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Masonry construction element

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ABSTRACT

A construction element (11) comprising two end faces (12, 13)and two connecting faces (14, 15) extending between those end faces, each connecting face having at least one pair of complementary interlock devices for mechanically interlocking with an adjacent element, one interlock device in each pair being a protrusion (16, 18) and the other being a recess (17, 19), each connecting face (14, 15) defining a protrusion region and a recess region. The at least one protrusion and recess from each pair of interlock devices being positioned in the respective regions substantially equidistant from the nearest end face, each end face having a proximate protrusion region on one adjoining interconnecting face and a proximate recess region on the other adjoining connecting face.

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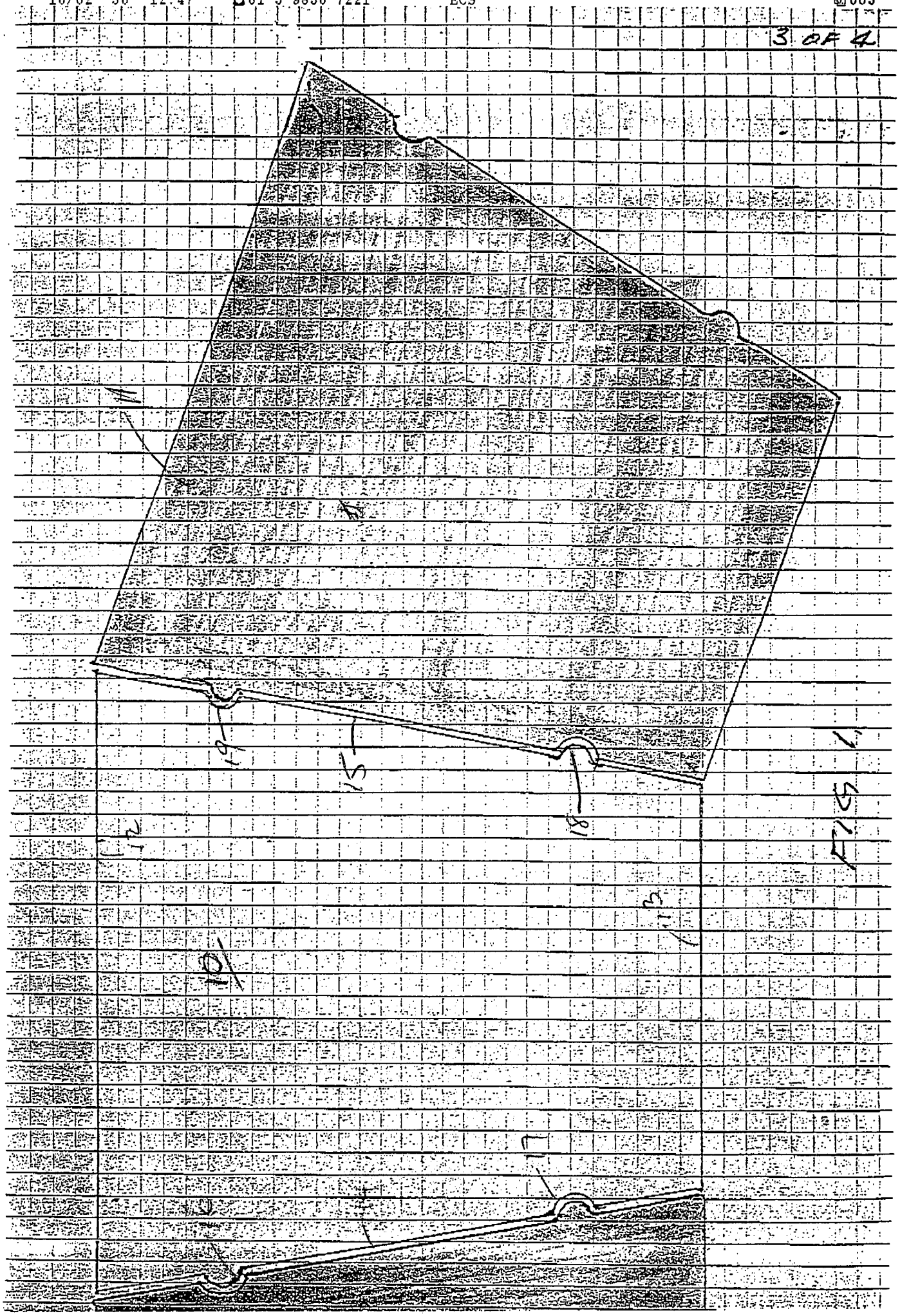

AUSTRALIA

Patents Act 1990

COMPLETE SPECIFICATION
STANDARD PATENT

Invention Title: **Masonry construction element**

The following statement is a full description of this invention, including the best method of performing it known to us:

MASONRY CONSTRUCTION ELEMENT

Field of the Invention

This invention relates to a masonry construction element which can be used to form straight curved or serpentine courses of like elements in a wall or a decorative feature such as garden edging and paving.

Background of the Invention

There are numerous types of masonry construction elements available which can be used to form decorative or retaining walls as well as border edging and paving in gardens. All elements include not only rectangular prism shaped bricks or concrete blocks where the interlocking between adjacent bricks occurs through the use of mortar, but also blocks which have some form of vertical mechanical interaction between different courses in the brick work. These types of bricks rely on mortar to provide lateral interaction between the adjacent bricks. Hence, when no mortar is used or glue is used, the integrity of a single course is seriously affected. Furthermore, because of the mechanical interlocking devices on the top and bottom surfaces of the bricks, the types of bricks are generally not suitable for generally paving and garden edging.

For known general paving and garden edging bricks, these too are generally useful for only straight line course work where the interlocking between the adjacent bricks allows only straight line laying of the bricks or trapezoidal shaped bricks which do not interlock but are able to form arcuate or serpentine garden edges.

As with wall bricks, these trapezoidal blocks rely on mortar to provide lateral interaction between the bricks to maintain their relative position when lateral or longitudinal forces are applied. In fact, because of their shape, trapezoidal bricks are particularly prone to being dislodged from position by forces from any direction such as lateral forces, generally parallel to the end faces and longitudinal forces in the direction of the larger end faces of the trapezoid shape.

In addition to the above problems, none of these types of bricks are able to universally perform all of the functions described above, without manually shaping of the individual bricks at the time they are laid.

Therefore it is an object of the present invention to provide a masonry construction element which can be used with like construction elements in the construction of small decorative retaining walls, straight course work, arcuate course work, or stable single course boundary edging.

Summary of the Invention

Accordingly the invention provides a construction element comprising two end faces and two connecting faces extending between those end faces, each connecting face having at least one pair of complementary interlock devices for mechanically interlocking with an adjacent element, one interlock device in each pair being a protrusion and the other being a recess, each connecting face defining a protrusion region and a recess region. The at least one protrusion and recess from each pair of interlock devices being positioned in the respective regions substantially

equidistant from the nearest end face, each end face having a proximate protrusion region on one adjoining interconnecting face and a proximate recess region on the other adjoining connecting face.

In a preferred form of the invention the masonry construction element has a top and bottom surface with the end faces at each end being of different lengths.

By providing a protrusion region and recess region in each connecting face, and having the protrusion region of one connecting face and the recess region of the other connecting face proximate to the end face, identical bricks can be laid side by side in a mechanically interlocking fashion with adjacent bricks. Furthermore, with one end face being longer than the other, these bricks can be laid in an arcuate shape when the same length faces are aligned side by side with each element interlocking with its neighbour. Alternatively, the construction elements can be laid in a straight course so that for any brick each of its end faces are adjacent a different length end face on a adjacent element, i.e with long and short faces alternating on the same exposed face.

Compared to the laying of an arcuate course, a straight course can easily be laid by rotating the masonry element approximately 180°C about a vertical axis through the top and bottom faces. This is able to be achieved through the specific arrangement of mechanical interlocking devices on the connecting faces.

In one embodiment of the invention a substantially flat region exists between the protrusion region and the recess

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region of each interconnecting side. The interconnecting faces are substantially the same length.

In an alternative form, each interconnecting face is divided equally into a protrusion region and a recess region and preferably a single protrusion extends the length of the protrusion region and a single recess extends the length of the recess region. While any number of protrusions may be provided in the protrusion region and recesses in the recess region, it is important that the number of protrusions and recesses be the same, and that the recesses at least be able to receive the protrusions of an interlocking element without a gap appearing between the adjoining top surfaces of adjacent masonry elements.

While it is not necessary for the protrusion to extend the height of the element, when the protrusion is a ridge for practical purposes during construction, it is preferable that the protrusion extends the height of the element. In the circumstances the recess is a trough which extends the height of the element.

In another aspect of the invention there is provided a construction element comprising two end faces, each end face being of different lengths, and two connecting faces extending between those end faces, each connecting face being equally divided into a protrusion and a recess which form a pair of complementary interlock devices for mechanically interlocking with an adjacent element, the protrusion and recess being positioned substantially equidistant from the nearest end face, each end face having a proximate protrusion on one adjoining connecting face and a proximate recess on the other adjoining connecting face.

In another aspect of the present invention there is provided a construction block including a first connecting face and a second connecting face, each connecting face being equally divided into a protrusion and a recess which form a pair of complementary interlock devices for mechanically interlocking with an adjacent block, the block being configured so that it can be rotated about a vertical axis for engagement of one of the connecting faces with one of the connecting faces of a like block so that the blocks can be engaged at one of two angular alignment positions.

The features objects and advantage of the present invention will become more apparent from the following description of the preferred embodiments and accompanying drawings in which:

Figure 1 and 1A are plan views of interacting construction elements in accordance with a first embodiment of the invention;

Figure 2 is a perspective view of the first embodiment of the invention;

Figure 3 is a plan view of two engaging elements in accordance with a second embodiment of the invention;

Figure 4 is a plan view of the third embodiment of the invention;

Figure 4a is a plan view of two adjacent elements in accordance with a third embodiment of the invention; and

Figure 5 is a perspective view of the third embodiment of the invention.

Referring to the drawings, Figure 1 shows a first embodiment of the invention in plan view. A construction element 10 in accordance with the invention is shown laid beside a like element. Construction element 10 has two end faces 12 and 13 and two connecting faces 14 and 15. The end faces may be flat, curved or architecturally treated. Each connecting face 14, 15 is shown as having a pair of complementary interlocking devices. The interlocking devices on connecting face 14 are protrusion 16 and recess 17, while those on connecting face 15 are protrusion 18 and recess 19. In this embodiment it is preferable that the protrusions are ridges which extend the full height of the construction element and the recesses are troughs which extend the full height of the construction element.

The ridge 16 and recess 17 are positioned on the connecting face 14 substantially equidistant from the nearest end faces 12 and 13 respectively. Similarly, recess 19 and ridge 18 are substantially equidistant from end faces 12 and 13 respectively. Furthermore with the arrangement it can be seen that end face 12 has a proximate protrusion 16 and a proximate recess 19 on the respective faces 14 and 15.

This arrangement allows for the construction elements to be laid in a positional relationship as shown in Figure 1 which results in an arcuate shape when a number of like construction elements are laid in this fashion. As the construction elements are roughly the same size as each other, a straight line of construction elements can be laid by simply rotating the adjacent element 11, 180°C about an axis perpendicular to the plane of Figure 1. This is shown in Figure 1A.

It is preferable that the end faces 12 and 13 are of different lengths so that these two possible arrangements can be made.

Slippage resulting from a force applied at right angles to an end face is obvious but also without the interlock dislodgment can occur when force is applied from any horizontal direction.

As can be seen from the drawings, when the construction elements are laid side by side, the mechanical interlocking between the elements is sufficient to resist sliding of the interconnecting faces relative to one another and thereby resist displacing one element relative to the other. Slippage is particularly common where forces parallel to the end faces are applied to joining construction elements. Because of the sloping nature of the connecting elements, a component of these forces acts perpendicular to the end faces in the direction of the longest end face to dislodge the construction element.

The protrusion and recesses of the connecting face are said to define interlocking regions which are conveniently referred to as a protrusion region and recess region.

Where more than one pair of complementary interlocking elements are provided on each connecting face, as shown in Figure 3, it is essential that the recesses be grouped together and the protrusions be grouped together in those respective recess end protrusion regions. This assists the locating of the construction elements relative to each other and also ensures the construction elements are able to be reversed to go from a arcuate configuration to a straight line configuration.

While the invention has been described with reference to one and two pairs of complementary interlocking elements, it would be appreciated that more than two pairs of elements can be used on each interconnecting face with the upper limit depending on the size of the interconnecting face and the required size of protrusion and recess for effective interlocking and locating.

To further assist with the locating of the adjoining construction elements, a substantially flat region may exist between the protrusion region and the recess region on each interconnecting side so that when construction elements are laid, unmatched protrusions can easily slide until they engage correctly.

In the third embodiment 20 of the invention as shown in Figure 4, the whole interconnecting face 21, 22 is divided more or less equally into a protrusion region 23, 24 and a recess region 25, 26 giving the connecting face a wave

appearance. As can be seen from Figures 4 and 5, the physical constraints of the invention equally apply to this embodiment in that each connecting face has one pair of complementary interlock devices for mechanically interlocking with an adjacent element. One of the interlock devices is a protrusion which extends one half of the interconnecting face while the other is a recess which extends the other half of the interconnecting face. Hence, the protrusion and recess are equidistant from the nearest end face, and each end face has a proximate protrusion and recess on each of the adjoining interconnecting faces. As with the other embodiments, the end faces may be straight, curved of architecturally treated.

While the invention as being described with reference to protrusions and recesses, it would be appreciated by those skilled in the art that these protrusions or recesses may be subject to the method of construction, by a single or line of dimples with correspondingly shaped end position dimples, or the protrusions may be a ridge with the recesses being a trough appropriately positioned in the construction element.

Since the preferred means of producing the construction element is in a mould in which the cured elements are pushed from the top surface out through the mould, the most practical configuration for the protrusions and recesses are ridges and troughs.

While the invention has been described with reference to forming arcuate shapes or straight line shapes, it would be appreciated by those of ordinary skill in the art that S-shapes or other combinations of straight and curved course work can be formed using the construction element in

accordance with the invention. Additionally, the construction elements can be laid in a number of lines of course work to form a retaining wall or decorative wall by simply laying the construction elements in the appropriate layers. Placing the construction elements one above the other, will not result in an unstable wall as it would if known construction elements were used since the mechanical interlocking between the adjacent construction elements will prevent columns of stack construction elements from easily being dislodged.

It will be understood that the invention disclosed and defined herein extends to all alternative combinations of two or more of the individual features mentioned or evident from the text or drawings. All of these different combinations constitute various alternative aspects of the invention.

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THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS

1. A construction element comprising two end faces, each end face being of different lengths, and two connecting faces extending between those end faces, each connecting face being equally divided into a protrusion and a recess which form a pair of complementary interlock devices for mechanically interlocking with an adjacent element, the protrusion and recess being positioned substantially equidistant from the nearest end face, each end face having a proximate protrusion on one adjoining connecting face and a proximate recess on the other adjoining connecting face.

2. The construction element of claim 1, further comprising a top and bottom .

3. The construction element of claim 1 or 2, wherein the recess receives the protrusion of an interlocking element without a gap appearing between the adjoining top surfaces of adjacent masonry elements.

4. A construction block including a first connecting face and a second connecting face, each connecting face being equally divided into a protrusion and a recess which form a pair of complementary interlock devices for mechanically interlocking with an adjacent block, the block being configured so that it can be rotated about a vertical axis for engagement of one of the connecting faces with one of the connecting faces of a like block so that the blocks can be engaged at one of two angular alignment positions.

5. The construction block of claim 4 wherein in one of the angular alignment positions block end faces align in a straight line configuration.

6. The construction block of claim 4 or 5 wherein the protrusion and recess define a substantially continuous curved surface.

7. The construction block of claim 4, 5 or 6 further including a substantially continuous upper surface.

8. A construction element substantially as hereinbefore described with reference to Figures 4, 4a and 5.

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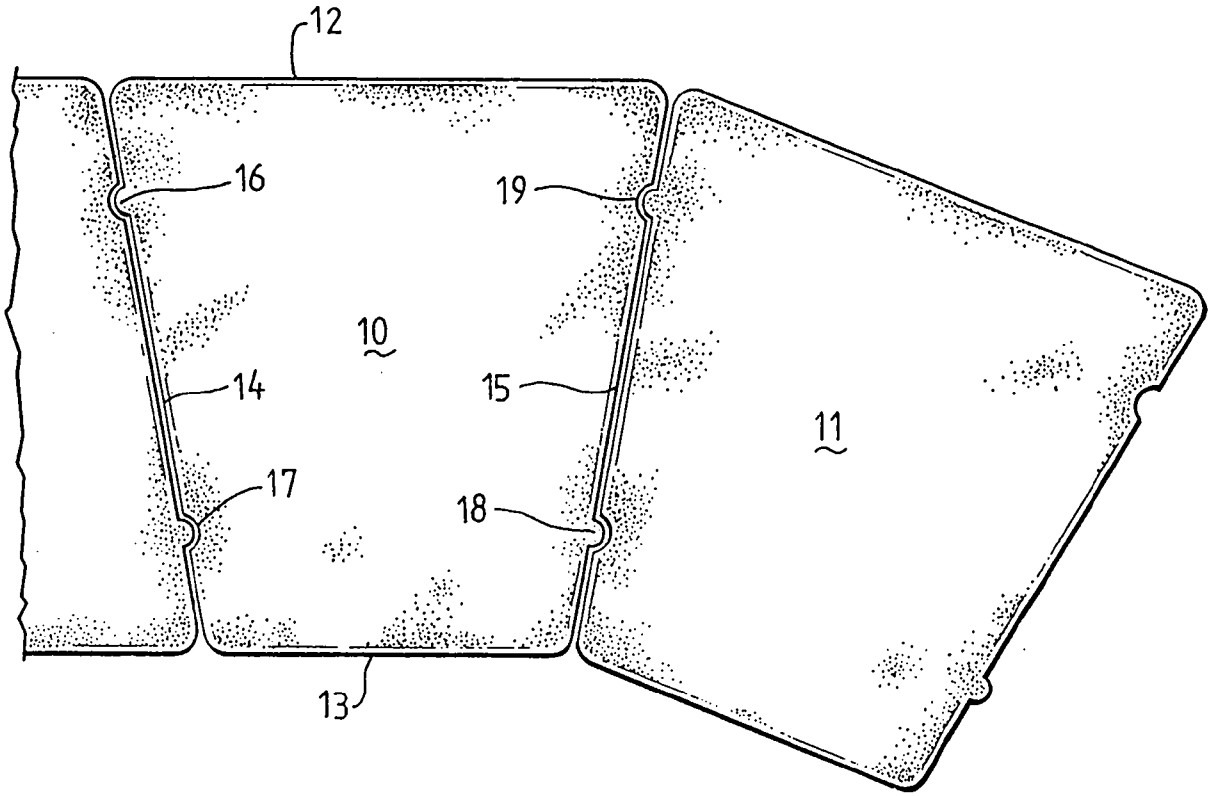

Fig. 1

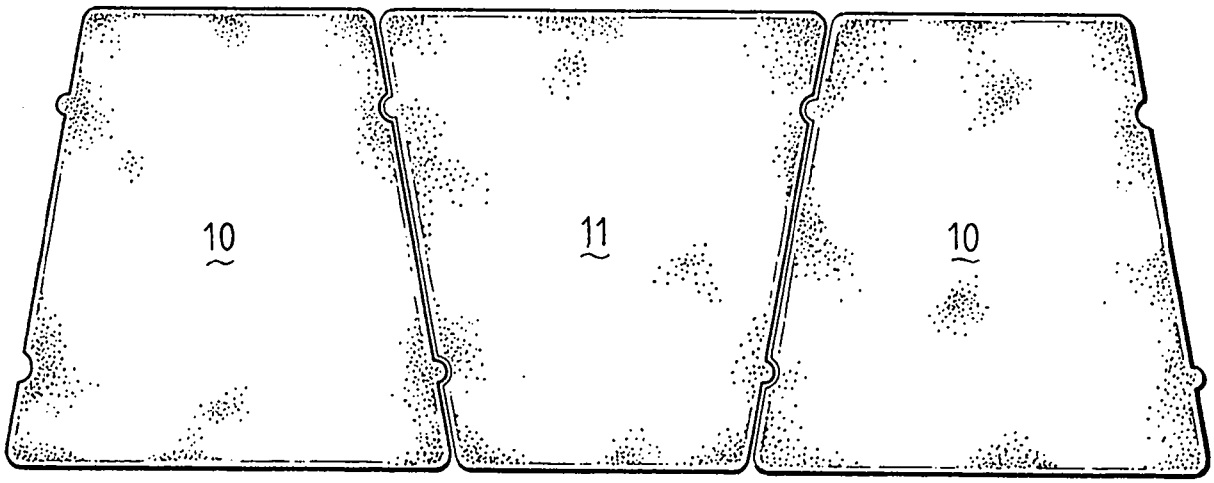

Fig. 1a

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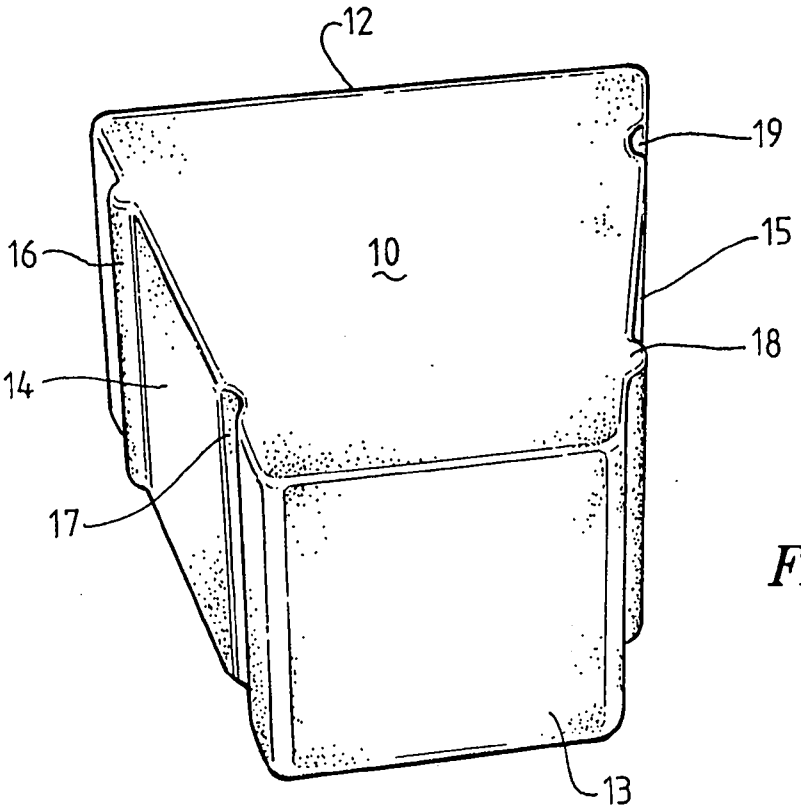

Fig. 2

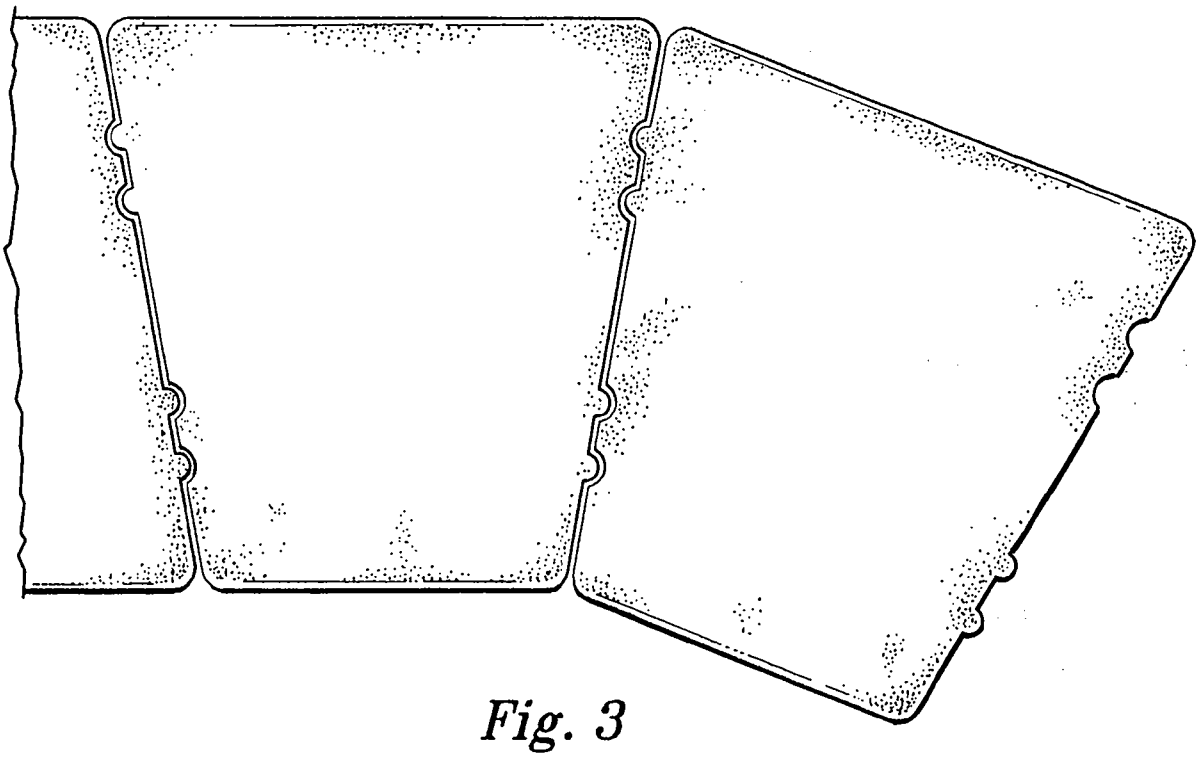

Fig. 3

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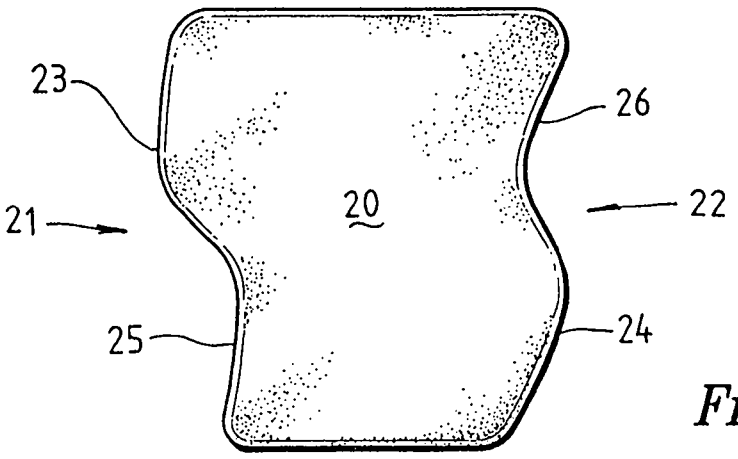

Fig. 4

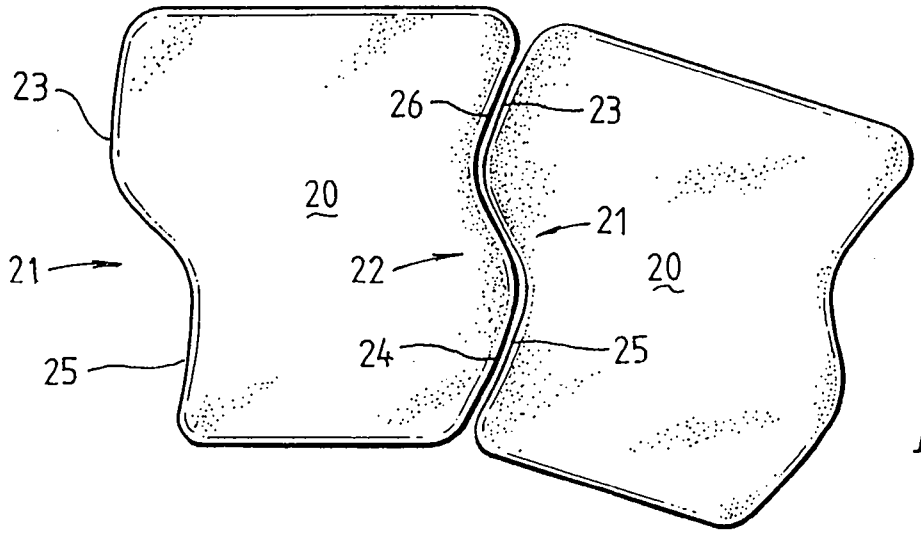

Fig. 4a

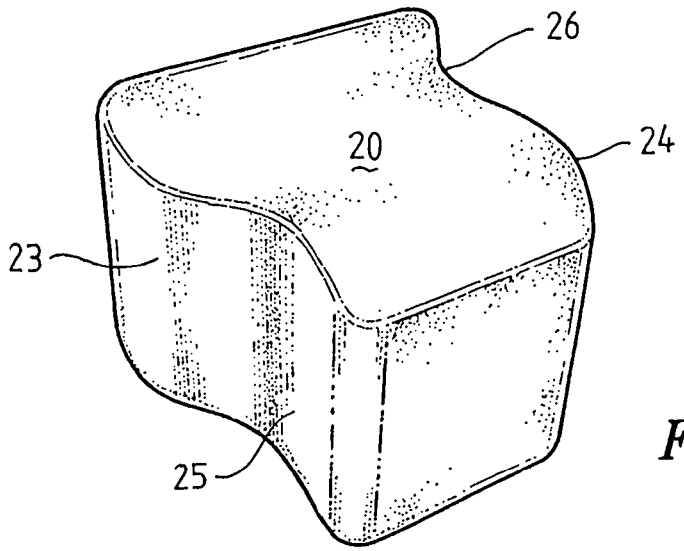

Fig. 5