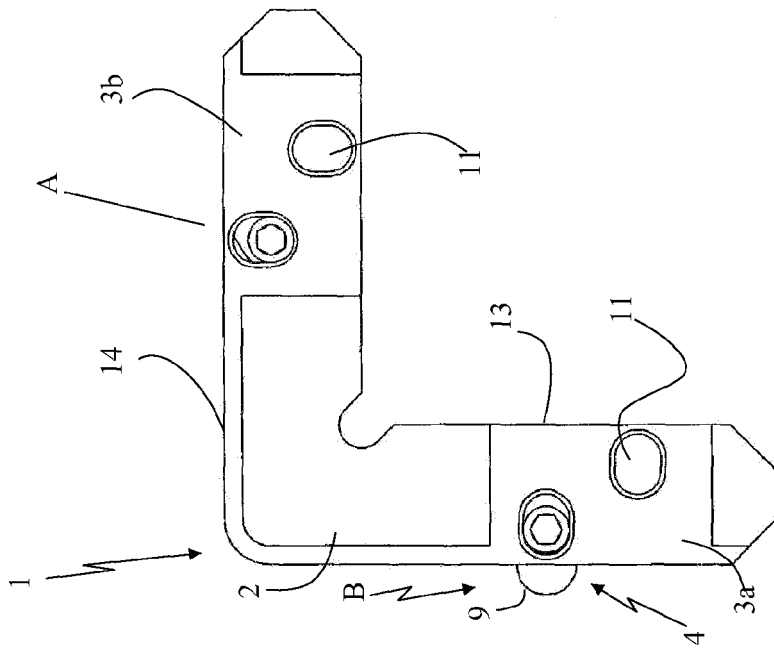


Fig. 7

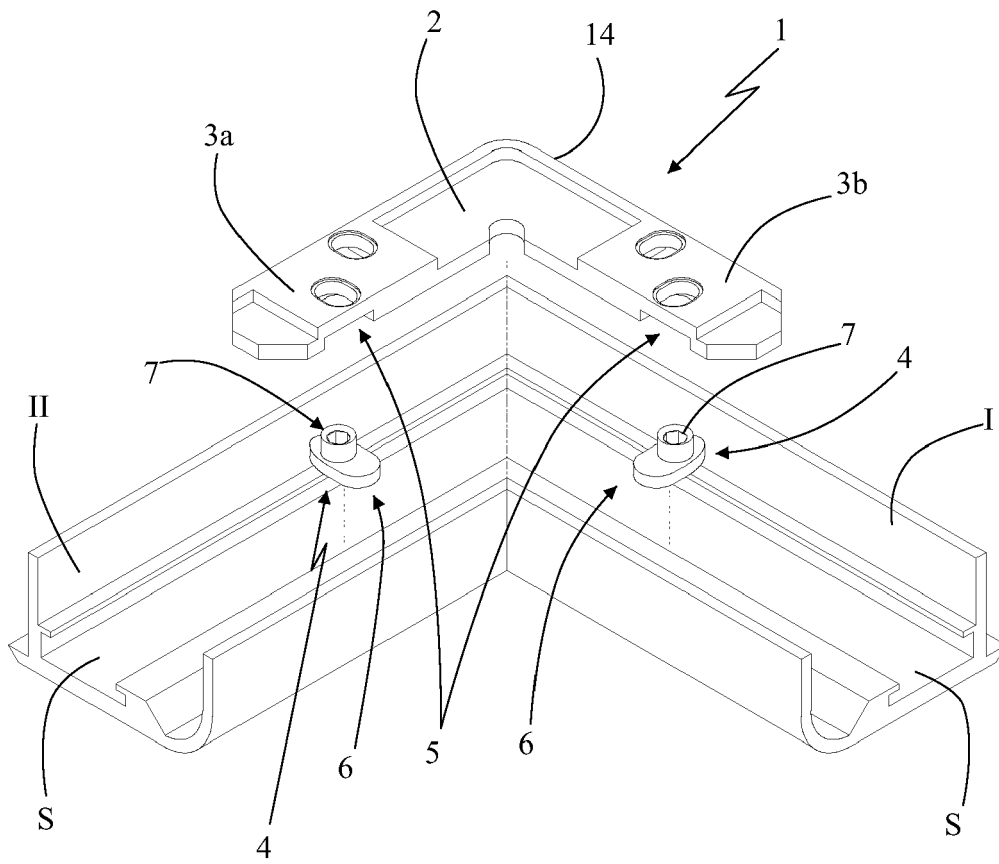


Fig. 10

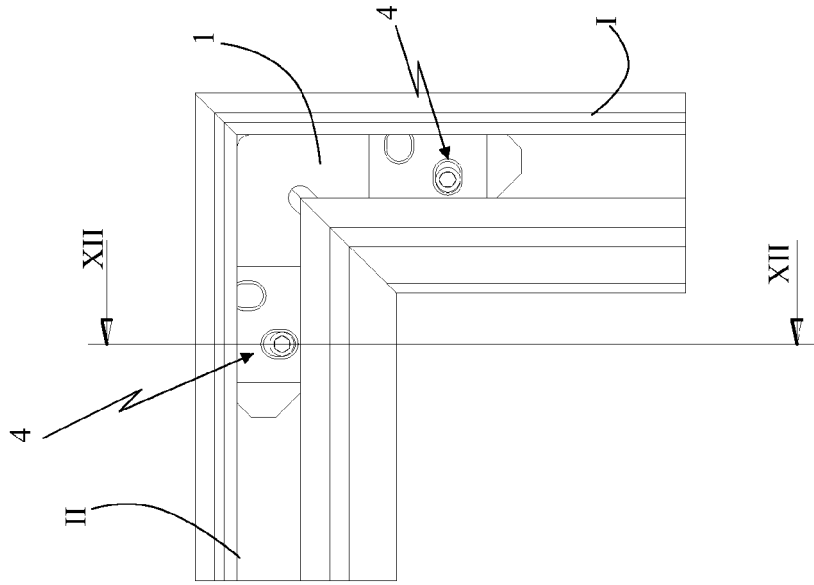


Fig. 11

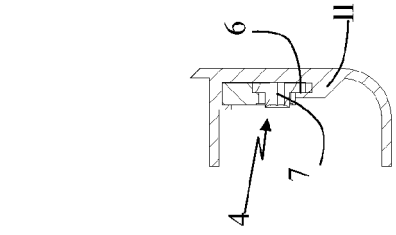


Fig. 12

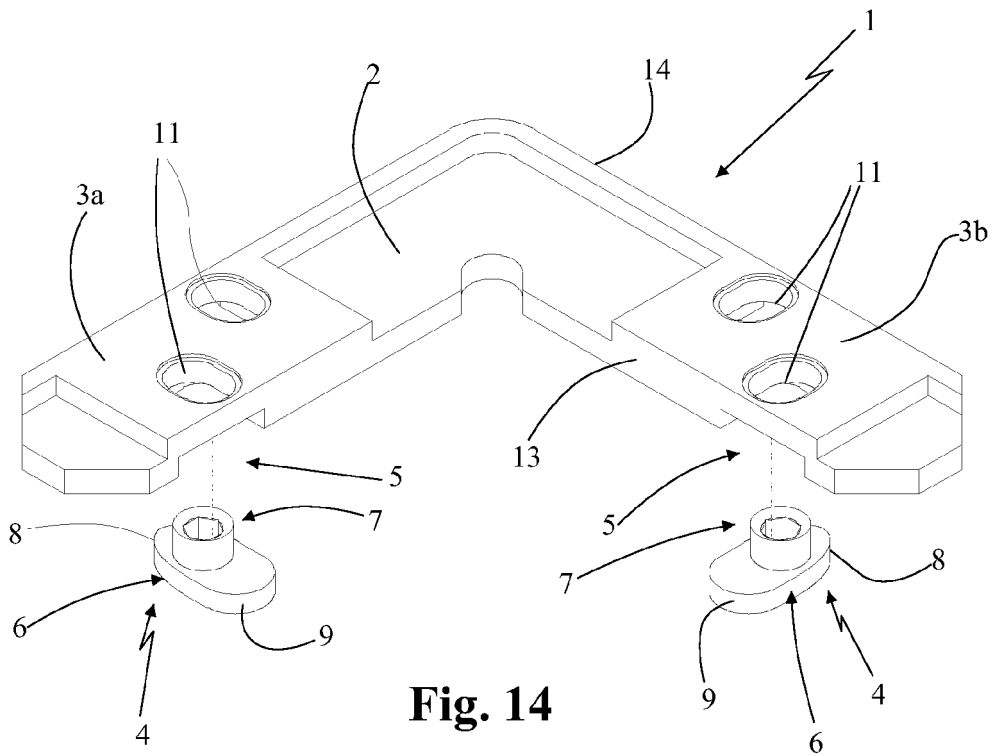


Fig. 14

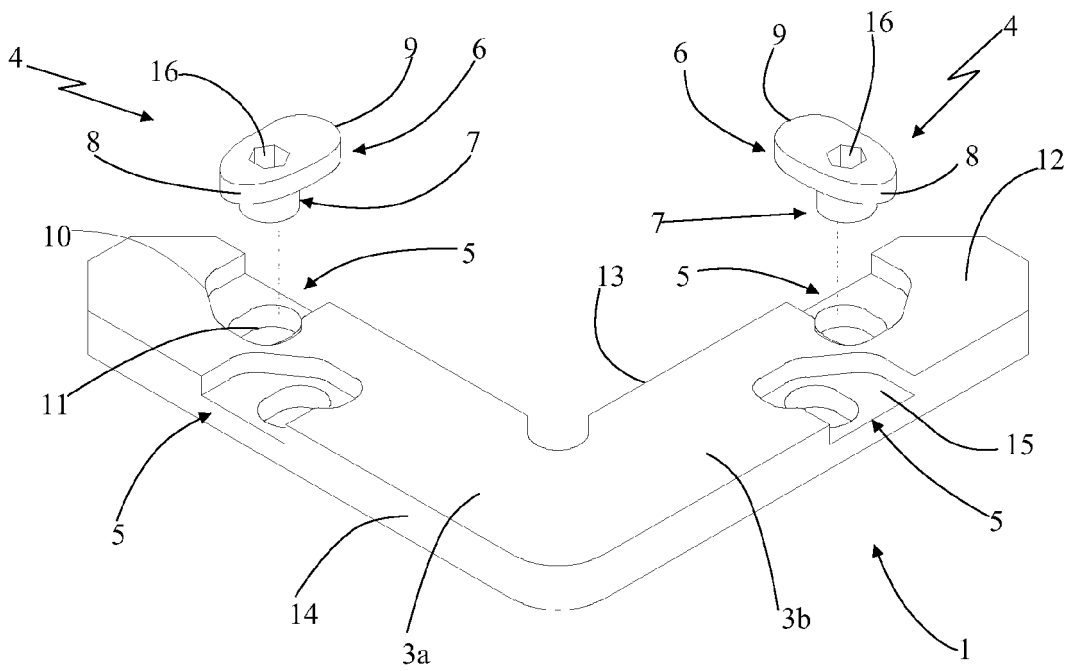


Fig. 15

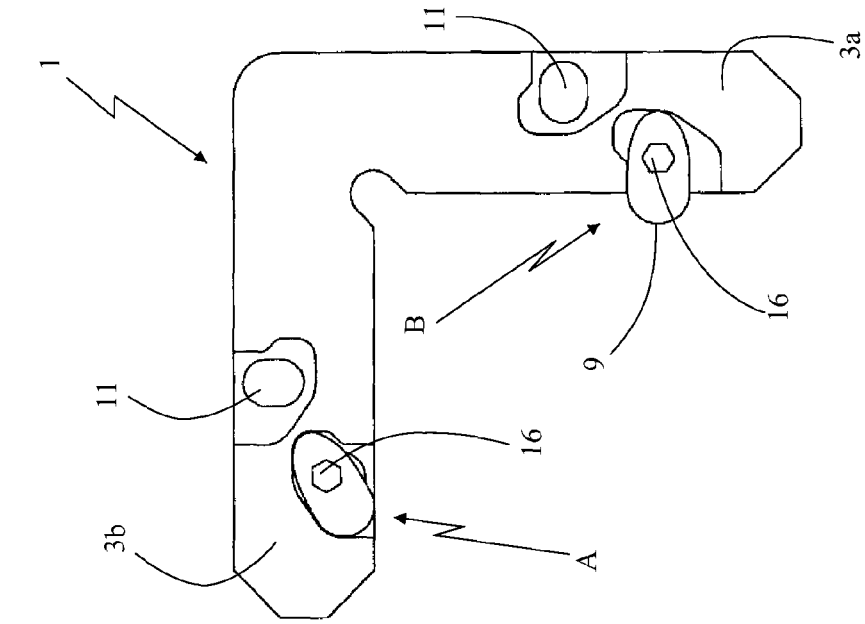


Fig. 17

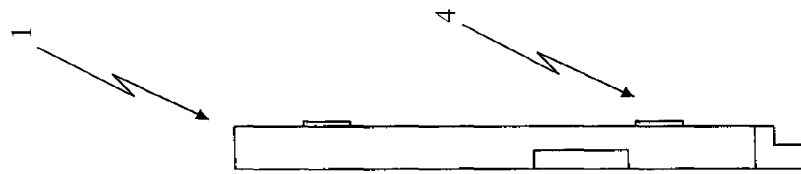


Fig. 18

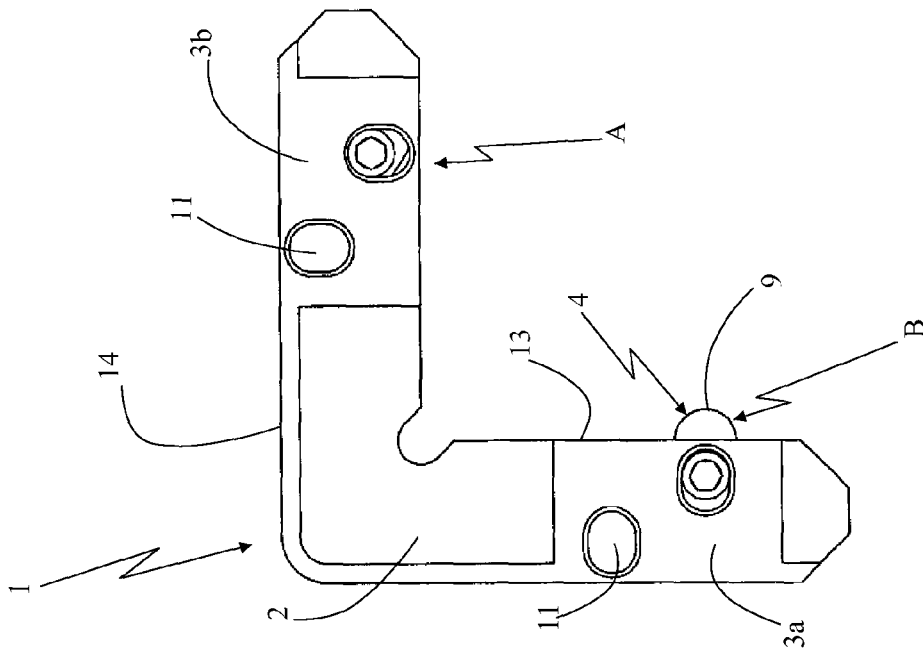


Fig. 16



DOCUMENTS CONSIDERED TO BE RELEVANT				
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)	
X	US 4 122 617 A (NIELSEN HELMAR) 31 October 1978 (1978-10-31) * figures 1-4 *	1	INV. E06B3/964	
X	DE 12 52 399 B (METAUX LEGERES [BE]) 19 October 1967 (1967-10-19) * figures 1,2,5 *	1		
X	EP 1 688 578 A (FLII COMUNELLO S P A [IT]) 9 August 2006 (2006-08-09) * figures 1,2 *	1		
D,A	EP 1 048 816 A (L M DEI F LLI MONTICELLI S R L [IT]) 2 November 2000 (2000-11-02) * the whole document *	1-10		
D,A	DE 26 56 958 A1 (UHL GEB GMBH & CO KG) 22 June 1978 (1978-06-22) * the whole document *	1-10		
D,A	US 4 538 936 A (ZEIDL HORST J [CA]) 3 September 1985 (1985-09-03) * figures 1-4 *	1-10		TECHNICAL FIELDS SEARCHED (IPC)
D,A	US 4 547 986 A (SHERMAN CHARLES F [US]) 22 October 1985 (1985-10-22) * figures 1-6 *	1-10		E06B A47G
A	DE 20 2005 006847 U1 (HIRSCH BODO [DE]) 28 July 2005 (2005-07-28) * figures 1-3 *	1-10		
The present search report has been drawn up for all claims				
Place of search Munich		Date of completion of the search 12 February 2008	Examiner Merz, Wolfgang	
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document		

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EPO FORM 1503 03.02 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.

EP 07 11 8306

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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12-02-2008

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 4122617	A	31-10-1978	NONE
DE 1252399	B		NONE
EP 1688578	A	09-08-2006	NONE
EP 1048816	A	02-11-2000	AT 210240 T 15-12-2001 DE 60000035 D1 17-01-2002 DE 60000035 T2 29-08-2002 ES 2169018 T3 01-07-2002 IT RN990011 A1 30-10-2000 PT 1048816 T 31-05-2002
DE 2656958	A1	22-06-1978	AT 367508 B 12-07-1982 AT 888377 A 15-11-1981 CH 625309 A5 15-09-1981
US 4538936	A	03-09-1985	NONE
US 4547986	A	22-10-1985	CA 1208014 A1 22-07-1986 DE 3380051 D1 20-07-1989 EP 0117361 A2 05-09-1984
DE 202005006847	U1	28-07-2005	NONE

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- EP 1048816 A [0017] [0019] [0022]
- DE 2656958 [0023]
- US 4538936 A [0023]
- DE 4369274 [0023]
- US 4547986 A [0023]