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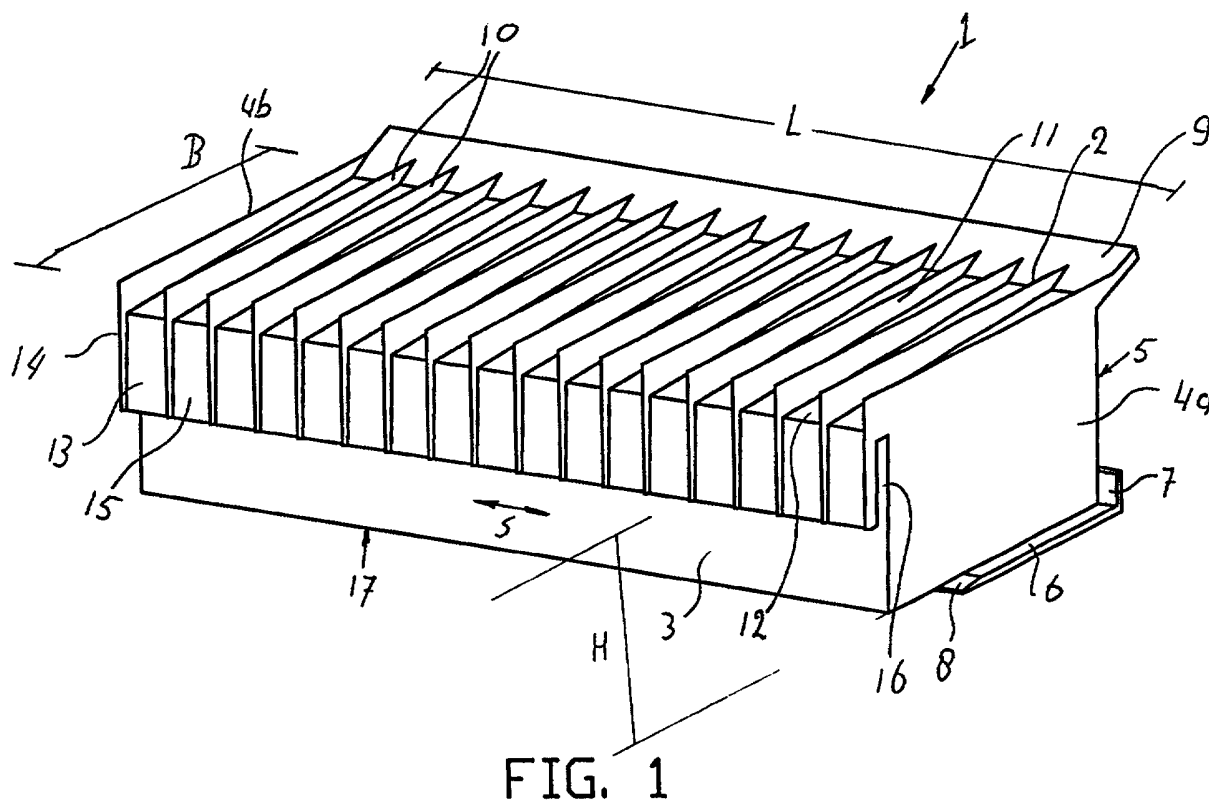
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(54) **Wall element**

(57) Wall element for incorporation as brick substitute in a wall of masonry, the wall element comprising an upper wall and a front wall, the upper wall being provided with a surface sloping downward towards the front

wall, the upper wall furthermore being provided with a series of ribs protruding from the downward sloping surface. Preferably the ribs between them define ducts sloping downward towards the front wall.



EP 1 394 332 A1

Description

[0001] The invention relates to a wall element for incorporation as brick substitute in a wall of masonry.

[0002] Such a wall element is known using strip-shaped blocks of foam glass as cold bridge interruption under cavity leafs. The known wall elements are placed as the bottom layer of a masoned cavity leaf of a cavity wall, straight on the foundation. A flashing is placed over the strip of foam glass for sealing/guiding. This connection detail is used in newly built houses. An objection to this connection detail is that moisture transport over the sealing can take place in a longitudinal direction of the wall to near a location, such as a joint, where the moisture may enter the inside of the cavity leaf. A further objection is that the known arrangement is difficult to place in renewal works, in which the wall elements have to replace an existing horizontal layer. Another objection is that the placement of the wall element and the sealing take many actions.

[0003] It is an object of the invention to at least improve on some of these points.

[0004] From one aspect the invention to that end provides a wall element for incorporation as brick substitute in a wall of masonry, the wall element comprising an upper wall and a front wall, the upper wall being provided with a surface sloping downward towards the front wall, the upper wall furthermore being provided with a series of ribs protruding from the downward sloping surface. The downward sloping upper surface enhances keeping the moisture away from the inside of the wall. The ribs prevent a moisture transport in wall direction, so that moisture is kept away from the joints.

[0005] Preferably the ribs between them define ducts sloping downward towards the front wall, the downward sloping upper surface guaranteeing a discharge to the outside to keep the water away from the cavity.

[0006] The ribs may be continued towards the front wall and extend downward over at least some length over the front wall, as a result of which a horizontal transport of moisture along the front wall is counteracted as well. The ribs preferably also define ducts on the front wall, for rapid discharge of moisture.

[0007] The distance between the ribs preferably is approximately 1 cm. Optional shortening of the wall element can then take place in steps of cm retaining the position of the ribs at the ends of the wall element.

[0008] Preferably the upper side of the ribs also slopes downward towards the front wall, as a result of which putting in mortar between the wall element and a - permanent- layer of bricks sitting above it is facilitated.

[0009] The gradient of the surface of the upper wall preferably is approximately 4-5 degrees, so that a dewatering is guaranteed, and the quantity of mortar to be arranged on the upper wall can remain limited.

[0010] The ribs may have a maximum height of approximately 6 mm. The space between the ribs can then be buttered with mortar of a horizontal joint.

[0011] For simple attachment/connection of a sealing flashing for connection to further parts of the construction it is preferred that the front wall is provided with a slot, opening substantially downwards. The flashing then need hardly bend when exiting the slot. The orientation of the slot enhances the placing of the flashing. This is further enhanced when the slot is oriented inclined.

[0012] In an embodiment the front wall has a first portion which limits the slot to the front and has an inclined front surface. Preferably the first portion has a height that is a part of the height of the front wall and the other part of the height of the front wall being oriented accordingly. The front wall can then be slightly recessed at the top, as a result of which the ribs at the front side, at the top, can be incorporated in the mortar of the horizontal joint.

[0013] In case the slot is situated in an upper half of the front wall, the wall element can for a large part be aligned with the construction parts of an annex. This is particularly advantageous when the wall element contains insulation material and has to connect to an insulation layer on said annex, in order to prevent a cold bridge.

[0014] In an embodiment in which the ribs have been continued to the front wall and extend slightly downward over at least some length over the front wall, and in which the aforementioned slot is present, it is preferred that the front wall comprises a first portion that limits the slot to the front and has a front surface on which the ribs are provided.

[0015] At the rear side the wall element can be provided with an integrally formed rigid strip extending upwardly inclined and to the rear, in which way moisture can be intercepted, or -in case of new masonry- falling mortar.

[0016] In a further embodiment the wall element has end walls which are formed as one unity with the front wall and the upper wall. At least one end wall may be provided with a first stop for limiting rearward motion of an adjacent next wall element, and/or at least one end wall may be provided with a second stop for limiting downward motion of an adjacent next wall element. Thus the wall elements to be placed adjacently can be aligned with each other in order to prevent that they tilt with respect to each other, due to which leakage locations could arise.

[0017] From a further aspect the invention provides a wall element for incorporation as brick substitute in wall of masonry, the wall element having an upper wall and being formed like a hollow prismatic body which at least at one side is accessible to filling material, particularly thermal insulation material. Such a wall element can be handled and placed as one unity and provides both a discharging upper surface and insulation.

[0018] Preferably the body is filled with an insulation mortar, such as mortar having expanded synthetic particles, such as small PS balls.

[0019] Preferably the hollow body, in the condition in which it is supplied, is open only at the bottom side for filling purposes.

[0020] The wall element preferably is manufactured of material that can be sawn, such as synthetic material, so that it can be cut to the desired length.

[0021] The invention furthermore provides an assembly of two wall elements according to the invention, furthermore provided with a bridge element having means for closing an intermediate space between both wall elements and means for coupling both wall elements. The bridge element which is able to close a joint between the bridge elements and which provides alignment, preferably can be snapped fixedly onto the wall elements.

[0022] The invention furthermore provides a wall of masonry, a horizontal layer being composed of wall elements according to the invention, as well as a construction, such as a house, comprising such a wall.

[0023] The wall elements may be provided with a slot according to claim 9, the slot or sheet of sealing material being secured in the slot and sealingly connecting to or forming a unity with a layer of sealing material on a flat roof.

[0024] Alternatively the wall elements may be provided with a slot according to claim 9, the strip or sheet of sealing material being secured in the slot and sealingly connecting to a roof of an adjacent building part, such as a conservatory.

[0025] The wall element according to the invention, particularly when it has to have insulating properties, preferably has a height of at least once a usual (masonry) brick height (4-6 cm), preferably a number of brick heights, for instance three. As a result the insulation can be continuous at any given relative height level of the location of the wall element and a structure (flat roof, conservatory) connecting to the said wall and a cold bridge can be prevented.

[0026] For ease in placement of the wall element may have a length of at least once the usual (masonry) brick length, preferably a number of brick lengths, such as for instance 50 cm. The wall element may optionally be provided with integrally formed partitions.

[0027] The invention will be elucidated on the basis of an exemplary embodiment shown in the attached drawings, in which:

Figure 1 shows an isometric view of an exemplary embodiment of a wall element according to the invention;

Figure 2 shows a cross-section of the wall element of figure 1;

Figures 3A and 3B show a bridge element for use with the wall elements according to figure 1;

Figures 4A and 4B show to consecutive stages of arranging the bridge element of figures 3A and 3B;

Figure 5 shows a cross-section of a cavity wall in which a number of wall elements according to figure 1 have been incorporated; and

Figure 6 shows an alternative embodiment of a wall element according to the invention.

[0028] The wall element 1 shown in figure 1 is manufactured as a unity from synthetic material and is substantially block-shaped, having an upper wall 2, a front wall 3, side walls 4a, 4b, a rear wall 5 and an open bottom 17, through which the hollow cavity in the wall element 1 can be accessed. In the bottom portion of the rear wall, the side wall 4a is provided with a stop strip 7, which has a height which is smaller than a horizontal joint height. The bottom edge of the side wall 4a is provided with an integrally formed guide and stop strip 6. At the front end the stop strip 6 is provided with a small pilot surface 8 and ends at the rear end at some distance from the strip 7 in order not to form a mortar nest. The wall element - keeping its functionality- can be made shorter starting from the side 4b, by sawing it through, the ribs serving as measuring aid.

[0029] In the corner area between the upper wall 2 and the rear wall 5 a rearward sloping and upwardly inclined strip 9 is integrally formed, which, as can be seen in figure 2, is at an angle of inclination α to the horizontal, α for instance being 20° . The strip 9 extends in horizontal direction to approximately 2 cm from the rear wall 5.

[0030] The surface of the upper wall 2 is inclined to the front, having an angle β (figure 2) of some degrees, preferably 4° to 5° . Thin ribs 10 protrude from the upper surface of the upper wall 2, which ribs are situated at a mutual distance S of approximately 1 cm. The ribs 10 between them define ducts 12, which dewater towards the front of the wall element 1. The upper sides 11 of the ribs 10 in the example are shown in figure 2 and are situated in a plane parallel to bottom 17, but, in the example as shown in figure 6, they may also be inclined, as will be discussed below.

[0031] At a more or less right angle near the front wall the ribs 10 change into pendent ribs 14, which between them define ducts 15. They have been formed on pendent wall part 13, which with the rest of the front wall 3 defines a downward opening longitudinal slot 16. Said slot 16 is intended for incorporation of a sealing flashing, which can be secured in there.

[0032] The wall element of figure 1 has a width B (also see figure 2) of for instance 10 cm, a length L of some tens of centimetres, for instance 50 cm, a height H (at the front side) of a brick size, for instance 5 cm. The height near the connection to strip 9 may be a little larger. The distance between the ribs 10 may approximately be 1 cm. As shown in figure 2 the hollow wall element 1 can be filled, in this case with a heat insulating material, such as a mortar with expanded synthetic foamed parts, for instance small polystyrene balls. Such a material is commercially available under the name Piro-

therm or Piromix. The insulating material preferably is compression resistant, so that in co-operation with the walls of the wall element 1 a compression resistant wall element is obtained, capable of transferring the forces in the wall, like a common brick in said wall.

[0033] In the figures 3A,B a bridge element 30 is shown, that may be made of stainless metal. It regards an L-shaped element here, having a long leg 31 and a short leg 32. At its end the long leg is provided with a turned end 33 having a snap edge 35, at its lower end the short leg 32 is provided with a snap edge 34. The dimensions of the bridge element 30 are chosen such that the length l corresponds to the largest width of the wall element 1 (insertion strip 9), and the height corresponds to the height of the wall 13. The width B corresponds to several times the distance S of the ribs 10, for instance 6 cm. The angle between the legs 31 and 32 is slightly smaller than 90° . The angle of snap edge 35 to the end 33 is smaller than 90° . The angle of the end 33 to the long leg 31 corresponds to the said angle α of strip 9.

[0034] Figure 4A shows how wall elements 1 can be placed adjacent to each other on a layer of bricks 45. A layer of mortar 46 has been applied on the layer of bricks. On said layer of mortar 46 wall elements 1 are placed, in which in case of renovation the layers of the wall in question lying there-above are propped at intermediate distances. Thus the wall elements 1 can replace one entire layer of bricks. When the right-hand wall element 1 is placed (direction A), it can be guided and supported with side wall 4b on the guide and stop strip 6 provided at the left-hand wall element 1, particularly its side wall 4a. Both wall elements are thus aligned. The stop strip 7 ensures aligning in horizontal rearward direction. When there is a joint 20 the adjacent wall elements 1 remain aligned, as a result of which discontinuities, that may form possible leakage locations, are counteracted. Both wall elements 1 can be coupled to each other by means of bridge element 30, which can be inserted in the direction B, until the snap edge 33 engages over the end edge of the strip 9 and the raised edge 34 about the lower end of wall member 13. The bridge element 30 is then as it were snap-fixed. The bridge element 30 then also forms a sealing for the joint or slit 20 between the bridge elements 1.

[0035] The situation shown in figure 4B is then achieved.

[0036] When on the right-hand side of the right-hand wall element 1 shown in the drawing, a wall element 1 is already present, the horizontal joint will not have been made at that location, so that it is interrupted there. The wall element is then inserted between two wall elements that have already been placed and support on a horizontal joint, just over the upper surface of the bricks 45. The limited height of the stop strip permits the insertion straight past the right-hand wall element. The inserted wall element can then be aligned with the adjacent wall elements, supporting at the left-hand side on strip 6 of

the wall element adjacent to it. With the bridge element 30 the wanted coupling and aligning to the wall element 1 situated at the right-hand side can subsequently be realised, the sealing of the slit 20 at that location then also being enhanced. After that the horizontal joint below the inserted wall element can be finished.

[0037] Subsequently the bricklayer fills the space on the upper wall 2 with mortar, by means of a usual filling trowel of approximately 10 to 12 mm. As can be seen in the cross-section of figure 5 the space above the upper side of the ribs 10 is filled with mortar, in which the inclined course of the upper sides 11 of the ribs 10, as suggested in figure 6 with angle τ , can be advantageous in order for the filling trowel to be able to press in the mortar to at least $2/3$ of the depth into the space between the ribs of the wall element 1 and the series of bricks 45 situated above it, buttering the spaces between the ribs 10 as well.

[0038] After this pointing has been finished, a sealing flashing 50 can be attached in the slot 16, and it can be made pendent. The high position of the slot 16 makes it possible to have the insulation body formed by the wall element 1, filled with insulation material 29, connect to insulation situated adjacent at the outer side of the wall. This is shown in figure 5, in which a cavity wall 40 is shown, having an outer leaf 41, and an inner leaf 42, cavity 43 and insulation 44. The outer leaf 41 is built up from layers of bricks 45, having horizontal joints 46. A flat roof 61 of an annexed outdoor space 60 is attached to the outer leaf 41. The insulation 63 of the flat roof is upwardly limited by a sealing layer 62, which slants upward near the outer leaf 41 and is covered by the lower portion of the sealing flashing 50. Near the wall a rim of PU foam has been arranged. Because the insulation 63 changes via the rim (also insulating) into wall element 1, a cold bridge is prevented. The cold bridge can be further counteracted by using a wall element which - in this example - has a double height, so that it also substitutes the brick 45a (figure 5).

[0039] A comparable effect can also be achieved when instead of a flat roof there is a conservatory roof added to the outer leaf 41.

[0040] With the wall element 101 shown in figure 6, which substantially corresponds to wall element 1, the degree of protrusion of the front side of a wall element can be kept limited. The outer surface T of the outer leaf 41 is schematically shown, the slot 116 and the wall member 113 limiting said slot to the floor side are at an angle δ to the vertical. The slot 116 is now as it were partially recessed. This embodiment makes it possible to accommodate the upper portions of the front ends of the ribs 110 in the mortar of the horizontal joint, which for aesthetic reasons might be preferable and which also facilitates the arrangement of the horizontal joint. The inclined, downwardly oriented slot 116 also enhances the mounting of the sealing flashing. The wall member 113 is also less vulnerable than the further protruding wall member 13 of the wall element of figure 1 is.

Claims

1. Wall element for incorporation as brick substitute in a wall of masonry, the wall element comprising an upper wall and a front wall, the upper wall being provided with a surface sloping downward towards the front wall, the upper wall furthermore being provided with a series of ribs protruding from the downward sloping surface, the ribs preferably defining between them ducts sloping downward towards the front wall. 5
2. Wall element according to claim 1, the ribs being continued towards the front wall and extending downward over at least some length over the front wall, the ribs preferably also defining ducts on the front wall. 10
3. Wall element according to claim 1 or 2, the mutual distance of the ribs being approximately 1 cm. 15
4. Wall element according to claim 1, 2 or 3, the upper side of the ribs also sloping downward towards the front wall. 20
5. Wall element according to any one of the preceding claims, the gradient of the surface of the upper wall being approximately 4-5 degrees. 25
6. Wall element according to any one of the preceding claims, the ribs having a maximal height of approximately 6 mm. 30
7. Wall element according to any one of the preceding claims, the front wall being provided with a slot, opening substantially downwards, the slot preferably being oriented inclined. 35
8. Wall element according to claim 7, the front wall comprising a first portion which limits the slot to the front and has an inclined front surface, the first portion preferably having a height that is a part of the height of the front wall and the other part of the height of the front wall being oriented accordingly. 40
9. Wall element according to any one of the claims 7 or 8, the slot being situated in an upper half of the front wall. 45
10. Wall element according to claim 2 and 7, the front wall having a first portion that limits the slot to the front and having a front surface on which the ribs are provided. 50
11. Wall element according to any one of the preceding claims, the wall element at the rear side being provided with an integrally formed rigid strip extending upwardly inclined and to the rear. 55
12. Wall element according to any one of the preceding claims, the wall element having end walls which are formed as one unity with the front wall and the upper wall, preferably at least an end wall being provided with a first stop for limiting the rearward motion of an adjacent next wall element.
13. Wall element according to claim 12 or 13, at least one end wall being provided with a second stop for limiting the downward motion of an adjacent next wall element.
14. Wall element according to any one of the preceding claims, formed like a hollow prismatic body which at least at one side is accessible to filling material, particularly thermal insulation material.
15. Wall element according to any one of the preceding claims, manufactured of material that can be sawn, such as synthetic material.
16. Wall element according to any one of the preceding claims, the wall element having a height of at least once a usual (masonry) brick height, preferably a number of brick heights.
17. Wall element according to any one of the preceding claims, the wall element having a length of at least once the usual (masonry) brick length, preferably a number of brick lengths, such as for instance 50 cm.
18. Assembly of two wall elements according to any one of the preceding claims, furthermore provided with a bridge element having means for closing an intermediate space between both wall elements and means for coupling both wall elements, wherein the bridge element preferably can be snapped fixedly onto the wall elements, and/or wherein the bridge element preferably has a width of at least several times the rib distance.
19. Wall of masonry, a horizontal layer being composed of wall elements according to any one of the claims 1-17.
20. Construction, such as a house, comprising a wall according to claim 19.
21. Construction according to claim 20, the wall elements being provided with a slot according to claim 7, a strip or sheet of sealing material being secured in the slot and sealingly connecting to or forming a unity with a layer of sealing material on a flat roof, or sealingly connecting to a roof of an adjacent building part, such as a conservatory.
22. Wall element for incorporation as brick substitute in a wall of masonry, the wall element having an upper

wall and being formed like a hollow prismatic body which at least at one side is accessible to filling material, particularly thermal insulation material, the body preferably being filled with an insulation mortar, such as mortar having expanded synthetic particles, such as small PS balls. 5

23. Wall element according to claim 22, the hollow body in the condition in which it is supplied only being open at the bottom side, for filling purposes. 10

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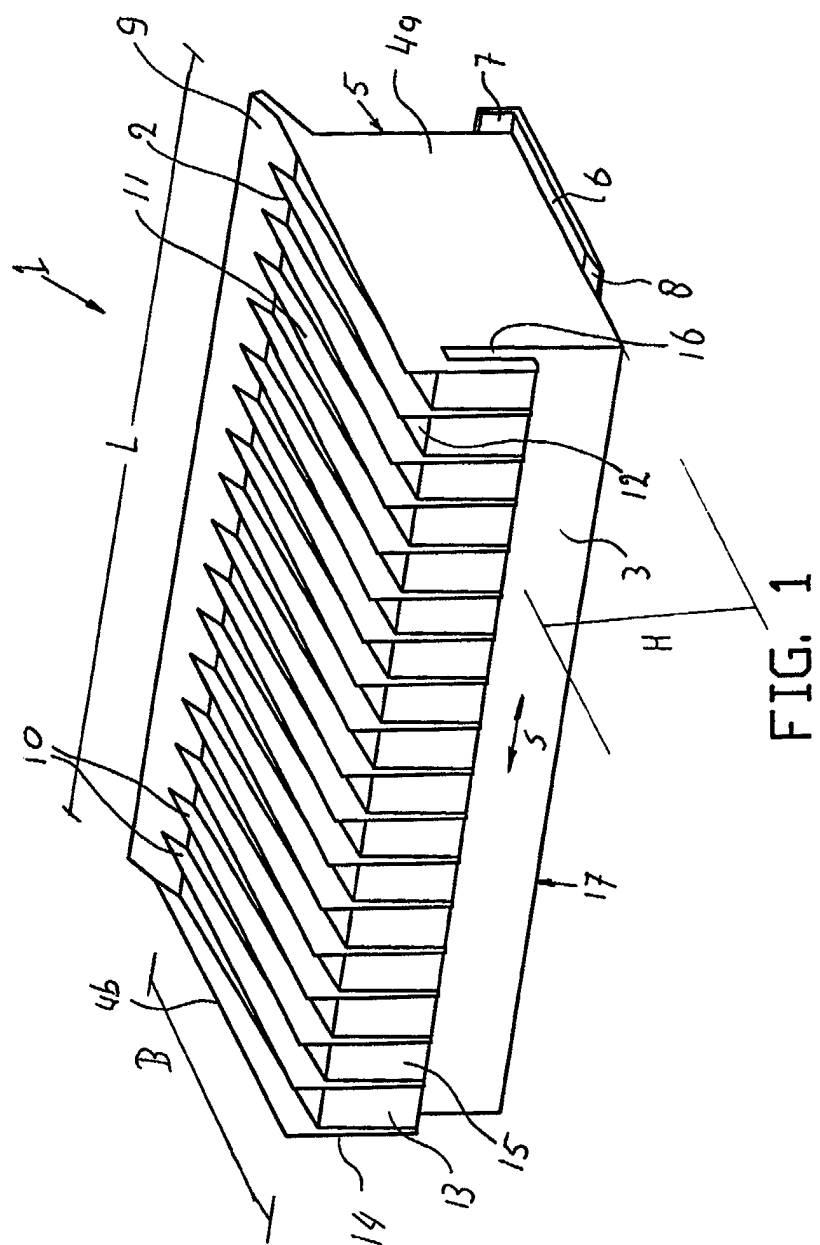
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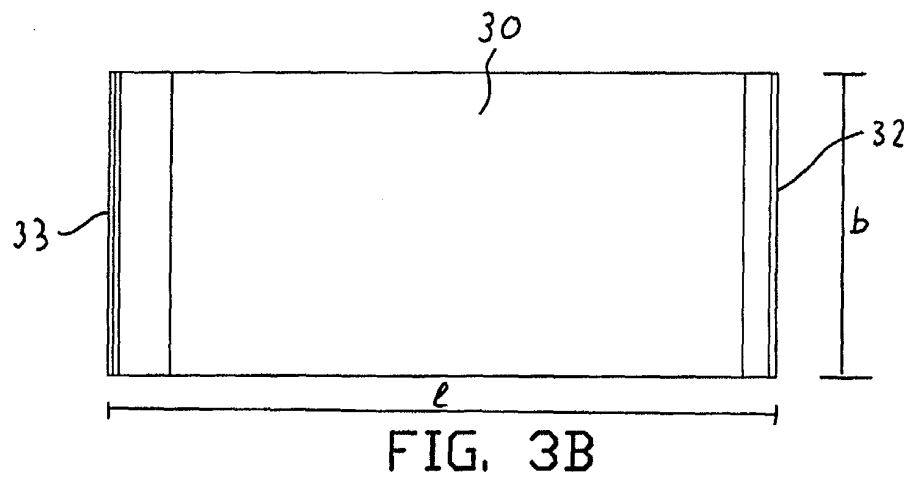
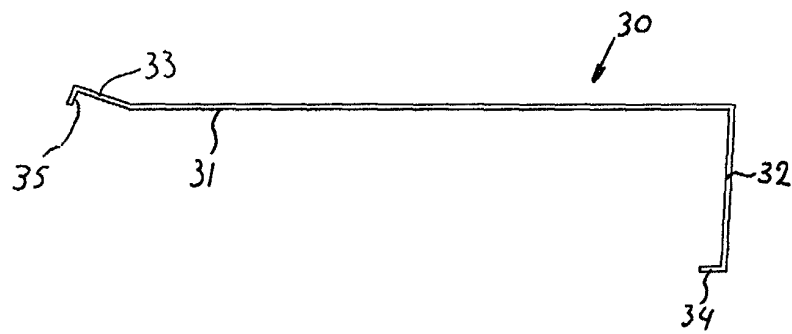
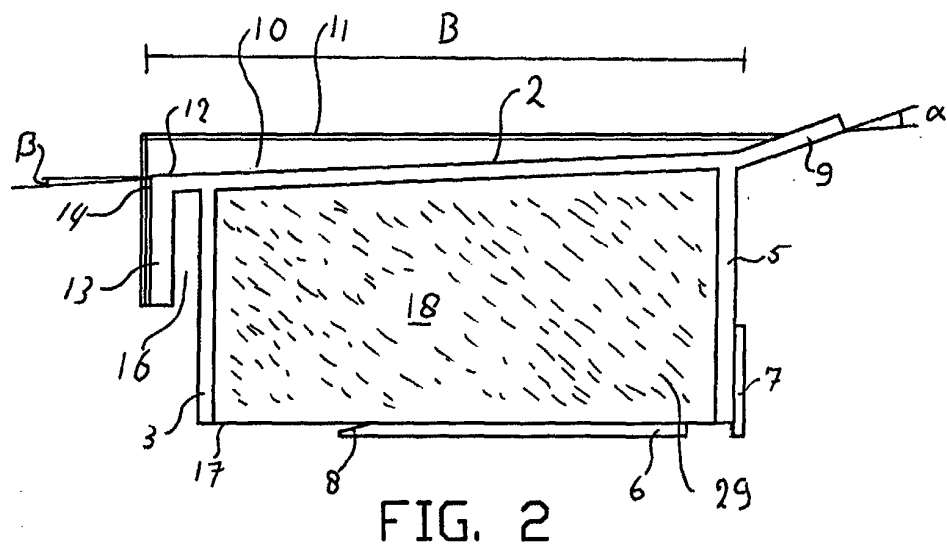
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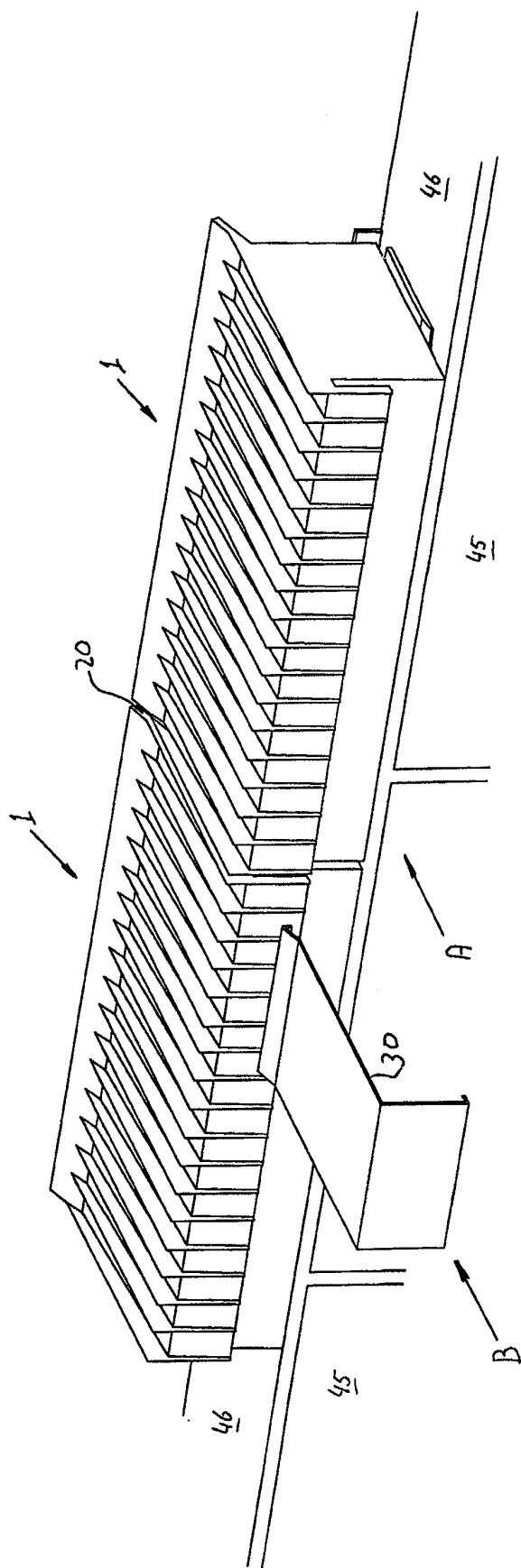


FIG. 4A

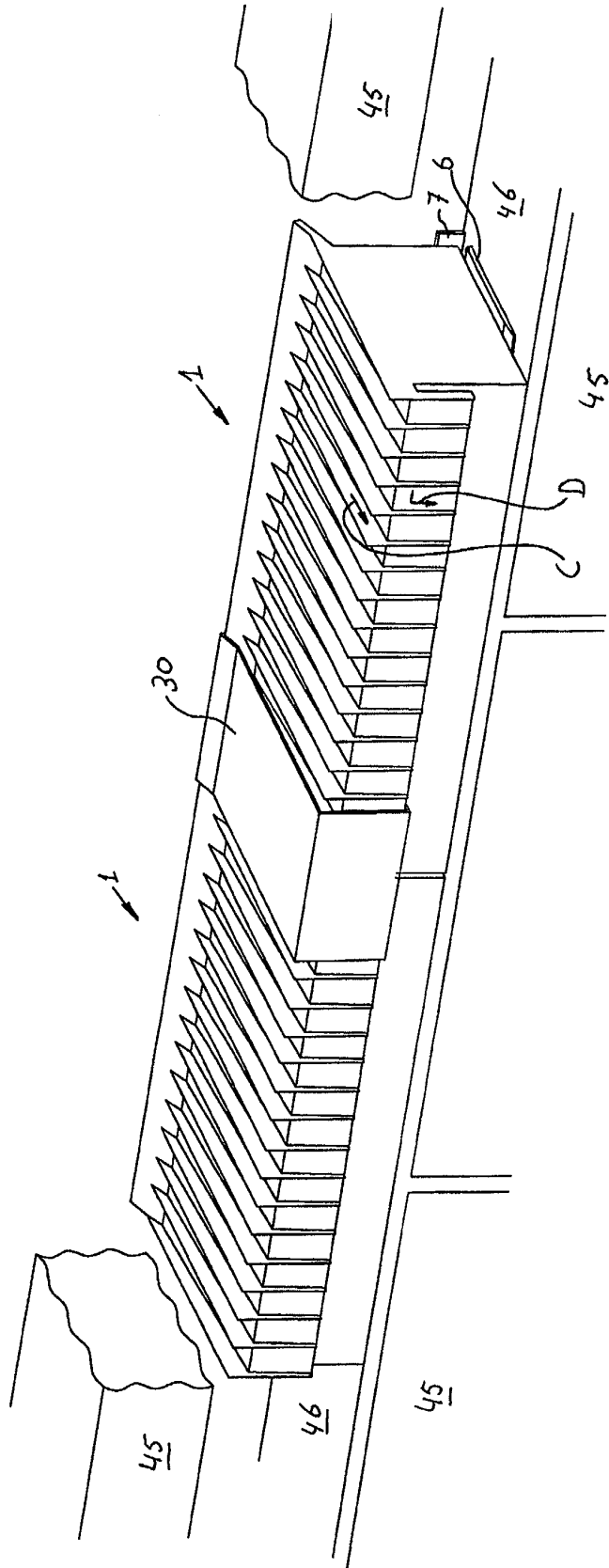


FIG. 4B

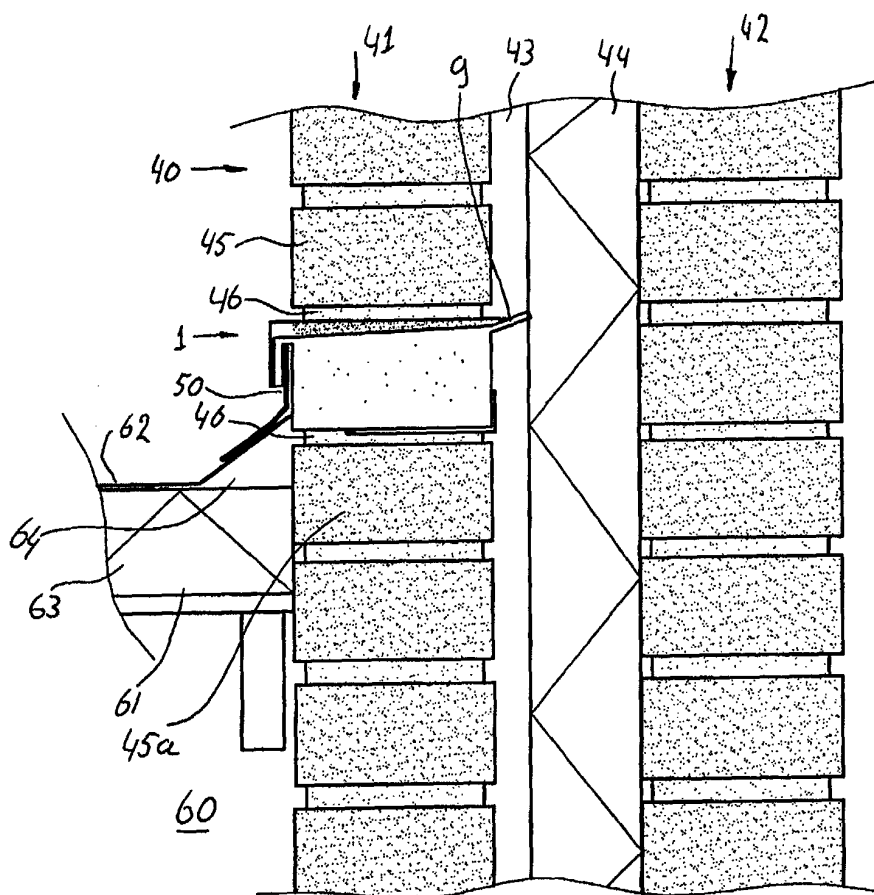


FIG. 5

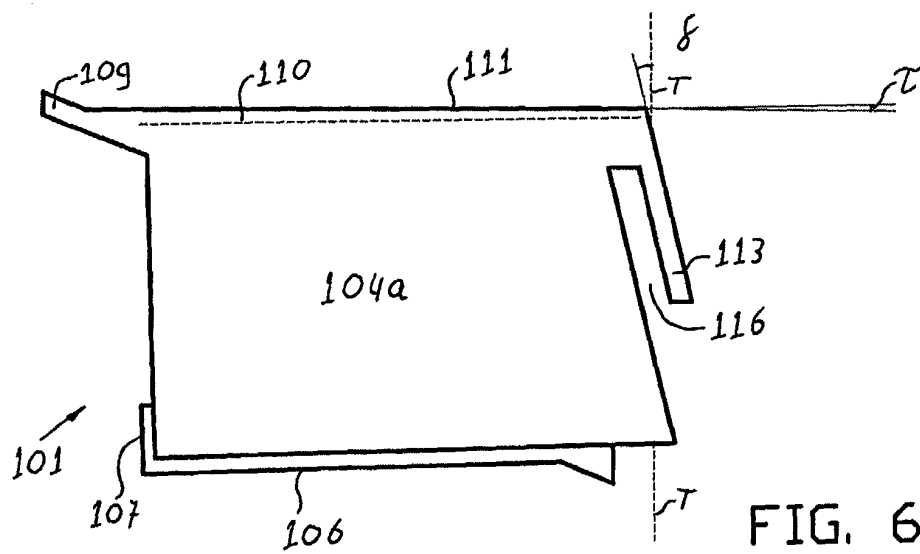


FIG. 6



European Patent
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EUROPEAN SEARCH REPORT

Application Number
EP 03 07 7689

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
A	US 6 032 429 A (CHOI) 7 March 2000 (2000-03-07) * column 2, line 47 - column 3, line 52; figures 1-5 *	1, 11, 16-20, 23	E04C1/41
A	EP 1 176 264 A (UBBINK NEDERLAND) 30 January 2002 (2002-01-30) * column 4, line 8 - column 5, line 7; figures 1-3 *	1, 2, 5	
X	EP 1 174 558 A (LIAPOR) 23 January 2002 (2002-01-23) * claim 1; figure 1 *	22	
			TECHNICAL FIELDS SEARCHED (Int.Cl.7)
			E04B E04C
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 20 November 2003	Examiner Mysliwetz, W
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**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 03 07 7689

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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20-11-2003

Patent document cited in search report		Publication date	Patent family member(s)		Publication date
US 6032429	A	07-03-2000	KR	125662 Y1	15-10-1998
EP 1176264	A	30-01-2002	NL	1015617 C2	08-01-2002
			EP	1176264 A1	30-01-2002
EP 1174558	A	23-01-2002	DE	10041747 A1	07-02-2002
			EP	1174558 A1	23-01-2002