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(54) **Device for adjustably mounting a panel**

(57) A device for adjustably mounting a panel to a positionally fixed support structure, comprising;

a pair of mounting pieces (1a,1b), each mounting piece having a mounting surface (2a,2b) which has a profile complementary to that of the panel and/or the mounting surface of the fixed support structure;

means (10a,10b) for mounting the mounting surface (2a,2b) of a mounting piece to that of the fixed support;

means (4a,4b,5a,5b,6) for connecting the mounting pieces (1a,1b) to each other in such a manner that their separation can be adjusted and made different along the length of the mounting pieces (1a,1b).

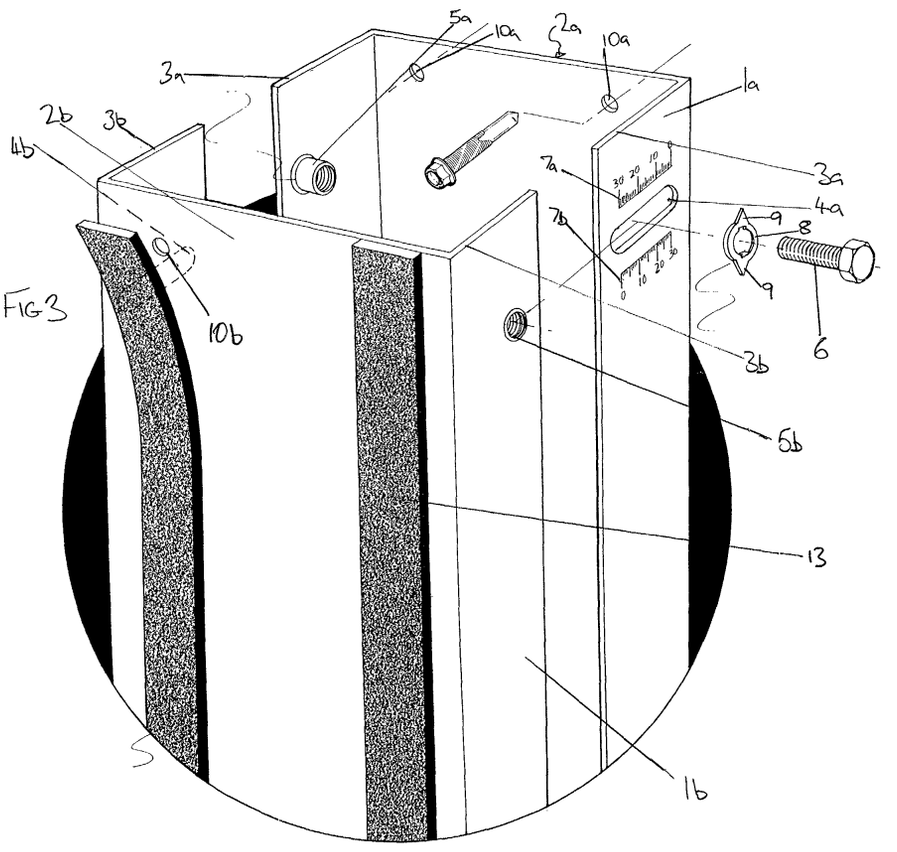

FIG 3

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Description

[0001] This invention relates to an apparatus for improving or adjusting the alignment of panels along a series of supports. In particular, the invention relates to such a device for use in the structural engineering, for example in building construction or room dividing.

[0002] It is well known that buildings or rooms can be fabricated by the setting of a plurality of support posts in a set line or predetermined curvature, and affixing panels to the support posts. One problem with this approach is that it is difficult to align the posts with 100 per cent accuracy, and whilst they may appear correctly aligned to the naked eye, there inevitably occurs some misalignment of the order of millimetres. When panels, which have been engineered to higher tolerances, are positioned for fixing to the posts, misalignments of just a few millimetres can result in a clearly visible distortion in the flatness or curvature of the surface subsequently assembled from the panels.

[0003] The present invention aims to alleviate these alignment problems and enable the engineer or builder to construct a structure with accurately aligned surfaces.

[0004] In accordance with the present invention, there is provided a device for adjustably mounting a panel to a positionally fixed support structure, comprising:

a pair of mounting pieces, each mounting piece having a mounting surface which has a profile complementary to that of the panel and/or the mounting surface of the fixed support structure;

means for mounting the mounting surface of each mounting piece to that of the fixed support;

means for connecting the mounting pieces to each other in such a manner that their separation can be adjusted and optionally made different along the length of the mounting pieces.

[0005] Conveniently, where the device is for connecting flat panels to flat support structures, the mounting pieces each comprise a substantially U-shaped cross section channel. Such shapes are known to be structurally quite rigid thereby providing a more rigid fixing for the structure. The two U-shaped cross section channels may be of approximately the same dimensions but optionally, one is slightly smaller than the other in a pair to enable the smaller to be slid between the limbs of the larger "U".

[0006] Preferably, each pair of mounting pieces and the means for connecting them are suitably configured so as to permit the separation of a pair to be variable at opposing ends of the mounting pieces, this enables a second degree of misalignment adjustment to be correctable, for example, where a support structure is not only out of line with the others in the plurality, but is angled slightly to the plane in which the panels are to be aligned. The suitably configured device can be adjusted to compensate not only for variances in position of adjacent support structures along a target base line, but also for variances in their tilt from a plane passing through the target base line.

[0007] Suitable means for connecting a pair of mounting pieces include, but are not strictly limited to; complementing grooves and indentations on opposing pairs; slot and sliding bolt arrangements; complementary snap fit connections and/or permanent fixings such as rivetting, adhesion or welding once the pair has been appropriately positioned.

[0008] Where a slot and sliding bolt arrangement is used, a scale may be incorporated adjacent the slot on the outer surface of the mounting piece. In addition, a washer may be incorporated between the bolt and slot, the washer being provided with one or more radial protrusions in the form of pointers. These radial protrusions can be used with the scale to accurately position a mounting device a preselected separation from it's pair.

[0009] In one convenient arrangement, the device of the invention may comprise a pair of identical U-shaped cross section mounting pieces each having at one end a pair of slots on opposing limbs, and at the other end a pair of opposing threaded orifices for receiving a screw threaded bolt. The orifices and slots are all spaced the same distance from the edges of the mounting piece such that, when a pair are positioned together, with one inverted with respect to the other, they can be connected at each end by insertion of a bolt through the slot of the first of the pair and received in the threaded orifice of the second of the pair. Where a scale is incorporated adjacent the slots, the separation at either end of the device can be accurately set so as to accommodate any linear or angular misalignment of the structure to which a panel is to be mounted.

[0010] The mounting surfaces of the mounting devices, may optionally further be provided with coatings or strips of sealant material. Equally or alternatively, insulating strips or coatings may be incorporated on one or more surfaces of either, or both of the mounting pieces.

[0011] Preferred materials for the devices are structural grade steels or aluminium. Other materials may equally be used subject to their being of suitable strength to hold the weight of mounted panels without deformation, and to their being compatible with any environment in which they may be placed (i.e. not likely to lose structural integrity or form in that environment.

[0012] Whilst much of this general description has been directed to flat panels and supports, it is to be understood that the invention can equally be applied to curved panels and supports, provided the mounting pieces of the device are provided with suitably complementary shaped surfaces to allow their mounting flush with the support and panel. Also, whilst much of this general description has been directed to the use of mounting pieces comprising substantially U-shaped cross section channels, it is to be understood that the devices

need neither be U-shaped or channels. Provided the mounting pieces are provided with suitably complementary shaped surfaces to allow their mounting flush with the support and panel, the shape of the remainder of a mounting piece is not crucial. In some arrangements, mounting pieces may be shaped with complementary male and female internal surfaces, to assist in connection, alignment and/or stability. Alternatively, the mounting pieces may comprise closed hollow cross sections or solid prismatic cross sections. In the latter case, the opposing internal faces may be identically shaped or complemtarily shaped. Various suitable arrangements will no doubt occur to the skilled addressee without the need for inventive application.

[0013] For the purposes of this specification, the term "panel" is to be interpreted broadly to include *inter alia* planar pieces of a variety of materials, such as metals, plywood, chipboard, MDF and the like, whether or not profiled.

[0014] It is to be understood that the devices of the invention may be used in applications where panels are to be aligned in a level manner, whether that alignment is in a vertical or horizontal plane or any angle between horizontal and vertical.

[0015] One embodiment of the invention will now be described by way of example with reference to the following Figures in which;

Figure 1 shows the schematically, the distorted faceting effect often resulting from poorly aligned supports;

Figure 2 shows schematically how a plurality of devices according to the invention may be used to overcome the problem illustrated in Figure 1 above;

Figure 3 shows a first embodiment of the invention in closer detail;

Figure 4 shows a second embodiment of the invention in closer detail;

Figure 5 shows generally how a device according to the invention may be incorporated into a panelled building structure.

[0016] As can be seen from Figure 1, a misalignment of just a few millimetres can result in a visible faceting of panels (P) fixed to adjacent support structures (S). As can be seen from Figure 2, positioning of a device according to the invention between each support structure (S) and a panel (P) mounted thereto, the alignment errors can be corrected providing a flush alignment of the panels and a smooth finish to the external surface of the panelled structure.

[0017] As shown in Figure 3, a device of the invention consists of two identical, square edged, U-shaped cross section channels (1a, 1b) (the mounting pieces), each having a mounting surface (2a, 2b) and limbs (3a, 3b). Towards an edge of a first limb (3a, 3b) is provided a slot (4a, 4b). On the opposing limb (3a, 3b) of the same mounting piece (1a, 1b), is provided a screw threaded orifice or sheet nut (5a, 5b) for receiving a threaded bolt (6).

[0018] Above and below the slot is provided a millimetre scale (7a, 7b). A first scale (7a) may be read from right to left and the second (7b) from left to right. This enables the device to be positioned in relation to a choice of reference points. A washer (8) for positioning between the slot (4a) and the head of the bolt (6). The washer is provided with a pair of diametrally opposed, pointed radial protrusions (9). These protrusions can be aligned with the scales (7a, 7b) to allow an accurate reading of the scale to be made when adjusting the separation ofthe two mounting pieces. The mounting surfaces (2a,2b) are each provided with screw holes (10a, 10b) via which they may be mounted to the support structure (not shown). Strips of foam sealant strip (13) are added to the surface (2b) of the device, to which the panel (not shown) will be mounted.

[0019] As shown in Figure 3 (a), a pair of identical mounting devices (1a, 1b) may be put together with each having the outer surface of one limb (3a, 3b) facing the inner surface of a limb of the other piece and each having one limb with an outer surface exposed to the surrounding environment. Figure 3(b) shows in more detail, the arrangement of the scales (7a, 7b) adjacent a slot.

[0020] Figure 4 shows an alternative embodiment which is broadly similar to that described in relation to Figure 3 but incorporates some design variations in the shape and dimensions of the mounting pieces (2a, 2b). In this arrangement a male piece (1a) is dimensioned such that it's limbs (3a) can fit within the limbs (3b) of a female mounting piece (1b). The male mounting piece (1a) has on it's mounting surface (2a) a longitudinally extending indentation (11) positioned centrally of two screw holes (10a) via which the piece (1a) can be mounted to a support structure (not shown). The indentation forms a rectangular channel with the surface of the support structure to which it is mounted, which channel may be filled with insulating, soundproofing or other such materials. Alternatively, the channel may be used for the passage of utilities pipes or communications lines.

[0021] The female mounting piece (1b) is provided with a pair of longitudinally extending indentations (12) into which sealant strips (13) may be located thereby providing an improved barrier to the ingress of moisture. As the mounting devices (1a, 1b) in this embodiment are clearly designed to be paired male to female, only a single scale (7) is needed. In this embodiment the scale (7) is provided on the limb (3a), the edge of limb (3b) is used as a cursor for the scale as the two pieces are brought together. Figure 4(a) shows a male and female pair of mounting devices fitted together at their

closest separation.

[0022] Finally Figure 5 illustrates a partially constructed panel walled structure. The arrows show the positioning of a device (1) according to the invention.

Claims

1. A device for adjustably mounting a panel (P) to a positionally fixed support structure (S), comprising;

   a pair of mounting pieces (1a, 1b), each mounting piece having a mounting surface (2a, 2b) which has a profile complementary to that of the panel (P) and/or the mounting surface of the fixed support structure (S);
   means (10a, 10b) for mounting the mounting surface (2a, 2b) of a mounting piece to that of the fixed support (S);
   means (4a, 4b, 5a, 5b, 6) for connecting the mounting pieces (1a,1b) to each other in such a manner that their separation can be adjusted and made different along the length of the mounting pieces (1a,1b).

2. A device as claimed in claim 1 **characterised in that** mounting pieces (1a, 1b) each comprise a substantially U-shaped cross section channel.

3. A device as claimed claim 1 or claim 2 **characterised in that** the two mounting pieces (1a, 1b) are substantially identical in form.

4. A device as claimed in claim 1 or claim 2 **characterised in that** the two mounting devices are provided in a male (1a) and female (1b) configuration allowing one to be receivable at least partially within the other.

5. A device as claimed in any preceding claim **characterised in that** the means (4a, 4b, 5a, 5b, 6) for connecting the mounting devices (1a, 1b) are suitably configured so as to permit the separation of a pair of mounting devices to be variable at opposing ends of the mounting pieces, thereby enabling a second degree of misalignment adjustment to be corrected.

6. A device as claimed in any preceding claim **characterised in that** at least one of the mounting pieces is provided with a slot (4a, 4b) in a limb (3a,3b) close to an end, and at least the pair to the said one mounting piece is provided with a threaded orifice (5a,5b) for receiving a screw threaded bolt (6).

7. A device as claimed in claim 6 **characterised in that** the mounting pieces are a pair of identical substantially U-shaped cross section pieces each having at one end a pair of slots (4a, 4b) on opposing limbs, and at the other end a pair of opposing threaded orifices (5a, 5b) for receiving a screw threaded bolt (6), the orifices and slots all being equi-spaced from the edges of the mounting pieces (1a, 1b) such that, when a pair of mounting devices are positioned together, with one inverted with respect to the other, they can be connected at each end by insertion of a threaded bolt (6) through the slot (4a, 4b) of the first of the pair and received in the threaded orifice (5a, 5b) of the second of the pair and/or insertion of a threaded bolt through the slot of the second of the pair and received in the threaded orifice of the first of the pair .

8. A device as claimed in claim 6 or claim 7 **characterised in that** at least one scale (7a, 7b) is provided adjacent the slot (4) to permit more accurate adjustment of the separation of the mounting pieces.

9. A device as claimed in claim 8 **characterised by** a washer (8) being provided with one or more radial protrusions (9) in the form of a pointer which may be used to locate position on the scale (7).

10. A device as claimed in any preceding claim **characterised in that** one or both of the mounting surfaces (2a, 2b) of the mounting devices (1a, 1b), are provided with coatings or strips of sealant material (13) and/or strips or coatings of insulating material.

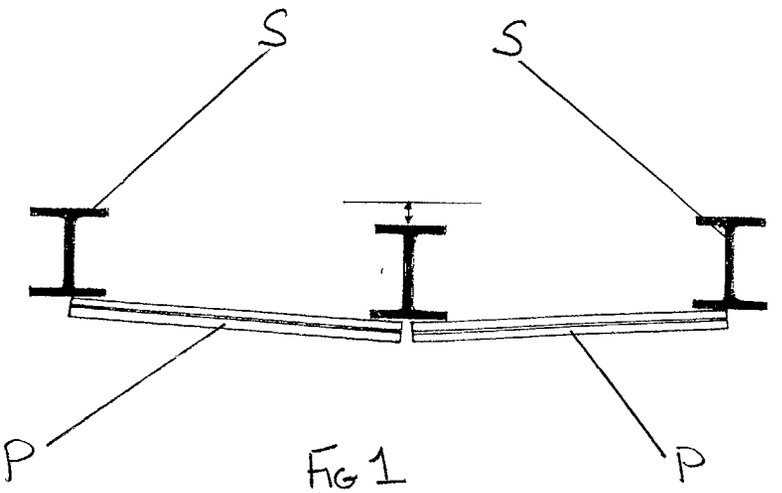

FIG 1

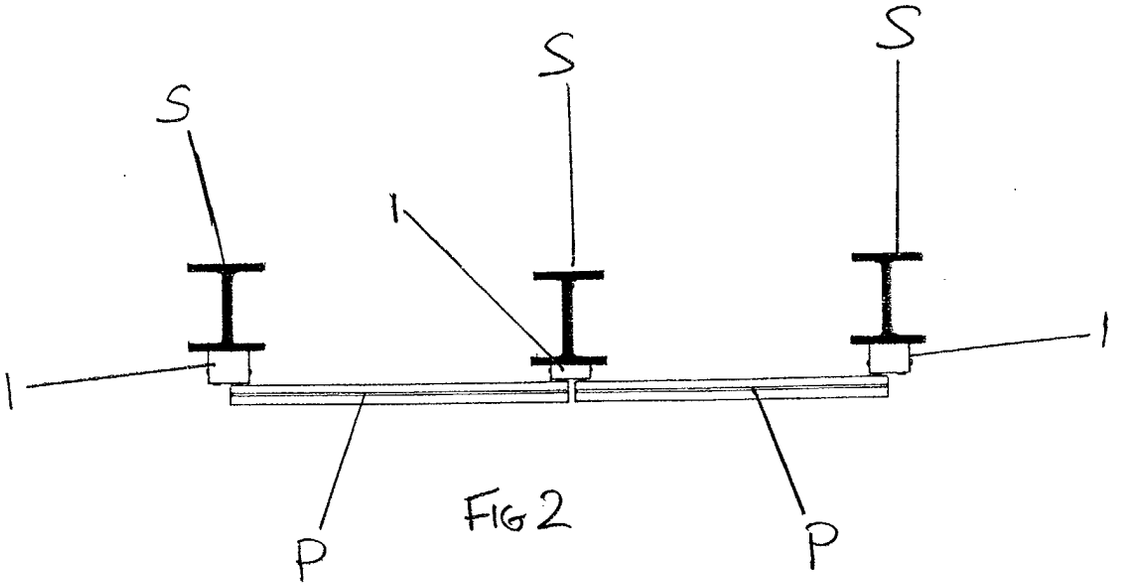

FIG 2

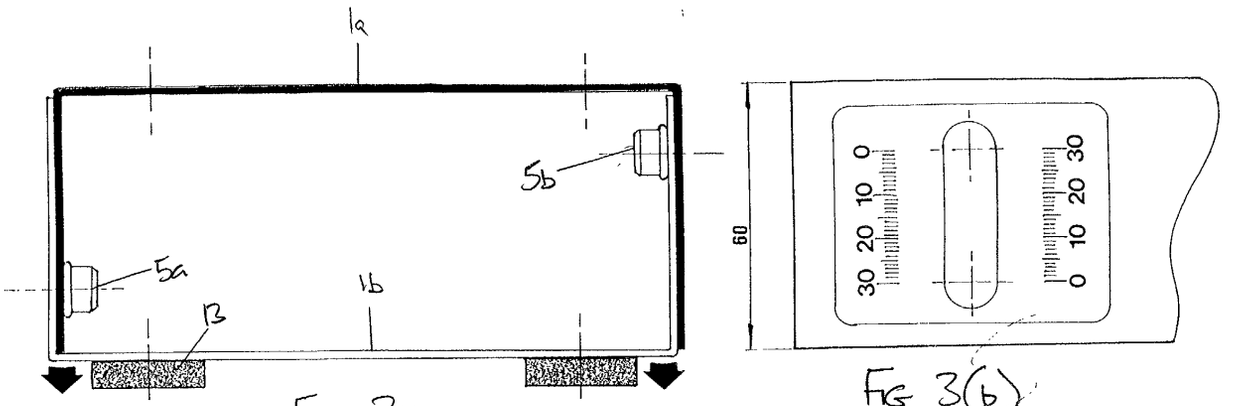

FIG 3(c)

FIG 3(b)

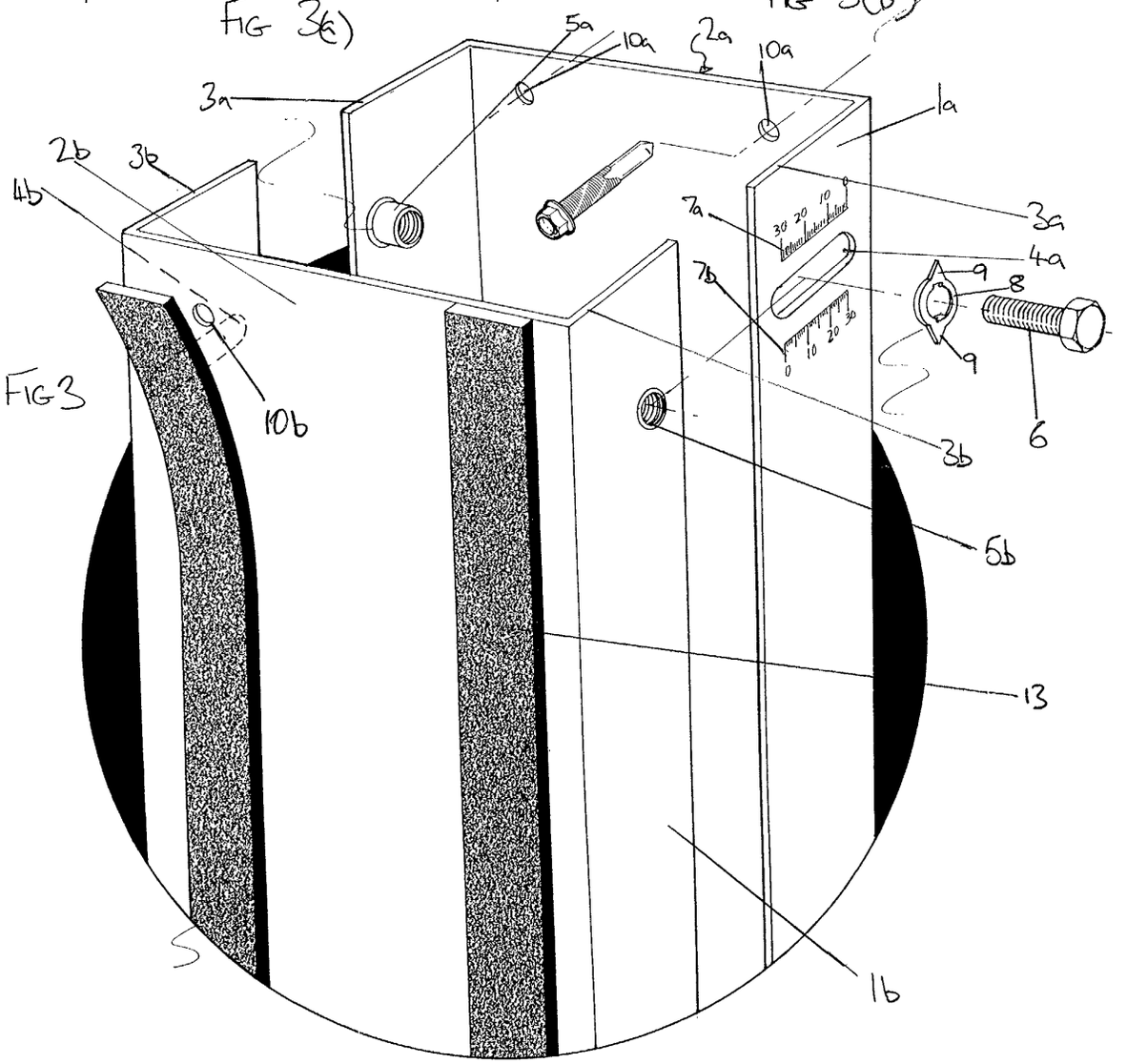

FIG3

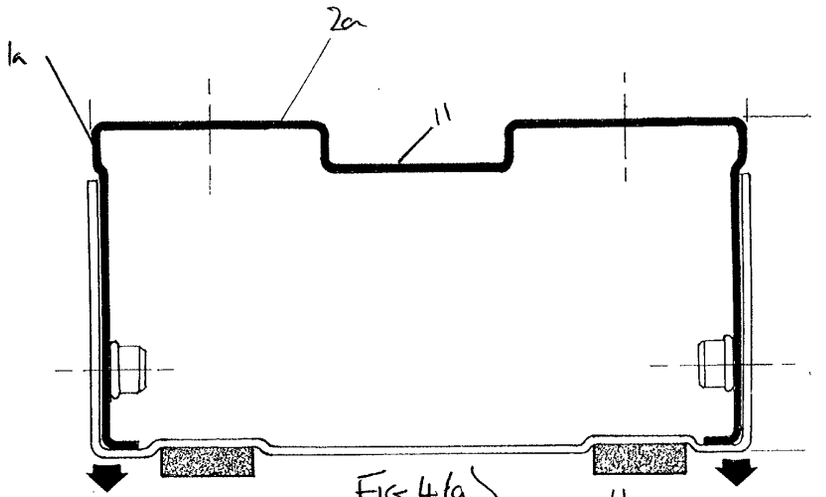

FIG 4(a)

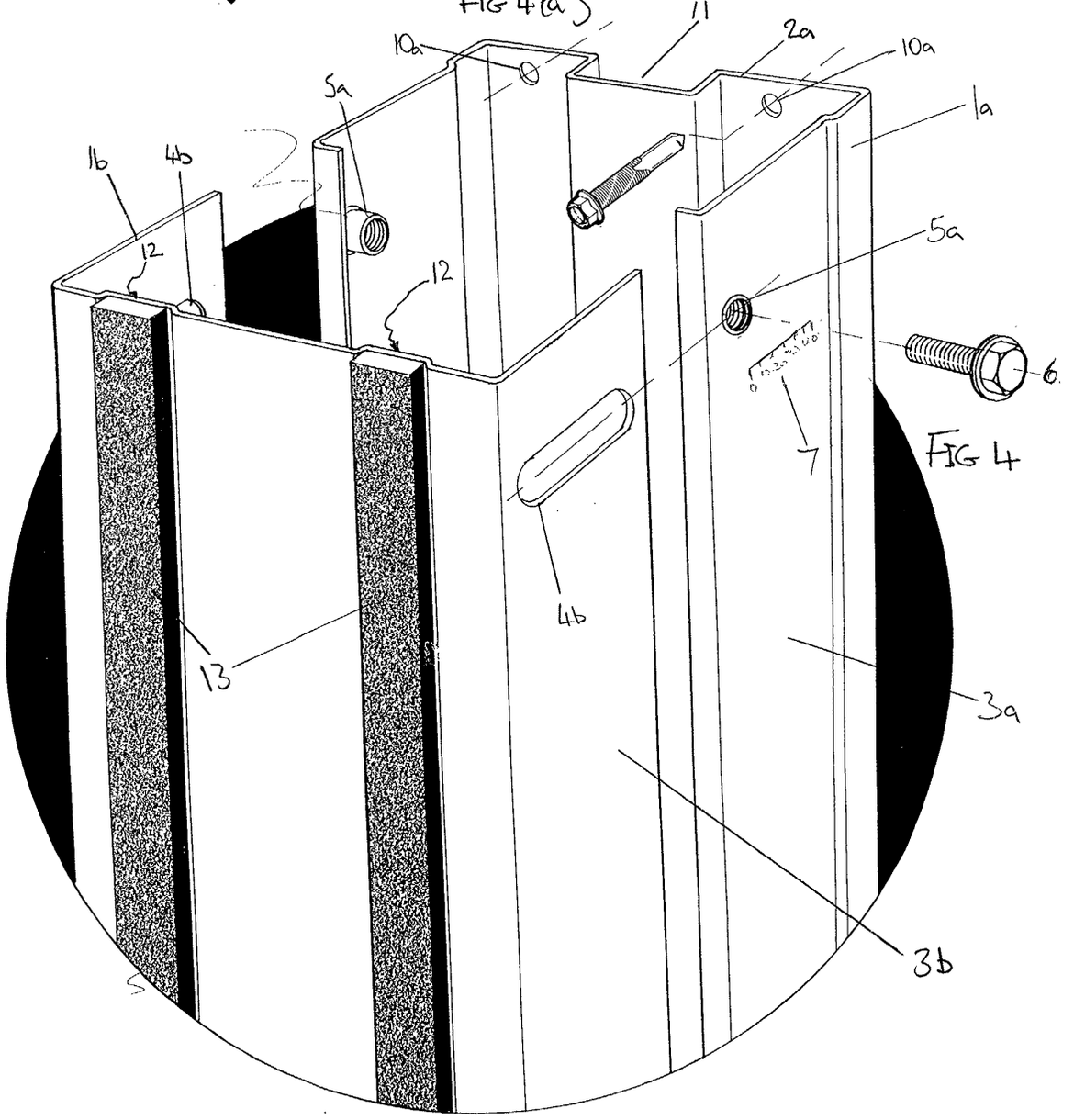

FIG 4

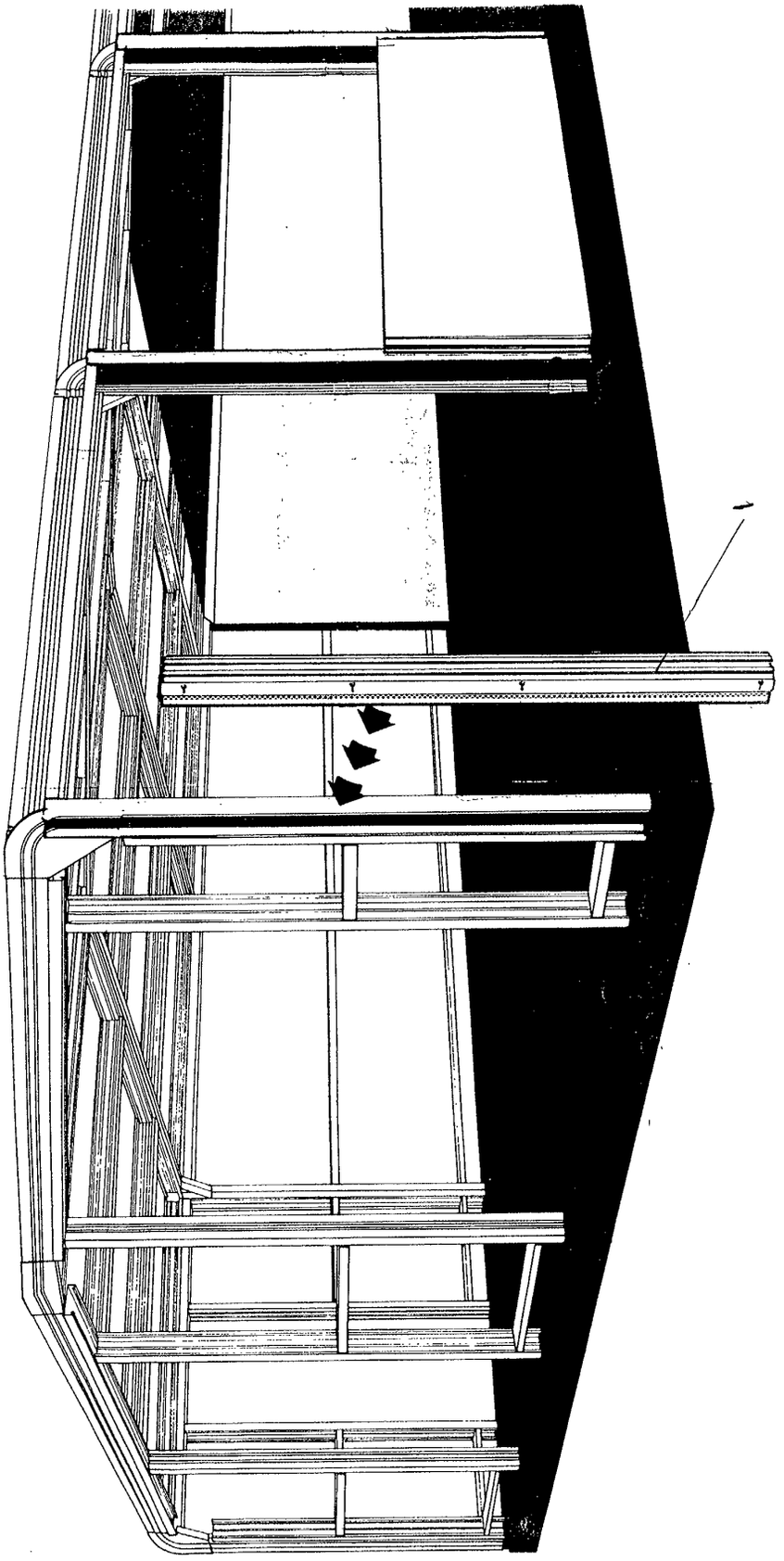

FIG 5

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 01 30 9418

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
X	DE 296 10 367 U (MURJAHN AMPHIBOLIN WERKE) 28 November 1996 (1996-11-28) * page 14; figures 1-3 *	1-6,10	E04F13/08
X	EP 0 052 158 A (ICKLER AG) 26 May 1982 (1982-05-26)	1-6	
Y	* page 5 - page 6; figures 1,3,4 *	7	
X	DE 40 24 579 A (HOHMANN CHRISTOPH) 6 February 1992 (1992-02-06)	1-6	
Y	* figures 1-8 *	7	
X	EP 0 006 245 A (HAASE WALTER) 9 January 1980 (1980-01-09) * figure 2B *	1,5	
A	EP 0 329 060 A (BWM DUEBEL & MONTAGETECH) 23 August 1989 (1989-08-23) * figures 2,8 *	1,10	
A	DE 196 53 672 A (BERGER ROBERT DIPL ING) 25 June 1998 (1998-06-25) * figure 1 *	1	TECHNICAL FIELDS SEARCHED (Int.Cl.7) E04F

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
MUNICH	11 March 2002	Bouyssy, V

CATEGORY OF CITED DOCUMENTS

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11-03-2002

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
DE 29610367 U	28-11-1996	DE 29610367 U1	28-11-1996
EP 0052158 A	26-05-1982	EP 0052158 A1	26-05-1982
DE 4024579 A	06-02-1992	DE 4024579 A1	06-02-1992
EP 0006245 A	09-01-1980	DE 2827148 A1	03-01-1980
		DE 7902266 U1	13-06-1979
		AT 159 T	15-09-1981
		EP 0006245 A1	09-01-1980
		NL 7901247 A	21-08-1979
		AT 4000 T	15-07-1983
		EP 0026495 A2	08-04-1981
EP 0329060 A	23-08-1989	DE 8802075 U1	31-03-1988
		DE 8809236 U1	20-10-1988
		AT 67815 T	15-10-1991
		DE 58900309 D1	31-10-1991
		EP 0329060 A2	23-08-1989
		ES 2025823 T3	01-04-1992
		NO 890679 A ,B,	21-08-1989
DE 19653672 A	25-06-1998	DE 19653672 A1	25-06-1998

EPO FORM P0459

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