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Correia

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(54) **PIVOTABLE INTERLOCK BLOCK CONNECTOR**

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(73) Assignee: **Rinox Inc.**, Quebec (CA)

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E04B 5/00	(2006.01)
E04B 7/00	(2006.01)
E04B 1/02	(2006.01)
E04B 2/00	(2006.01)
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E02D 3/02	(2006.01)
E02D 5/00	(2006.01)
E02D 17/00	(2006.01)
E02D 19/00	(2006.01)

(52) **U.S. Cl.** **52/285.1**; 52/271; 52/565; 52/564; 52/585.1; 52/581.2; 52/582.2; 405/284; 405/286

(58) **Field of Classification Search** 52/36.1, 52/239, 481.2, 285.1, 271, 564, 565, 582.1–585.1; 403/165, 263, 361; 446/85, 102, 111; 405/284, 405/286

See application file for complete search history.

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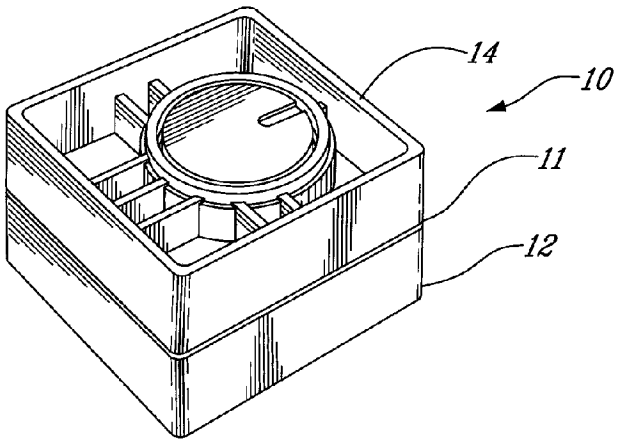
(57) **ABSTRACT**

An interlock connector (**10**) for interlocking stackable build ing blocks (**26**). The blocks are provided with apertures (**32**), such as grooves, on their top and bottom surfaces. The connector comprises a main body which includes two separate and vertically superimposed body portions and is interposed between two stacked blocks with each body portion disposed in a respective groove (**32**). One body portion is pivotable with respect to another, with a vertical pivot axis that is offset from the central vertical axis of the main body, so as to be pivotable to positions where the stacked blocks are offset. In another embodiment, the interlock connector comprises a single piece main body having an aperture to receive a projection protruding from the surface of one of the stacked blocks while being disposed in the groove of the other block, with the connector being pivotable about the projection to positions where the stacked blocks are offset. Other embodiments include connectors with offset upper and lower body portions to interlock blocks having symmetrical grooves, wherein certain of the embodiments allow a block to be pivoted about a body portion.

6 Claims, 7 Drawing Sheets



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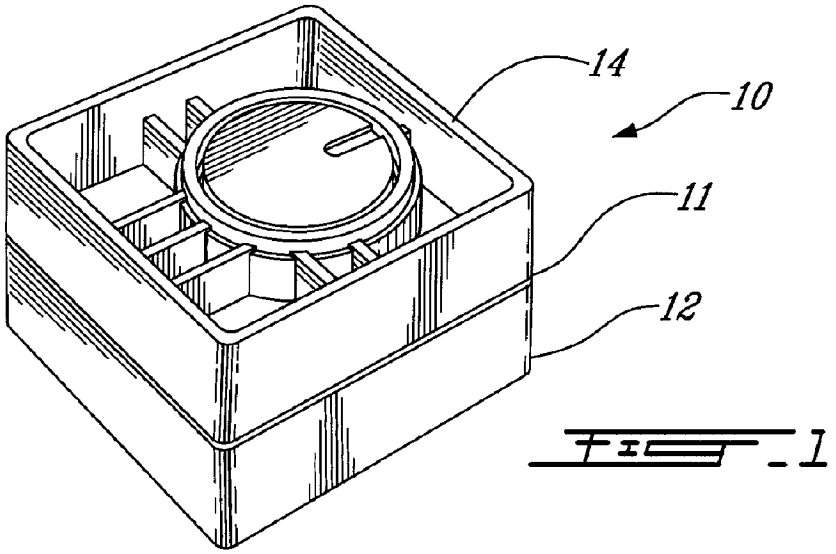

Fig. 1

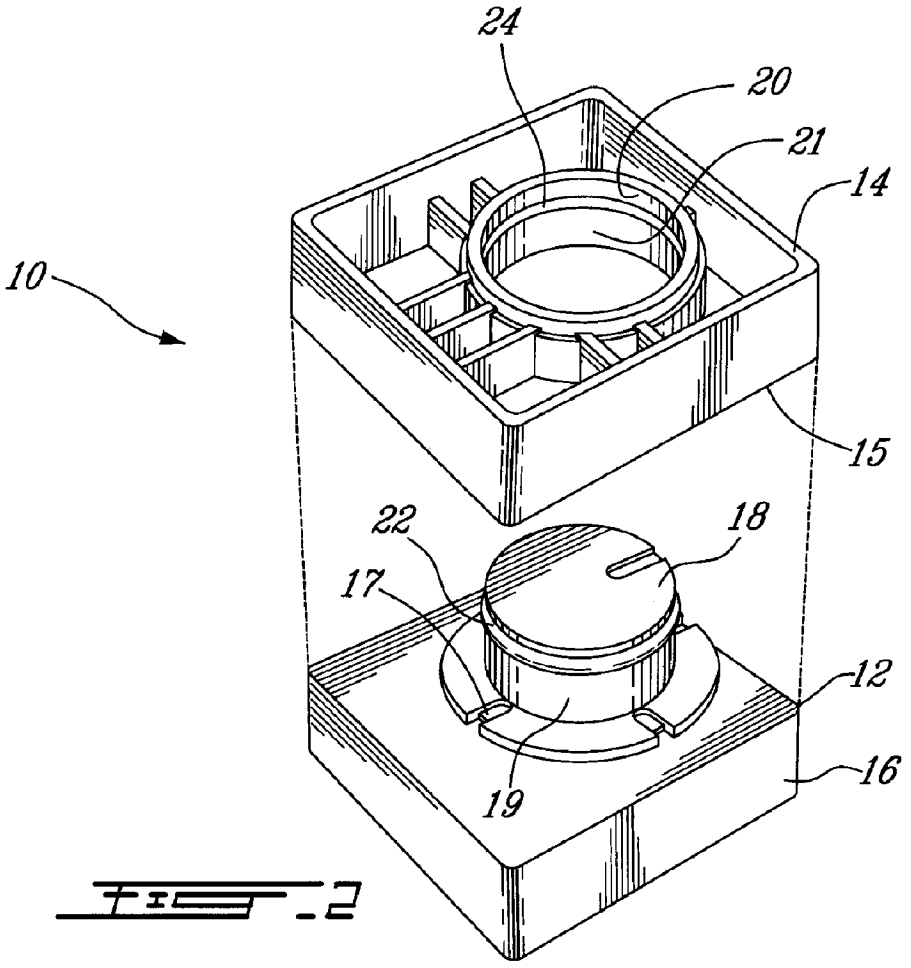

Fig. 2

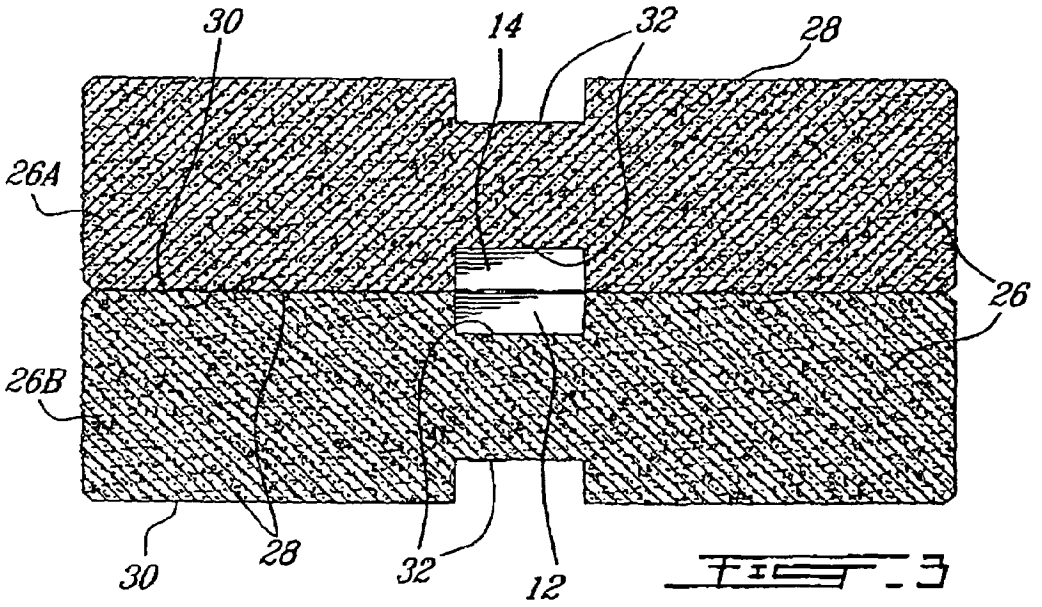

FIG. 3

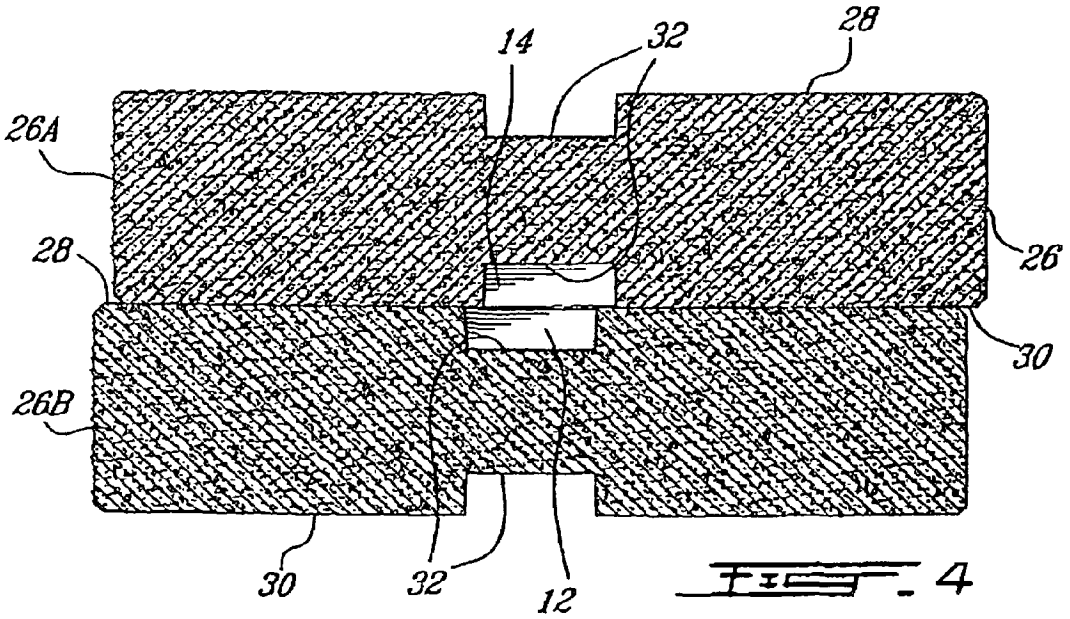

FIG. 4

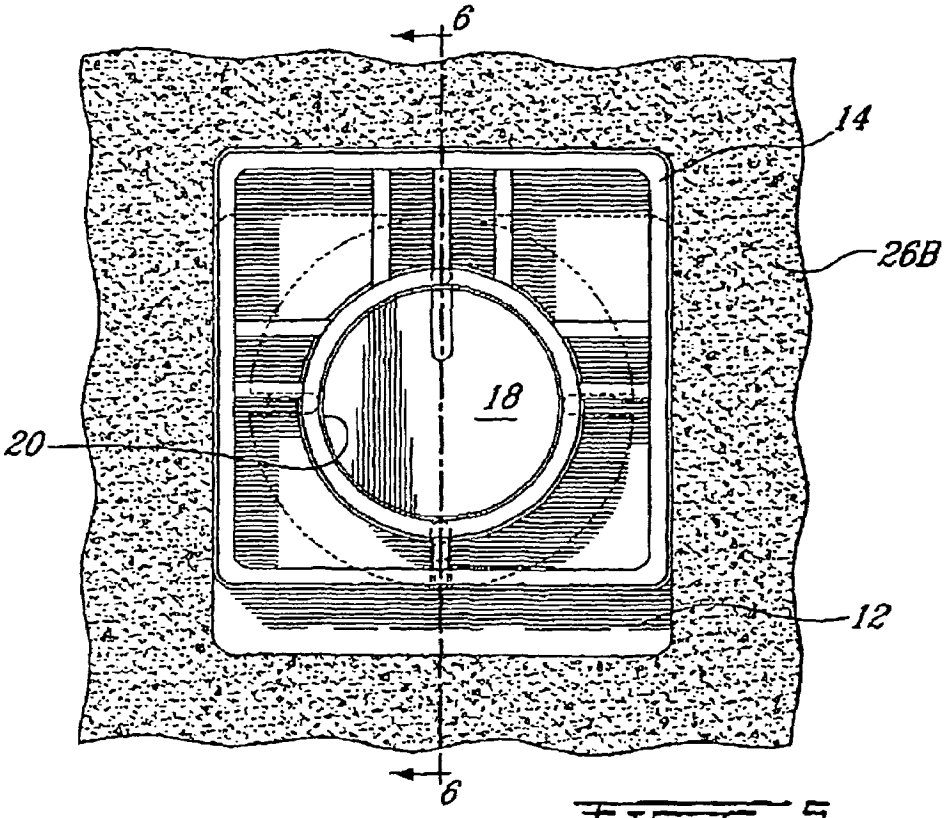

FIG. 5

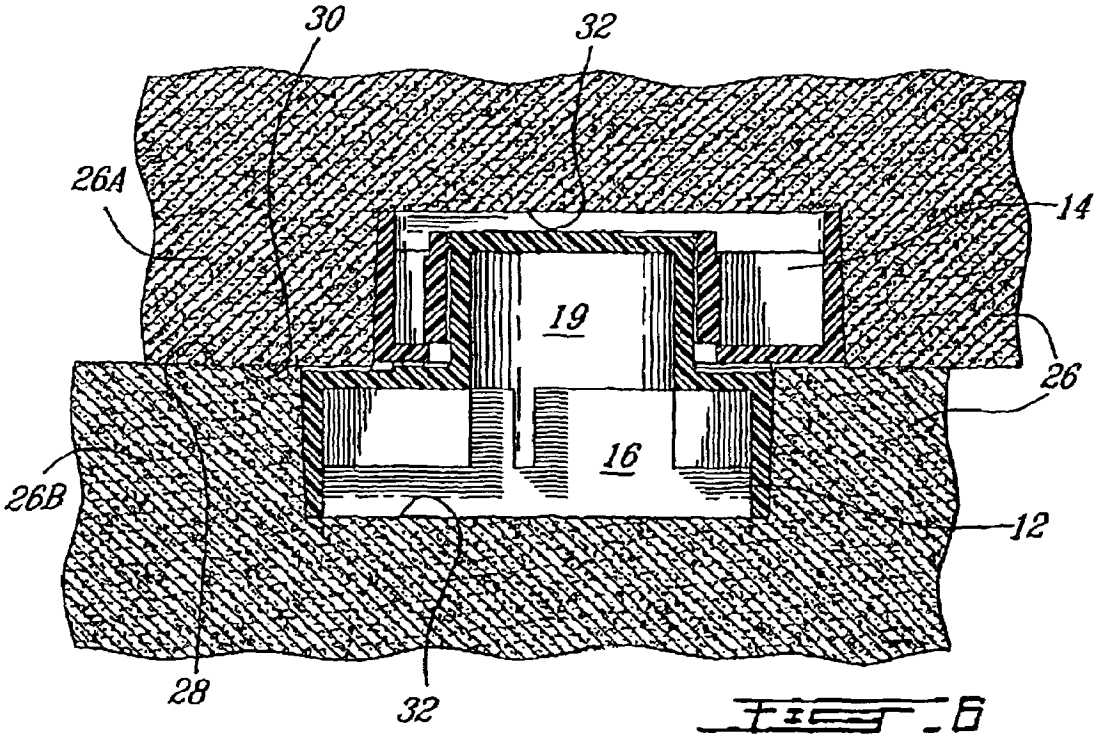

FIG. 6

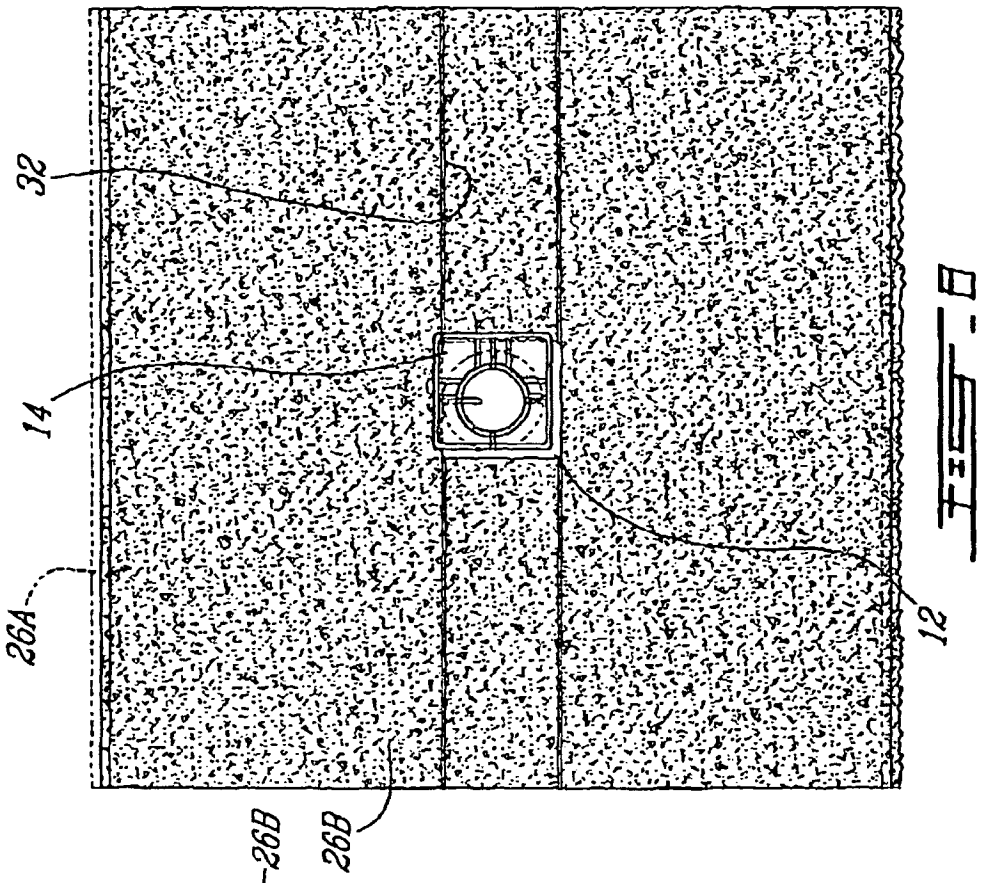

FIG. 8

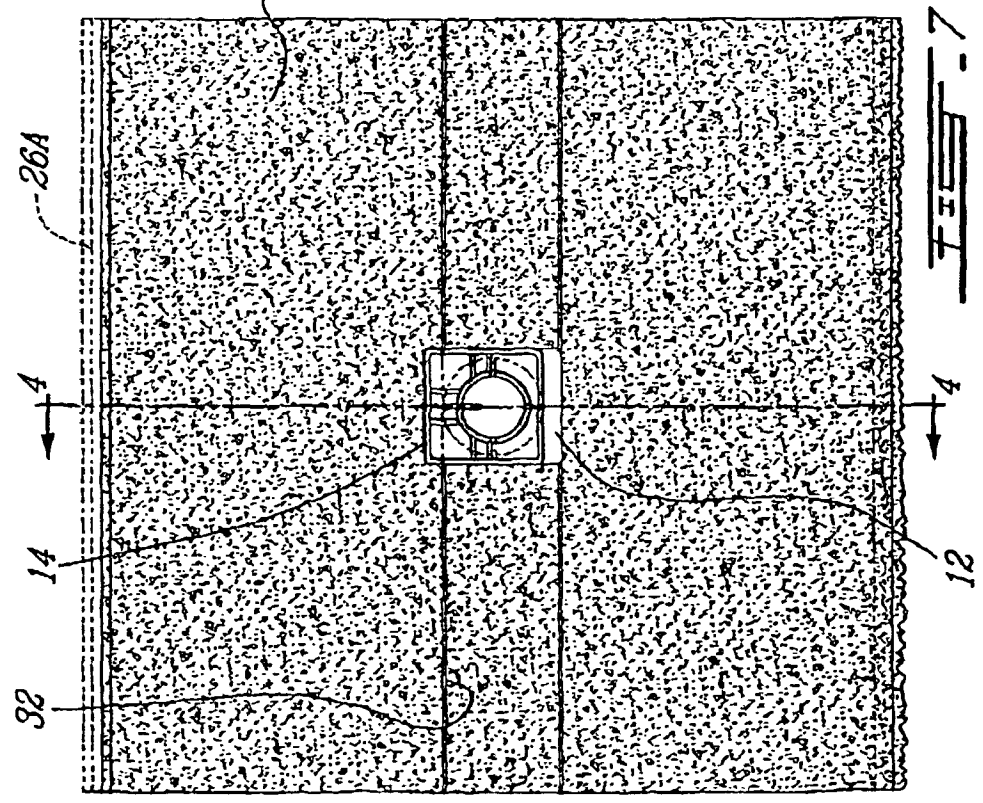

FIG. 7

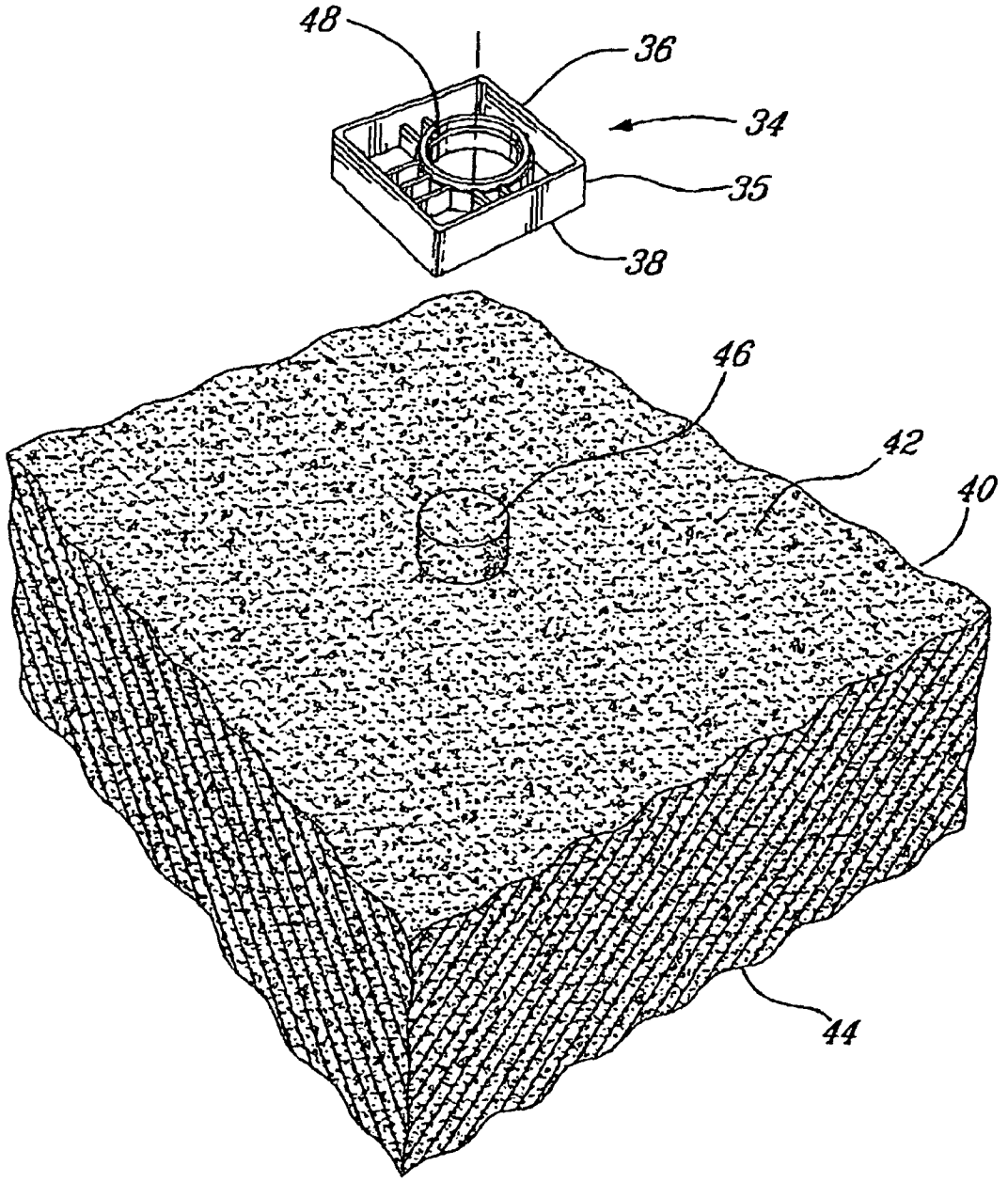

Fig. 9

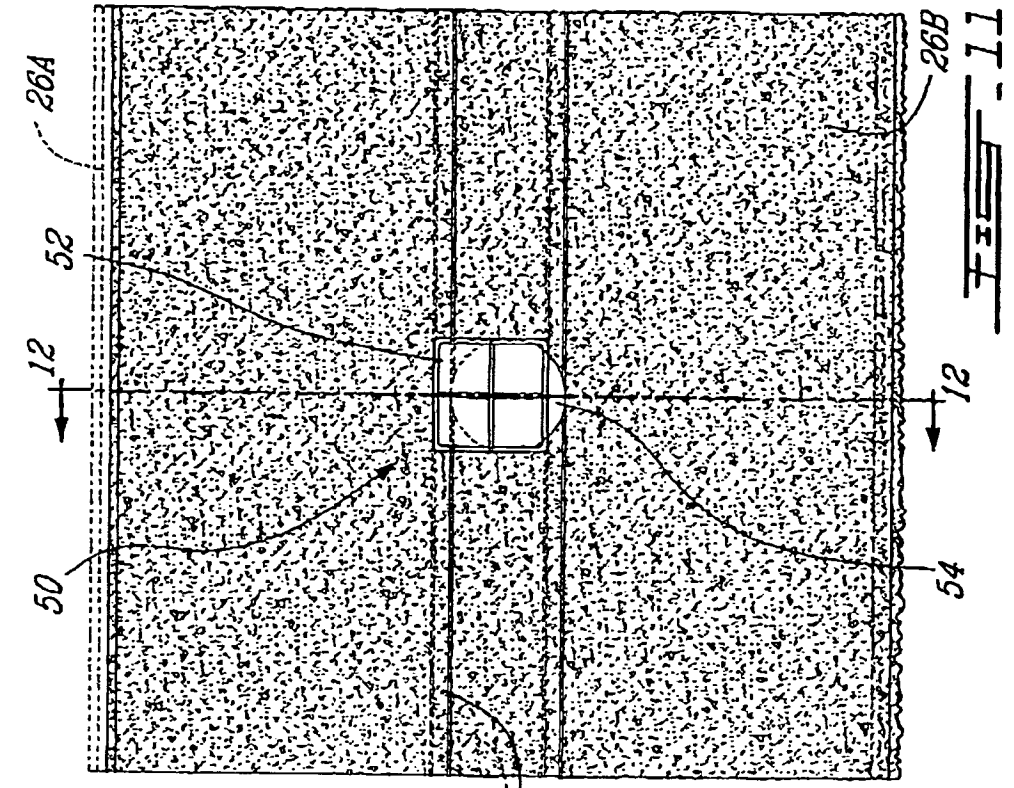

FIG - 11

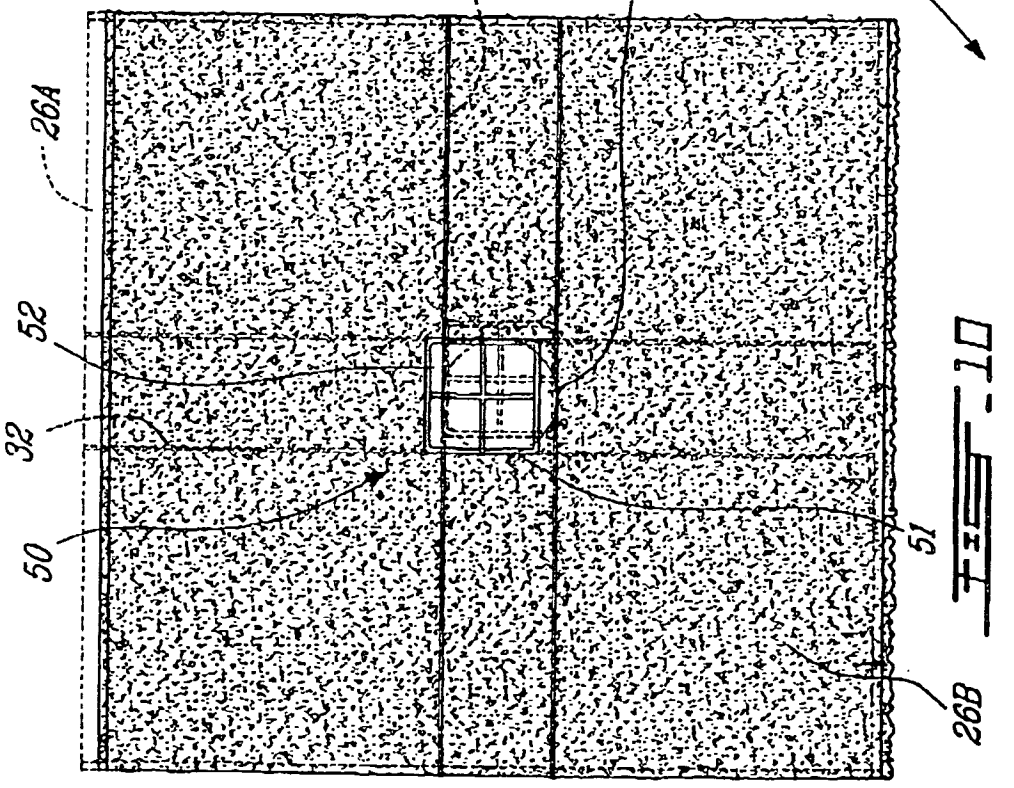

FIG - 10

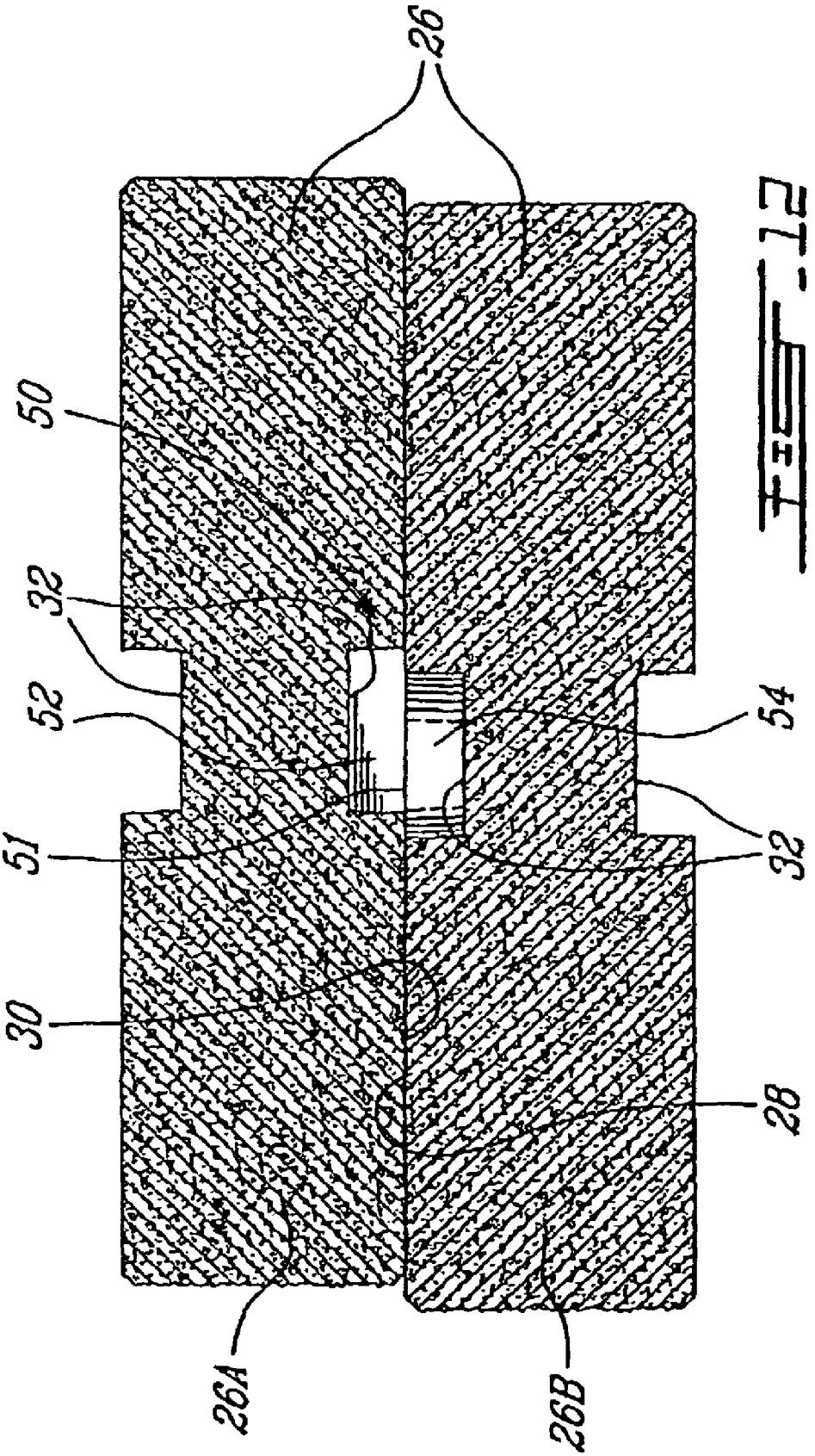

FIG. 12

PIVOTABLE INTERLOCK BLOCK CONNECTOR

CROSS-REFERENCE TO RELATED APPLICATION

This application is a 35 U.S.C. §371 of PCT International Application Number PCT/CA00/00796, which was filed 4 Jul. 2000 (Apr. 4, 2000), and was published in English.

FIELD OF THE INVENTION

The present invention relates to interlock connectors for outdoor landscaping stackable building blocks. More specifically, the present invention is concerned with a pivotable interlock block connector.

BACKGROUND OF THE INVENTION

Outdoor landscaping wall systems such as retaining wall structures comprised of stacked and interlocked precast concrete building blocks are well known. It is common to vertically stack such blocks in horizontal courses, wherein an upper course is offset with respect to the next lower course, so as to provide a retaining wall having a desired inclination. Usually, such blocks are provided with grooves on their top and bottom faces. In this way, interlock connectors can be interposed between two stacked building blocks and fitted in the grooves.

U.S. Pat. Nos. 4,490,075 and 4,815,897, both issued to Risi et al. on Dec. 25, 1984 and Mar. 28, 1989 respectively, teach an interlock block for a retaining wall system. This block has an axially extending projection upstanding from the top surface and the bottom surface has an axially extending recess of a configuration that is complementary to the projection. The projection is inwardly or eccentrically positioned so that when an upper block is connected to a lower block it is offset, creating an inclined wall structure.

U.S. Pat. No. 5,282,700 issued to Rodrique on Feb. 1, 1994 teaches an interlock block connector comprising an elongated main body to be interposed between two blocks. The elongated main body has offset upper and lower portions so as to offset two stacked blocks.

Canadian Patent Numbers 2,115,462 and 2,114,677, both issued to Correia et al. on Aug. 12, 1995 and Dec. 30, 1997, respectively, disclose blocks for constructing retaining walls having opposed flat top and bottom surfaces with respective grooves formed therein. Connecting elements are disposed within the grooves and interposed between two stacked blocks. The grooves are asymmetrically positioned so as to create an offset between two interconnected blocks.

U.S. Pat. No. 5,248,226 issued to Risi et al. on Sep. 28, 1993 teaches a connector for stackable blocks having offset upper and lower portions; the blocks have asymmetrically positioned grooves on their top and bottom surfaces hence, when blocks are vertically stacked, one course of blocks is offset with respect to the next course. A variety of connectors are provided having different configurations, such as a cylindrical upper body portion so as to allow one block to be pivoted about the connector with respect to a lower block.

A drawback with the prior art is that the same interlock connector cannot be used with blocks having symmetrical grooves to create more than one offsetness. Another disadvantage with the prior art is that connectors that allow an upper block to be pivoted with respect to a lower block are not of a generally rectangular configuration and hence, provide less stability and resistance against transversal displacement.

OBJECTS OF THE INVENTION

The general object of the present invention is therefore to provide an improved interlock connector for interlocking stackable building blocks.

Another object of the present invention is to provide an improved interlock connector for interlocking stackable building blocks free of the above-noted disadvantages.

A further object of the present invention is to provide an improved interlock connector for interlocking stackable building blocks that is pivotable between two stacked blocks to positions where the stacked blocks are offset and wherein one block may be pivoted with respect to the other interconnected block.

Yet another object of the present invention is to provide an interlock connector for interlocking stackable building blocks wherein the same connector may be used to provide more than one degree of offsetness between two stacked blocks.

SUMMARY OF THE INVENTION

More specifically, in accordance with one aspect of the present invention, there is provided an interlock connector for interlocking stackable building blocks, the blocks comprising respective top and bottom surfaces provided with apertures for receiving the interlock connector, the connector comprising:

a main body to be interposed between two stacked blocks, the main body having a central vertical axis and comprising vertically superimposed first and second body portions, one of the first and second body portions is snugly fitted in the bottom surface aperture of the upper block while the other body portion is snugly fitted in the top surface aperture of the next lower block, the first and second body portions being pivotable about a vertical pivot axis that is offset from the central vertical axis of the main body to positions wherein the upper block is offset with respect to the lower block.

Preferably, top and bottom surface apertures comprise substantially symmetrical grooves for snugly fitting therein a first or second body portion.

Preferably, one of said first and second body portions comprises a projection eccentrically positioned with respect to the central vertical axis of the main body and the other of the first and second body portions comprises a complementary aperture for receiving the projection therein so as to be pivotable about the projection.

Preferably, the first and second body portions comprise a generally rectangular configuration of substantially the same dimension and the projection comprises a generally cylindrical configuration.

Preferably, the second body aperture and the projection comprise mutually engaging fastening members for releasably fastening the first and second body portions. More preferably, the mutually engaging fastening members comprise snap fasteners.

In accordance with another aspect of the present invention, there is provided an interlock connector for interlocking stackable building blocks, the blocks comprising respective top and bottom surfaces, wherein either the bottom surface of an upper block or the top surface of the next lower block comprises an aperture while the other comprises a projection, the connector comprising:

a main body to be interposed between two stacked blocks, this main body having a central vertical axis and comprising an aperture eccentrically positioned with respect to this central vertical axis, the main body aperture pivotally receiv-

ing the projection of one block therein, the main body being fitted in the aperture of the other block, the main body having a vertical pivot axis that is offset from the central vertical axis of the main body so as to be pivotable about the projection to positions wherein one stacked block is offset relative to the other stacked block.

Preferably, the block aperture comprises a groove for snugly fitting therein the main body.

Preferably, the main body comprises a generally rectangular configuration and the projection comprises a generally cylindrical configuration.

In accordance with yet another aspect of the present invention, there is provided an interlock connector for interlocking stackable building blocks, the blocks comprising respective top and bottom surfaces, the top and bottom surfaces comprising respective and substantially symmetrical apertures, the connector comprising:

a main body to be placed in the block apertures thus interposed between two stacked blocks, the main body comprising vertically superimposed first and second body portions, the first and second body portions being offset with respect to one another, one of the first and second body portions being snugly fitted within the bottom surface aperture of the upper block, the other body portion being snugly fitted within the top surface aperture of the next lower block so as to offset the two stacked blocks.

Preferably, the block apertures comprise grooves.

Preferably, the first and second body portions comprise a generally rectangular configuration of substantially the same dimension.

Alternatively, the first and second body portions comprise a generally cylindrical configuration of substantially the same dimension and the blocks are pivotable about the first and second body portions.

Alternatively, one of the first and second body portions comprises a generally rectangular configuration and the other body portion comprises a generally cylindrical configuration with the block being pivotable about this other body portion.

Other objects, advantages and features of the present invention will become more apparent upon reading of the following non restrictive description of preferred embodiments thereof, given by way of example only with reference to the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

In the appended drawings:

FIG. **1** is a perspective view of a preferred embodiment of the present invention;

FIG. **2** is an exploded view of FIG. **1**;

FIG. **3** is a front elevational view of the present invention interlocking two stacked blocks;

FIG. **4** is a front elevational view of the present invention interlocking two blocks in an offset position;

FIG. **5** is a top view of the interlock connector of FIG. **4**;

FIG. **6** is a sectional view of FIG. **5** along the line **6-6**;

FIG. **7** is a top view of the present invention interlocking two stacked blocks in an offset position, wherein the upper block is represented in dotted line;

FIG. **8** is a top view of the present invention interlocking two stacked blocks in an offset position that is different than the offset position of FIG. **7**, wherein the upper block is represented in dotted line;

FIG. **9** is a perspective view of another preferred embodiment of the present invention;

FIG. **10** is a top view of yet another preferred embodiment of the present invention interlocking two stacked blocks wherein the upper block is represented in dotted line;

FIG. **11** is a view similar to FIG. **10**; and

FIG. **12** is a sectional view along the line **12-12** of FIG. **11**.

DESCRIPTION OF THE PREFERRED EMBODIMENT

FIGS. **1** and **2** show a preferred embodiment of the interlock block connector **10** according to the present invention, shown here having a main body **11** formed of two separate and vertically superimposed lower and upper body portions, **12** and **14**, respectively. The terms "upper" and "lower" are used throughout the disclosure only to simplify the present description when referring to the interlock block connector in accordance with the present invention. It will therefore become apparent, as will be discussed hereinbelow, that body portion **12** may also be superimposed on top of body portion **14**.

The lower body portion **12** includes a base **16** and a projection **18** extending therefrom. Projection **18** is eccentrically positioned with respect to base **16**. Preferably, base **16** has a generally rectangular configuration and projection **18** has a generally cylindrical configuration. The upper body portion **14** comprises a complementary aperture **20** for pivotally fitting projection **18** therein. Preferably, body portion **14** has a generally rectangular configuration substantially similar in size to base **16**.

Projection **18** and aperture **20** may include mutually engaging fastening members on their outer wall **19** and inner wall **21**, respectively. Fastening members such as ring ridges **22** and complementary ring recesses **24** may be used for releasably snap fitting projection **18** and aperture **20**. Other types of fastening members known to the skilled artisan may also be used. It must also be noted that a variety of complementary apertures and projections may also be used for pivotally assembling the separate body portions **12** and **14**. For example, one body portion may include a projecting pin member to be pivotally inserted in the complementary aperture of the other body portion.

When the main body **11** is assembled as in FIG **1**, body portion **14** can be pivoted about projection **18**. Obviously, body portion **12** can also be pivoted about aperture **20**. Both projection **18** and aperture **20** are eccentrically positioned with respect to the main body **11**. Therefore, the pivot axis of body portions **12** and **14** is offset from the central vertical axis of the main body **11**. In this way, one body portion **12** or **14** may be pivoted to positions where the body portions **12** and **14** are offset with respect to one another as shown in FIGS. **4**, **5**, **6**, **7** and **8**.

FIG. **3** shows the main body **11** of the present interlock connector interposed between two stacked blocks **26**. Blocks **26** are preferably rectangular in configuration and bounded by generally parallel and similar top and bottom surfaces **28**, **30** respectively (also see FIG. **4**). Preferably, blocks **26** are precast concrete stackable building blocks used particularly in retaining wall systems. Hence, it is understood that the blocks used in the present invention are not limited to the configuration illustrated herein; all that is required is that blocks **26** be of a suitable configuration to enable like blocks to be vertically stacked in overlying wall defining relation.

The top and bottom surfaces **28** and **30** of blocks **26** are provided with respective apertures **32** for receiving therein the interlock connector **10**. Advantageously, apertures **32** are provided in the form of grooves and preferably, in the form

of substantially symmetrical grooves **32**. In this way, the task of building a retaining wall is simplified since identical blocks may be used. Grooves **32** may be long rectangular slots as better seen in FIGS. **7** and **8**. Of course block apertures **32** may be in the form of rectangular holes or any other suitable configuration capable of receiving the interlock connector **10**.

When the main body **11** is interposed between two blocks **26** as in FIG. **3**, for example, one of the body portions preferably the upper body portion **14**, is snugly fitted in groove **32** of an upper block **26**A while the other body portion, preferably lower body portion **12**, is snugly fitted in groove **32** of the next lower block **26**B. The rectangular configuration of body portions **12** and **14** allows the interlock connector of the present invention to interlock two stacked blocks **26** against lateral displacement. It is understood that other types of grooves and body portion configurations may also be used; it is preferable to use configurations that minimise the lateral displacement of the stacked blocks **26**.

An upper block **26**A can be pivoted along with an upper body portion **14**, with respect to a lower block **26**B, to positions where the body portions **12** and **14** are offset causing the upper and lower blocks **26**A and **26**B to be offset as well as shown in FIGS. **4**, **6**, **7** and **8**. Obviously, body portions **12** and **14** can be adjusted to be offset before stacking an upper block **26**A on a lower block **26**B. This would especially be the case when blocks **26** are provided with grooves that are not symmetrical.

As is common in retaining wall structures, a plurality of blocks **26** may be vertically stacked in interlocked, overlapping horizontal courses. The offset of the body portions **12** and **14** will allow the horizontal courses of blocks to be offset with the next adjacent course in order to create an inclined wall structure. In the present example, a desired offsetness may be selected by pivoting upper body portion **14** to a "slightly" offset position as shown in FIG. **8** or to a "greater" offset position as shown in FIG. **7**.

Referring again to FIG. **1**, body portion **14** may have protrusions (not shown) on its underside **15** which can be fitted in complementary slots **17** in body portion **12**. In this way, body portions **12** and **14** are stabilised at a given position, such as the positions shown in FIGS. **3**, **7** and **8**.

The pivotability of body portions **12** and **14** allows for interlocked, horizontally overlapping blocks **26** to be pivoted with respect to one another in order to build a horizontally curved wall structure. Complementary vertical ridges (not illustrated) may also be provided along the outer wall **19** of projection **18** and the inner wall **21** of aperture **20**, in order to produce a "clicking" sound when a body portion **12** or **14** is pivoted; this may allow the builder to estimate to what degree one block has been pivoted with respect to another, facilitating the building of a horizontally curved wall structure. Wall corners may also be created by pivoting an upper block **26**A to a position where its longitudinal axis is perpendicular to the longitudinal axis of a lower block **26**B.

In another embodiment in accordance with another aspect of the present invention, an interlock connector **34** as illustrated in FIG. **9**, may comprise a main body **35** which is a single piece. Main body **35** includes similar "upper" and "lower" body portions **36**, **38**, respectively.

Also shown in FIG. **9** is block **40**, which like block **26**, is a precast concrete stackable building block. Block **40** is vertically bounded by opposite surfaces **42** and **44**. At least one surface, in this example surface **42**, is a connector-engaging surface and hence, includes a projection **46**. Surface **44** may be provided with an aperture such as a groove to receive therein connector **34**. The main body **35** has a complementary and eccentrically positioned aperture **48** to pivotally receive projection **46**. Projection **46** is preferably in the form of a concrete peg made of the same concrete material as building block **38** and is advantageously cylindrical in configuration. In the example illustrated in FIG. **9** aperture **48** is built through the whole main body **35**. It is within the scope of the invention though, that the upper body portion **36** may comprise a closed top surface while the lower body portion **38** includes aperture **48**.

Block **40** may be either stacked on top of a lower block **26**B or an upper block **26**A may be stacked on top of block **38** with projection **46** facing either block **26**A or **26**B, as the case may be. The main body **35** is interposed between blocks **26** and **38** with body portion **36** snugly fitted in a groove **32** of a block **26** while body portion **38** receives projection **46**. The main body **35** is pivotable about projection **46**. Since aperture **48** is eccentrically positioned, the pivot axis of main body **35** will be offset from the central vertical axis of the main body **35**. Main body **35** functions much like body portion **14** in FIG. **2**; hence, it is pivotable about projection **46**, like body portion **14** is pivotable about projection **18**, to positions where the stacked blocks **38** and **26** are offset.

FIGS. **10**, **11** and **12** illustrate another preferred embodiment of an interlock block connector **50**, in accordance with yet another aspect of the present invention, having a main body **51** formed of a single piece and which comprises offset "upper" and "lower" body portions **52** and **54**, respectively. Body portion **52** has a generally rectangular configuration and body portion **54** has a generally cylindrical configuration. When two blocks **26** are stacked and interlocked by way the main body **51** being interposed therebetween, body portion **52** will be snugly fitted into the groove **32** of the upper block **26**A and body portion **54** will be snugly fitted in the groove **32** of the lower block **26**B.

The circular configuration of body portion **52** allows for an upper block **26**A to be pivoted, as in FIG. **10**, with respect to a lower block **26**B as the lower body portion turns within the groove **32** of the lower block **26**B.

In another embodiment (not illustrated), both body portions of main body **51** may have cylindrical configurations similar to that of body portion **54**. In yet another preferred embodiment (not illustrated), both body portions of main body **51** may have a generally rectangular configuration similar to that of body portion **52**; this will allow for both body portions to be snugly fit within grooves **40**, yet pivoting would not be possible with such a configuration.

Advantageously the various embodiments described herein of the present interlock block connector are made from a strong and durable plastic material.

Although the present invention has been described hereinabove by way of preferred embodiments thereof, it can be modified, without departing from the spirit and nature of the subject invention as defined in the appended claims.

What is claimed is:

1. An assembly of interlocking tiers of stackable precast concrete building blocks, said blocks being of the type used to erect walls by stacking said blocks in vertical or setback configurations, said blocks being of the type having planar top and bottom surfaces having symmetrical apertures on their top and bottom surfaces, said blocks being connected by a connecter, said connector being shaped and sized to snugly fit in the apertures of said blocks so as to prevent sliding of blocks once interlocked by the connector, said connector having a first body portion defining a shape contour and being adapted for assembly in manually pivot-

able relationship with a second body portion having a shape contour similar to the first body portion, said pivotable relationship being established at a point offset from the geometrical center of the body portions whereby when assembled, the connector can be manually adjusted to provide a shape contour typical of a vertical interlocking mode and at least one offset shape contour typical of an offset interlocking mode; wherein the pivotable relationship is established by providing a generally cylindrical protrusion on the first body portion and providing on the second body portion a corresponding aperture, sized and shaped to receive said protrusion.

2. The assembly of claim **1** wherein said second body portion is pivotable about said protrusion.

3. The assembly of claim **2** wherein the first and second body portions have a generally rectangular box shape contour.

4. The assembly of claim **3** wherein the first body portions are releasably and manually adjustable in preset pivoting relationships by providing mutually engageable protuberances and cooperating depressions on the respective body portions whereby the body portions can be pivoted in and out of preset relative positions.

5. The assembly of claim **2** wherein the first and second body portions are snap-fitted together for assembly.

6. A kit of parts including a block and corresponding connector, the parts kit for assembly a respective connector with tiers of stackable precast concrete building blocks, said blocks being of the type used to erect walls by stacking said blocks in vertical or setback configurations, said blocks being of the type having planar top and bottom surfaces having symmetrical apertures on their top and bottom surfaces, said connector being shaped and sized to snugly fit in the apertures of said blocks so as to prevent sliding of blocks once interlocked by the connector, said connector having a first body portion defining a shape contour and adapted for assembly in manually pivotable relationship with second body portion having a shape contour similar to the first body portion, said pivotable relationship being established at a point offset from the geometrical center of the body portions whereby when assembled, the connector can be manually adjusted to provide a shape contour typical of a vertical interlocking mode and at least one offset shape contour typical of an offset interlocking mode; wherein the pivotable relationship is established by providing a generally cylindrical protrusion on the first body portion and providing on the second body portion a corresponding aperture, sized and shaped to receive said protrusion.

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