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(71) Applicant *(for all designated States except US)*: **KEN KEMP AS TRUSTEE FOR KEMP INVESTMENT TRUST PTY LTD** [AU/AU]; 1/46 Wynter Street, Taree, NSW 2430 (AU).

(72) Inventor; and

(75) Inventor/Applicant *(for US only)*: **KEMP, Ken** [AU/AU]; 60 Pitt Street, Taree, NSW 2430 (AU).

(74) Agent: **F B RICE & CO**; Level 23, 44 Market Street, Sydney, NSW 2000 (AU).

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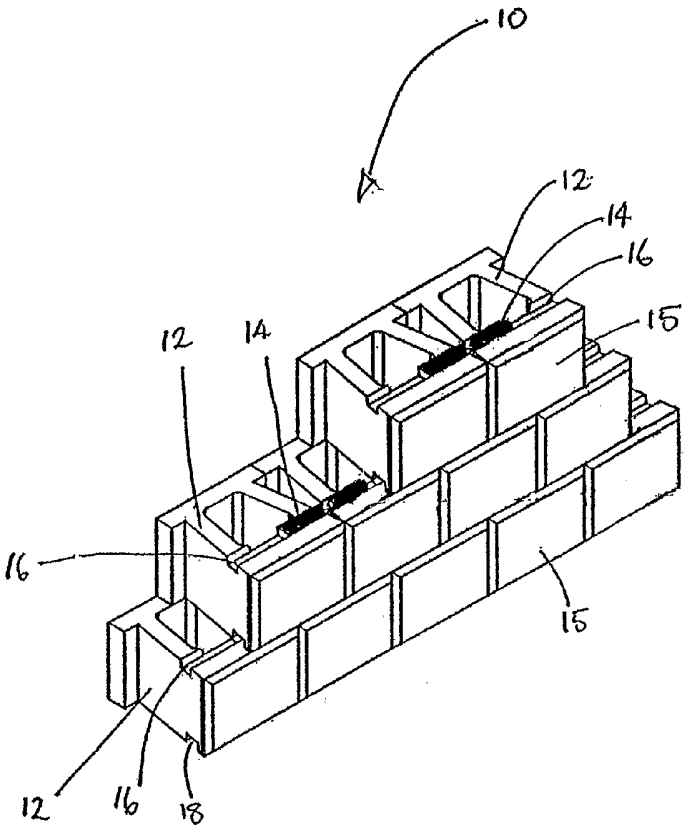

(57) Abstract: The present invention resides in a wall assembly (10), such as a retaining wall assembly, comprising a plurality of blocks (12) arranged in at least two vertically stacked rows. At least one anchor member (14) is provided to link at least two adjacent blocks (12) of a row with at least one block (12) of a vertically stacked row such that the blocks (12) are interlocked in their relative positions,.

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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.

"Wall assembly"

Cross-Reference to Related Applications

The present application claims priority from Australian Provisional Patent 2005901047 filed on 4 March 2005, the content of which is incorporated herein by reference.

Technical Field

The present invention relates to a wall assembly comprising a plurality of individually arranged blocks. In particular, the present invention relates to a wall assembly for use as a retaining wall comprising a plurality of vertically or substantially vertically stacked rows of blocks, and an anchor member for retaining the blocks in each of the vertically stacked rows in position.

Background of the Invention

Retaining walls and the like are common structures used in the building and construction industry to hold back or support soil, particularly when the natural ground level has been altered.

Typically, the natural ground level can be altered in two specific manners. Firstly, when a structure has been "cut into" the natural ground level such that the structure, or a portion thereof, is below the natural ground level. In this particular case, a retaining wall structure is installed to prevent soil on the high side from collapsing into the low side. Secondly, when the natural ground level has been built up by providing additional "fill" to the ground level to create an elevated platform. In this instance, a retaining wall structure is employed to prevent the additional "fill" from moving down to the natural ground level. This latter case is typical where a structure has been built on a sloping site and the retaining wall prevents any built up material from moving further down the sloped incline.

Whilst retaining walls have a functional purpose as described above, they are also often employed in situations where they perform a visual function, particularly in landscaping applications where they are often chosen to complement other landscape

elements, such as plants, paving and the like. In this regard, the materials used and the shape of the wall can vary significantly depending upon the functional and aesthetic requirements of the wall. For instance, traditional retaining walls are often built out of native stone, timber, or concrete bricks/blocks which are chosen to provide the desired visual effect in the landscape.

Retaining walls made out of stone or concrete bricks/blocks generally fall under two types: wet or dry retaining walls. A wet retaining wall is one that is constructed with mortar to bond the elements of the wall together. These walls are generally used in more permanent applications where the strength of the wall is paramount and the soil is stable and unlikely to move considerably over time. A dry retaining wall, or segmental retaining wall, is one that is constructed without mortar and depends upon the weight and friction of one unit/segment upon another for its stability. Such walls are typically easier to build and allow greater variation in shape and application and provide a degree of flexibility to accommodate minor earth movements, which may be caused by temperature variations, such as freeze/thaw cycles, without causing damage to the wall. As such, dry or segmental retaining walls are typically more popular than wet retaining walls for most simple applications, such as home or garden applications.

A variety of systems have been proposed for securing units together in a stable manner for a segmental retaining wall. Such systems typically employ pins or the like which are received in slots formed between the vertically arranged units to retain the units in position. Unfortunately, such systems typically do not allow for any transfer of loads between neighbouring units in the rows of the wall and are typically only applicable for retaining walls that extend along a straight line, and not walls which have convex and/or concave portions. In many instances, existing wall structures having concave or convex portions lose their structural integrity as neighbouring units in a row lose contact with each other requiring additional reinforcement.

Also, existing systems do not easily provide a means for applying a setback to the wall, should one be so desired. Typically a batter or the like is required at the base of the wall prior to construction to provide a setback, which is a timely and labour intensive process. Alternatively, the units themselves are created with nibs and slots, or lips to determine the setback of the wall, which requires precise tolerances and the like during manufacturing of the units.

In this regard, it is desirable to provide a retaining wall system which enables segmental retaining walls having a variety of shapes and sizes to be easily assembled in a safe and reliable manner.

Any discussion of documents, acts, materials, devices, articles or the like which has been included in the present specification is solely for the purpose of providing a context for the present invention. It is not to be taken as an admission that any or all of these matters form part of the prior art base or were common general knowledge in the field relevant to the present invention as it existed before the priority date of each claim of this application.

Summary of the Invention

Throughout this specification the word "comprise", or variations such as "comprises" or "comprising", will be understood to imply the inclusion of a stated element, integer or step, or group of elements, integers or steps, but not the exclusion of any other element, integer or step, or group of elements, integers or steps.

According to a first aspect, the present invention is a wall assembly comprising:

a plurality of blocks arranged in at least two vertically stacked rows; and

at least one anchor member, said anchor member configurable to link at least two adjacent blocks of a row with at least one block of an adjacent vertically stacked row such that the blocks are interlocked in their relative positions.

The rows of blocks may be vertically stacked in a variety of manners. In one form, the rows may be stacked such that wall assembly has a substantially sheer external face. In another form the rows may be stacked such that an upper row of blocks is offset from the lower row of blocks, thereby providing a stepped external face to the wall assembly. The amount of offset between rows of blocks may vary between rows and/or between wall assemblies.

In one embodiment, each of the plurality of blocks has a first surface and at least a second surface. The first surface may be a surface of the block configured to at least partially support thereabove a block of a vertically stacked row of blocks, whilst the second surface may be a surface of the block configured to be at least partially supported therebelow on a block of a vertically stacked row of blocks.

A recess may be provided in the first surface for at least partially receiving the anchor member. The recess may be a channel formed in the first surface. The channel may extend across at least a portion of the first surface in a direction substantially parallel to an external surface of the block. The anchor member may be configured to be at least partially received in the channel formed in the first surface of the at least two adjacent blocks to link the at least two adjacent blocks.

In one embodiment, the anchor member comprises a projecting element that is configured to extend beyond the first surfaces of the at least two adjacent blocks when the anchor member is received in the channels formed therein. The projecting element may be at least partially received by the second surface of the at least one block of the vertically stacked row of blocks. The projecting element may be received within a recess provided in the second surface of the at least one block of the vertically stacked row of blocks. The recess may be a channel that extends across at least a portion of the second surface of the block in a direction substantially parallel to an external surface of the block.

In an embodiment of this aspect of the invention, the first and second surfaces of each block are the upper and lower surfaces of the blocks respectively, when the blocks are arranged in said rows.

In one embodiment, the blocks are bricks or concrete building blocks. Each block may be shaped to conform to a neighbouring block such that the blocks can be readily assembled together without the need for cutting or further reshaping. In one embodiment, each block has a hollow central portion for receiving structural reinforcement upon assembly. In this regard, the hollow central portion of each block may be filled with soil, stone or other suitable matter to enhance the stability of the wall.

In another embodiment of the present invention, each anchor member has an elongate body configured to be received in the channel formed in the first surface of at least two neighbouring blocks. In one form, the elongate body a base portion shaped to conform to the channel provided in the first surfaces of the blocks. The base portion may be substantially rectangular such that it is securely received within the channels. The base portion may be fully received within the channels. The base portion may be provided with a plurality of fins which project therefrom. In this regard, the fins may

act against the walls of the channels to secure the base portion within the channels thereby preventing the anchor member from being inadvertently dislodged from the channels during assembly of the wall.

The projecting element of the anchor member may extend from the base portion along an edge thereof. The projecting element may be configured to project beyond the first surface of the blocks when the base portion is received in the channels provided therein. In this arrangement, the projecting element is shaped to be received in the channel formed in the second surface of a block of a vertically stacked row of blocks, to retain the block in position with respect to the lower row of blocks. In one embodiment, the projecting element retains one upper block in position with respect to two neighbouring lower blocks.

In an embodiment, the projecting element comprises at least two elongate substantially rectangular projecting members. Each of the projecting members may have a cross-sectional width which is less than the cross-sectional width of the base portion of the anchor member. In one embodiment, the cross-sectional width of the projecting members is substantially half the cross-sectional width of the base portion of the anchor member.

In a further embodiment, the anchor member is constructed from a flexible material, such as polyethylene. In another embodiment, a segment of the anchor member may be constructed in a manner that facilitates bending of the anchor member about its longitudinal axis. In this regard, the segment of the anchor member that facilitates bending may be located in the base portion of the anchor member. Further, the segment of the anchor member that facilitates bending may be located in a region of the base portion located between the projecting members.

In one form, the segment of the base portion that facilitates bending comprises walls which are thinner than the walls of the remainder of the base portion. The segment may also comprise a plurality of tubular regions extending through the base portion of the anchor member, in a direction orthogonal to the length of the anchor member. In one embodiment, the segment of the base portion comprises four tubular regions with each region having a substantially triangular cross-section. In this regard, at least one of the walls of the tubular regions may be frangible, thereby further facilitating bending of the anchor member in this region.

It will be appreciated that this aspect of the present invention provides a wall assembly consisting of a plurality of vertically stacked rows of blocks, wherein individual blocks are connected, not just with their neighbouring block within a row, but also with their neighbouring block in a vertically displaced row, thereby enabling load sharing between all blocks in the structure.

According to a second aspect, the present invention is a wall assembly comprising:

a plurality of blocks adapted to be arranged in a plurality of vertically stacked rows, each said block having a first surface and a second surface and each of said first and second surfaces having a channel formed therein that extends across at least a portion of said surface; and

at least one anchor member adapted to be at least partially received in the channels formed in the first surface of at least two adjacent blocks in a row and having a projecting element that extends beyond the first surfaces of the at least two adjacent blocks, said projecting element being configured to be at least partially received within the channel formed in the second surface of at least one block of a vertically displaced row of blocks, thereby retaining the at least one block in position with respect to the at least two adjacent blocks.

The rows of blocks may be vertically stacked in a variety of manners. In one form, the rows may be stacked such that wall assembly has a substantially sheer external face. In another form the rows may be stacked such that an upper row of blocks is offset from the lower row of blocks, thereby providing a stepped external face to the wall assembly. The amount of offset between rows of blocks may vary between rows and/or between wall assemblies.

According to a third aspect, the invention is an anchor member for linking a plurality of blocks of a wall assembly consisting of at least two vertically stacked row of blocks, the anchor member comprising;

an elongate body configured to extend between at least two adjacent blocks of a first row, said elongate body having a projecting element extendable therefrom and configured to be received by at least one block of a second row, thereby linking said blocks of the first and second rows.

The rows of blocks may be vertically stacked in a variety of manners. In one form, the rows may be stacked such that wall assembly has a substantially sheer external face. In another form the rows may be stacked such that an upper row of blocks is offset from the lower row of blocks, thereby providing a stepped external face to the wall assembly. The amount of offset between rows of blocks may vary between rows and/or between wall assemblies.

In an embodiment of this aspect of the invention, the elongate body comprises a base portion that is at least partially received within a recess formed in a surface of the at least two adjacent blocks of the first row. The recess may be a channel and the base portion may be shaped to substantially conform to the shape of the channel. In this regard, the base portion may be secured within the channels formed in the surfaces of the blocks, thereby providing connection between the at least two adjacent blocks of the first row.

The base portion may include fin elements which extend from one or more walls thereof. The fin elements may act against inner walls of the channel to further secure the base portion in position within the channels of the at least two adjacent blocks of the first row.

The projecting element may comprise a lip that extends from the base portion. In one form, the lip may be formed integral with the base portion. In another form the lip may be formed separately from the base portion. The lip may be configured to extend from the base portion along an edge thereof. The lip may be configured to extend beyond the surface of the at least two adjacent blocks of the first row when base portion is positioned within the channels formed therein. The lip may be received within a recess formed in a surface of the at least one block of the second row to retain the at least one block of the second row in position with respect to the at least two adjacent blocks of the first row. In one form, the recess may be a channel formed in a surface of the at least one block of the second row. The lip may be shaped to extend into the channel formed in the at least one block of the second row. In this regard, the lip may be shaped such that an edge thereof may contact an inner surface of the channel thereby retaining the at least one block of the second row in position.

In one embodiment, the lip comprises at least two elongate substantially rectangular projecting members. Each of the projecting members may have a cross-

sectional width which is less than the cross-sectional width of the base portion of the anchor member. In one embodiment, the cross-sectional width of the projecting members is substantially half the cross-sectional width of the base portion of the anchor member.

The base portion may further include a flexible region which facilitates bending of the base portion along its longitudinal axis. In this regard, the walls of the base portion at the flexible region may be thinner than the walls of the base portion along the remainder of its length. The walls of the flexible region of the base portion may also be frangible. In one form, the flexible region of the base portion may further comprise a plurality of removed portions formed therein. In this regard, the flexibility of the flexible region of the base portion may be further increased by breaking one or more of the frangible walls of the flexible region.

It will be appreciated that the flexible region of the base portion will provide load sharing between the at least two adjacent blocks of the first row, thereby providing enhanced stability to the wall assembly employing the connector elements. Further to this, the connector element may be made from a flexible material, such as polyethylene, to further enhance the flexibility and hence the stability of the wall assembly.

According to a fourth aspect, the invention is a block for constructing walls, comprising;

a first surface spaced apart from a substantially parallel second surface, thereby defining a block height;

a first face;

a second face;

opposed sides extending between respective ends of the first and second faces;

at least one first recess formed in the first surface and extending to the opposed sides; and

at least one second recess formed in the second surface.

In one embodiment of this aspect, the at least one first recess is an elongate channel formed in the first surface extending from the opposed sides such that the elongate channel is open at the opposed sides. The elongate channel may be formed substantially parallel to the first face.

In one embodiment, the at least one second recess may be an elongate channel formed in the second surface extending from the opposed sides such that the elongate channel is open at the opposed sides. The elongate channel formed in the first surface may be laterally offset from the channel formed in the second surface.

The elongate channels formed in the first and second surfaces may be configured to receive the anchor member of the third aspect of the invention to facilitate linking of blocks in the wall as previously described.

The rows of blocks may be vertically stacked in a variety of manners. In one form, the rows may be stacked such that wall assembly has a substantially sheer external face. In another form the rows may be stacked such that an upper row of blocks is offset from the lower row of blocks, thereby providing a stepped external face to the wall assembly. The amount of offset between rows of blocks may vary between rows and/or between wall assemblies.

Brief Description of the Drawings

By way of example only, preferred embodiments of the invention are now described with reference to the accompanying drawings, in which:

Fig. 1A is a perspective view of a partially assembled retaining wall having a vertically face in accordance with an embodiment of the present invention;

Fig. 1B is a side view of the partially assembled retaining wall of Fig. 1A;

Figs. 2A to 2C are perspective, top and side views respectively of an embodiment of a block used to construct the retaining wall of Fig. 1A;

Fig. 3 is a perspective view of an embodiment of an anchor member used in association with the retaining wall of Fig. 1A;

Figs. 4A to 4C are front side and bottom views of the anchor member of Fig. 3;

Fig. 5A is a perspective view of a partially assembled retaining wall with a 6° setback in accordance with yet another embodiment of the present invention;

Fig. 5B is a side view of the partially assembled retaining wall of Fig. 5A, showing the 6° setback;

Fig. 6A is a perspective view of a partially assembled retaining wall having a convex configuration in accordance with yet another embodiment of the present invention;

Fig. 6B is a side view of the partially assembled retaining wall of Fig. 6A, showing a substantially vertical face of the wall;

Fig. 6C is a perspective view of an embodiment of a block used to assemble the convex retaining wall of Fig. 6A;

Fig. 7A is a perspective view of a partially assembled retaining wall having a concave configuration in accordance with yet another embodiment;

Fig. 7B is a side view of the partially assembled retaining wall of Fig. 7A showing a substantially vertical face of the wall;

Fig. 8A is a perspective view of a partially assembled retaining wall in accordance with yet another embodiment of the present invention;

Fig. 8B is a side view of the retaining wall of Fig. 8A showing the degree of setback between the horizontal layers of the wall;

Fig. 9A is a perspective view of a block used to assemble the wall of Fig. 8A; and

Fig. 9B is a side view of the block of Fig. 9A.

Preferred Mode for Carrying out the Invention

Whilst the present invention is described in relation to a retaining wall system 10, it will be appreciated that the invention could equally be employed in a variety of wall constructions where individual blocks or units are stacked in vertical rows.

Referring to Fig. 1A, one embodiment of a retaining wall system 10 is shown in partial construction. The wall system comprises a plurality of individual units or blocks 12 arranged in a series of rows, with each row being vertically stacked such that the external face 15 of each block 12 forms a substantially vertical face of the wall system 10, as is shown in Fig. 1B.

The rows of blocks may be vertically stacked in a variety of manners. In one form, the rows may be stacked such that wall assembly has a substantially sheer external face. In another form the rows may be stacked such that an upper row of blocks is offset from the lower row of blocks, thereby providing a stepped external face to the wall assembly. The amount of offset between rows of blocks may vary between rows and/or between wall assemblies.

An anchor member 14 is provided between adjacent blocks 12 in each row, and is positioned such that it extends across the vertical join formed between the adjacent blocks 12. The anchor member 14 will be described in more detail below, however as is shown in Fig. 1B, the anchor member acts to aid in positioning the blocks 12 of each row with respect to each other and with respect to the upper row of blocks.

According to one embodiment, in order to accommodate the anchor member 14 to facilitate construction of the wall system 10, each block 12 of the wall system 10 is configured in the manner as is shown in Figs 2A to 2C. As shown in Fig. 2B, each block 12 has a trapezoidal shaped main body 17 having a vertically extending front portion 2, a vertically extending rear portion 4 and a pair of vertically extending sides 6 which extend from the front portion 2 to the rear portion 4. An external face 15 is provided on the front portion 2 of the main body 17 such that when the blocks are assembled in the manner shown in Fig, 1A, the external face 15 of each block forms the external surface of the wall system 10. The external face 15 may be made from the same material as the main body 17, such as concrete or the like, which may be polished or otherwise treated to form the desired external surface texture. Alternatively, the

external face 15 may be in the form of a separate panel made from a material, such as ceramic, marble or the like, which is adhered, or otherwise applied, to the front portion 15 of each block to create the desired wall surface.

The main body 17 is substantially hollow and contains an internal space 20. The internal space 20 is enclosed by the front portion 2, rear portion 4 and the sides 6 and provides a space into which crushed rock and the like may be received to provide additional stabilising effect to the blocks 12 when positioned. The rear portion 4 of the main body 17 is substantially parallel with the front portion 2 and has a pair of nibs 19 extending therefrom. In this regard, the width of the rear portion 4 of the block 12, including the nibs 19, is substantially the same as the width of the front portion 2 of the main body which contains the external face 15. This ensures that both the front and rear portions of neighbouring blocks 12 fit together neatly and simply in straight rows as shown in Fig. 1A, to create the retaining wall system 10, without the need for complicated alignment and masonry cutting tools.

As shown more clearly in Fig. 2C, each block 12 has a lower surface 3 and an upper surface 5. In the embodiment as shown, a pair of grooves 16 and 18 are formed in the upper 5 and lower 3 surfaces respectively. The grooves 16, 18 extend substantially between the sides 6 of the blocks 12, and in the embodiment as shown, are offset from one another, such that groove 18 is closer the external face 15, than groove 16. In this regard, when the blocks 12 are arranged in rows, the grooves 16, 18 align with grooves 16, 18 provided in the neighbouring block 12, to form common grooves in the upper and lower surfaces of the row of blocks. The purpose of the grooves will become more apparent when discussed in relation to the anchor member 14 below.

The anchor member 14 is shown in more detail in Fig. 3 and Figs. 4A to 4C. The anchor member 14 is in the form of a flexible, elongate wedge member having a substantially L-shaped cross section which defines a substantially rectangular base portion 22 and two substantially rectangular upwardly projecting portions or lips 24. Whilst the figures show two upwardly projecting portions or lips 24, it will be envisaged that the a single continuous upwardly projecting portion 24 could also be employed. In the embodiment shown, the anchor member 14 has a length (L) of about 180mm, a height (H) of about 27 mm, and a maximum width (W) of about 30mm. It will be appreciated however that the dimensions of the anchor member 14 may vary

depending upon the size of the blocks and the particular wall system being constructed. In order to allow the anchor member 14 to flex under load, it is preferably made from a flexible polymer material, such as polyethylene, however other suitable materials are also envisaged.

The base portion 22 of the anchor member 14 is shaped to conform with the groove 16 provided in the upper surface 5 of the blocks 12 such that it is securely retained therein, as shown in Figs. 1A and 1B. In the embodiment shown, the height and width of the base portion 22 substantially matches the depth and width of the groove 16 provided in the upper surface 5 of the blocks 12. In this regard, whilst the shape of the base portion 22 and the groove 16 have been shown as substantially rectangular, various other shapes may also be employed. To assist in retaining the base portion 22 of the anchor member 14 within the grooves 16, a plurality of fins 23 are provided upon the side walls thereof. The fins 23 are made from the same flexible material as the anchor member 14 and extend outwardly from the side walls of the base portion 22 and taper towards the underside of the anchor member 14, providing a maximum width at the top of the base portion 22. In this regard, the fins 23 act against the inner walls of the groove 16 to ensure that the anchor member is firmly located within the groove 16 of the blocks 12.

The two upwardly projecting portions or lips 24 are formed along one edge of the base portion 22, and extend above the base portion 22 such that when the anchor member 14 is positioned within the groove 16 the projections or lips 24 extend beyond the upper surface 5 of the blocks 12. The width of the upwardly projecting portions 24 is substantially less than the width of the base portion 22 and tapers slightly towards its apex. The upwardly projecting portions 24 are configured in this manner so that they can be received within the grooves 18 formed in the lower surface 3 of the upper row of blocks 12, as shown in Fig. 1B.

Referring to Fig. 4B, the upwardly projecting portions 24 have an inwardly facing side wall 25 and an outwardly facing sidewall 26, which are both configured to act against an inner wall of the grooves 18, depending upon the orientation of the anchor member 14. In use, the blocks 12 experience a lateral force due to the weight of the soil or the like being retained by the wall, and hence the upwardly projecting portions/lips 24 act as "hooks" which capture the vertically disposed blocks 12 and retain them in position with respect to the lower row of blocks.

By changing the orientation of the anchor members 14 within the grooves 16, the structure of the wall can be altered from a vertical face wall, to a wall having an angular setback. As is discussed above and shown in relation to Figs 1A and 1B, if the anchor members 14 are inserted into the grooves 16 with the upwardly projecting portions 24 arranged closest to the external faces 15 of each block 12, then the wall will have a substantially vertical face. This is because the inwardly facing side walls 25 of the upwardly projecting portions 24 capture the rear inner wall of the groove 18 provided in the blocks 12 of the vertically disposed row of blocks.

However, as is shown in Figs. 5A and 5B, if the anchor members 14 are rotated 180° and are inserted into the grooves 16 such that the upwardly projecting portions 24 are arranged distal from the external faces 15 of each block 12, when the rows of blocks 12 are assembled, the wall will assume a slope with a 6° setback. As will be appreciated, by altering the off-set between the grooves 16, 18 of each of the blocks 12, the angle of setback of the sloped wall can be set as desired.

Whilst the embodiments shown in Figs. 1A and 1B and Figs. 5A and 5B are in relation to walls that extend in a single, substantially straight line, due to the flexible nature of the anchor members 14, the present invention can be readily applied to produce walls of various shapes and configurations. In this regard, a flex portion 27 is provided in the central region of the anchor member 14 which separates the two upwardly projecting portions 24. In this region, the side walls 29 of the base portion 22 are not provided with fins 23 and as such are relatively thin in comparison to the rest of the anchor member 14.

As shown more clearly in Fig. 4C, the flex portion 27 comprises four hollow triangular segments 28. The segments 28 provide increased flexibility to the anchor member 14 in this region, allowing the anchor member to bend about the flex portion 27. To improve the flexibility of the anchor member 14 in a specific direction, one or more of the side walls 29 can be cut, such that the anchor member 14 can bend more freely about the junction 30 of the segments 28.

As discussed previously and shown in relation to Fig. 1A, in use the anchor member 14 is positioned such that it extends between two adjacent blocks 12 of a common row of blocks. In this regard, the flex portion 27, which is located in the

centre of the anchor member 14, is typically positioned between the adjacent blocks 12 and allows a small degree of movement between adjacent blocks during and following assembly of the wall system 10, to aid in transferring loads between blocks 12 and improving the structural integrity of the wall system 10.

The flex portion 27 of the anchor member 14 makes it possible to form convex or concave wall systems 10, or to form wall systems 10 having convex or concave portions, as is shown in Figs. 6A and 7A. In this regard, as the flex portion 27 extends between adjacent blocks 12 in a row, the blocks can be arranged in an angular relationship to each other, whilst still being connected via the single anchor member 14.

The manner in which the anchor member 14 functions in a convex or concave portion of a wall system is substantially the same as that described above for walls that extend in straight lines. As the grooves 18 have a greater width than the upwardly projecting portions 24, the grooves 18 can accommodate the upwardly projecting portions 24 in the event that the portions 24 are angled with respect to each other, as is the case in convex or concave wall sections. Therefore, the structural integrity of the wall is the same regardless of the shape of the wall.

As is shown in Fig. 6C, in order to achieve a convex shaped wall or wall portion, it may be necessary to alter the shape of the blocks 12. In this regard, the blocks are constructed such that the nibs 19 provided on the rear portion of the main body 17 can be readily removed. Following removal of the nibs 19, the blocks can be easily assembled into the required position to form the desired convex wall shape.

Referring to Figs. 8A - 9B, there is shown an alternative embodiment of a wall system 10 in accordance with the present invention. In this embodiment, the anchor member 14 of the type as discussed above is employed. However, rather than the blocks 12 of the wall system 10 having channels 16, 18 formed in both the upper 5 and lower 3 surfaces to accommodate the anchor member 14, only channel 16a is formed in the upper surface 5, as shown in Fig. 9B.

In this embodiment, the channel 16a is formed proximal the rear portion 4 of the block 12, such that the anchor member 14 extends between adjacent blocks 12 in a row along the rear portions thereof. In this arrangement, the upwardly projection portion 24 of the anchor member 14 is received within the internal space 20 of the upper block 12,

as shown in Fig. 8B, to secure the vertically adjacent blocks 12 in position. In this arrangement, a rearward inclination of the wall system 10 is possible having a slant of 6°, due to the channel 16a and the rear wall of the internal space 20 of the block being laterally offset from one another.

In each of the above described embodiments, the slant or degree of setback of the wall can be changed by altering the position of the channels 16, 16a and 18 with respect to the block 12. This provides a wall system 10 that can be readily adapted to cater for a variety of consumer needs.

It will be appreciated that in each of the above described embodiments, the structural integrity of the wall system 10 employing the anchor member 14 is significantly increased due to each anchor member 14 providing not only a connection between horizontally adjacent blocks 12 in a row, but also providing a connection between vertically adjacent blocks 12. In this regard, a single anchor member 14 connects three or more blocks 12 in the wall structure, substantially increasing load sharing ability between the blocks 12, such that any load applied against the wall will be shared through the blocks 12, and not necessarily concentrated upon a single block 12 or region of the blocks 12. As the anchor member 14 is flexible, the wall structure can also cope with a degree of movement between the blocks 12 without compromising the structural integrity of the wall.

Whilst the retaining wall system 10 of the present invention has been discussed in relation to the described components of the system, other components can also be used in conjunction with the above described components to improve the structural integrity of the wall system. In particular, reinforcing components may also be used in conjunction with the above described components as may the inclusion of other raw materials which may enhance the walls function and visual acuity

It will be appreciated by persons skilled in the art that numerous variations and/or modifications may be made to the invention as shown in the specific embodiments without departing from the spirit or scope of the invention as broadly described. The present embodiments are, therefore, to be considered in all respects as illustrative and not restrictive.

CLAIMS:

1. A wall assembly comprising:

a plurality of blocks arranged in at least two vertically stacked rows; and

at least one anchor member, said anchor member configurable to link at least two adjacent blocks of a first row with at least one block of a second row such that the at least two adjacent blocks of the first row and the at least one block of the second row are interlocked in their relative positions.

2. A wall assembly according to claim 1, wherein each block comprises a first surface and at least a second surface.

3. A wall assembly according to claim 2, wherein the first surface is configured to at least partially support a block of a row of blocks and the second surface is configured to be at least partially supported on a block of a row of blocks.

4. A wall assembly according to claim 2 or claim 3, wherein a recess is provided in said first surface for at least partially receiving said anchor member.

5. A wall assembly according to claim 4, wherein the recess is a channel.

6. A wall assembly according to claim 5, wherein the channel extends across at least a portion of said first surface.

7. A wall assembly according to claim 6, wherein said anchor member is configured to be at least partially received in the channel formed in the first surface of the at least two adjacent blocks to link the at least two adjacent blocks.

8. A wall assembly according to claim 7, wherein the anchor member comprise a projecting element that is configured to extend beyond the first surfaces of the at least two adjacent blocks.

9. A wall assembly according to claim 8, wherein said projecting element is configured to be at least partially received by the second surface of the at least one block of the second row.

10. A wall assembly according to claim 9, wherein a recess is provided in the second surface of the at least one block of the second row to receive said projecting element.

11. A wall assembly according to claim 10, wherein the recess is a channel.

12. A wall assembly according to claim 11, wherein the channel extends across at least a portion of said second surface.

13. A wall assembly according to any one of the preceding claims, wherein the anchor member is constructed from a flexible material.

14. A wall assembly according to claim 13, wherein the flexible material is polyethylene.

15. A wall assembly according to claim 13 or claim 14, wherein the anchor member is configured to facilitate bending of the anchor member about its longitudinal axis.

16. An anchor member for linking a plurality of blocks of a wall assembly consisting of at least two vertically stacked rows of blocks, the anchor member comprising;

an elongate body configured to extend between at least two adjacent blocks of a first row, said elongate body having a projecting element extendable therefrom and configured to be received by at least one block of a second row of blocks, thereby linking said at least two adjacent blocks of the first row to the at least one block of the second row.

17. An anchor member according to claim 16, wherein the elongate body comprises a base portion adapted to extend between the at least two adjacent blocks of the first row to be receivable within a recess formed in the at least two adjacent blocks.

18. An anchor member according to claim 17, wherein the recess is formed in a surface of the at least two adjacent blocks.

19. An anchor member according to claim 18, wherein the recess is a channel formed in the surface of the at least two adjacent blocks and the base portion is shaped to be received within the channel.

20. An anchor member according to claim 19, wherein the surface of the at least two adjacent blocks is the surface that at least partially supports the at least one block of the second row.

21. An anchor member according to claim 19, wherein the base portion comprises a flexible region which facilitates bending of the base portion along its longitudinal axis.

22. An anchor member according to claim 21, wherein the flexible region comprises a region of the base portion having reduced wall thickness.

23. An anchor member according to claim 22, wherein the walls of the flexible region of the base portion are be frangible to facilitate bending of the base portion in the flexible region.

24. An anchor member according to any one of claims 16 to 23 wherein the projecting element is a lip formed integral with the elongate body.

25. An anchor member according to claim 24, wherein the lip is configured to be received within a recess formed in a surface of the at least one block of a vertically stacked row of blocks.

26. An anchor member according to claim 25, wherein the recess is a channel formed in the surface of the at least one block, and the lip is shaped to extend into the channel.

27. An anchor member according to claim 24 wherein the surface of the at least one block is the undersurface of the block.

28. A block for constructing walls, comprising;

a first surface spaced apart from a substantially parallel second surface, thereby defining a block height;

a first face;

a second face;

opposed sides extending between respective ends of the first and second faces;

at least one first recess formed in the first surface and extending to the opposed sides; and

at least one second recess formed in the second surface.

29. A block according to claim 28, wherein the at least one first recess is an elongate channel formed in the first surface extending from the opposed sides such that the elongate channel is open at the opposed sides.

30. A block according to claim 29, wherein the elongate channel is formed substantially parallel to the first face.

31. A block according top claim 30, wherein the at least one second recess is an elongate channel formed in the second surface extending from the opposed side surfaces such that the elongate channel is open at the opposed side surfaces.

32. A block according to claim 31, wherein the elongate channel formed in the first surface may be laterally offset from the channel formed in the second surface.

33. A block according to claim 30, wherein the elongate channel is configured to receive at least part of an anchor member according to any one of claims 16 to 27, to facilitate linking of said block to at least one adjacent block in a row.

34. A block according to claim 31, wherein the elongate channel is configured to receive at least part of an anchor member according to any one of claims 16 to 27, to facilitate linking of said block to at least one block in an adjacent row of blocks.

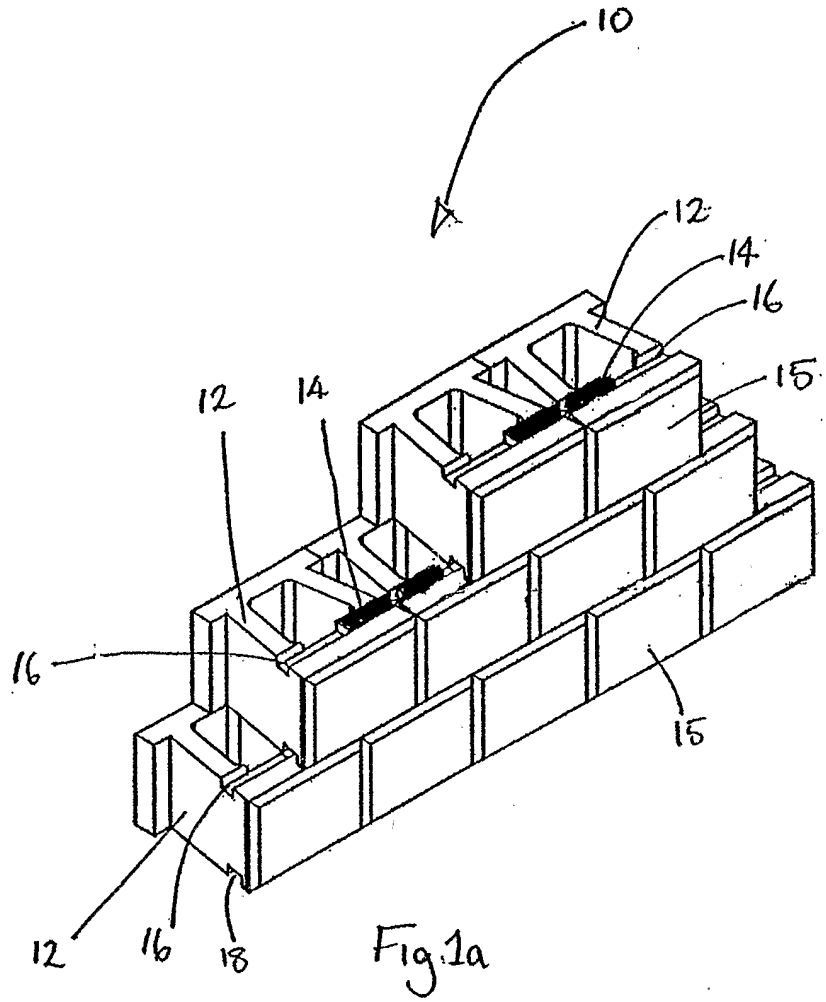

Fig.1a

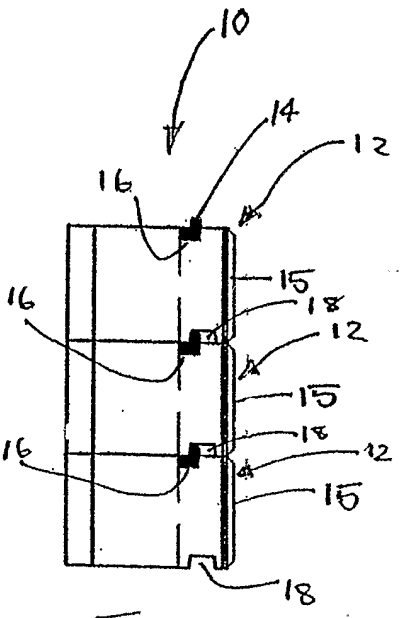

Fig. 1b.

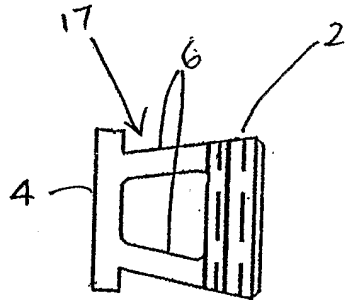

Fig. 2b

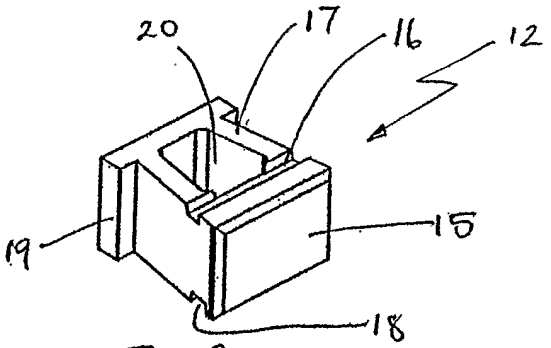

Fig. 2a.

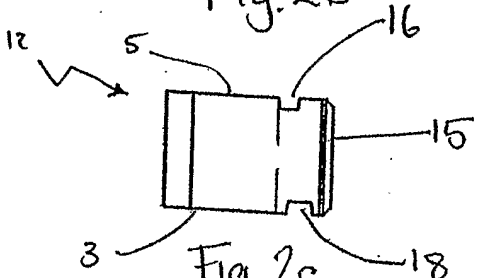

Fig. 2c

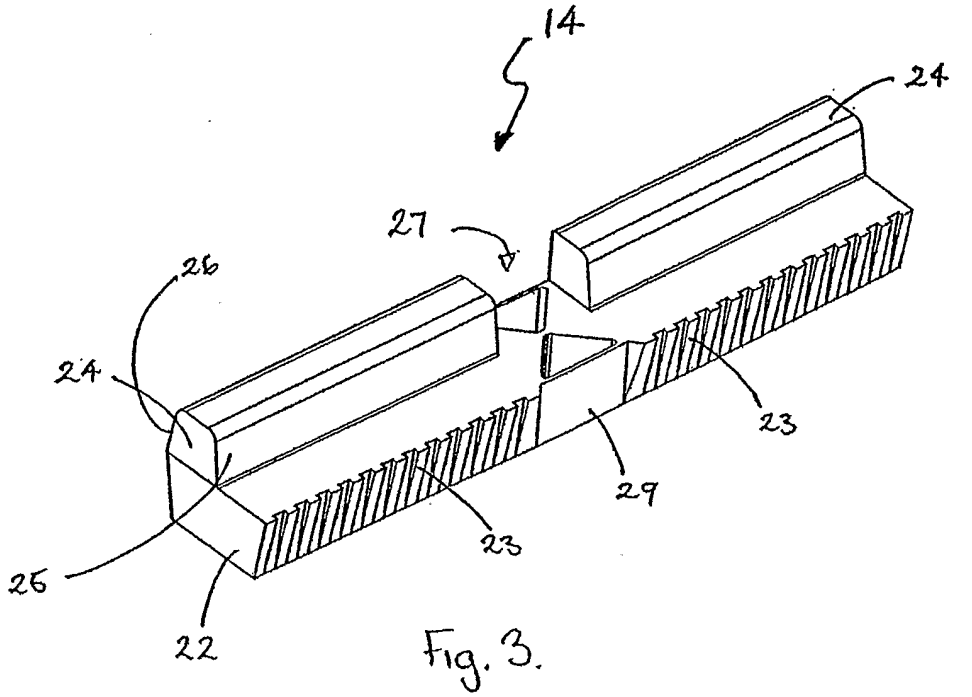

Fig. 3.

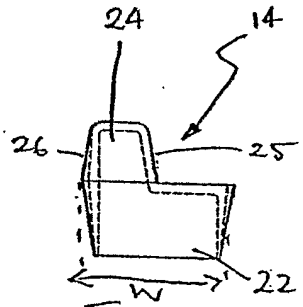

Fig. 4b.

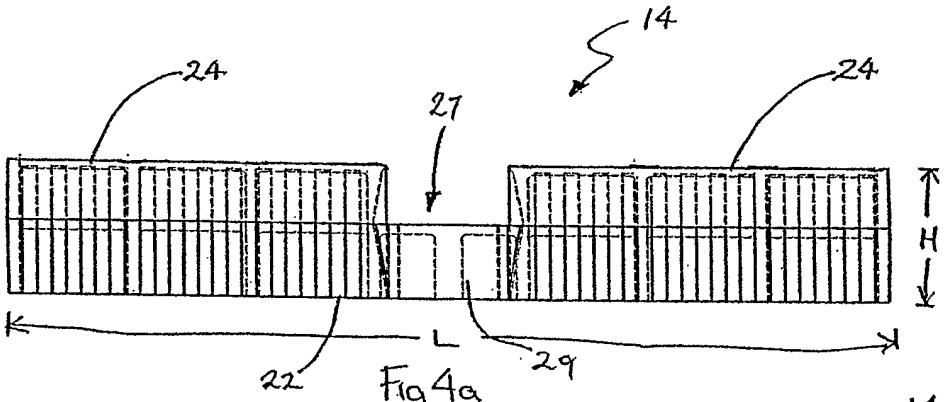

Fig 4a.

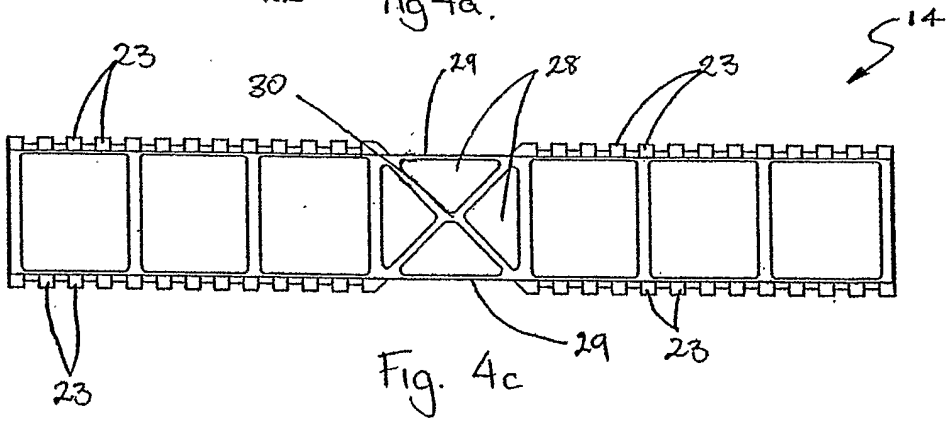

Fig. 4c

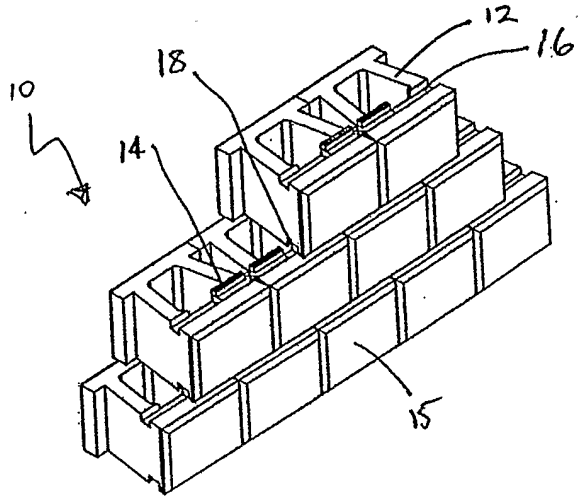

Fig. 5a

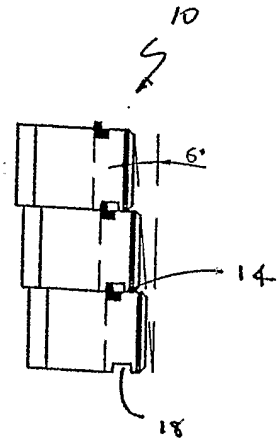

Fig. 5b.

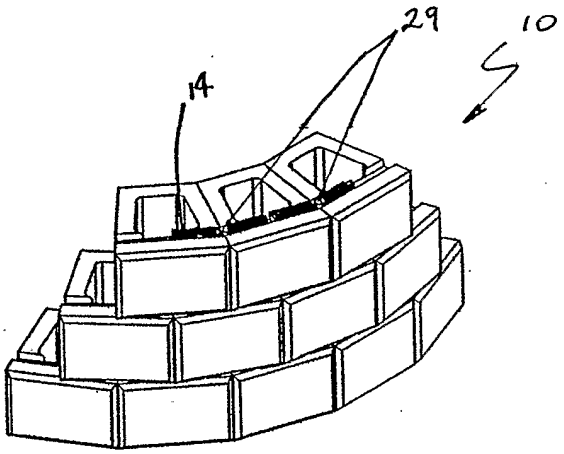

Fig. 6a

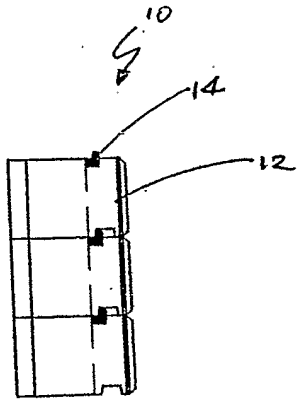

Fig. 6b

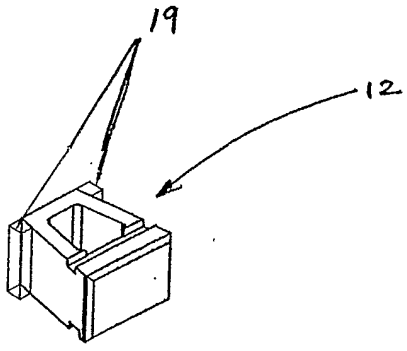

Fig. 6c

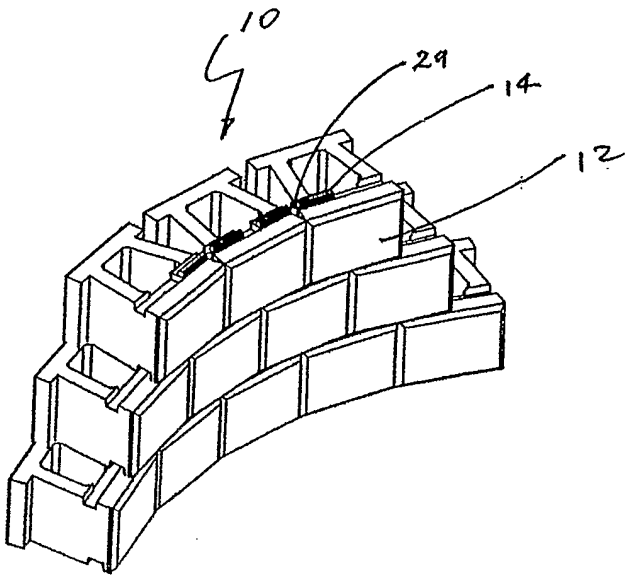

Fig. 7a

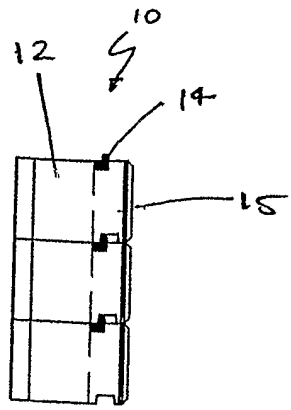

Fig. 7b

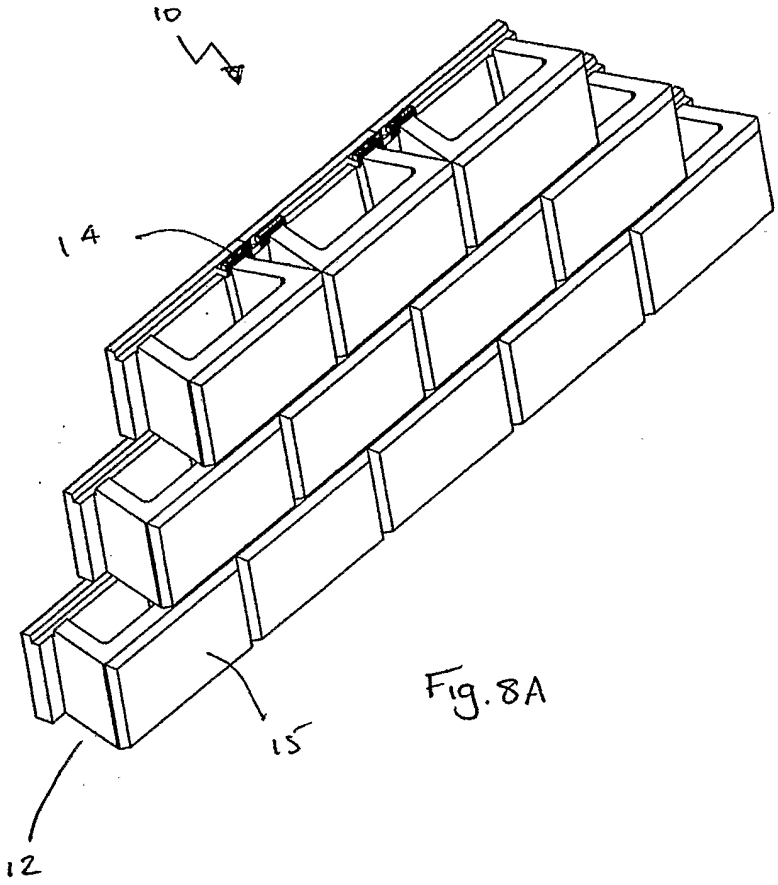

Fig. 8A

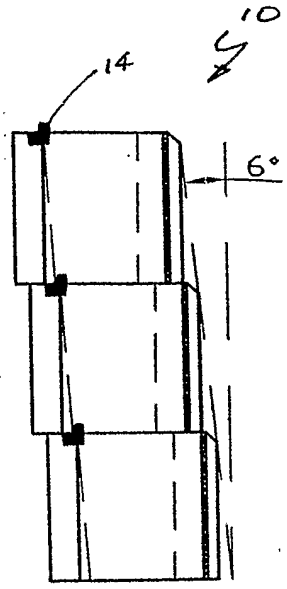

Fig 8B

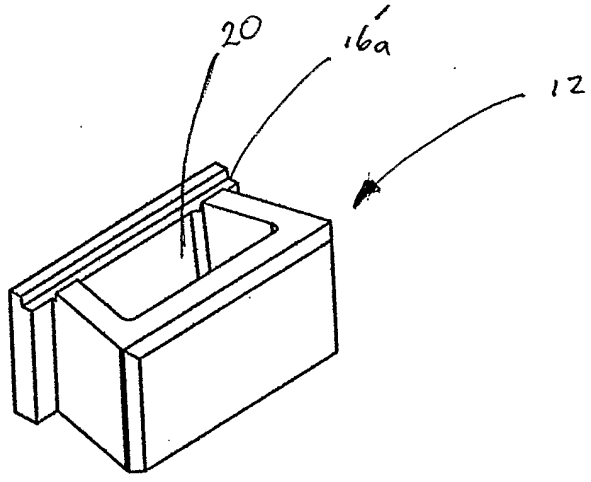

Fig 9A

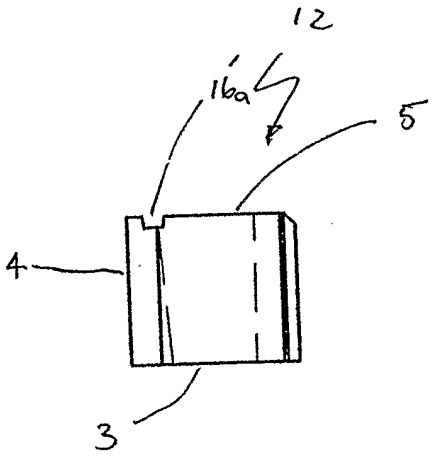

Fig. 9B

INTERNATIONAL SEARCH REPORT

International application No.
PCT/AU2006/000273

A. CLASSIFICATION OF SUBJECT MATTER

Int. Cl.

E02D 29/02 (2006.01)

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)

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 practicable, search terms used)
E02D 29/02, E04B 2/08 with keywords (block+, brick+, recess+, channel+, groove+)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	GB 2313867 A (NETLON LIMITED) 10 December 1997 The whole document	1-34
X	CA 2114677 C (CORREIA et al) 2 August 1995 The whole document	1-15 and 28-32
X	US 5511910 A (SCALES) 30 April 1996 The whole document	1-20 and 24-34
X	WO 1995/033893 A1 (THE TENSAR CORPORATION) 14 December 1995 The whole document	1-21 and 24-34

[X] Further documents are listed in the continuation of Box C [X] See patent family annex

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
05 April 2006	11 APR 2006
Name and mailing address of the ISA/AU AUSTRALIAN PATENT OFFICE PO BOX 200, WODEN ACT 2606, AUSTRALIA E-mail address: pct@ipaustralia.gov.au Facsimile No. (02) 6285 3929	Authorized officer **LEOPOLD FILIPOVIC** Telephone No : (02) 6283 2105

INTERNATIONAL SEARCH REPORT

International application No.
PCT/AU2006/000273

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	GB 2331317 A (FORTICRETE LIMITED) 19 May 1999 The whole document	1-20 and 24-34
X	AU 51982/01 A (BORAL MASONRY LIMITED) 20 December 2001 The whole document	1-15 and 28-32

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.
PCT/AU2006/000273

This Annex lists the known "A" publication level patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

Patent Document Cited in Search Report		Patent Family Member					
GB	2313867	AU	27821/97	EP	0900304	HK	1003660
		ID	17215	US	6019550	WO	9744533
CA	2114677	US	5528873				
US	5511910	US	5417523	US	5788420		
WO	9533893	AU	26417/95	BR	9507928	CA	2189538
		CN	1164265	EP	0764229	NO	965206
		NZ	287641	US	5540525	US	5595460
GB	2331317	CA	2253147	IE	980908		
AU	5198201	AU	51982/01				

Due to data integration issues this family listing may not include 10 digit Australian applications filed since May 2001.

END OF ANNEX