

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
9 November 2006 (09.11.2006)

PCT

(10) International Publication Number
WO 2006/117513 A1

(51) International Patent Classification:

E04B 2/10 (2006.01) E04C 5/20 (2006.01)
E04G 21/18 (2006.01)

(21) International Application Number:

PCT/GB2006/001493

(22) International Filing Date: 25 April 2006 (25.04.2006)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:

0508850.5	29 April 2005 (29.04.2005)	GB
0511760.1	9 June 2005 (09.06.2005)	GB
0517718.3	31 August 2005 (31.08.2005)	GB
0524199.7	28 November 2005 (28.11.2005)	GB

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, LY, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SM, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, LV, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

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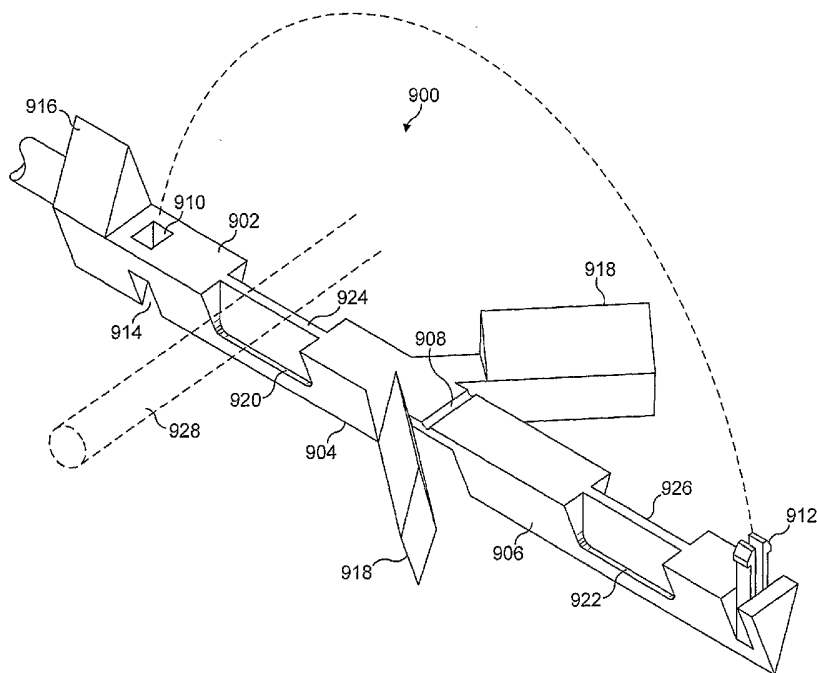
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Published:

— with international search report

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: A MASONRY REINFORCEMENT ELEMENT



(57) Abstract: This invention relates to a masonry reinforcement element comprising upper and lower spacing ends and being configured to locate on a masonry reinforcement structure.

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A MASONRY REINFORCEMENT ELEMENT

The invention relates to a device or devices which support centrally or any other positional requirement, reinforcement or any other structure which is built in to the mortar bed joint in any masonry construction, and support the masonry units until a time where the mortar has become load bearing and/or stable.

This is a typical problem where heavy masonry units are being used, as the weight of these units will only allow a few courses to be laid before the bed joints previously laid compress further and mortar seepage and bed joint reduction will occur.

A similar problem further exists when using lighter dense masonry units where the masonry units do not absorb the moisture from the mortar and will swim and float in the mortar until excessive courses have been laid and again mortar seepage and bed joint reduction will occur.

A similar problem exists when the masonry units are saturated and the mortar is wet again the bed joints will compress and mortar seepage and bed joint reduction will occur. Another problem which occurs is when the bed joint reduction due to the masonry weight or the masonry saturation causes the masonry to miss-align.

For the bed joint reinforcement/structure to actually function it must be encased in mortar and a central location in the bed joint is preferred.

This is a particular problem if the bed joints are beginning to compress under the weight of the masonry units or the reluctance of the masonry units to absorb

the moisture from the mortar the reinforcement/structure could come into contact with the masonry and render it less effective. This is also a problem if the site operatives have not installed the reinforcement/structure correctly and it has not been totally encased in mortar rendering it less effective.

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Accordingly the invention provides reinforcement elements such as support feet. The support feet can be of any shape and size in relation to the particular construction requirements but are typically 10.7mm in height and 23mm in length with a mid section width of 8mm (see Fig. 1). The height of the support feet can vary to accommodate masonry tolerances which will also then allow the user to build to gauge e.g. 10.7mm and 9.0mm or whichever sizes are deemed necessary to achieve gauge height. The support feet can be made with a wide variety of materials such as plastic, ceramics, metal, etc. The support feet can be manufactured using different methods of manufacture relating to the selected material to be used.

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The support feet can be clipped on to the reinforcement or moulded on to the reinforcement or structure, suspending the reinforcement or structure at the optimum requirement in the mortar bed.

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The reinforcement/structure can then be laid onto the masonry or into the mortar and the mortar applied with the masonry units laid onto the mortar with enough pressure to compress the mortar until they come to rest on the supports, the excess mortar then can be removed as normal. The support feet can be clipped on or otherwise located by whatever means to secure them or maintain their position in relation to the reinforcement/structure. The support feet could be over moulded onto the reinforcement/structure or by any other relative manufacturing techniques. The support feet can be used with a wide range of reinforcement/structure sizes and shapes and is not limited in any way if the

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reinforcement/structure are bridging cavities or any other voids. The support feet can be manufactured to suit any angle of support when attached to the reinforcement/structure typically 45 degrees.

Embodiments in the invention will now be described by way of example with
5 reference to the drawings of which:

Fig. 1 shows a support according to a first embodiment of the invention;

Fig. 2 shows a support according to a second embodiment of the invention;

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Fig. 3 shows a support according to a third embodiment of the invention;

Fig. 4 shows a support according to a fourth embodiment of the invention;

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Fig. 5 shows a support according to a fifth embodiment of the invention;

Fig. 6a shows a support according to a sixth embodiment of the invention;

Fig. 6b is an alternative view of the support of Fig. 6a;

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Fig. 7a shows a support according to seventh embodiment of the invention;

Fig. 7b shows an alternative view of the embodiment of Fig. 7a;

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Fig. 7c shows an alternative view of the embodiment of Fig. 7a;

Fig 8 shows a support according to an eighth embodiment of the invention; and

Fig. 9 shows a support according to a ninth embodiment of the invention.

Fig. 1 shows a triangular type support (1.1) supporting the reinforcement centrally at 45 degrees with the V notch clip on type (1.2), with an extended collar (1.3) for additional stability; and

- 5 Fig. 2 shows a spherical type support (2.1) again supporting the reinforcement centrally, with a V notch (2.2) clip on function.

A further embodiment is shown in Fig. 3 in which the support feet or reinforcement element have a generally diamond cross-section tapering from a central width to point or chamfered upper and lower spacing ends together with
10 a cut-out, groove or notch into which the reinforcement structure fits. Fig. 4 is yet another embodiment in which the reinforcement element includes a central core and a plurality of limbs extending therefrom symmetrically. For example four limbs can project symmetrically from the central core such that the
15 reinforcement element is stable whichever three limbs contact a supporting surface. The three supporting limbs straddle the reinforcement structure to locate the reinforcement element and the fourth projects upwardly so as to provide the spacing function required.

20 A further embodiment is shown in Fig. 5 in which the support feet or reinforcement element (5.1) is generally X shaped when viewed from above. Each of the four limbs of the reinforcement element (5.1) has a generally diamond cross-section tapering from a central width to a point or chamfered upper and lower spacing ends. The centre of the X shaped element has a cut
25 out (5.2), groove or notch into which the reinforcement structure fits.

Figs 6A and 6B show yet a further embodiment in which reinforcement elements 600 comprise support feet 602 joined by a crossbar 604. Each support foot is of appropriate configuration for snap fitting or otherwise fitting

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over or onto reinforcement steel rods or wires 608 and hence include an aperture 606. The feet 602 can be of any appropriate configuration for example that described in any of the embodiments described herein. For example the feet 602 may have a diamond cross-section tapering to points top and bottom defining spacing ends. The feet 602 may be mounted at any appropriate orientation to the crossbar 604 for example at a 45 degree angle providing additional stability in use.

In operation the feet are snapped on or moulded onto or otherwise fitted onto reinforcement 604 by push-fitting the orifice 606 over the rods 608. The crossbar then holds the reinforcement rods 608 in an appropriate spaced configuration to act as a masonry support and gauge reinforcement system. As a result no additional crossbars are required between the reinforcement rods 608.

The reinforcement elements 600 can be formed in any appropriate manner for example by moulding, wherein the feet 602 and crossbar 604 are integrally formed of any appropriate plastics material.

An alternative embodiment similar to that shown in Figs 6A and 6B is shown in Figs 7A to 7C. In this case a reinforcement element designated generally 700 and including feet 702 and a crossbar 704 is fitted to reinforcement rods 708 by snapping an orifice 710 over the rods or feeding the rods 708 through the orifice as appropriate. Each of the feet 702 is generally of a Y-shape viewed in plan with a central limb 712 transitioning into the crossbar 714 through which the orifice 710 passes and two forked limbs 714 each extending substantially at 135 degrees to the central limb 712 and at 90 degrees to one another. Once again, in cross section, each of the limbs is generally diamond shaped tapering to support points top and bottom. The reinforcement element

can be once again formed in any appropriate manner for example by moulding as a single integral part.

5 As a result the reinforcement rod 708 can simply be maintained in spaced relation by the reinforcement element without the need for additional crossbars. Furthermore the provision of first and second angled limbs 714 relative to the crossbar 704 provides additional stability and resistance to tilting or rotating of the reinforcement element 700.

10 It will be appreciated that the reinforcement rods in the embodiments described above may be of any appropriate diameter for example 3 to 5 millimetres and that the apertures or orifices in the reinforcement elements can be sized appropriately. Alternatively the apertures can be resilient to allow gripping of a range of sizes or a diaphragm can be provided as shown in Fig. 8. In that
15 case a reinforcement element shown generally at 800 but which may be of any appropriate configuration includes an orifice 802 through which a reinforcement rod (not shown) may be inserted or into which it can be slipped via an appropriate notch (not shown). The orifice 802 includes a central diaphragm 804 comprising an annular ring of thin plastics material defining a
20 central aperture 806 of smaller diameter than that afforded by orifice 802. Accordingly when a smaller diameter reinforcement rod is inserted it will sit in the orifice 806 formed by the diaphragm 804. When a larger diameter rod is inserted it will simply break through the orifice 804 and be held in place in the larger orifice 802. A plurality of diaphragms defining progressively smaller
25 orifices may be provided.

It will be appreciated that aspects from different embodiments described above can be interchanged or juxtaposed as appropriate. For example the Y-shaped feet 702 shown in Fig. 7 can be used as individual reinforcement elements

without crossbar 704 in the manner described with reference to, for example, Fig. 3.

5 In a further embodiment shown in Fig. 9 a masonry reinforcement element designated generally 900 includes a generally elongate body 902 having a first portion 904 and a second portion 906 hinged together for example by a thinned region such as a living hinge 908. The first portion further includes a detent aperture 910 arranged to receive a detent or catch 912 extending from the second portion 906 when it is folded about the living hinge to mate with the first portion 914. The catch 912 can comprise, for example, a pair of outwardly
10 biased barbed fingers with inclined upper faces such that upon insertion into the aperture 910 the fingers are pushed together allowing the first and second portions 906, 904 to be closed relative to one another, the fingers 912 springing apart once they escape the aperture 910 to lock the two parts together. The first
15 portion 904 may further include a cut-out portion 914 on an opposing face to the aperture 910 into which a user's fingers or an appropriate tool can be inserted to release the fingers 912 by pushing them together allowing the second portion to be hinged away from the first portion.

20 When the first and second portions are hinged together and locked in position the elongate portion has a generally diamond cross-section of the nature described in more detail above. For example the first and second portions may each have a half-diamond cross-section such that when folded together the diamond cross-section is formed. In addition the first portion may have an
25 additional protruding half diamond section 916 on the face which receives the second portion acting as an extension of the half-diamond section of the second portion when it is locked in position.

In addition the first body portion has first and second limbs 918 projecting at respective symmetric angles from an end in the range 100° to 140° to the body portion in the vicinity of the living hinge 908. The limbs also have a diamond cross-section of the type discussed above. Accordingly in the closed configuration where the first and second portions are hinged and locked together, the support as a whole forms a generally Y shape. The first and second portions further include reinforcement rod receiving formations 920, 922. The receiving formations comprise a generally U-shaped cut out in the upper face of each portion (i.e. the faces which mate in the hinged closed configuration) and positioned such that the formations mate in the hinged closed position defining a passage generally perpendicular to the elongate dimension of the support. However, each of the formations includes a thin obstructing membrane 926 across its centre and forming a continuation of the body portion across the formation. Accordingly when it is desired to grip the support about a stainless steel reinforcement rod shown in phantom lines at 928, the rod is laid across the thinned membrane 924 (or 926) in the formation 920 (or 922), while the support 900 is in its opened position. When the first and second portions 904, 906 are hinged together, the membrane is of sufficient frangibility that it is deformed or otherwise displaced such that the rod is gripped firmly between the membranes forming an aperture between them.

As a result a range of possible diameters of rod is accommodated and a simplified assembly mechanism is provided.

As with the embodiments discussed above, the materials can be selected appropriately for example any appropriate plastics material. The membranes 924, 926 may be for example of 0.5 millimetres thickness and the dimensions of the remaining parts can be of any appropriate size for example as discussed above in relation to other embodiments.

It will further be seen that the reinforcement rod can be machined in order to reduce the risk of axial slippage when embedded in mortar. In particular the rod can have indentations stamped in at regular intervals providing a flattened
5 region in the generally circular cross section. For example the diameter of the rod may range from three to five millimetres and the indentation may range from one quarter to one millimetres on respective opposing sides. In a preferred approach a four millimetre diameter rod may be indented between 0.25 and 0.5 millimetres either side. The indentations can be at any desired
10 spacing for example every 400 or 500 millimetres along the rod.

It will be appreciated that the arrangement can be used in relation to any form of building block including bricks and breeze blocks and for cooperating with reinforcement structure for any masonry projects including such building
15 blocks.

As a result of the arrangement described the reinforcement structure is maintained in the correct position within the mortar and also the courses of building blocks are retained at the correct spacing providing a particularly
20 advantageous and stable structure.

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CLAIMS

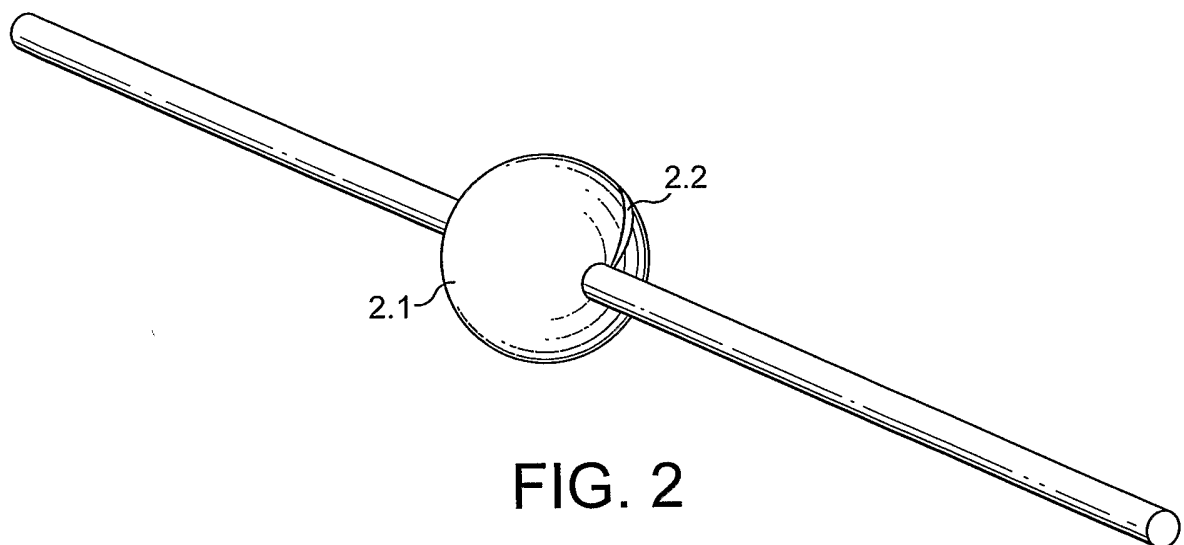
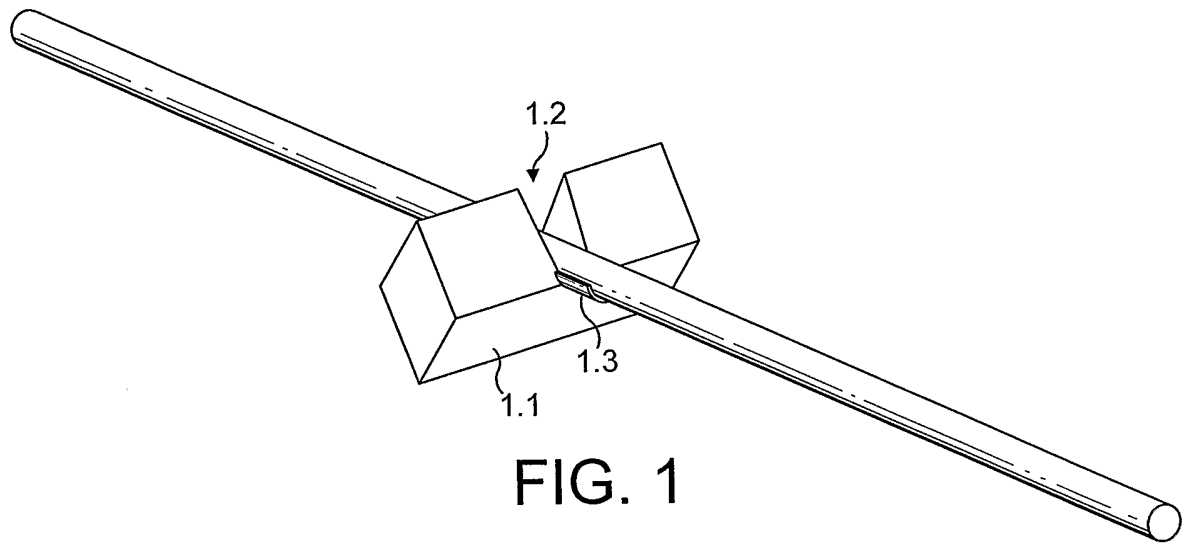
- 5 1. A masonry reinforcement element comprising upper and lower spacing ends and being configured to locate on a masonry reinforcement structure.
2. A masonry reinforcement element as claimed in claim 1 further comprising a cut-out or notch.
- 10 3. A masonry reinforcement element as claimed in claim 1 or claim 2 wherein the upper and lower spacing ends are tapered or chamfered with respect to a central cross-sectional width.
- 15 4. A masonry reinforcement element as claimed in claim 1 or claim 2 wherein the masonry reinforcement element is spherical.
5. A masonry reinforcement element as claimed in claim 1 or claim 2 wherein the masonry reinforcement element is X shaped.
- 20 6. A masonry reinforcement element as claimed in claim 1 comprising a plurality of limbs projecting from a central core.
7. A masonry reinforcement element as claimed in claim 2 in which the cut out or notch is V shaped.
- 25 8. A masonry reinforcement element comprising first and second components have respective upper and lower spacing ends, the components being joined by a cross piece.

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9. An element as claimed in claim 8 in which the components are shaped as claimed in any of claims two to seven.
- 5 10. An element as claimed in any preceding claim 8 which each component or element comprises first and second limbs extending at divergent angles relative to the crosspiece and/or one another.
- 10 11. An element as claimed in any preceding claim comprising an orifice configured to locate on a masonry reinforcement structure.
12. An element as claimed in claim 11 in which the orifice includes a diaphragm provided therein defining an inner orifice of smaller diameter.
- 15 13. A masonry reinforcement system including a masonry reinforcement structure and a masonry reinforcement element as claimed in claim 1.
14. A masonry reinforcement element comprising first and second limbs provided at a divergent angle relative to one another and each having upper and lower spacing ends.
- 20 15. A masonry reinforcement element for supporting a masonry reinforcement structure comprising first and second portions moveable relative to one another to a gripping position in which a masonry reinforcement structure is gripped therebetween.
- 25 16. An element as claimed in claim 15 in which the first and second portions are hinged.

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17. An element as claimed in claim 15 or claim 16 in which at least one of the first and second portions includes a membrane arranged to deform and grip said masonry reinforcement structure in the gripping position.
- 5 18. An element as claimed in any of claims 15 to 17 further including the features of any of claims 1 to 14.
19. A masonry reinforcement structure element comprising an elongated rod of generally circular cross section having one or more indentations.
- 10 20. An element as claimed in claim 19 in which the indentations comprise flattened portions.
21. An element as claimed in claim 19 or 20 in which the indentations are
- 15 substantially regularly spaced.
22. A masonry reinforcement system including a masonry reinforcement structure element as claimed in any of claims 19 to 21 and a masonry reinforcement element as claimed in any of claims 1 to 12 or 14 to 19.
- 20 23. A masonry reinforcement element, structure or method substantially as described herein with reference to the drawings.



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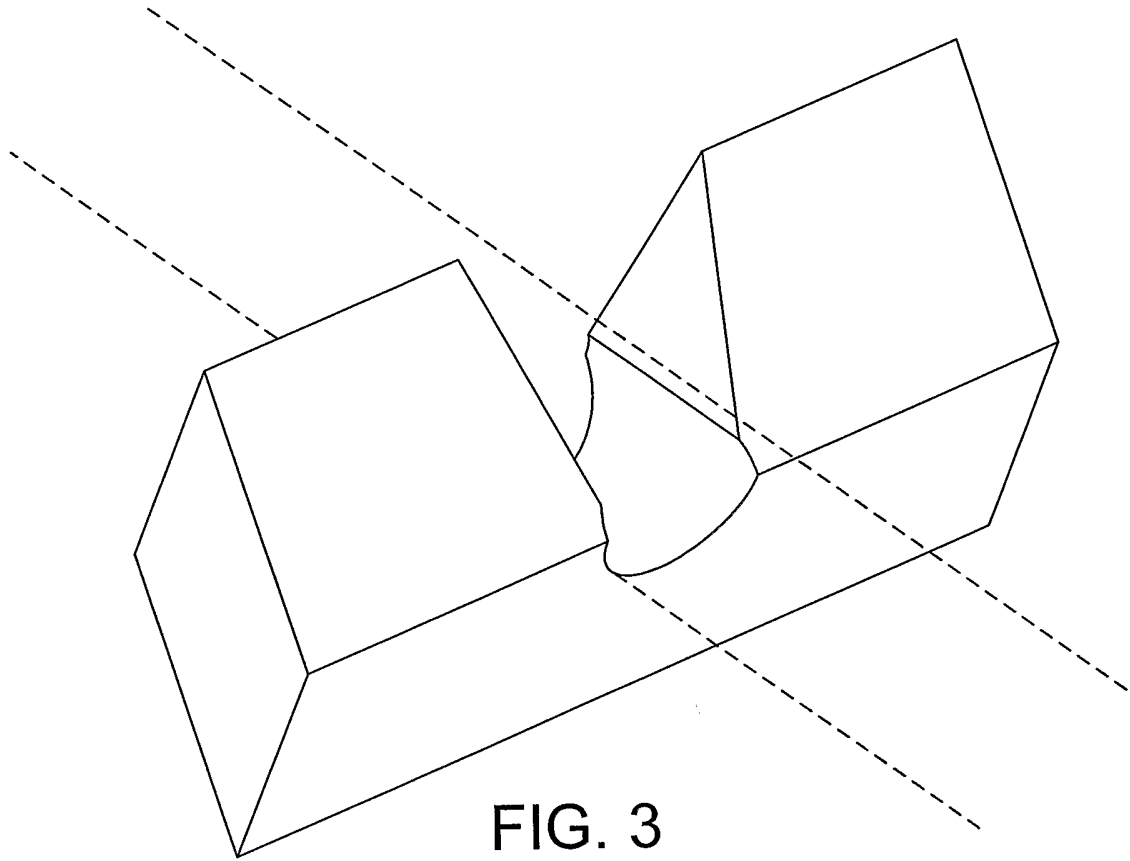


FIG. 3

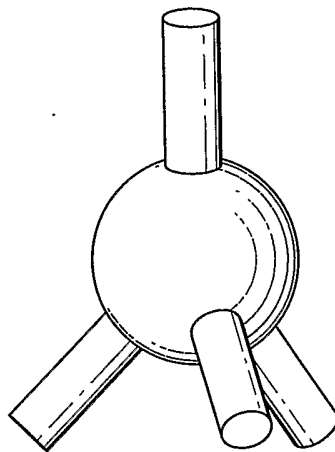


FIG. 4

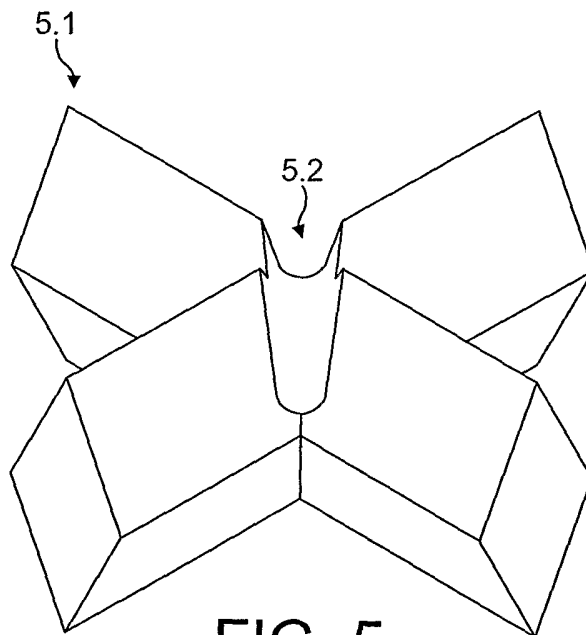
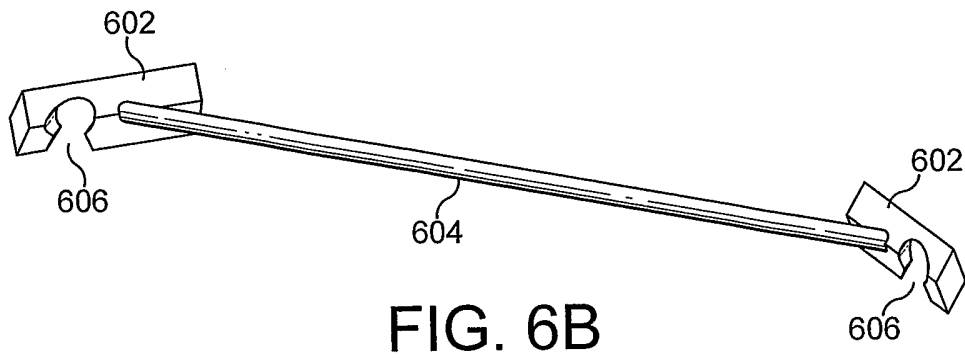
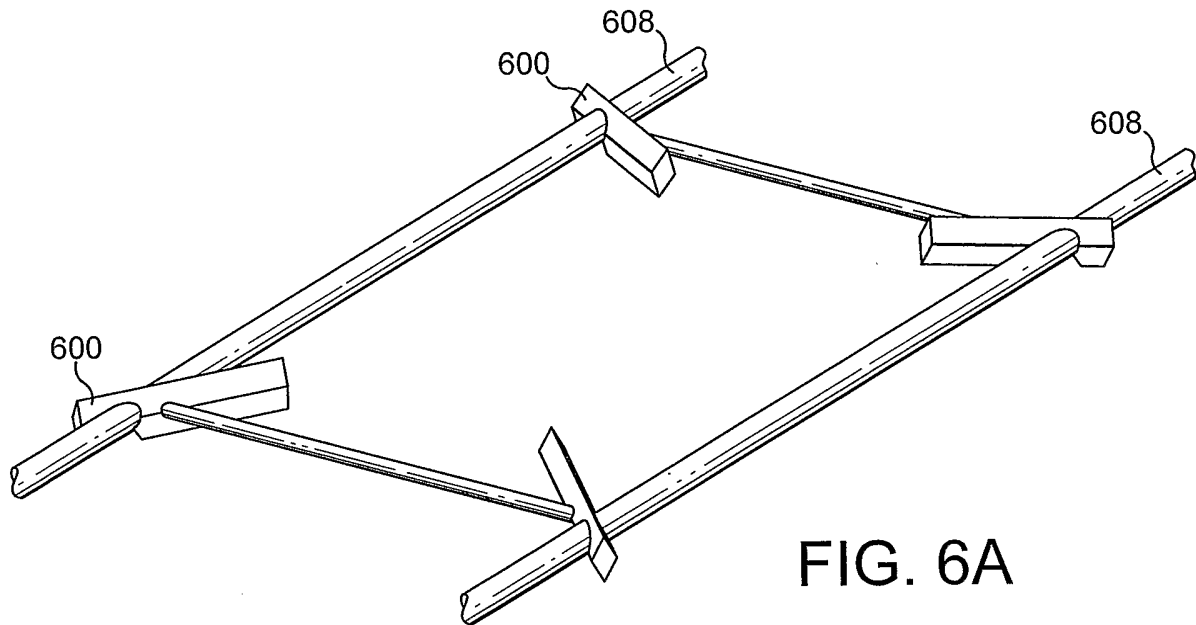


FIG. 5



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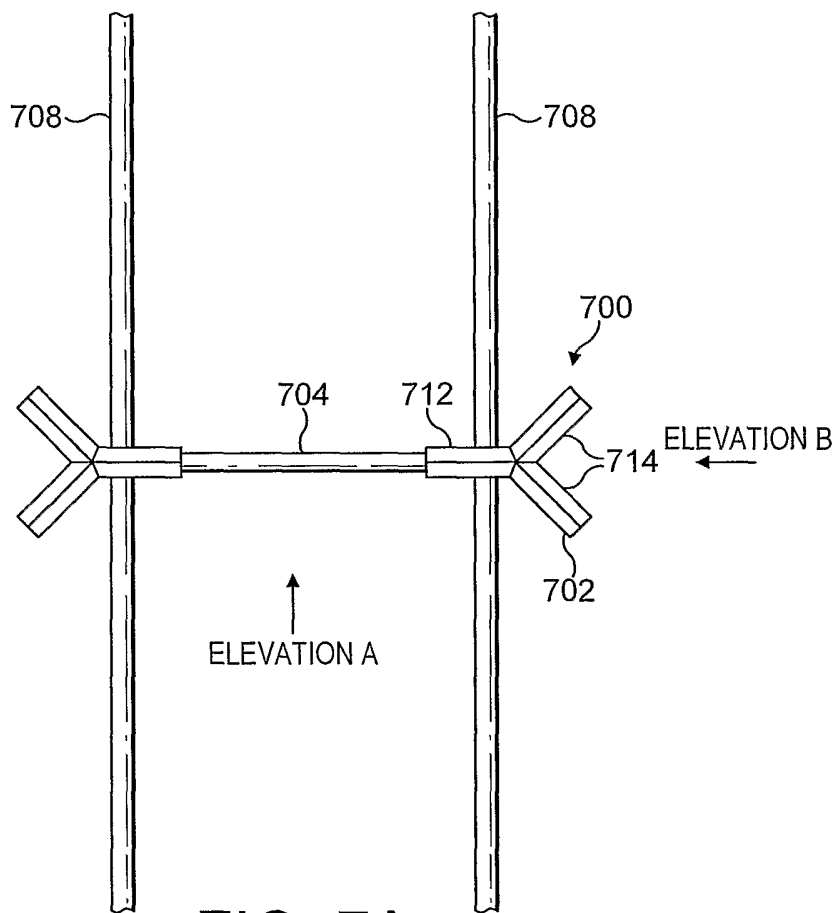


FIG. 7A

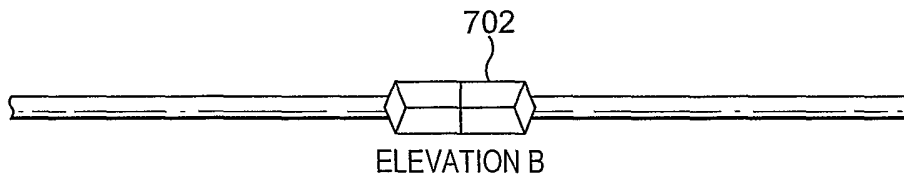
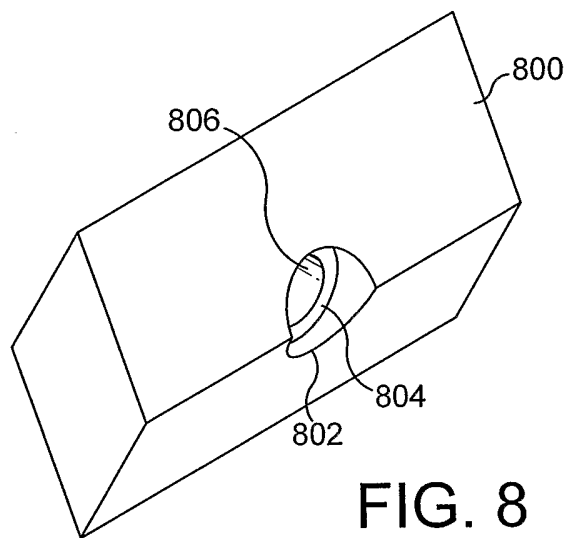


FIG. 7B



FIG. 7C



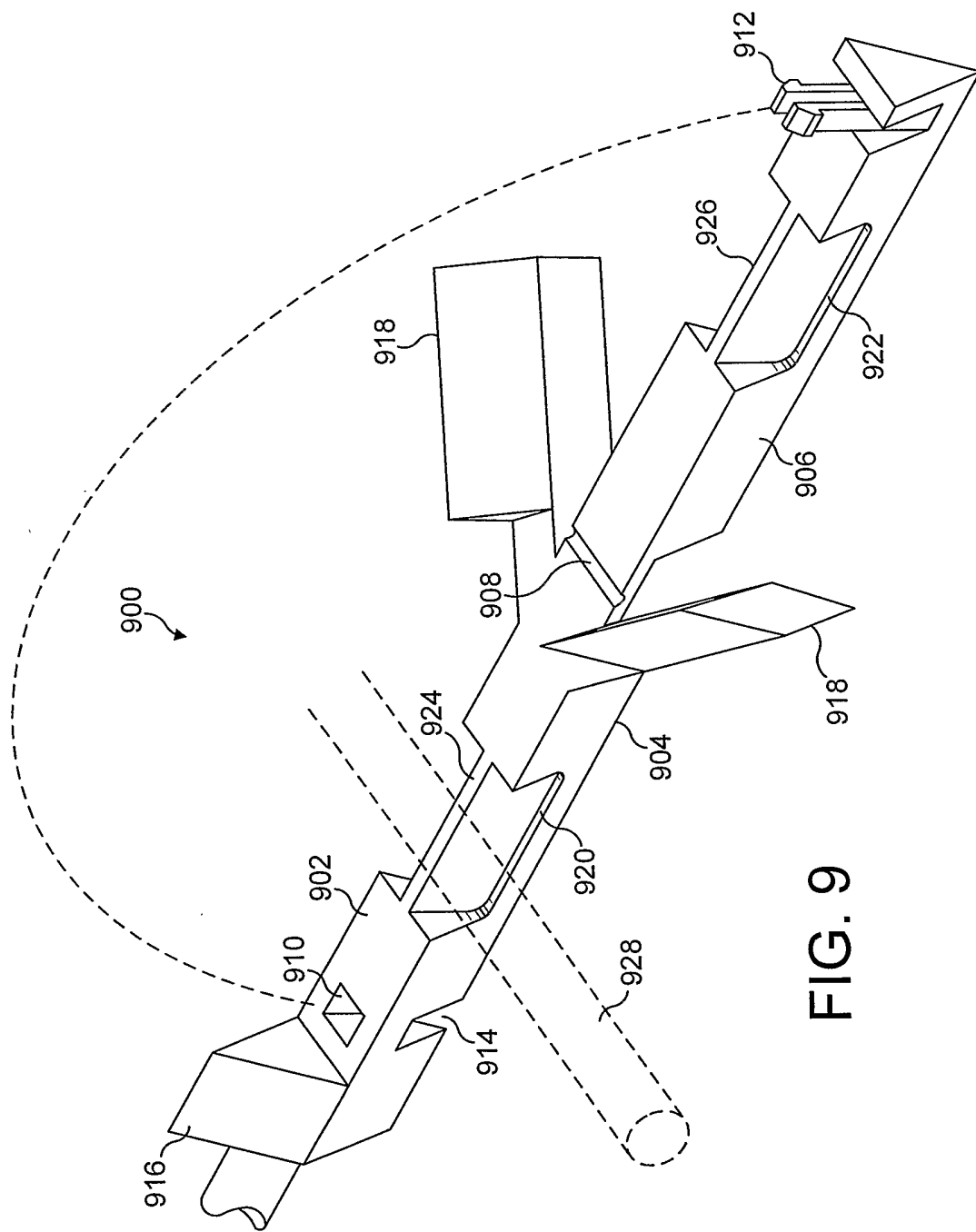


FIG. 9

INTERNATIONAL SEARCH REPORT

International application No
PCT/GB2006/001493A. CLASSIFICATION OF SUBJECT MATTER
INV. E04B2/10 E04G21/18 E04C5/20

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
E04B E04G E04C

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

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Y	the whole document	22
X	US 2 776 559 A (SUMMERS OTTO MURRAY) 8 January 1957 (1957-01-08)	1,2,8,9, 13
Y	column 2, lines 43-49; figures 1,5	22
X	US 1 070 921 A (SALTIEL) 19 August 1913 (1913-08-19) figures 1,2	1,2
X	DE 24 27 829 A1 (BAUBEDARF PAUL WERNER & CO) 2 January 1976 (1976-01-02) figures 1-5	1,11,15, 16,18
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 Further documents are listed in the continuation of Box C. See patent family annex.

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- *A* document defining the general state of the art which is not considered to be of particular relevance
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11 July 2006

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20/07/2006

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Vratsanou, V

INTERNATIONAL SEARCH REPORT

International application No
PCT/GB2006/001493

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