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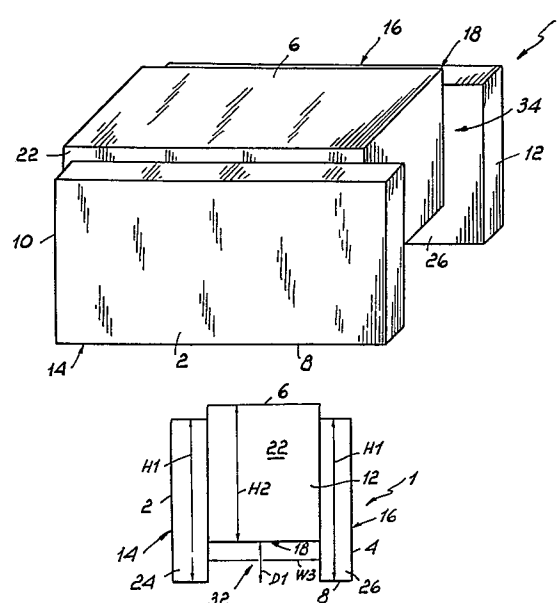
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54 **Building block.**

57 A building block comprises two opposite faces (2, 4), and two pairs of parallel sides (8, 6 and 10, 12). Outside flanges (26) extend along a first two sides (8, 12), defining channels (34) along the first sides between the faces and spaced apart therefrom. Central shoulders (22) extend along a second two sides and are spaced apart from the faces. Each of the shoulders (22) along each of the second sides has a lateral extent such that each shoulder (22) can fit closely within the channel (34) along an adjacent side of another such block and a height less than the depth of the channel along the adjacent side, to provide a passageway between the blocks.



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This invention relates to a building block having an interlocking feature and channels whereby mortar can be added from the top of a wall erected with such blocks.

5 Erecting walls of blocks, bricks in particular, is commonly recognized as a labour intensive task requiring a fair amount of skill. The bottom course of bricks is first laid on a suitably level foundation. Successive courses of bricks are laid on top of the
10 initial course and care must be taken in the placement of the bricks and the amount of mortar used so the wall is straight. Continual use of plumb lines, levels and the like is required for satisfactory construction. The amount of care required slows the pace of
15 experienced brick layers and makes it difficult for the amateur to produce satisfactory results.

Such walls of blocks have normally an insufficient bearing power.

A task of the invention is to solve on the one hand
20 the problem of the simplification of erection of walls of blocks and on the other hand to solve the problem inherent in the obtainment of a wall of blocks of high bearing power.

These problems are solved by the invention as
25 defined in the appended claims.

Advantages resulting from the invention include the fact that an entire wall can be first erected without the use of mortar, binding material such as concrete cement or the like because of the interlocking
30 feature. The interfitting of the shoulders and channels

assures that the completed wall will be true with minimum or even no use of levels or similar devices after the initial course of blocks is laid. After the wall is erected, the structure can be made permanent
5 by adding binding material from the top of the wall which is then distributed downwardly through the passageways to bond the blocks together. Clearly, this allows on the one hand a wall to be erected in considerably less time than a standard brick or block
10 wall and allows the amateur to produce satisfactory results the first time and on the other hand the passageways filled with the hardened binding material such as concrete forms as skeleton of concrete of the so called framework or micro-framework type of high
15 bearing power. The blocks may be made of a single material or of different materials. For example, outside portions including the flanges may be integral with the central portion or could be brick facing, while a central portion therebetween could be
20 concrete. The appearance of an expensive brick wall of high bearing power is therefore achieved with a saving in material costs. The blocks are also suitable for constructing exterior or interior walls of buildings where the outside portions are of a suitable
25 exterior of interior facing and the central portion could be an insulator. A building block according to the invention therefore lends itself to the modular construction of bearing walls for buildings.

Preferred embodiments of the invention are
30 described hereinafter with reference to the accompanying

drawings in which:

Figure 1 is a perspective view of a building block according to an embodiment of the invention;

Figure 2 is an elevational view of the building
5 block;

Figure 3 is a top plan view of the building block;

Figure 4 is an end view of the building block;

Figure 5 is an elevational view with broken away portions of a plurality of building blocks, according
10 to the invention, arranged in courses and forming a wall;

Figure 6 is the same view as in Fig. 5 , but without broken away portions;

Figure 7 is the same view as in Fig. 5 , but in
15 exploded representation;

Figure 8 is a top plan view of a building block according to another embodiment of the invention; and

Figure 9 is a side elevational view of the block of Figure 8.

20 Referring to the drawings and in particular Figures 1 to 4, a building block 1 is illustrated which has two opposite faces 2 and 4, a first side 6, illustrated on top, a second side 8, illustrated on bottom, a third side 10 and a fourth side 12. A
25 first pair of sides 6 and 8 are opposite each other and a second pair of sides 10 and 12 are also opposite each other. The block is constructed of two outside portions 14 and 16 and a central portion 18, each of which has the shape of a cuboid. In other
30 words, each is box-like in shape. All three portions

may be integral and constructed of a single material, such as concrete. Alternatively, different materials may be used for the different portions which are then bonded together with a suitable adhesive or fasteners.

5 For example, the outside portions 14 and 16 could be brick facing, while the central portion 18 could be a cheaper material, such as concrete. The central portion 18 could be made of an insulating material for constructing a wall forming the exterior of a building.

10 The blocks could also be made of other materials besides masonry. The outside portions 14 and 16 could be wood, while the central portion 18 could be an insulator or a less expensive material.

As indicated in Figure 3, the outside portions
15 have equal lengths L_1 , while the central portion has a length L_2 which is less than the length of each of the outside portions. Similarly, as indicated in Figure 4, the outside portions have equal heights H_1 while the central portion has a height H_2 less than the
20 height of each of the outside portions. Figures 1 to 4 illustrate that while the outside portions 14 and 16 are aligned opposite each other, the central portion is offset relative to the outside portions both lengthwise and heightwise to the extent that
25 parts of the central portion extending beyond the outside portions form shoulders 20 and 22, respectively. As defined herein, "shoulder" means a more or less abrupt protuberance or projection from a body. It may be seen that shoulders 20 and 22 extend along the
30 two adjacent sides 10 and 6, respectively, and are

spaced apart from the faces 2 and 4 by the outside portions 14 and 16. The shoulders 20 and 22 have heights H3 and H4, respectively, as indicated in Figure 2. These heights are approximately equal in the preferred embodiment. Similarly, shoulder 20 has a lateral extent, or width W1, shown in Figure 3, while shoulder 22 has a lateral extent or width W2, also shown in Figure 3. Both shoulders have approximately the same width in the preferred embodiment.

10 Due to the fact that each of the outside portions 14 and 16 is greater in length and height than the central portion 18 and because the central portion is offset lengthwise and heightwise to form shoulders 20 and 22, outside flanges 24 and 26 extend along the
15 side 8 of the block. Flanges 24 and 26 comprise the bottom parts of outside portions 14 and 16, respectively, as seen in Figure 4. Outside flanges 28 and 30 extend along side 12, which is adjacent side 8, in a similar manner, as seen in Figure 3. Flanges 24 and 26 therefore
20 define a channel 32 extending along side 8 between the faces 2 and 4 and spaced apart therefrom, while flanges 28 and 30 likewise define a channel 34 extending along side 12 between faces 2 and 4 and spaced apart therefrom. Channel 32 has a depth D1 and a lateral extent,
25 or width W3, while channel 34 has a depth D2 and a width W4. It may be seen that the depths D1 and D2 are approximately equal in the preferred embodiment while the widths W3 and W4 are also equal in block 1.

 The channels 32 and 34 and the shoulders 22 and 20
30 have partially complementary rectangular shapes, as

seen best in Figures 3 and 4, permitting a plurality of blocks to be stacked in horizontal courses to form a wall 36, with rectilinear crossing horizontal and vertical passageways 46, 44 respectively, in which
5 concrete is poured to form uprights and beams of concrete upon hardening, as seen in Figure 5. The width W2 of shoulder 22 along side 6 is just slightly less than the width W3 of the channel 32 along side 8, although this cannot be measured from the drawings
10 because of the scale and drawing tolerances. However, in fact, shoulder 22 is just slightly narrower than channel 32 and the rectangular shapes of this shoulder and the channel means each shoulder 22 is capable of closely fitting within the channel 32 along side 8 of
15 another such block in an adjacent course. For example, referring to wall 36 shown in Figure 5, a plurality of blocks similar to block 1 are stacked in four courses 39, 40, 42 and 44 on a foundation 38. The initial course 39 comprises blocks 1a, 1b, 1c, etc. all
20 substantially identical to the block 1 shown in Figures 1 to 4. The second course 40 comprises blocks 2a, 2b, 2c, etc., while the third course 42 comprises blocks 3a, 3b, 3c, etc. In the manner described, it may be seen that the shoulder 22 of each block is closely
25 fitted within the channel 32 of each respective underlying block in the widthwise dimension.

In the same manner, the shoulder 20 along side 10 of each block is fitted closely within the channel 34 of each respective abutting block 1 in the width-
30 wise dimension.

However, as is clear from Figure 2 and Figure 4, the height H4 of the shoulder along side 6 is substantially less than the depth D1 of the channel along side 8. In the preferred embodiment, the height H4 is
5 approximately one-half the depth D1. This is also true for the height H3 of shoulder 20 along side 10 which is generally one-half of the depth D2 of channel 34 along side 12. The effect of the difference in the height of a shoulder and the depth of the channel on
10 the opposite side of the block is to form vertical passageways 44 and horizontal passageways 46 between blocks when they are stacked in courses as seen between blocks shown in Figure 5.

As seen in Figure 4 and in Figure 3, both channel
15 32 and channel 34 are open-ended. The outside portions of blocks 1b, 2b, 3b and 4b have been broken away in Figure 5 to illustrate that this results in the vertical passageways 44 and the horizontal passageways 46 forming a continuous rectangular grid or matrix
20 between the blocks.

As illustrated between blocks in Figure 5, the passageways can be filled with concrete or mortar or some other substance, such as polyester resin, for bonding the blocks together.

25 The method of building the vertical wall 36, shown in Figure 5, first requires a level foundation 38 on which the initial course of blocks 1a, 1b and 1c are arranged so that the shoulder along one side of each block fits closely within the channel along the
30 adjacent side of the adjacent block. Course 40

comprising blocks 2a, 2b and 2c is then stacked on course 39 and the blocks of course 40 are fitted together in the same manner as the course 39. This results in the shoulders along the top sides of the
5 blocks in course 39 fitting closely within the channels along the bottom sides of the blocks in course 40. This is repeated for course 42 which is stacked or laid on course 40 in the same way course 40 is stacked on course 39.

10 After the courses of blocks have been stacked on one another, the vertical rectilinear passageways 44 and horizontal rectilinear passageways 46 between the blocks are empty. For some purposes, particularly temporary walls, nothing further need be done. How-
15 ever, it is possible to fill these passageways with a fluid-like substance by pouring the substance downwardly through the openings 52 where the vertical passageways 44 communicate outwardly with the top
20 54 of the wall. If it is desired simply that the passageways be filled, sand may be poured down the openings 52 to fill the passageways. However, in order to bond the blocks together to form a permanent wall, a number of other alternatives are available depending upon the material of which the blocks are made.

25 Assuming that the blocks are of masonry material, concrete or mortar is poured down through openings 52. In order to distribute the fluid and fill the passageways, the fluid is preferably vibrated by inserting relatively thin vibrators down and through openings 52
30 or by placing vibrators against the facing of a number

of blocks. This causes the mortar or similar material to fill all the passageways. The mortar or other such substance is then allowed to set and this permanently bonds the blocks together. If the blocks are of some
5 other material, such as wood or plaster, other substances capable of setting may be used, such as polyester resin.

Figure 5 therefore illustrates how a plurality of blocks 1, as shown in Figures 1 to 4, may be used
10 to considerably simplify the construction of a block wall. Once an initial level foundation is provided, the shoulders and channels permit a complete wall to be constructed without any necessity for levels, plumb lines or the like. The skill required to build
15 a wall is reduced for this reason and because no mortar or similar material is required until the wall is erected. The mortar can then be poured in from the top of the wall to permanently bond the blocks together. Reinforced concrete rods, not shown may be
20 laid in the passageways 44, 46 to increase the bearing capacity of the wall.

As mentioned above, the blocks may be of masonry construction, for example concrete, and can replace existing types of concrete blocks in building
25 construction.

Alternatively, the outside portions 14 and 16 can be of a different material, such as brick, while the central portion can remain concrete. The central portion can be hollow to save material and reduce
30 weight.

Making the blocks of three separate portions 14, 16 and 18 allows great flexibility in producing blocks for different purposes and the blocks can be constructed of other than masonry materials.

5 Consequently, the invention has wider application than replacing conventional concrete blocks or bricks.

An alternative embodiment is shown in Figures 6 and 7. The construction of block 60 is generally similar to the first embodiment and so is described
10 only with respect to the differences. For block 60, the outside flanges 62 and 64 extend along side 66, while the outside flanges 68 and 70 extend along side 72 which is the side opposite side 66. Similarly, central shoulder 74 extends along side 76 while
15 shoulder 78 extends along side 80 which is the side opposite side 76. A plurality of blocks 60 are arranged in courses such that adjacent blocks in the same course are rotated 90° with respect to each other. For example, side 76 would be on top for a
20 first block, while side 68 would be on top for an adjacent second block. In this way, the shoulder 76 of the second block, for example, fits closely within channel 72 of the first block. As seen the height of the shoulders is less than the depth of the
25 channels to provide a passageway between blocks. Similarly, the following courses are laid so each block is rotated 90° with respect to the block above it and the block below it.

C L A I M S

1 1. A building block having a central portion
2 and lateral portions on at least two opposite sides
3 thereof, characterized in that said lateral portions
4 (14, 16) are offset with respect to said central
5 portion (18) to form projecting portions (20, 22) of
6 said central portion (18) with respect to said lateral
7 portions (14, 16) and recessed zones (34, 32) with
8 respect to said lateral portions (14, 16), each
9 respective projecting portion (20, 22) having a height
10 (H3, H4) less than the depth (D2, D1) of said recessed
11 zones (32, 34) and width (W1, W2) fitting within the
12 widths (W3, W4) of said recessed zones (32, 34) thereby
13 to form passageways (44, 46) when the blocks are stacked
14 on courses.

1 2. A block according to Claim 1, characterized
2 in that said central portion (18) and said lateral
3 portions (14, 16) have a generally parallelepiped
4 shape.

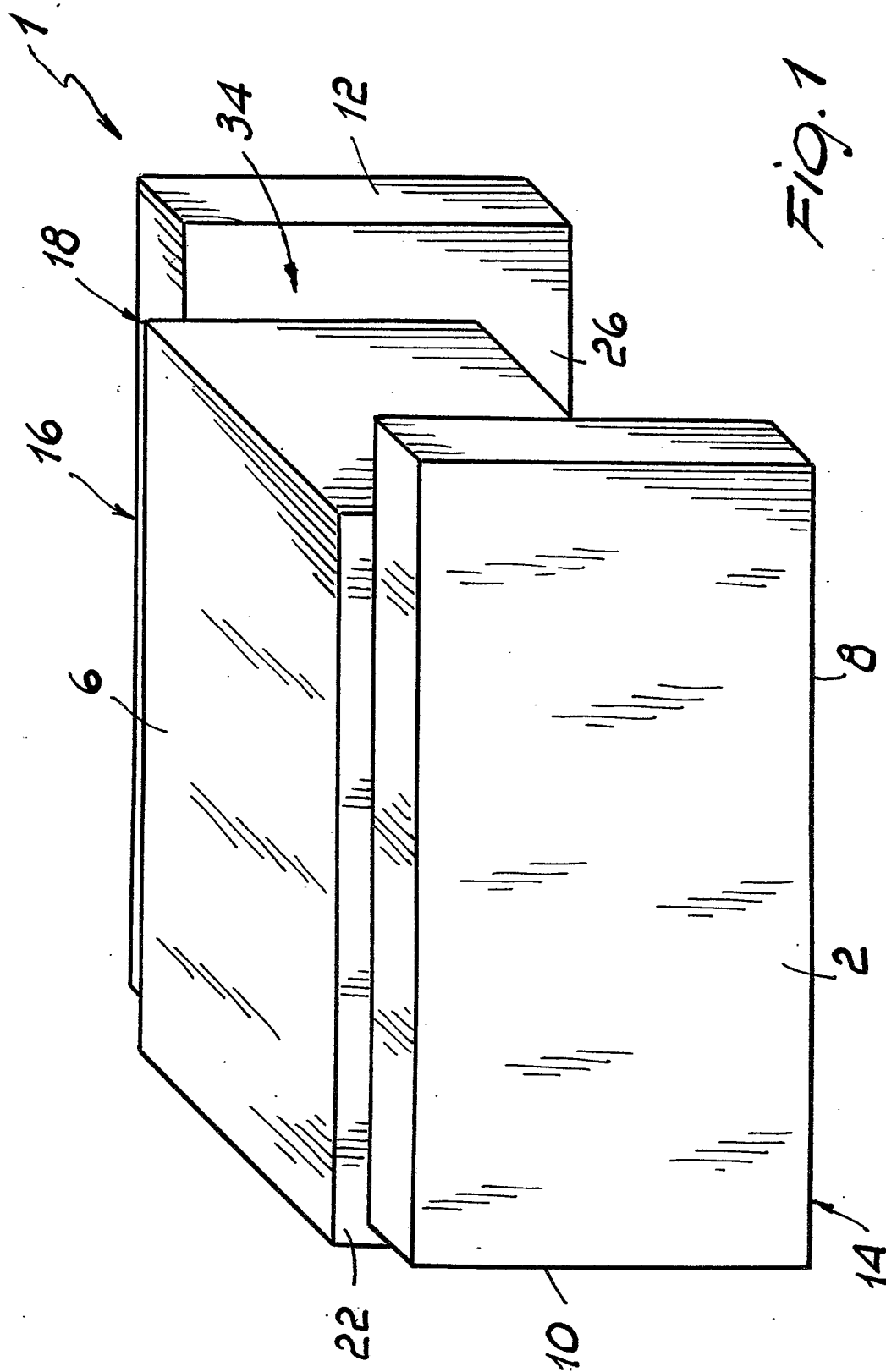
1 3. A block according to Claims 1 and 2, charac-
2 terized in that said lateral portions (14, 16) are in-
3 tegral with said central portion (18) and are made
4 of same material.

1 4. A block according to Claims 1 and 2, charac-
2 terized in that said lateral portions (14, 16) and
3 said central portion (18) are made of different
4 material and in that means are provided for holding
5 them together.

1 5. A wall made of blocks according to Claims 1-4

2 stacked on courses, characterized in that between
3 adjacent abutting blocks vertical passageway are
4 provided and between superposed adjacent blocks
5 horizontal passageways are provided, said vertical
6 and horizontal passageways being filled with
7 cementitious material thereby to form bearing uprights
8 and beams of a bearing recticular framework.

1 6. A wall according to Claim 5, wherein
2 reinforced concrete rods are laid into said passage-
3 ways.



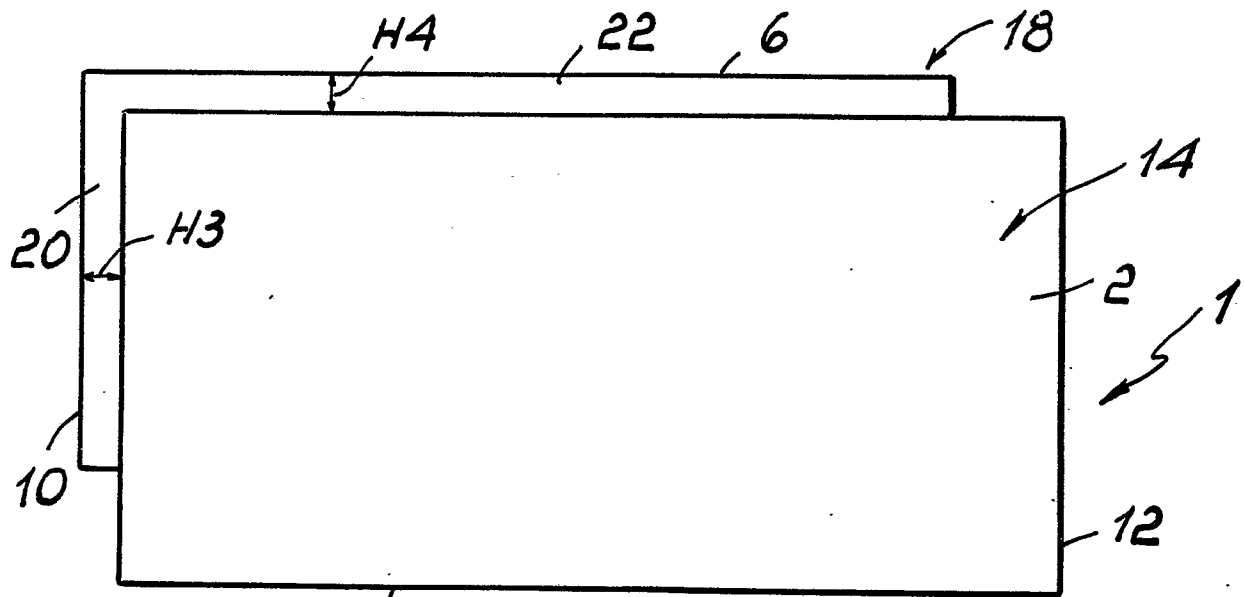


Fig. 2

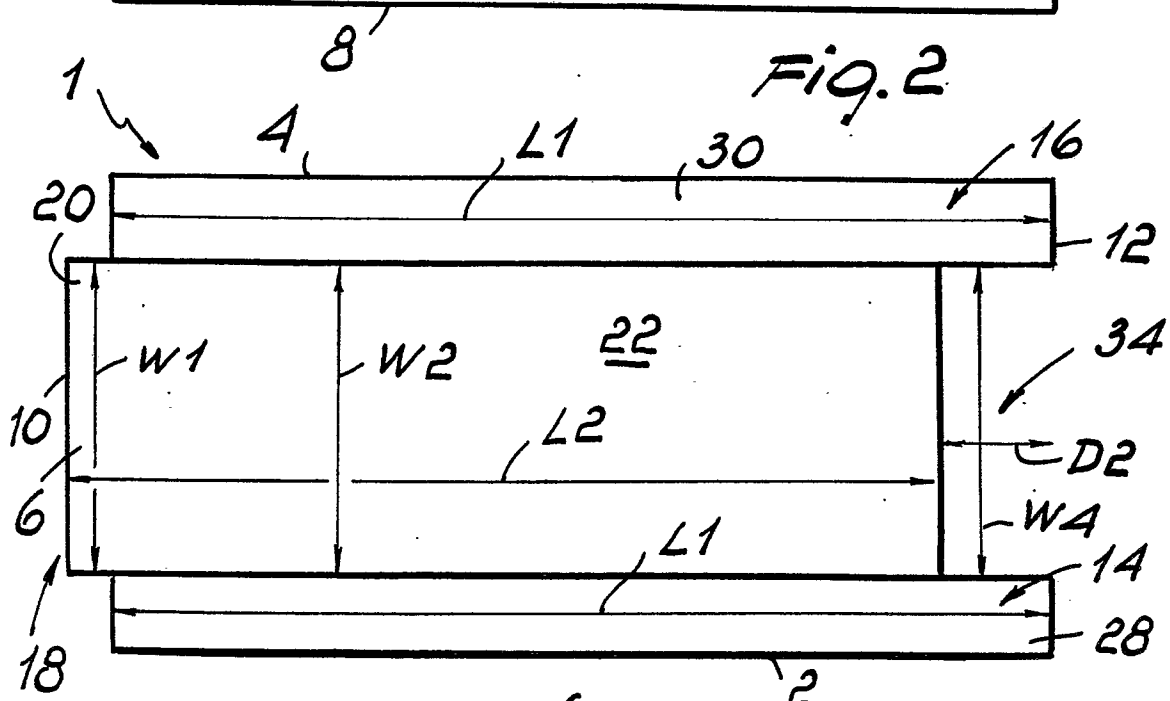


Fig. 3

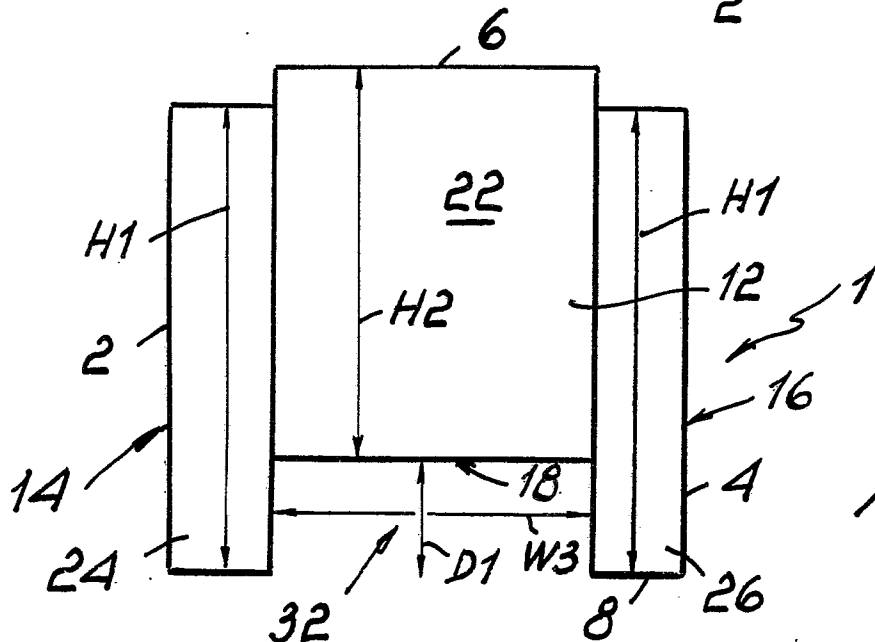
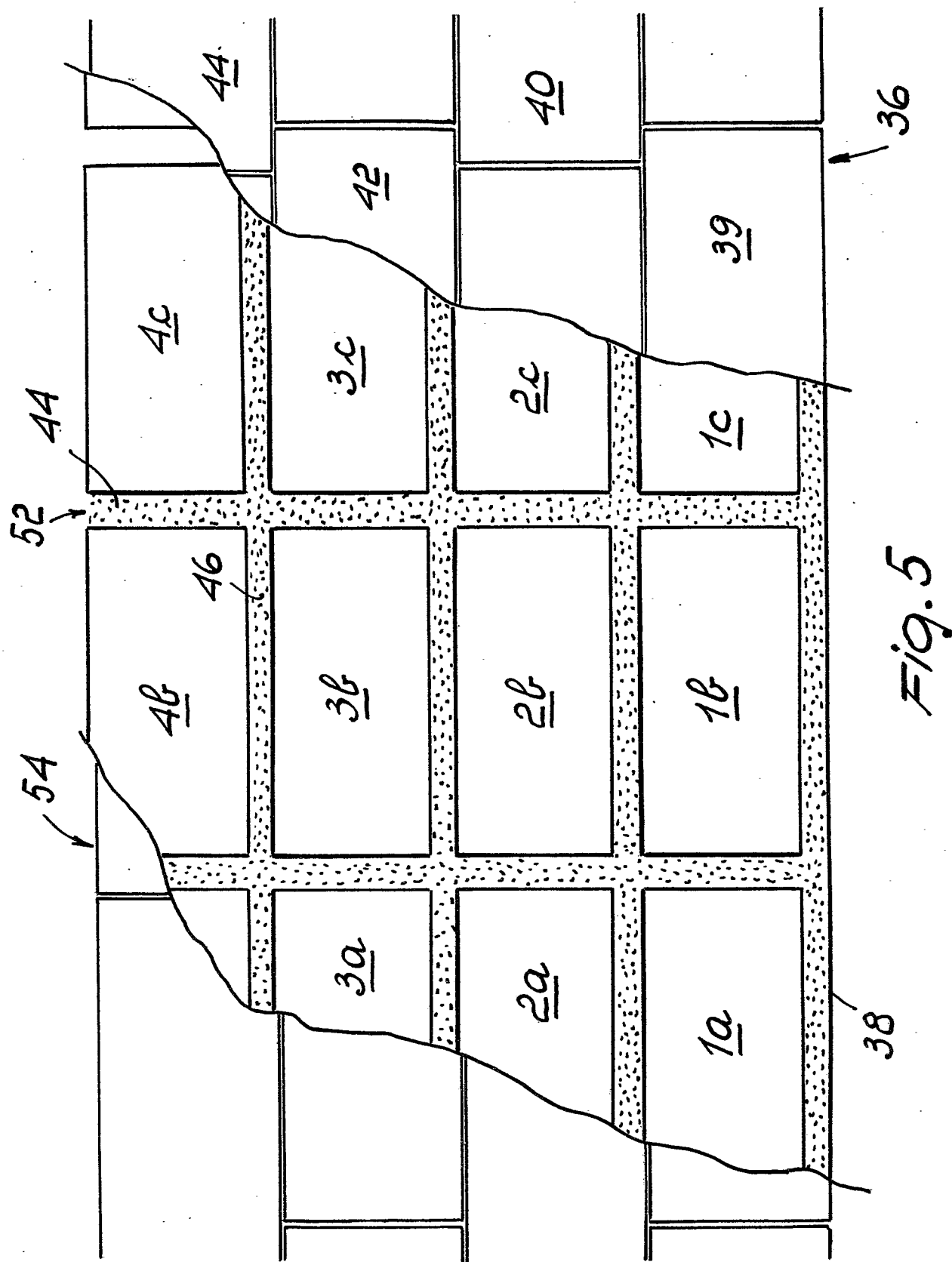
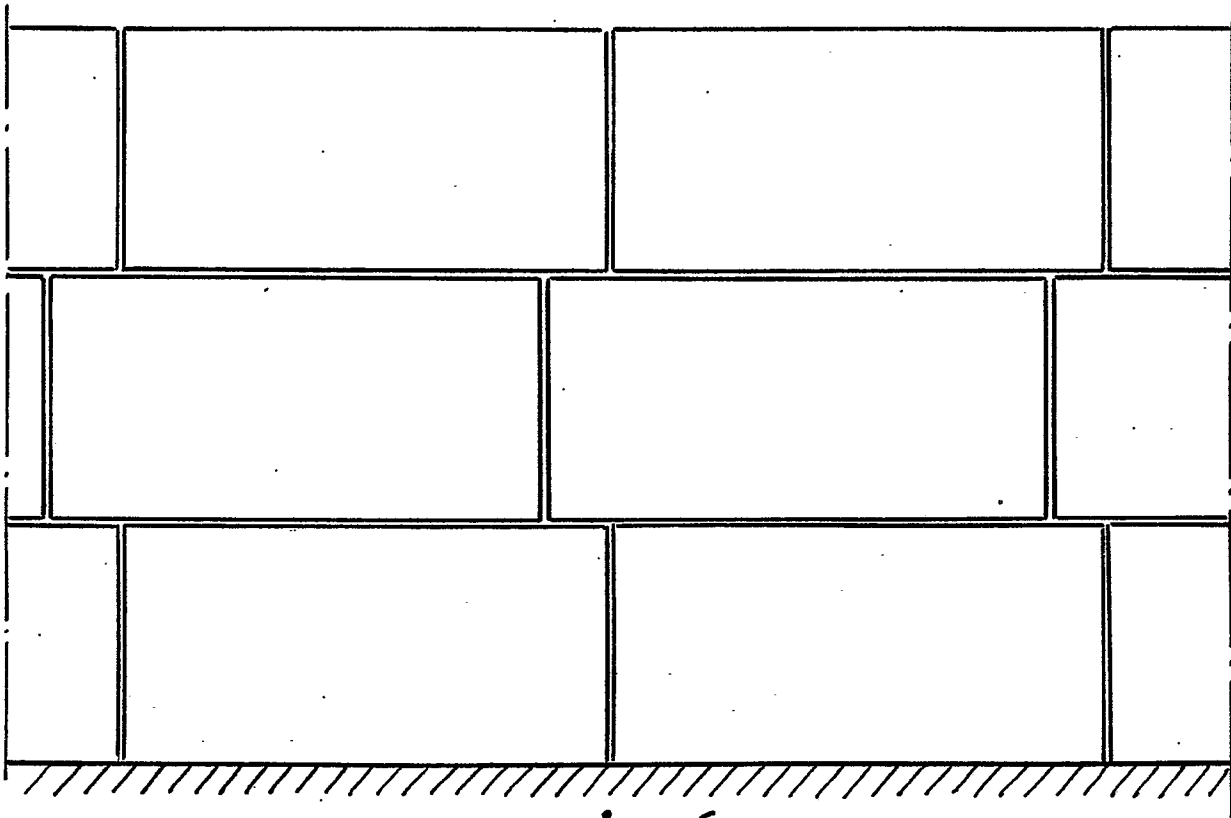
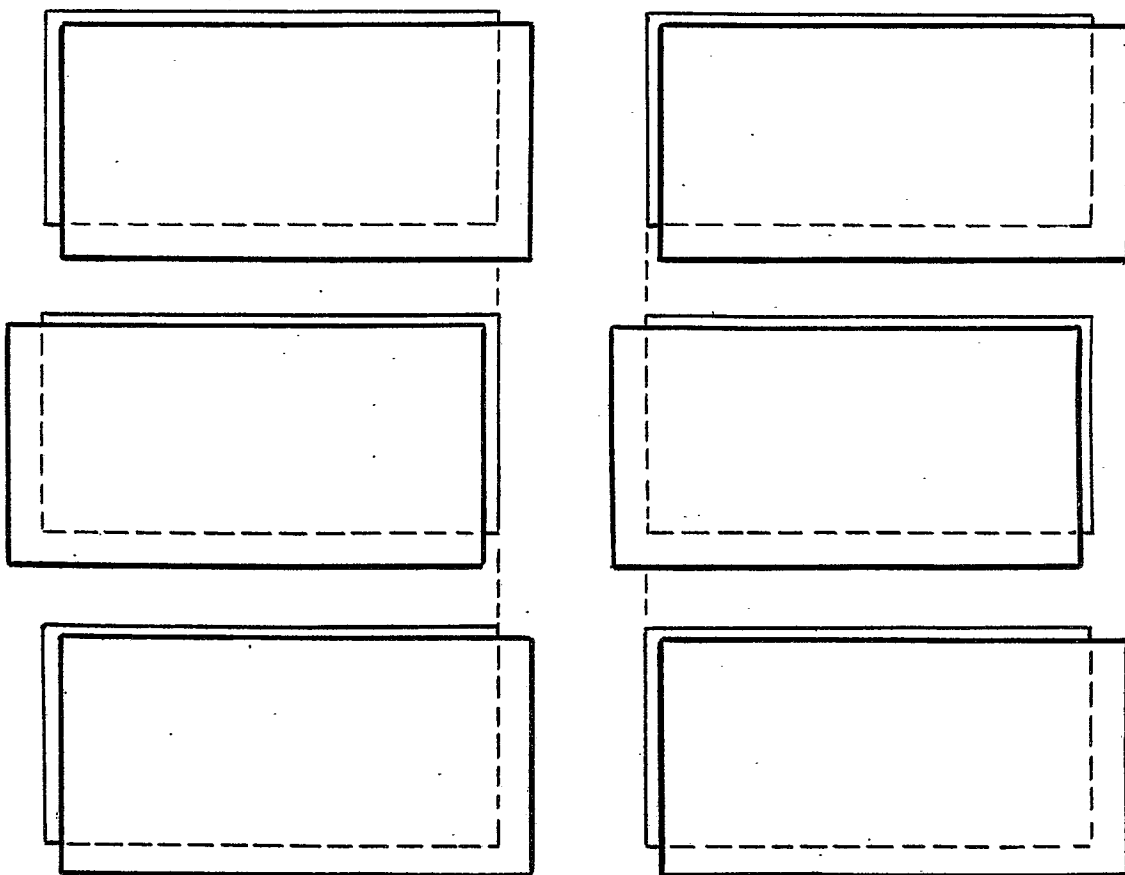


Fig. 4



*Fig. 6**Fig. 7*

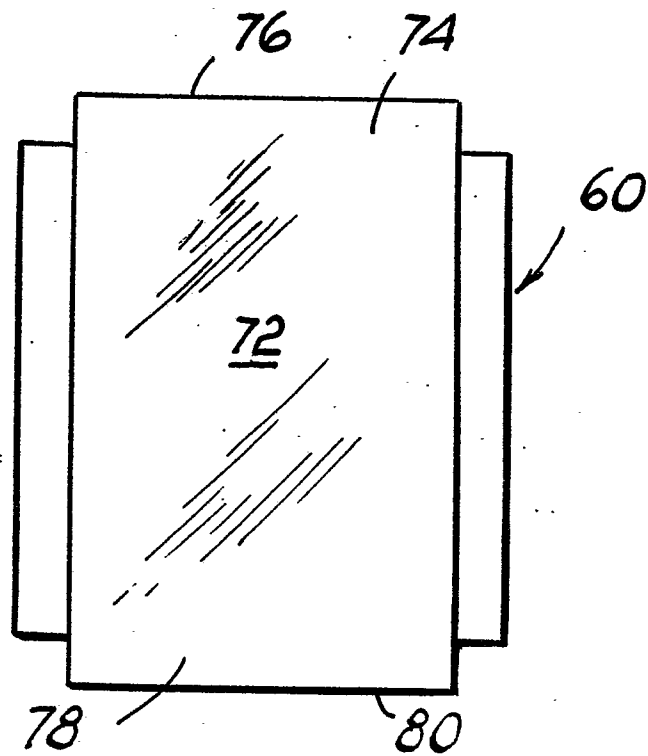


Fig. 8

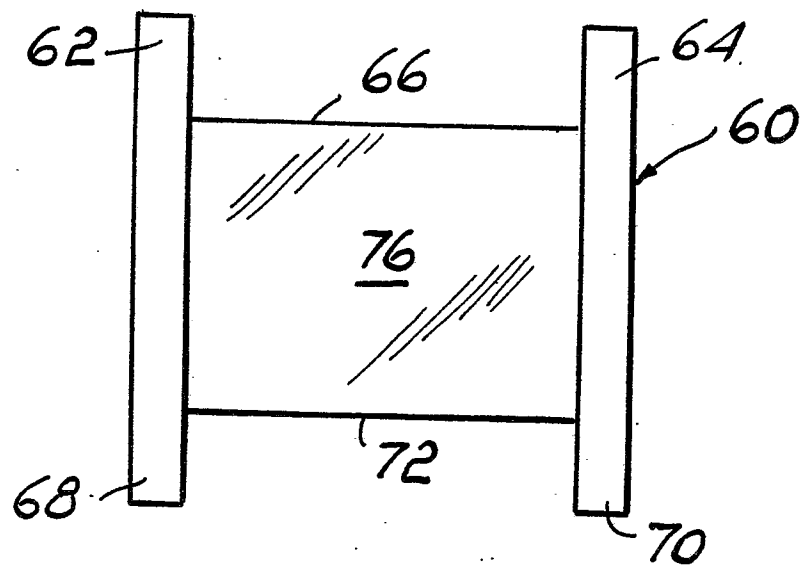


Fig. 9



European Patent
Office

EUROPEAN SEARCH REPORT

0045012
Application number

EP 81 10 5594.6

DOCUMENTS CONSIDERED TO BE RELEVANT			CLASSIFICATION OF THE APPLICATION (Int. Cl. ³)
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	
X	<u>FR - A - 947 872</u> (P. MATHURIN) * whole document * ---	1-3,5	E 04 C 1/10 E 04 B 2/08
	<u>GB - A - 778 411</u> (H. LENDERS) * fig. 1, 2 * ---	1,2,4	
	<u>FR - A - 844 462</u> (A. LEFEVRE) * fig. 1 to 3 * ---	1-3,5	
	<u>DE - C - 871 957</u> (P. BIST) * claims 1, 2; fig. 1 to 3 * ---	1-3	TECHNICAL FIELDS SEARCHED (Int. Cl. ³)
A	<u>FR - A - 1 157 731</u> (H.C. BARTELS) * fig. 1, 2 * ----		E 04 C 1/00 E 04 B 2/00
			CATEGORY OF CITED DOCUMENTS
			X: particularly relevant A: technological background O: non-written disclosure P: intermediate document T: theory or principle underlying the invention E: conflicting application D: document cited in the application L: citation for other reasons
X	The present search report has been drawn up for all claims		&: member of the same patent family, corresponding document
Place of search Berlin		Date of completion of the search 14-10-1981	Examiner v. WITTKEN