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(54) **Support arrangement for use in the construction of a foundation raft**

(57) A support arrangement for use in the construction of a low level beam or a wall for a building or other superstructure, the support comprising: a support angle having: a base member for, in use, supporting one or more building blocks; a support member arranged at substantially 90° with respect to the base member; and

a plurality of support gussets extending from one side of the support member, through the support member and engaging on the other side of the support member with the base member to support the base member and to reduce relative movement between the support member and the base member.

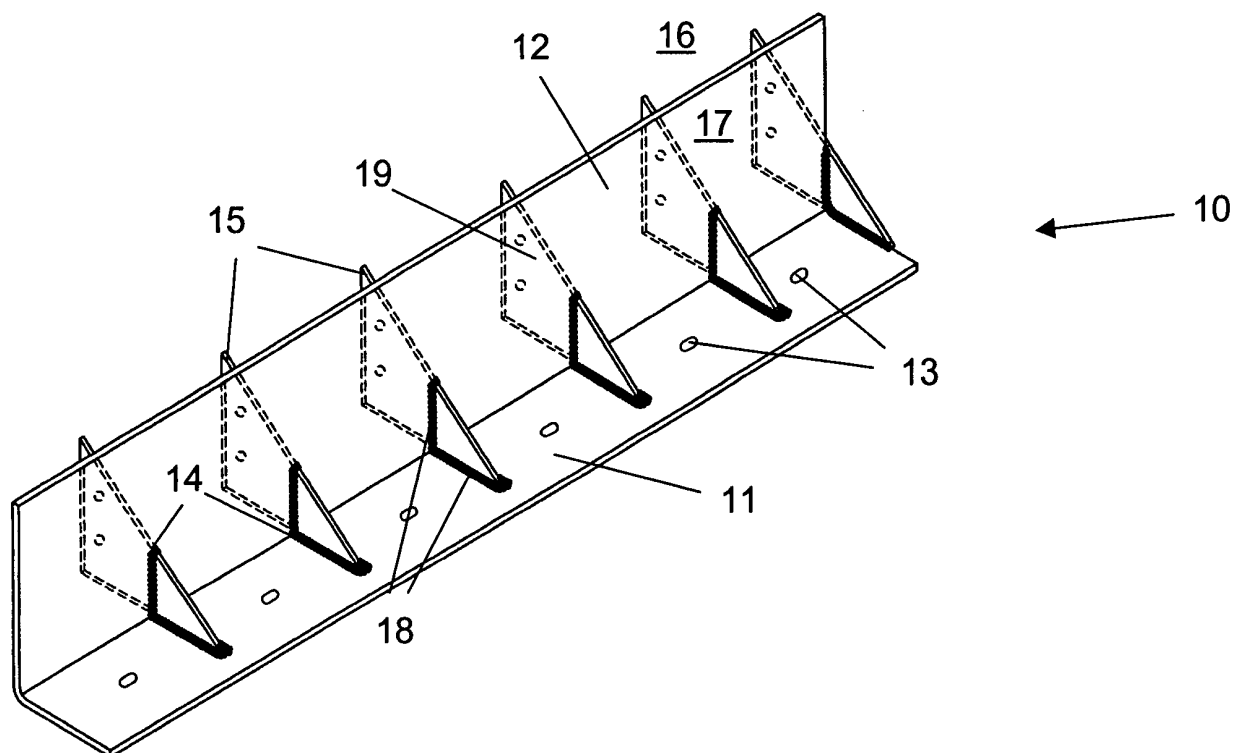


Figure 1

Description

[0001] This invention relates to a support arrangement for use in the construction of a low level beam or concrete foundation raft and, in particular, to foundation rafts or beams which are spaced from the ground.

[0002] When building on ground, which is liable to subsidence or heave, it is well known to erect the building or other superstructure on a raft or beam, itself supported by piles, with the underside of the raft spaced above the ground by a void or compressible material. The raft or beam is typically cast in situ and is typically formed by pouring concrete or other settable material into formwork which defines the desired shape of the beam or raft. Typically, this formwork takes the form of temporary shuttering, usually formed from wood.

[0003] Once the settable material of the raft or beam has cured sufficiently, the shuttering is removed and a separate support angle is provided around the edge of the raft or beam such that the appropriate wall or other blockwork can be built upon the support. The support itself is typically placed on timber decking on which the raft or beam has been constructed.

[0004] It has been found that, as the size of the buildings increases, the size and strength of the support angle must increase significantly in order that it can still adequately support the blockwork. However, as these support angles are typically formed from stainless steel, there is a significant cost increase as the thickness of the base member of the support angle has to increase to accommodate the load from taller and heavier buildings. A known support angle is disclosed in our earlier patent applications GB 2382086 and EP 1310601.

[0005] It is an aim of the present invention to provide a support arrangement which overcomes the problem described above.

[0006] According to the present invention, there is provided a support arrangement for use in the construction of a low level beam or a wall for a building or other superstructure, the support comprising:

a support angle having:

a base member for, in use, supporting one or more building blocks;
a support member arranged at substantially 90° with respect to the base member; and

a plurality of support gussets extending from one side of the support member, through the support member and engaging on the other side of the support member with the base member to support the base member and to reduce relative movement between the support member and the base member.

[0007] Thus, the present invention provides a support arrangement in which the base member of the support angle, on which building blocks, such as the external

wall of a building, are supported, is provided with additional support from gussets which engage with the base member, which, in use, is preferably substantially horizontal, thereby ensuring that the thickness of the support angle can be minimised, thereby reducing costs.

[0008] The support gussets may additionally engage with the support member which, in use, is preferably substantially vertical.

[0009] Preferably, adjacent support gussets are spaced to accommodate a building block therebetween. The term "building block" is intended to cover any form of building blocks such as a standard house brick, a breeze block, concrete slab or other like building material.

[0010] The support gussets preferably include a securing portion extending away from the one side of the support member such that, in use, the securing portion engages with the low level beam. The support arrangement of the present invention is particularly useful in this form as it can act also as permanent shuttering to the low level beam during its construction and, when the support gussets include a securing portion, the settable material from which the beam is formed passes around the securing portion, thereby providing additional support to the angle. The securing portion is preferably provided with holes into which the settable material of the beam can pass.

[0011] The support gussets may be of any suitable shape, but may be substantially triangular.

[0012] The support gussets are preferably welded to the base member and/or to the support member, but alternatively any form of suitable engagement means, such as screws, bolts or the like may be used.

[0013] The base member preferably includes a plurality of slots, each slot being associated with a respective support gusset which, in use, extends into the slot. Preferably, the support gusset passes through the base member and is provided with a support plate extending substantially parallel to and on the under, outer side of the base member. Such a support plate may be integrally formed with the gusset or, alternatively, may be a separate element engaged, typically by welding, to the support gusset. This additional support plate provides additional support to the base member and helps ensure that the thickness of the base member can be minimised.

[0014] The support gussets may be provided with at least one flap, the flap being substantially adjacent the support member to provide additional support thereto. Preferably, the flap is formed by punching and folding the flap from the support gusset. Alternatively or additionally, one or more screws or studs may be fixed to the support gusset to achieve the same effect. The location of the flap, screw or stud is preferably on the other side of the support member, i.e. the flap helps to support the support member against poured, but not yet set, concrete, when the support angle is being used as shuttering.

[0015] The support gusset may be substantially elongate in the direction from the one side of the support member to the other side of the support member. The end of the elongate support gusset is preferably adapted for simple engagement with the base member, either by welding or some other means, such as the provision of a support plate which may be formed integrally with or be connected to the elongate support gusset.

[0016] By using an elongate support gusset, the support gusset may be inserted into the support angle through, firstly, the base member and then, subsequently, the support member, thereby facilitating insertion of the support gusset whilst the support angle acts as permanent shuttering to the low level beam during its construction. Alternatively, the elongate support gusset may be connected to the support angle before use.

[0017] The securing portion of the elongate support gusset, that is the portion of the support gusset which, in use, is on the one side of the support member and extends into the low level beam or raft, may be corrugated or, alternatively, may include one or more projections from a surface, which, in use, engage with the low level beam in which it is located and increase the support provided.

[0018] The gussets are typically passed through slots formed in the support section and secured to the base member by welding. Further support to the support section may be provided by a small tack weld on the gusset section adjacent to the slot, or tack welded to the support section at this point. An alternative form of support between the gusset and the support member may be a flap or a small screw fixed in a pre-formed hole in the gusset just in front of the support member.

[0019] A further alternative to the above is to form an additional slot in the base member and pass the gusset up through the slots in the base member and the support member. This option would typically be used when support to the base member is provided by a support plate.

[0020] The support member and the base member may be integrally formed or, alternatively, the support gusset and support member may be provided with co-operating slots for engagement, the support member being separate from the base member.

[0021] The support angle and the support gussets are typically formed from 3 or 4mm thick stainless steel, although other thicknesses or suitable materials could be utilised.

[0022] Examples of the present invention will now be described with reference to the accompanying drawings, in which:

Figs. 1 and 1 a show, respectively, a perspective and an end view of one example of the present invention;

Figs. 2 and 2a show, respectively, a perspective and a partial front view of another example of the invention;

Figs. 3 and 3a show, respectively, a perspective and

a partial front view of a third example of the present invention;

Figs. 4, 4a and 4b show, respectively, a perspective view of a fourth example of the present invention and front views of examples of the support gussets used in the fourth example;

Figs. 5, 5a and 5b show, respectively, an end view of a fifth example and views showing the engaging slots in the support member and support gusset used in the fifth example;

Figure 6A and 6B are plan and front elevation views respectively of a further example of the present invention;

Figures 7A and 7B show side views of an elongate support gusset and a support angle; and

Figures 8A and 8B show the engagement of the support gusset with the base member.

[0023] A support angle 10 is shown in Fig. 1. The support angle 10 comprises a base member 11 integrally formed along its longer edge with a support member 12. The base member is provided with a plurality of holes 13 through which suitable fixing means such as screws or nails can be inserted to assist in fixing the base member 11 to, for example, timber decking (not shown).

[0024] The support member 12 is provided with a plurality of slots 14 through which a respective support gusset 15 passes from the one side 16 to the other side 17 of the support member 12. The support gussets 15 are typically triangular in shape as shown, but may be other suitable shapes. The support gussets 15 are, in this example, welded at 18 to both the base member 11 and the support member 12 and are provided with a securing portion 19, which, in use, passes into and engages with the low level beam or foundation raft which is being constructed. The support gussets 15 may, however, be welded only to the base member 11.

[0025] The support member 12 provides support to the concrete of the raft in the temporary condition before curing, the concrete being located on side 16 of the support member. The substantially horizontal base member 11 is used to secure the support 10 in the construction phase, via holes 13, and provides permanent support to the brickwork 3 (see Fig. 2) of a building.

[0026] As can be seen in Fig. 1 a, the support gussets 15 rest on the upper surface of the base member 11 and are welded thereto and to the support member 12 at welding locations 18.

[0027] Figs. 2 and 2a show a perspective view of a further example of the present invention in which one or more of the support gussets 15 are provided with an additional support plate 20. In this example, the support plate 20 is welded to the lower portion of the support gusset 15, but as shown in Figs. 3 and 3a, the support plate 20 may be integrally formed with the support gusset 15. In both examples, the base member 11 is provided with a slot 21 through which the support gusset on which the support plate 20 is mounted can pass. The

support gusset 15 may then be welded in place to the support member 12 or may simply support the base member 11, but not be fixed to it. Adjacent support gussets 15 are spaced so as to accommodate a building block 22 therebetween. As can be seen in Fig.2, the height of the gusset as it passes through the support member 12 is substantially similar to that of the height of the building block 22 which adjacent gusset 15 are spaced to accommodate. This arrangement facilitates easier construction of the second layer of building blocks as the support gussets do not interfere with this second layer of blocks which, in the normal construction, overlap adjacent blocks in the first layer.

[0028] In Figs. 4, 4a and 4b, the provision of flaps 23 or screws 24 can be seen in the support gussets 15. Studs or screws 24 or flap 23 provides lateral support to the support member 12 in the temporary condition, i. e. shortly after pouring of the low level beam or foundation raft, whilst the settable material cures. The flap 23 can be punched from the support gusset 15 and they act also to assist in supporting the support member 12. The flap, screw or stud can be on either or both sides of the support member 12, but are preferably located on at least the other (inner) 17 side of the support member 12. The flap, screw or stud can be on either or both sides of the support gusset 15, as shown in Fig. 5.

[0029] As will be seen from Fig. 5, 5a and 5b the support member 12 may be formed separately from the base member 11 and, in this case, is preferably formed with slots 25 which engage with cooperating slots 26 in support gussets 15. In this example, it is preferable for a flap, stud or screw to be utilised on both sides 16, 17 of the support member 12 to assist in supporting this feature. The gusset may be used in this configuration or may be further secured by welding 26 or by a support plate 20 as described above.

[0030] The securing portions 19 of the support gussets 15 in the above examples are all provided with one or more holes 30.

[0031] Figures 6A and 6B illustrate a further support arrangement 40 having a base member 41 and a support member 42. The base member includes a plurality of holes 43 through which suitable fixing means such as screws or nails can be inserted to assist in fixing the base member 41 to, for example, timber decking.

[0032] A plurality of support gussets 45 pass from one side 46 to the other side 47 of the support member 42. As can be seen in Figures 7A and 7B, the support gussets 45 are elongate and provided with a securing portion 49 which, in use, passes into and engages with the low level beam or foundation raft which is being constructed. In this example, the securing portion 49 is corrugated, but may also be provided with ridges, holes or projections to assist in engaging with the low level beam.

[0033] The support gusset 45 engages with the base member 41 either by welding or, as can be seen in Figures 8A and 8B, the provision of a support plate 50 which may itself be welded to the support gusset, as in Figure

8A, or may be formed integrally with the support gusset, as shown in Figure 8B.

[0034] The support gusset 45 may also be secured to the support member 42 or may be supported at the point at which the gusset passes through the support member, by welding by the provision of a flap or screw 51. The support gusset 15 may be formed from two sections, one on each side of the support member 12. Typically, the two sections are joined, preferably by welding, at the point at which they pass through the support member 12.

[0035] In the example of Figure 8A, slots 52 are formed in the base member 41 to allow the support gusset 45 to pass through the base member and this permits the support gusset to be inserted through the support member, directly into the settable material of the low level raft 53, whilst the settable material is curing. Alternatively, the support gusset may be inserted into the support angle prior to use.

Claims

1. A support arrangement for use in the construction of a low level beam or a wall for a building or other superstructure, the support comprising:

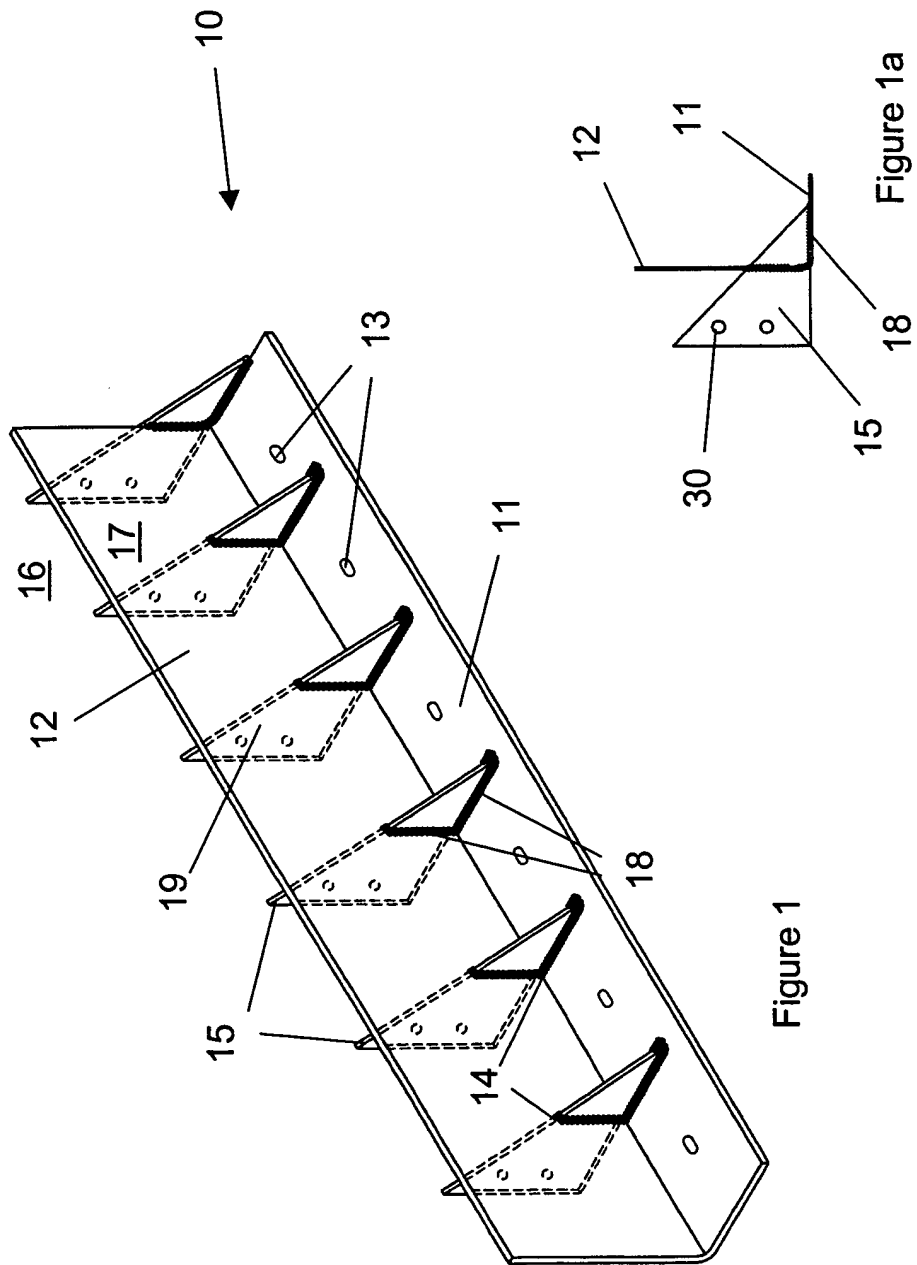
a support angle having:

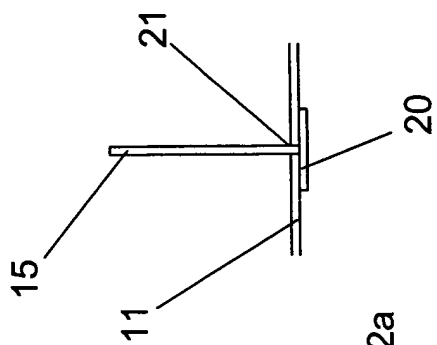
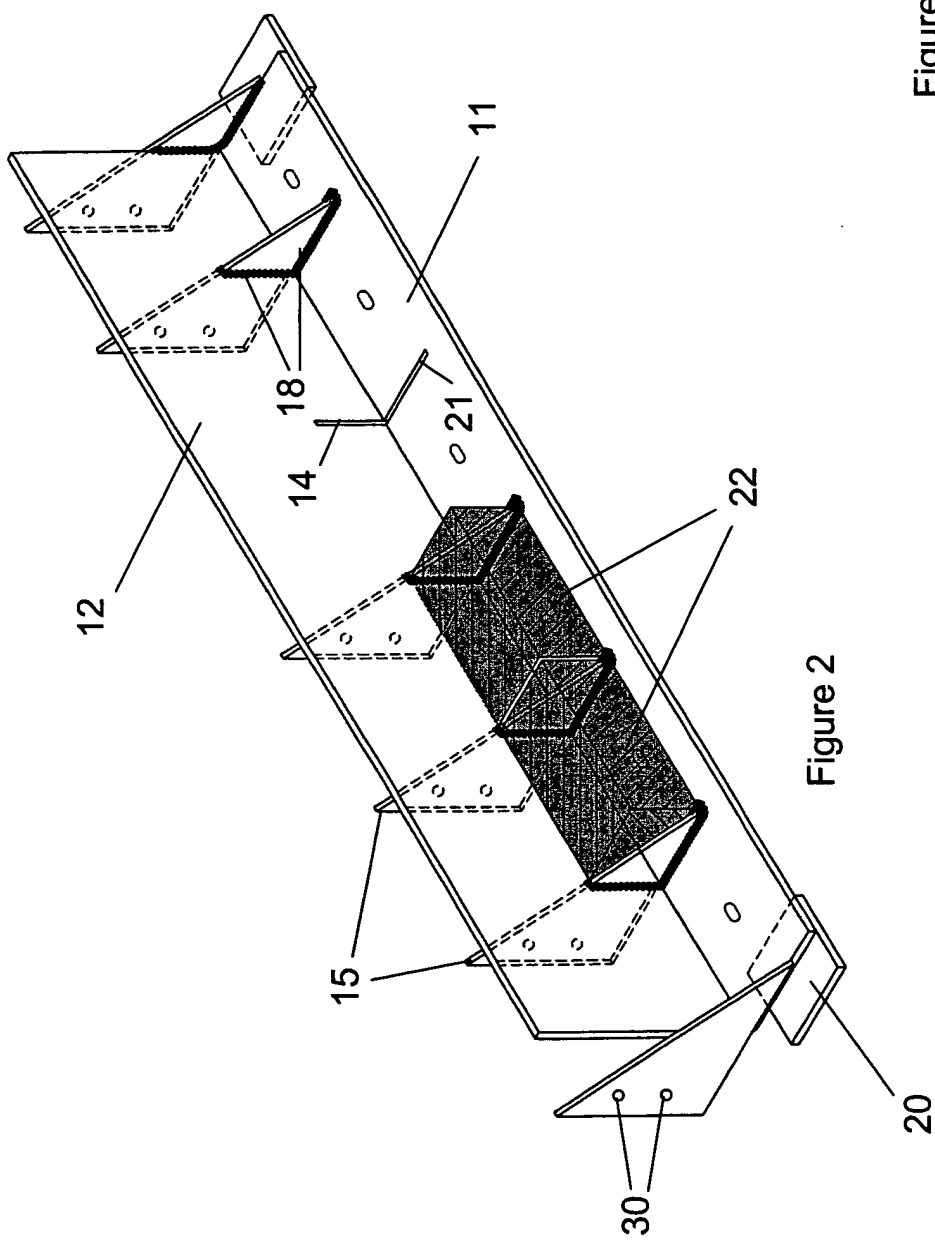
a base member for, in use, supporting one or more building blocks;
a support member arranged at substantially 90° with respect to the base member;
and

a plurality of support gussets extending from one side of the support member, through the support member and engaging on the other side of the support member with the base member to support the base member and to reduce relative movement between the support member and the base member.

2. A support arrangement according to claim 1, wherein the support gussets additionally engage with the support member.
3. A support arrangement according to claim 1 or claim 2, wherein adjacent support gussets are spaced to accommodate a building block therebetween.
4. A support arrangement according to any one of claims 1 to 3, wherein the support gussets include a securing portion extending away from the support member and the base member for, in use, engagement with a low level beam.

5. A support arrangement according to any one of the preceding claims, wherein the support gussets are substantially triangular in shape.
6. A support arrangement according to any one of claims 1 to 4, wherein the support gusset is substantially elongate in the direction from the one side of the support member to the other side of the support member. 5
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7. A support arrangement according to claim 6, wherein the securing portion of the elongate support gusset is corrugated.
8. A support arrangement according to claim 6, wherein the securing portion of the elongate support gusset includes one or more projections from a surface which, in use, engage with the low level beam in which it is located. 15
20
9. A support arrangement according to any one of the preceding claims, wherein the support gussets are welded to the base member and/or the support member. 25
10. A support arrangement according to any one of the preceding claims, further comprising a plurality of slots in the base member, each slot being associated with a respective support gusset which extends into the slot. 30
11. A support arrangement according to claim 10, wherein the support gusset passes through the base member and is provided with a support plate extending substantially parallel to and on the outer side of the base member. 35
12. A support arrangement according to claim 11, wherein the support plate is integrally formed with the gusset. 40
13. A support arrangement according to claim 11, wherein the plate is welded to the support gusset.
14. A support arrangement according to any one of the preceding claims, further comprising at least one flap on each gusset, the flap being substantially adjacent the support member to provide additional support thereto. 45
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15. A support arrangement according to any one of the preceding claims, wherein the gussets and the support member are provided with cooperating slots for engagement. 55





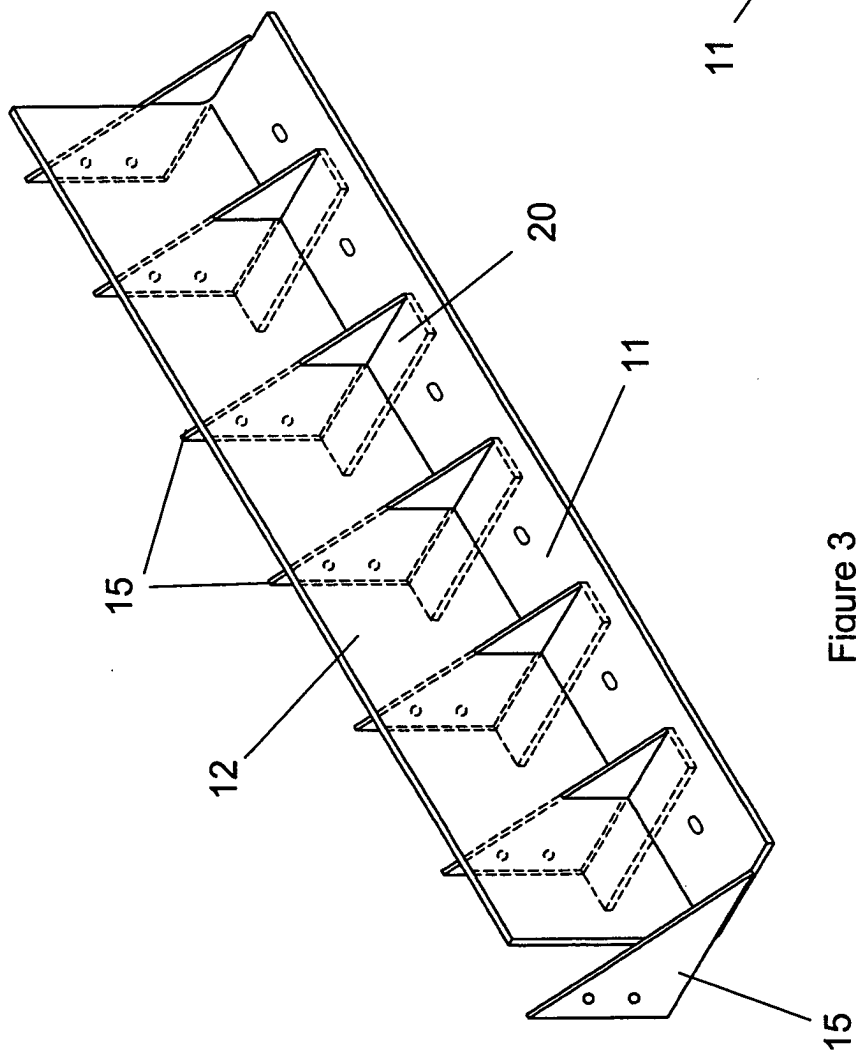


Figure 3

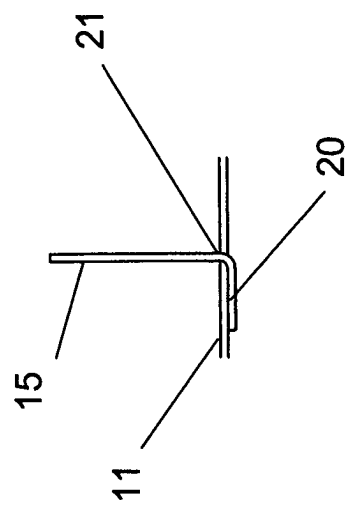


Figure 3a

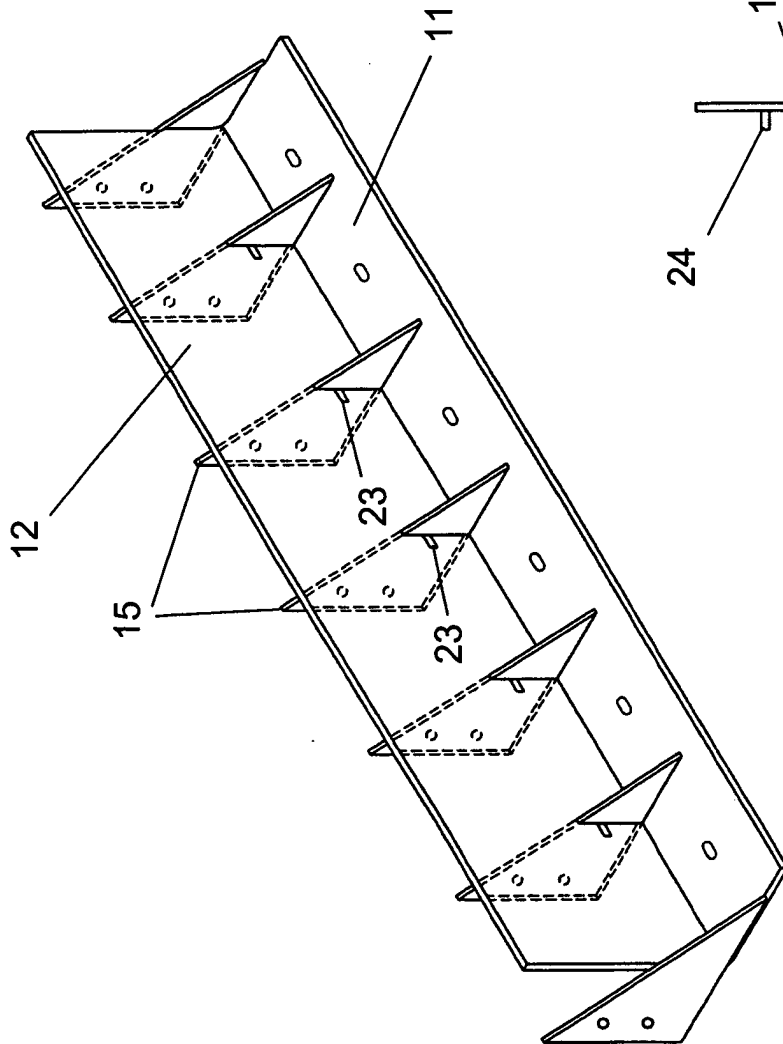


Figure 4

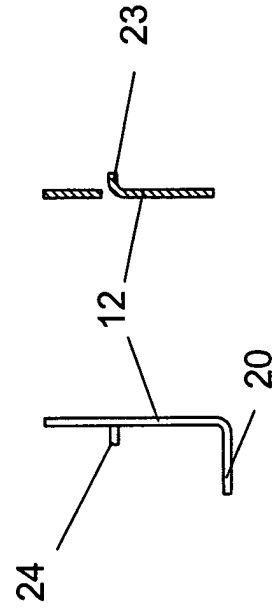
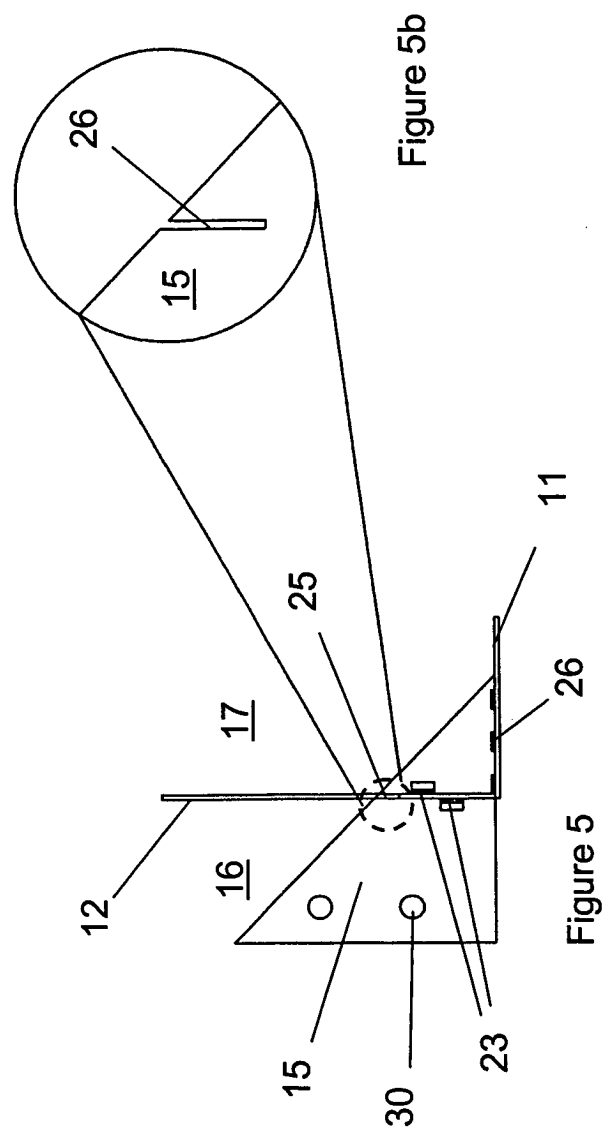
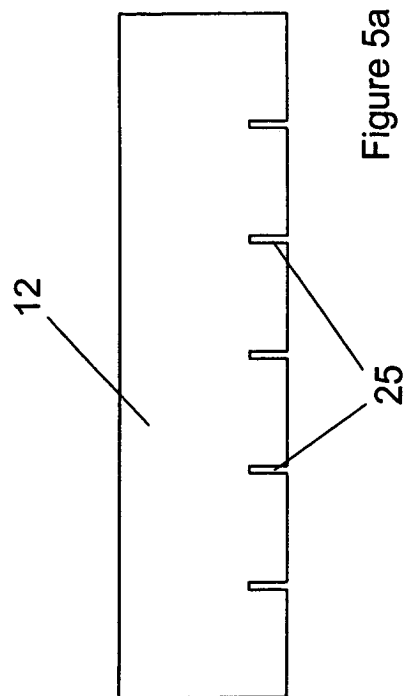
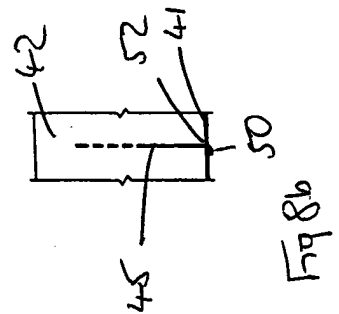
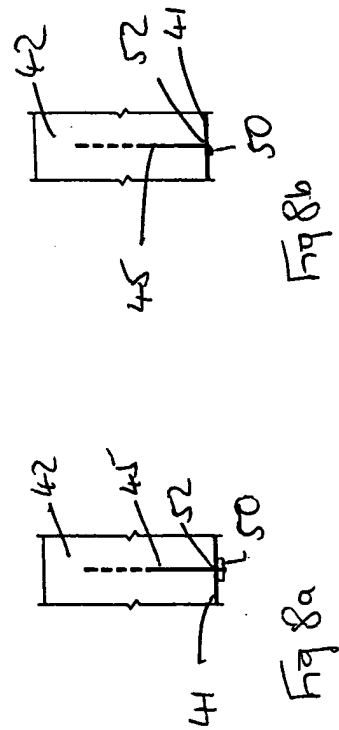
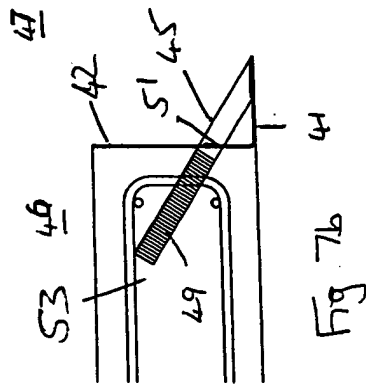
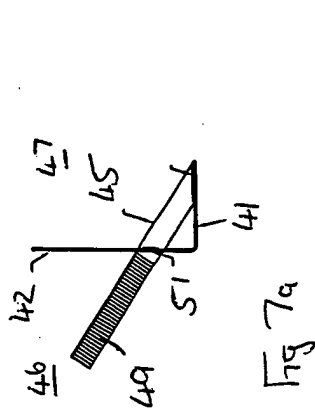
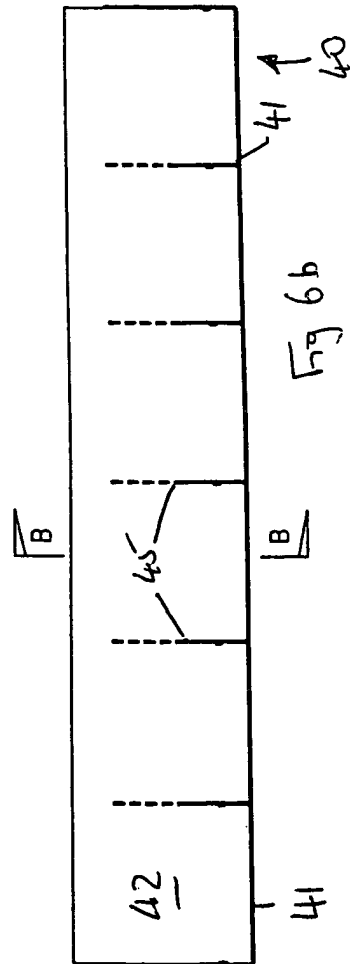
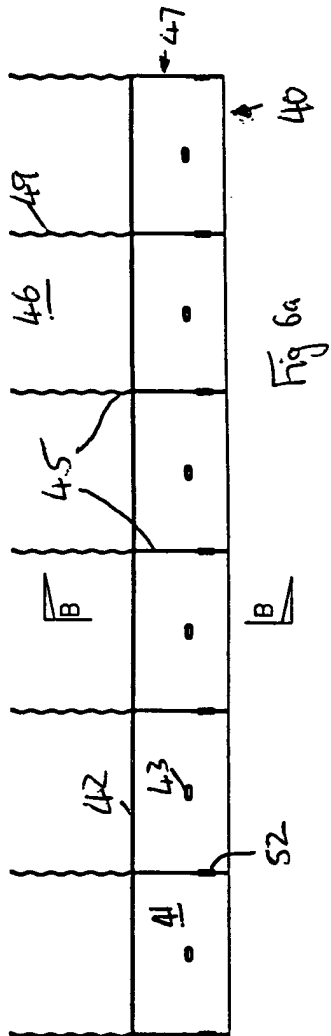


Figure 4a

Figure 4b







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)
D,A	EP 1 310 601 A (ABBEY PYNFORD HOLDINGS PLC) 14 May 2003 (2003-05-14) * paragraph [0025] - paragraph [0040]; figure 14 *	1-15	E02D27/01 E02D27/08 E02D27/02 E04G17/14
A	----- US 4 107 889 A (GONSALVES ET AL) 22 August 1978 (1978-08-22) * column 4, line 35 - column 9, line 9; figures 1,5 *	1-15	
A	----- US 3 819 143 A (BUTTS E,CA ET AL) 25 June 1974 (1974-06-25) * figures 14,15 *	1-15	
A	----- US 3 071 835 A (TUMEY LAWRENCE F) 8 January 1963 (1963-01-08) * column 2, line 7 - column 7, line 44; figure 1 *	1-15	
			TECHNICAL FIELDS SEARCHED (Int.Cl.7)
			E01F E02D E04G
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 7 October 2005	Examiner Geiger, H
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 03.82 (P04C01)

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

EP 05 25 3797

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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07-10-2005

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