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(54) **WALL ELEMENT**

WANDELEMENT

ELÉMENT MURAL

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Description

[0001] The invention relates to a wall element comprising two outer layers extending at least substantially parallel to each other with at least one intermediate layer present therebetween.

[0002] Such a wall element is described in German patent No. 23 49 436 (Baltzer). A wall element according to the preamble of claim 1 is known from WO 9964231.

[0003] The object of the invention is to improve the wall element that is known from the aforesaid German patent publication, in the sense that a wall element is provided which has an optimal constructional stiffness for serving as (part of a) wall panel, for example a partition wall etc, and which at the same time is light in weight. It is noted that the term "wall panel" is understood to include an element for use in a wall, floor, ceiling, roof etc.

[0004] In order to accomplish that object, a wall element of the kind referred to in the introduction, wherein the intermediate layer is at least substantially made of a metal plate-shaped material, and wherein a profile is formed in the plane of the plate-shaped material, is according to the invention characterised in that the intermediate layer defines a compartment which contains an insulation material. The insulation material is preferably a sound-insulating and/or thermally insulating material. In particular, opposing edges of the intermediate layer are flanged at least twice, with the insulation material being contained between flanged parts of the edges of the intermediate layer.

[0005] In a preferred embodiment of a wall element according to the invention, the intermediate layer is connected to one outer layer on its side remote from the insulation material, whilst the intermediate layer is connected to the other outer layer at the flanged parts of the edges of the intermediate layer. In another preferred variant, the intermediate layer is connected to one outer layer on its side remote from the insulation material, whilst the intermediate layer is connected to the other outer layer via another, second intermediate layer. The second intermediate layer preferably has an at least substantially U-shaped cross-section, with the second intermediate layer engaging the first intermediate layer with legs of said U-shaped cross-section. In another preferred variant, the second intermediate layer has an at least substantially L-shaped cross-section, with the second intermediate layer engaging the first intermediate layer with legs of said L-shaped cross-section.

[0006] Research has shown that the present construction results in an unexpectedly high constructional stiffness of the wall element, so that the wall element can be loaded with large forces without losing any of its shape stability. At the same time a surprisingly light-weight construction is obtained, which makes the element easier to handle.

[0007] Experiments have furthermore shown that the metal intermediate layer comprising the (thermal) insulation material is resistant to very high temperatures, as high as 1000 °C and higher. In addition, said experiments have shown that warping of the intermediate layer due to expansion of the metal is hardly possible at the aforesaid temperatures, if at all, since the profile is capable of compensating said expansion in various directions, viz. both in the longitudinal direction and in the transverse direction of the profile. The present wall element is for example quite suitable for use as a (part of a) partition wall in a building, for example a hospital, since the metal intermediate layer is capable of stopping electromagnetic radiation that is used in the hospital.

[0008] In another preferred embodiment of a wall element according to the invention, the profile is a profile of corrugated cross-section formed in the plane of the plate-shaped material. Preferably, corrugations of the profile extend in meandering fashion in the plane of the plate-shaped material. It is noted that within the framework of the invention the term "in meandering fashion" is understood to mean any manner of meandering (from left to right). Preferably, the corrugations extend in zigzag fashion in the plane of the plate-shaped material, so that corrugations alternately make a more or less acute angle to the left and to the right. In another preferred embodiment, the corrugations extend in snake-like fashion in the plane of the plate-shaped material. The corrugations preferably extend parallel to each other in the plane of the plate-shaped material rather than converge or diverge. The profile is in particular provided along at least substantially the entire length of the plate-shaped material and extends over all the first parts of the intermediate layer.

[0009] In another preferred embodiment of a wall element according to the invention, the corrugations extend sinusoidally in the plane of the plate-shaped material. The distance between two adjacent crests of the sine shape preferably ranges between 0.25 and 2 times the amplitude of the sine shape. In particular, the distance between two adjacent crests of the sine shape at least substantially equals the amplitude of the sine shape. Tests have shown that in this way a construction having an optimum constructional stiffness is obtained, whilst at the same time said construction is light in weight.

[0010] In another preferred embodiment of a wall element according to the invention, the plate-shaped material is made of a metal selected from the group consisting of iron, steel, copper and aluminium, or of an alloy of one or more of said metals. The profile is preferably rolled in the plate-shaped material, as will be explained in more detail yet hereinafter.

[0011] In another preferred embodiment of a wall element according to the invention, the outer layers are glued together with the intermediate layer/layers. The adhesive that is used is preferably a swellable adhesive, in particular a foamable adhesive, more in particular a polyurethane-based foamable adhesive.

[0012] In another preferred embodiment of a wall element according to the invention, the outer layers are at least substantially made of a material selected from the group consisting of fibre material, plastic, rubber, metal,

paper/cardboard and wood. In another preferred variant, plaster boards are used as the outer layers.

[0013] The fibre material in particular contains glass fibres, carbon fibres, mineral fibres and/or synthetic fibres. Fibres of the type known under the trade names "Kevlar" or "Twaron" may for example be used as synthetic fibres.

[0014] The layer of plastic material is preferably selected from the group consisting of PVC-U, PP, PE, ABS, PVC-C and PVDF. It is noted that the material abbreviations used above relate to the following (plastic) materials:

PVC-U	Polyvinyl fluoride (without plasticiser)
PP	Polypropylene
PE	Polyethylene
ABS	Acrylonitrile Butadiene Styrene
PVC-C	Polyvinyl chloride (rechlorinated)
PVDF	Polyvinylidene fluoride

[0015] The rubber layer is in particular selected form the group consisting of EPDM or NBR. In another preferred variant, the outer layers are made of a metal, in particular stainless steel or wood, such as two-ply or three-ply wood.

[0016] In another preferred embodiment of a wall element according to the invention, the outer layers are at least substantially made of layers of paper/cardboard, each layer at least substantially being made up of a corrugated sub-layer and a flat sub-layer provided on one side thereof, with the paper/cardboard layers being bonded together by means of an adhesive applied to the corrugations of the corrugated sub-layers. It is noted that the term "paper" is commonly used for lighter paper types, whilst the term "cardboard" is frequently used for heavier paper types. Within the framework of the present invention no limitation is intended as regards the type of material when the terms "paper" or "cardboard" are used.

[0017] The outer layers are preferably impregnated, in particular with a resinous material, such as polyurethane or polyester resin. It is noted that impregnation with a resinous material, for example, not only has the advantage of increasing the constructional stiffness, but also of providing protection against external influences, such as moisture. Because of the additional stiffness, fewer layers of corrugated paper/cardboard are in principle required for imparting the required stiffness to the flat wall panel. Impregnation preferably takes place by vapour deposition, spraying or otherwise, with vapour deposition or spraying taking place in a direction parallel to the direction of the "cell structure" of the corrugated paper/cardboard that is used. Impregnation can also take place mechanically, in which case toothed and/or flat rollers are used for forcing the impregnation agent into the paper/cardboard.

[0018] In another preferred embodiment of a wall element according to the invention, the intermediate layer/layers is/are staggered relative to the outer layers, said wall element being profiled along a first part of the circumferential edge and being provided with at least one outwardly extending lip along a second part of the circumferential edge, with a lip of one wall element being inserted into a corresponding profile of the upper wall element in the connected condition of adjacent wall elements. Such a staggered position of the intermediate layer/layers makes it possible to effect a solid connection between several wall elements in a simple manner.

[0019] In an alternative preferred embodiment, the wall element is profiled along a first part of the circumferential edge at both ends, and the wall element is provided with at least one outwardly extending lip along an adjacent part of the circumferential edge, with a lip of one wall element being inserted into a corresponding profile of the upper wall element in the connected condition of adjacent wall elements.

[0020] Preferably, said intermediate layer/layers is/are flanged in a direction transversely to the outer layers, parallel to the flanged portions of the intermediate layer/layers, at at least one edge of the wall element.

[0021] The invention will now be explained in more detail with reference to figures of embodiments of the invention shown in a drawing, in which like parts are provided with the same numerals and in which:

- Figure 1 shows a wall element according to the invention;
- Figures 2 and 3 show a part of the wall element of figure 1 in the direction indicated at II;
- Figures 4 and 5 correspond to figures 2 and 3 but relate to another variant of the wall element of figure 1;
- Figure 6 schematically shows a plate-shaped material for use as an intermediate layer in the wall element of figure 1; and
- Figure 7 corresponds to figure 6, but makes use of the plate-shaped material of figure 6.

[0022] In figure 1, a wall element 1 according to the invention is shown. The wall element 1 is substantially plate-shaped, being built up of two parallel outer layers 2 and 3 of gypsum. Disposed between said outer layers 2 and 3 is an intermediate layer 4, which extends between the outer layers 2 and 3.

[0023] Figure 2 shows part of the wall element 1, seen in the direction II shown in figure 1. The intermediate layer 4 comprises a first intermediate layer 4' consisting of a plate-shaped material which is flanged three times (inter alia) for forming first parts 5a, second parts 5b and third parts 5c. The first parts 5a, which extend perpendicularly to the outer layers 2 and 3, and the second parts 5b, which extend parallel to the outer layers 2 and 3, may be connected (in particular glued) to a second interme-

diate layer 4'' likewise made of a plate-shaped material. The plate-shaped material of the second intermediate layer 4'' is flanged once for forming parts 6, which extend perpendicularly to the outer layers 2 and 3. The parts 6 of the second intermediate layer 4'' engage round the first intermediate layer 4', viz. at the location of the first parts 5a. As figure 3 shows, the intermediate layers 4' and 4'' form a compartment 7, in which strip-shaped sound-insulating and/or thermally insulating material can be contained. The material 8 is partially held in place by the third parts 5c of the first intermediate layer 4'. The intermediate layers 4' and 4'' are connected, preferably glued, to the outer layers 2 on their sides remote from the insulation material 8.

[0024] Figures 4 and 5 correspond to figures 2 and 3, with this difference that the second intermediate layer 4'' (which is more or less L-shaped) is flanged twice on one side for forming parts 9a and 9b, part 9a extending perpendicularly to the outer layers 2 a 3 and part 9b extending parallel thereto. The part 5c of the first intermediate layer 4' engages the second part 9b of the second intermediate layer 4''.

[0025] To make it possible to connect wall elements 1 together so as to create a wall, for example, the intermediate layer 4 is slightly staggered relative to the outer layers 2 and 3, as is indicated at x. One part of the intermediate layer, which projects outside the outer layers 2 and 3, forms a lip 10 along a circumferential edge of the wall element 1, whilst the other part of the intermediate layer, which extends within the outer layers 2 and 3, forms a profile 11 in said circumferential edge. In connected condition, a lip 10 can be inserted into a profile 11 of an adjacent wall element. The end of one wall element 1 comes to abut against the end of an adjacent wall element 1 in that case.

[0026] As figures 1 - 5 show, a profile of corrugated cross-section comprising crests 12 and valleys 13 is formed in the intermediate layers 4' and 4''.

[0027] In figure 6, the plate-shaped material for use in the intermediate layer 4 of figure 7 is shown. A profile of corrugated cross-section comprising crests 12 and valleys 13 is formed in the plane of the plate-shaped material, with the corrugations 14 of the profile extending sinusoidally and parallel to each other in the plane of the plate-shaped material.

[0028] Figure 7 corresponds to figure 5, with this difference that a corrugated profile as shown in figure 6 is formed in the intermediate layers 4' and 4''.

[0029] It is noted that the invention is not limited to the embodiments as shown and described herein, but it also extends to other preferred variants that fall within the scope of the appended claims.

Claims

1. A wall element comprising two outer layers (2, 3) extending at least substantially parallel to each other with at least one intermediate layer (4) present therebetween, wherein the intermediate layer (4) is at least substantially made of a metal plate-shaped material, and wherein a profile is formed in the plane of the plate-shaped material, **characterised in that** the intermediate layer (4) defines a compartment (7) which contains an insulation material (8).

2. A wall element according to claim 1, wherein opposing edges of the intermediate layer (4) are flanged at least twice, and wherein the insulation material (8) is contained between flanged parts of the edges of the intermediate layer (4).

3. A wall element according to claim 1 or 2, wherein the intermediate layer (4) is connected to one outer layer on its side remote from the insulation material (8), and wherein the intermediate layer (4) is connected to the other outer layer at the flanged parts of the edges of the intermediate layer (4).

4. A wall element according to claim 1 or 2, wherein the intermediate layer (4) is connected to one outer layer on its side remote from the insulation material (8), and wherein the intermediate layer (4) is connected to the other outer layer via another, second intermediate layer (4").

5. A wall element according to claim 4, wherein the second intermediate layer (4") has an at least substantially U-shaped cross-section, and wherein the second intermediate layer (4") engages the first intermediate layer (4) with legs of said U-shaped cross-section.

6. A wall element according to claim 4, wherein the second intermediate layer (4") has an at least substantially L-shaped cross-section, and wherein the second intermediate layer (4") engages the first intermediate layer with legs of said L-shaped cross-section.

7. A wall element according to claim 4, 5 or 6, wherein the second intermediate layer (4") is at least substantially made of a metal plate-shaped material, wherein a profile is formed in the plane of the plate-shaped material.

8. A wall element according to any one of the preceding claims 1 - 6, wherein the profile is a profile of corrugated cross-section formed in the plane of the plate-shaped material.

9. A wall element according to claim 8, wherein corrugations of the profile extend in meandering fashion in the plane of the plate-shaped material.

10. A wall element according to claim 9, wherein said

corrugations extend parallel to each other in the plane of the plate-shaped material.

11. A wall element according to claim 9 or 10, wherein the corrugations extend in zigzag fashion in the plane of the plate-shaped material.

12. A wall element according to claim 9 or 10, wherein the corrugations extend in snake-like fashion in the plane of the plate-shaped material.

13. A wall element according to claim 12, wherein the corrugations extend sinusoidally in the plane of the plate-shaped material.

14. A wall element according to claim 13, wherein the distance between two adjacent crests of the sine shape preferably ranges between 0.25 and 2 times the amplitude of the sine shape.

15. A wall element according to claim 14, wherein the distance between two adjacent crests of the sine shape at least substantially equals the amplitude of the sine shape.

16. A wall element according to any one of the preceding claims 1 - 15, wherein the profile is provided along at least substantially the entire length of the plate-shaped material.

17. A wall element according to any one of the preceding claims 1 - 16, wherein the plate-shaped material is made of a metal selected from the group consisting of iron, steel, copper and aluminium, or of an alloy of one or more of said metals.

18. A wall element according to any one of the preceding claims 1 - 17, wherein the outer layers (2,3) are glued together with the intermediate layer/layers.

19. A wall element according to any one of the preceding claims 1 - 18, wherein the outer layers (2,3) are at least substantially made of a material selected from the group consisting of fibre material, plastic, rubber, metal, gypsum, paper/cardboard and wood.

20. A wall element according claim 19, wherein the fibre material contains glass fibres, carbon fibres, mineral fibres and/or synthetic fibres.

21. A wall element according to claim 19, wherein the outer layers (2,3) are at least substantially made of layers of paper/cardboard, each layer at least substantially being made up of a corrugated sub-layer and a flat sub-layer provided on one side thereof, with the paper/cardboard layers being bonded together by means of an adhesive applied to the corrugations of the corrugated sub-layers.

22. A wall element according to claim 21, wherein the outer layers (2,3) are preferably impregnated, in particular with a resinous material.

23. A wall element according to claim 19, wherein the outer layers (2,3) are at least substantially made of two-ply or three-ply wood.

24. A wall element according to any one of the preceding claims 1 - 23, wherein the intermediate layer/layers (4,4") is/are staggered relative to the outer layers (2,3), said wall element being profiled along a first part of the circumferential edge and being provided with at least one outwardly extending lip along a second part of the circumferential edge, with a lip of one wall element being inserted into a corresponding profile of the upper wall element in the connected condition of adjacent wall elements.

25. A wall element according to any one of the preceding claims 1 - 24, wherein said intermediate layer/layers (4,4") is/are flanged in a direction transversely to the outer layers (2,3), parallel to the flanged portions of the intermediate layer/layers (4, 4"), at at least one edge of the wall element (1).

26. A wall element (1) according to any one of the preceding claims 1 - 25, wherein the wall element (1) is profiled along a first part of the circumferential edge at both ends, and the wall element (1) is provided with at least one outwardly extending lip along an adjacent part of the circumferential edge, with a lip (10) of one wall element being inserted into a corresponding profile (11) of the upper wall element in the connected condition of adjacent wall elements.

Patentansprüche

1. Wandelement, das zwei äußere Schichten (2, 3) umfasst, die sich wenigstens im wesentlichen parallel zueinander erstrecken, mit wenigstens einer Zwischenschicht (4), die dazwischen vorliegt, wobei die Zwischenschicht (4) wenigstens im wesentlichen aus einem metallischen plattenförmigen Material hergestellt ist und wobei ein Profil in der Ebene des plattenförmigen Materials ausgebildet ist, **dadurch gekennzeichnet, dass** die Zwischenschicht (4) einen Zwischenraum (7) definiert, der ein Isolationsmaterial (8) enthält.

2. Wandelement nach Anspruch 1, wobei gegenüberliegende Kanten der Zwischenschicht (4) wenigstens zweimal gebördelt sind und wobei das Isolationsmaterial (8) zwischen gebördelten Teilen der Kanten der Zwischenschicht (4) enthalten ist.

3. Wandelement nach Anspruch 1 oder 2, wobei die

Zwischenschicht (4) mit einer äußeren Schicht auf ihrer Seite, die vom Isolationsmaterial (8) entfernt liegt, verbunden ist und wobei die Zwischenschicht (4) mit der anderen äußeren Schicht an den gebördelten Teilen der Kanten der Zwischenschicht (4) verbunden ist.

4. Wandelement nach Anspruch 1 oder 2, wobei die Zwischenschicht (4) mit einer äußeren Schicht auf ihrer Seite, die vom Isolationsmaterial (8) entfernt ist, verbunden ist und wobei die Zwischenschicht (4) mit der anderen äußeren Schicht über eine weitere, zweite Zwischenschicht (4") verbunden ist.

5. Wandelement nach Anspruch 4, wobei die zweite Zwischenschicht (4") einen wenigstens im wesentlichen U-förmigen Querschnitt besitzt und wobei die zweite Zwischenschicht (4") mit der ersten Zwischenschicht (4) mit Schenkeln des U-förmigen Querschnitts in Eingriff steht.

6. Wandelement nach Anspruch 4, wobei die zweite Zwischenschicht (4") einen wenigstens im wesentlichen L-förmigen Querschnitt besitzt und wobei die zweite Zwischenschicht (4") mit der ersten Zwischenschicht mit Schenkeln des L-förmigen Querschnitts in Eingriff steht.

7. Wandelement nach Anspruch 4, 5 oder 6, wobei die zweite Zwischenschicht (4") wenigstens im wesentlichen aus einem metallischen plattenförmigen Material hergestellt ist, wobei ein Profil in der Ebene des plattenförmigen Materials ausgebildet ist.

8. Wandelement nach einem der vorangehenden Ansprüche 1-6, wobei das Profil ein Profil mit gewelltem Querschnitt ist, ausgebildet in der Ebene des plattenförmigen Materials.

9. Wandelement nach Anspruch 8, wobei die Wellen des Profils sich in mäandernder Weise in der Ebene des plattenförmigen Materials erstrecken.

10. Wandelement nach Anspruch 9, wobei die Wellen sich parallel zueinander in der Ebene des plattenförmigen Materials erstrecken.

11. Wandelement nach Anspruch 9 oder 10, wobei die Wellen sich in Zick-Zack-Weise in der Ebene des plattenförmigen Materials erstrecken.

12. Wandelement nach Anspruch 9 oder 10, wobei die Wellen sich in schlangenähnlicher Weise in der Ebene des plattenförmigen Materials erstrecken.

13. Wandelement nach Anspruch 12, wobei die Wellen sich sinusförmig in der Ebene des plattenförmigen Materials erstrecken.

14. Wandelement nach Anspruch 13, wobei der Abstand zwischen zwei benachbarten Maxima der Sinuskurve in einem Bereich zwischen dem 0,25- und 2-fachen der Amplitude der Sinuskurve liegt.

15. Wandelement nach Anspruch 14, wobei der Abstand zwischen zwei benachbarten Maxima der Sinuskurve wenigstens im wesentlichen gleich der Amplitude der Sinuskurve ist.

16. Wandelement nach einem der vorangehenden Ansprüche 1-15, wobei das Profil entlang wenigstens im wesentlichen der gesamten Länge des plattenförmigen Materials vorgesehen ist.

17. Wandelement nach einem der vorangehenden Ansprüche 1-16, wobei das plattenförmige Material aus einem Metall hergestellt ist, das ausgewählt ist aus der Gruppe, bestehend aus Eisen, Stahl, Kupfer und Aluminium, oder aus einer Legierung von einem oder mehreren der Metalle.

18. Wandelement nach einem der vorangehenden Ansprüche 1-17, wobei die äußeren Schichten (2, 3) mit der/den Zwischenschicht/-schichten zusammen verklebt sind.

19. Wandelement nach einem der vorangehenden Ansprüche 1-18, wobei die äußeren Schichten (2, 3) wenigstens im wesentlichen aus einem Material hergestellt sind, das ausgewählt ist aus der Gruppe, bestehend aus Fasermaterial, Kunststoff, Gummi, Metall, Gips, Papier/Karton und Holz.

20. Wandelement nach Anspruch 19, wobei das Fasermaterial Glasfasern, Kohlenstofffasern, Mineralfasern und/oder synthetische Fasern enthält.

21. Wandelement nach Anspruch 19, wobei die äußeren Schichten (2, 3) wenigstens im wesentlichen aus Schichten aus Papier/Karton hergestellt sind, wobei jede Schicht wenigstens im wesentlichen aus einer gewellten Unterschicht und einer flachen Unterschicht, die auf einer Seite davon vorgesehen ist, hergestellt ist, wobei die Papier/Kartonschichten mittels eines Klebstoffes miteinander verbunden sind, der auf die Wellen der gewellten Unterschichten aufgebracht ist.

22. Wandelement nach Anspruch 21, wobei die äußeren Schichten (2, 3) vorzugsweise imprägniert sind, insbesondere mit einem harzartigen Material.

23. Wandelement nach Anspruch 19, wobei die äußeren Schichten (2, 3) wenigstens im wesentlichen aus doppellagigem oder dreilagigem Holz hergestellt sind.

24. Wandelement nach einem der vorangehenden Ansprüche 1-23, wobei die Zwischenschicht/-schichten (4, 4") relativ zu den äußeren Schichten (2, 3) versetzt ist/sind, wobei das Wandelement entlang eines ersten Teils der Umfangskante profiliert und mit wenigstens einer sich nach außen erstreckenden Lippe entlang eines zweiten Teils der Umfangskante versehen ist, wobei die Lippe eines Wandelementes in ein entsprechendes Profil des oberen Wandelementes im verbundenen Zustand benachbarter Wandelemente eingeschoben ist.

25. Wandelement nach einem der vorangehenden Ansprüche 1-24, wobei die Zwischenschicht/-schichten (4, 4") in einer Richtung quer zu den äußeren Schichten (2, 3) gebördelt ist/sind, parallel zu den gebördelten Abschnitten der Zwischenschicht/-schichten (4, 4"), an wenigstens einer Kante des Wandelementes (1).

26. Wandelement nach einem der vorangehenden Ansprüche 1-25, wobei das Wandelement (1) entlang eines ersten Teils der Umfangskante an beiden Enden profiliert ist und das Wandelement (1) mit wenigstens einer sich nach außen erstreckenden Lippe entlang eines benachbarten Teils der Umfangskante versehen ist, wobei eine Lippe (10) eines Wandelementes in ein entsprechendes Profil des oberen Wandelementes im verbundenen Zustand benachbarter Wandelemente eingeschoben ist.

Revendications

1. Élément mural comprenant deux couches extérieures (2, 3) s'étendant au moins sensiblement parallèlement l'un à l'autre avec au moins une couche intermédiaire (4) présente entre elles, dans lequel la couche intermédiaire (4) est au moins sensiblement en un matériau conformé en plaque métallique, et dans lequel un profilé est formé dans le plan du matériau conformé en plaque, **caractérisé en ce que** la couche intermédiaire définit un compartiment (7) qui contient un matériau isolant (8).

2. Élément mural selon la revendication 1, dans lequel des bords opposés de la couche intermédiaire (4) sont rabattus au moins deux fois, et dans lequel le matériau isolant (8) est contenu entre des parties rabattues des bords de la couche intermédiaire.

3. Élément mural selon la revendication 1 ou 2, dans lequel la couche intermédiaire (8) est reliée à une couche extérieure sur son côté distant du matériau isolant (8), et dans lequel la couche intermédiaire (4) est reliée à l'autre couche extérieure au niveau des parties rabattues des bords de la couche intermédiaire (4).

4. Élément mural selon la revendication 1 ou 2, dans lequel la couche intermédiaire (4) est reliée à une couche extérieure sur son côté éloigné du matériau isolant (8), et dans lequel la couche intermédiaire est reliée à l'autre couche extérieure par le biais d'une autre seconde couche intermédiaire (4").

5. Élément mural selon la revendication 4, dans lequel la deuxième couche intermédiaire (4") a une section sensiblement en forme de U, et dans lequel la deuxième couche intermédiaire (4") s'engage avec la première couche intermédiaire (4) par des pattes de ladite section en forme de U.

6. Élément mural selon la revendication 4, dans lequel la deuxième couche intermédiaire (4") a une section au moins sensiblement en forme de L, et dans lequel la deuxième couche intermédiaire s'engage avec la première couche intermédiaire par des pattes de ladite section en forme de L.

7. Élément mural selon la revendication 4, 5 ou 6, dans lequel la deuxième couche intermédiaire (4") est au moins sensiblement en un matériau conformé en plaque métallique, un profilé étant formé dans le plan du matériau conformé en plaque.

8. Élément mural selon l'une quelconque des revendications précédentes 1 à 6, dans lequel le profilé est un profilé de section ondulée formée dans le plan du matériau conformé en plaque.

9. Élément mural selon la revendication 8, dans lequel les ondulations du profilé s'étendent en méandres dans le plan du matériau conformé en plaque.

10. Élément mural selon la revendication 9, dans lequel lesdites ondulations s'étendent parallèlement l'une à l'autre dans le plan du matériau conformé en plaque.

11. Élément mural selon la revendication 9 ou 10, dans lequel les ondulations s'étendent en zigzag dans le plan du matériau conformé en plaque.

12. Élément mural selon la revendication 9 ou 10, dans lequel les ondulations s'étendent en serpentant dans le plan du matériau conformé en plaque.

13. Élément mural selon la revendication 12, dans lequel les ondulations s'étendent en sinusoïdes dans le plan du matériau conformé en plaque.

14. Élément mural selon la revendication 13, dans lequel la distance entre deux crêtes adjacentes de la forme sinusoïdale est de préférence comprise entre 0,25 et 2 fois l'amplitude de la forme sinusoïdale.

15. Élément mural selon la revendication 14, dans lequel la distance entre deux crêtes adjacentes de la forme sinusoïdale est au moins sensiblement égale à l'amplitude de la forme sinusoïdale.

16. Élément mural selon l'une quelconque des revendications précédentes 1 à 15, dans lequel le profilé est prévu le long d'au moins sensiblement toute la longueur du matériau conformé en plaque.

17. Élément mural selon l'une quelconque des revendications précédentes 1 à 16, dans lequel le matériau conformé en plaque est fait d'un métal sélectionné dans le groupe constitué du fer, de l'acier, du cuivre et de l'aluminium, ou en un alliage d'un ou plusieurs desdits métaux.

18. Élément mural selon l'une quelconque des revendications précédentes 1 à 17, dans lequel les couches extérieures (2, 3) sont collées à la couche intermédiaire ou les couches intermédiaires.

19. Élément mural selon l'une quelconque des revendications précédentes 1 à 18, dans lequel les couches extérieures (2, 3) sont réalisées au moins sensiblement en un matériau sélectionné dans le groupe constitué d'un matériau fibreux, d'une matière plastique, d'un caoutchouc, d'un métal, de gypse, du papier/carton ou du bois.

20. Élément mural selon la revendication 19, dans lequel le matériau fibreux contient des fibres de verre, des fibres de carbone, des fibres minérales et/ou des fibres synthétiques.

21. Élément mural selon la revendication 19, dans lequel les couches extérieures (2, 3) sont au moins sensiblement constituées de couches de papier/carton, chaque couche étant au moins sensiblement constituée d'une sous-couche ondulée et d'une sous-couche plate prévue sur un côté de celle-ci, les couches de papier/carton étant reliées entre elles au moyen d'un adhésif appliqué sur les ondulations des sous-couches ondulées.

22. Élément mural selon la revendication 21, dans lequel les couches extérieures (2, 3) sont de préférences imprégnées, notamment avec un matériau résineux.

23. Élément mural selon la revendication 19, dans lequel les couches extérieures (2, 3) sont au moins sensiblement constituées de contreplaqué à deux feuilles ou trois feuilles.

24. Élément mural selon l'une quelconque des revendications précédentes 1 à 23, dans lequel la couche intermédiaire ou les couches intermédiaires (4, 4") sont disposées de façon alternées par rapport aux couches extérieures (2, 3), ledit élément mural étant profilé le long d'une première partie du bord circonférentiel et étant doté d'au moins une lèvre s'étendant vers l'extérieur le long d'une seconde partie du bord circonférentiel, une lèvre d'un élément mural étant insérée dans un profilé correspondant de l'élément mural supérieur lorsque des éléments muraux adjacents sont reliés entre eux.

25. Élément mural selon l'une quelconque des revendications précédentes 1 à 24, dans lequel ladite couche intermédiaire ou lesdites couches intermédiaires (4, 4") sont rabattues dans une direction transversale aux couches extérieures (2, 3) parallèlement aux parties rabattues de la ou des couches intermédiaires (4, 4"), à au moins un côté de l'élément mural (1).

26. Elément mural selon l'une quelconque des revendications précédentes 1 à 25, dans lequel l'élément mural est profilé le long d'une première partie du bord circonférentiel aux deux extrémités, et l'élément mural (1) est doté d'au moins une lèvre s'étendant vers l'extérieur le long d'une partie adjacente du bord circonférentiel, une lèvre (10) d'un élément mural étant insérée dans un profilé correspondant (11) de l'élément mural supérieur lorsque des éléments muraux adjacents sont reliés entre eux.

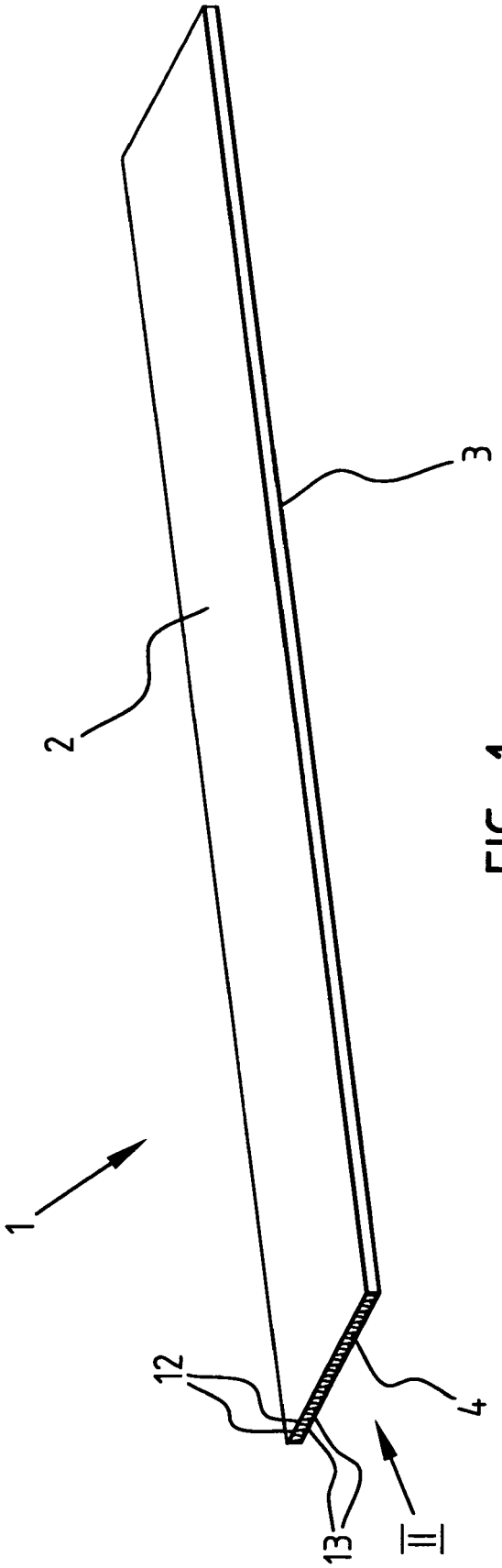

FIG. 1

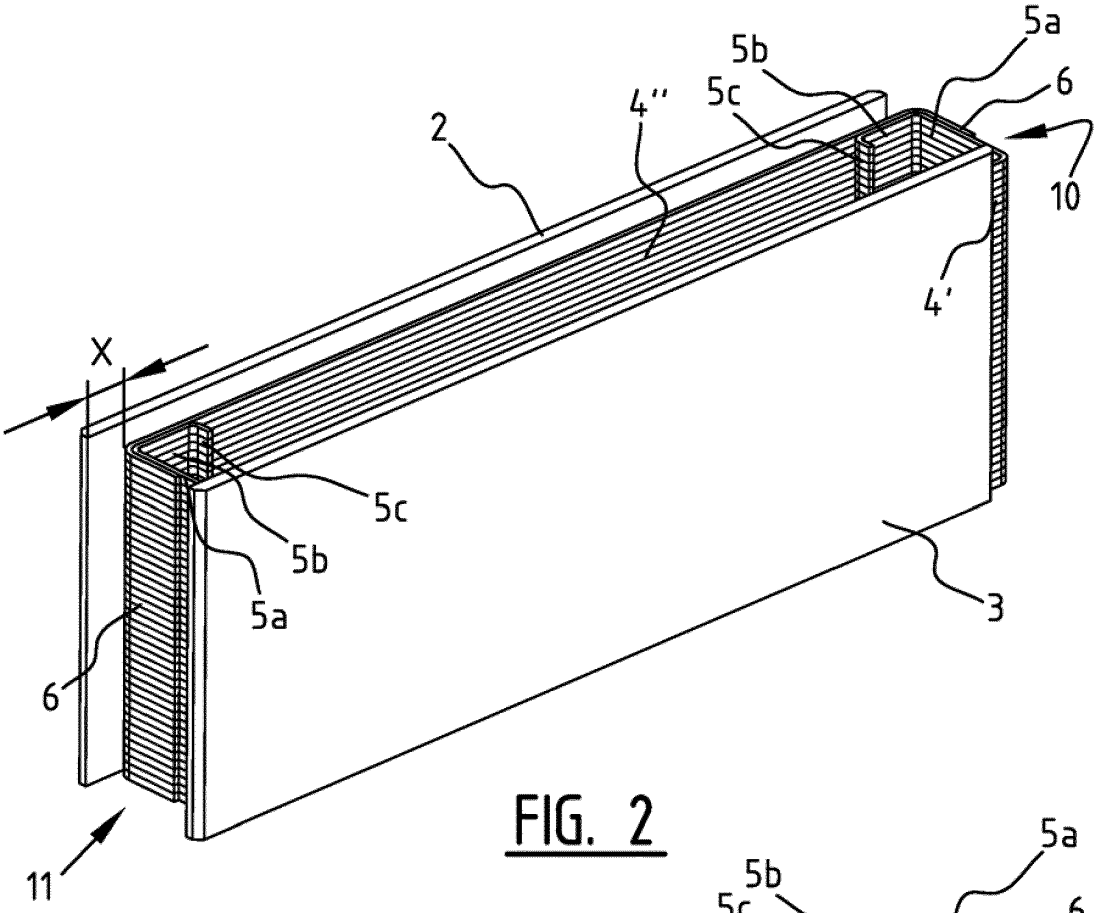

FIG. 2

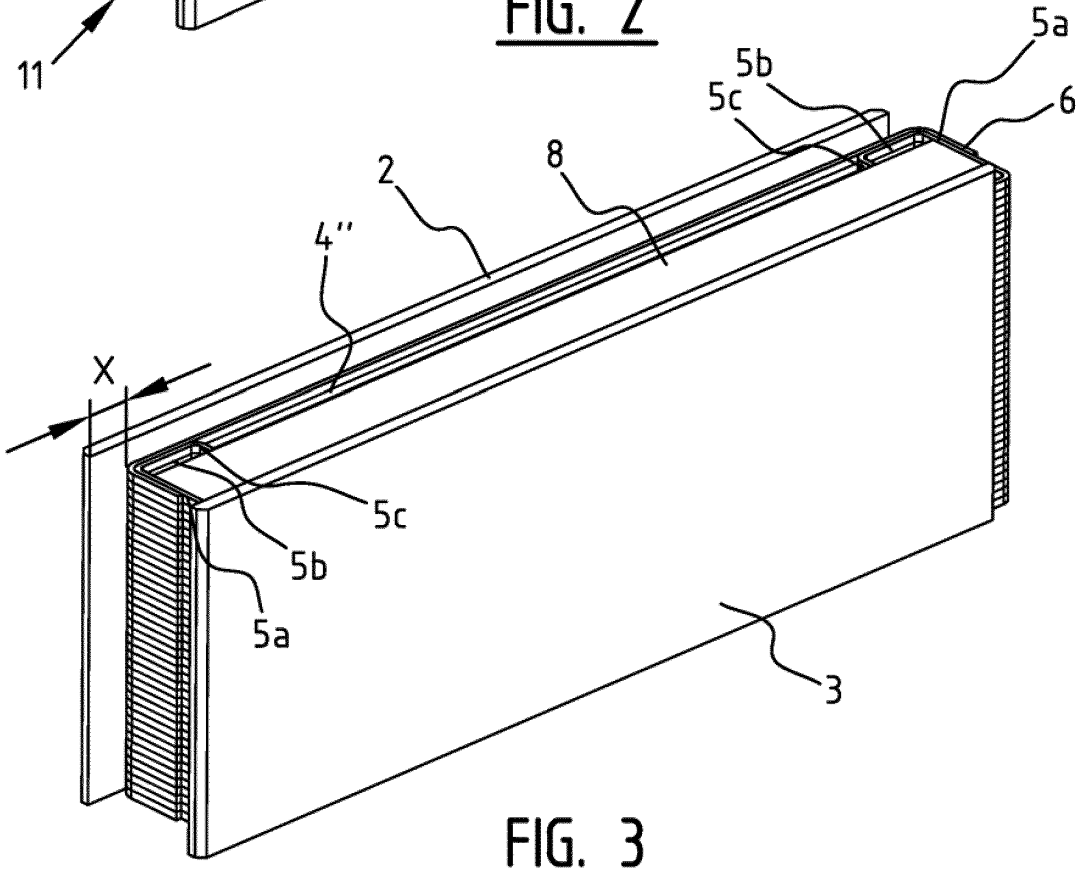

FIG. 3

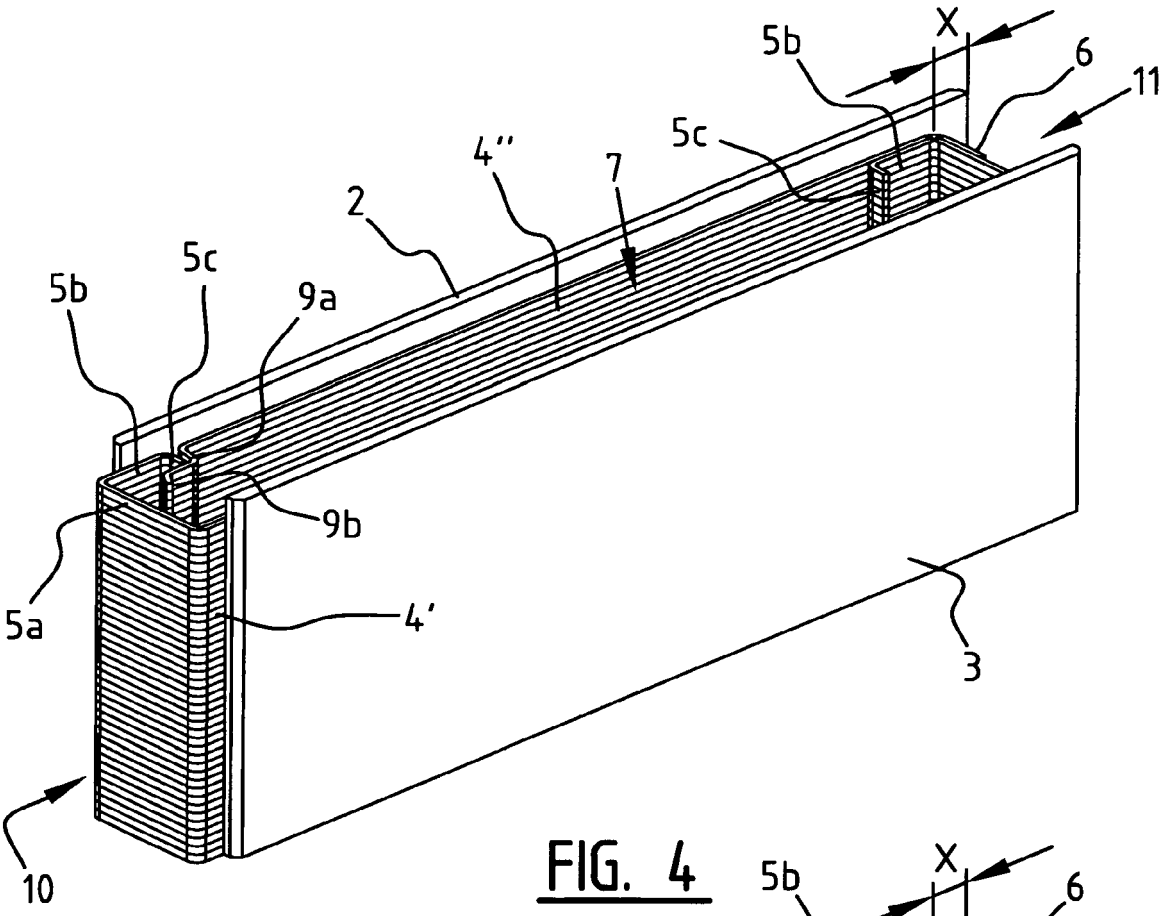

FIG. 4

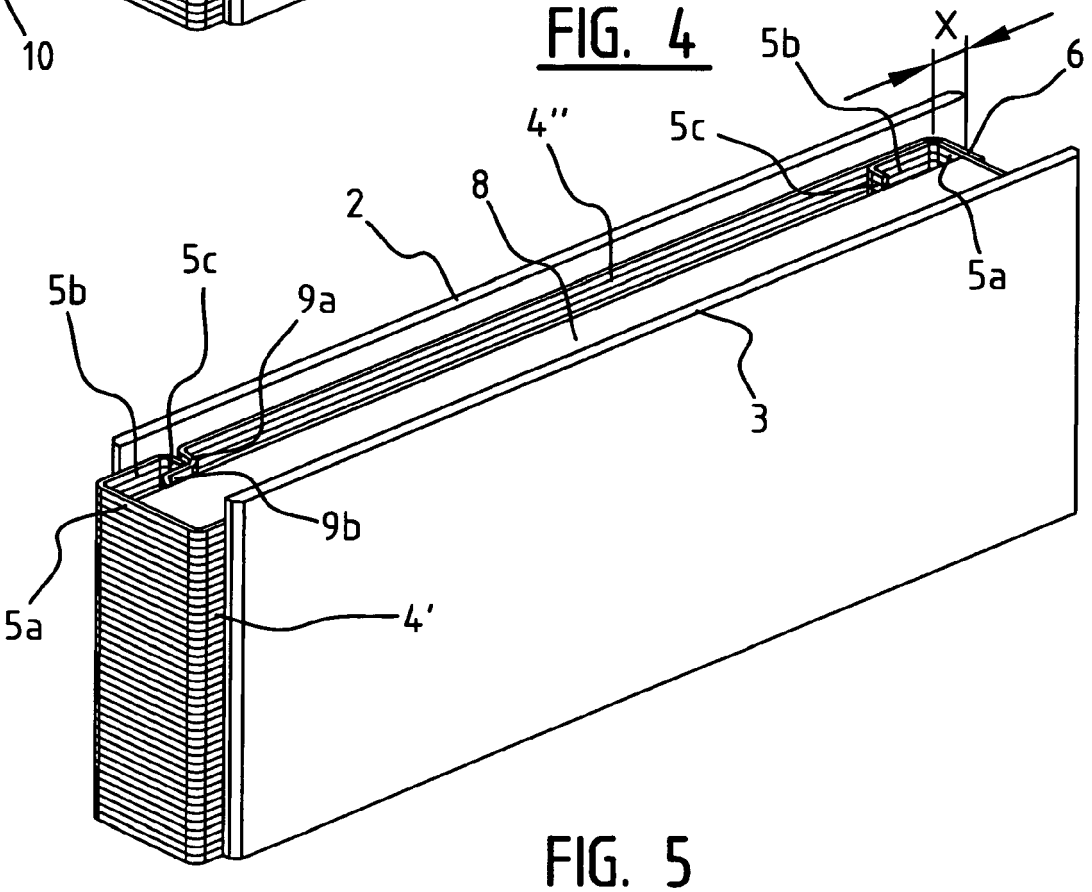

FIG. 5

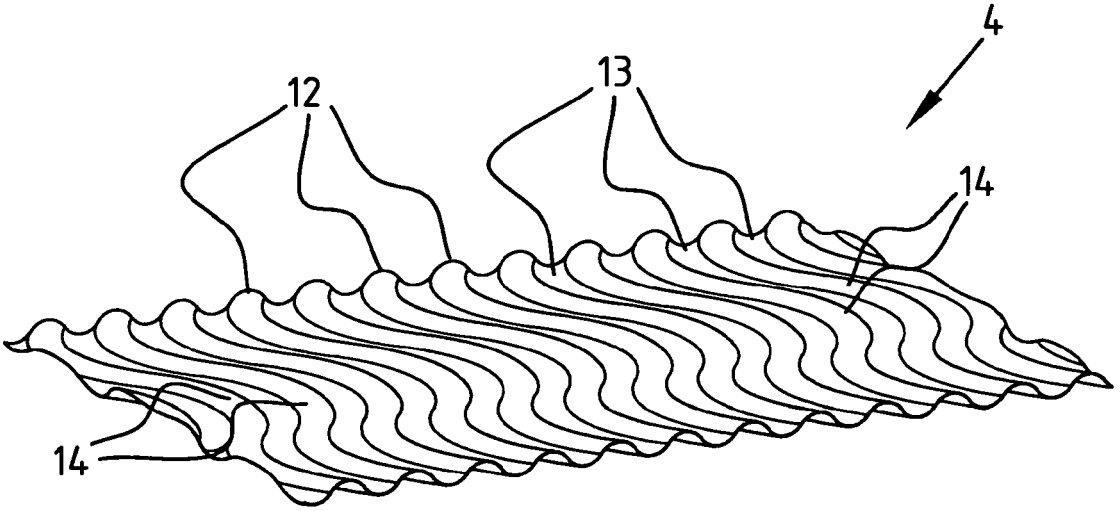

FIG. 6

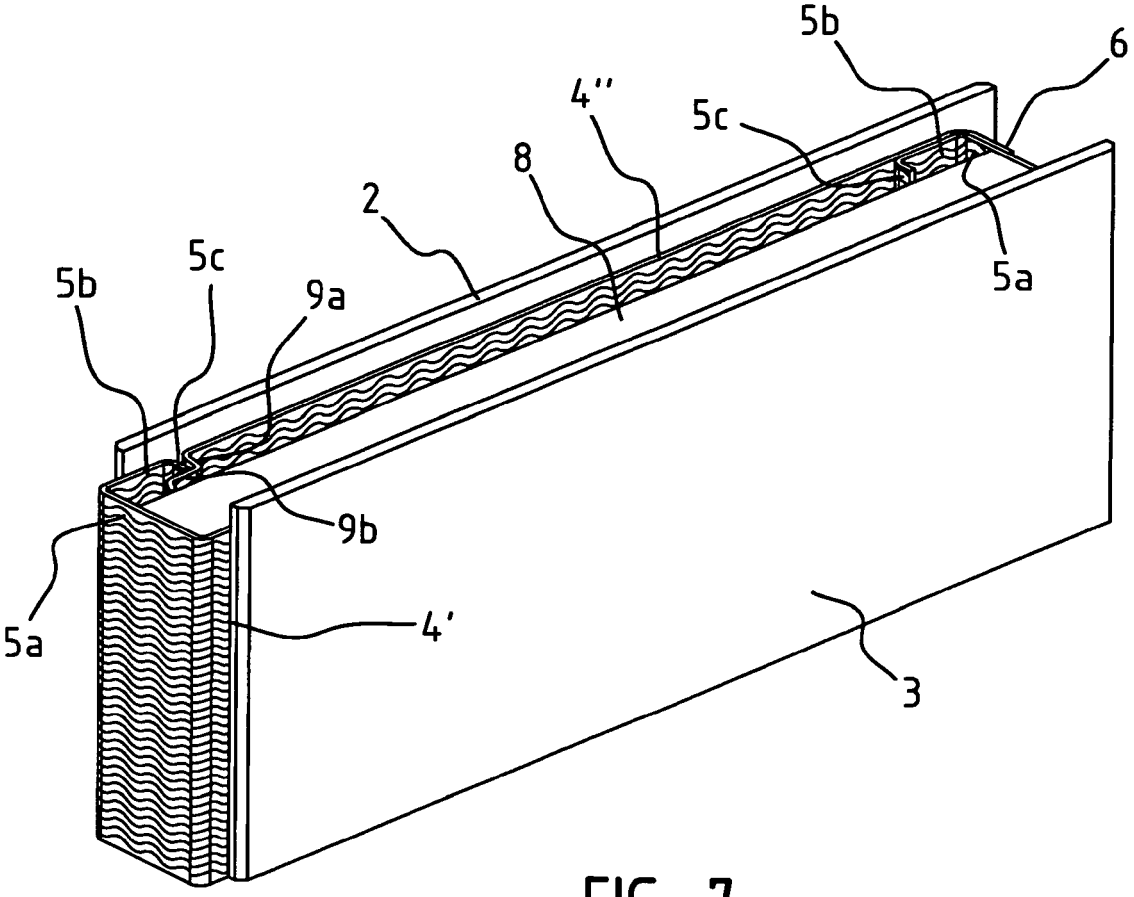

FIG. 7

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

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- WO 9964231 A **[0002]**