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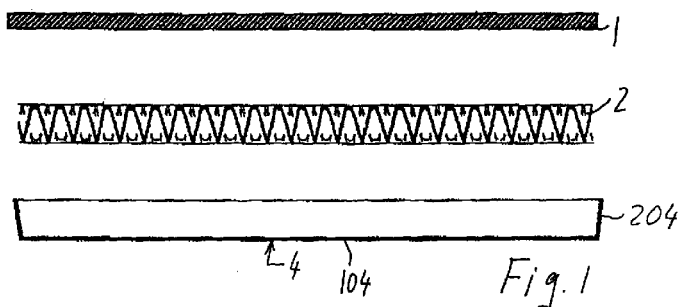
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(54) **Lining element, particularly for aerated or floating lining of walls, floors, roofs or the like**

(57) A lining element, particularly for aerated or floating lining of walls, floors, roofs, or the like, characterized in that it consists of a sized panel (10, 10') which comprises at least one intermediate support layer (2) having a honeycomb structure, and at least one lining layer (1) made of lining material on the exposed face which is glued (3) and/or welded and/or otherwise fastened to said exposed face, there being provided an ele-

ment in the form of a box or chest (4) wherein the assembly of the lining and intermediate layers (1, 2) is accommodated, and which lays overlays over the peripheral edges and the non exposed face of said assembly. The lining element can be used for aerated walls, floating floors or roof linings, or the like.



Description

[0001] The invention relates to a lining element, particularly for aerated or floating lining of walls, floors, roofs or the like.

[0002] The invention has the object to provide an element, particularly for lining walls, floors, or the like, which is load-bearing all over its surface, light-weight, cost-effective and has very good heat and sound insulating properties, very good fire-retardant properties, and allows to use any kind of material on the exposed face, thereby reducing the amount of material which is expensive for its exterior quality.

[0003] The invention achieves the above purposes by providing a lining element, consisting of a sized panel which comprises at least one intermediate support layer having a honeycomb structure, and at least one lining layer made of lining material on the exposed face, which is glued and/or welded and/or otherwise fastened to said exposed face, there being provided an element in the form of a box or chest wherein the lining element is accommodated, and which lays over the peripheral edges and the non exposed face of said lining element.

[0004] The box or chest may be made of any suitable material.

[0005] The walls of the box or chest may be either continuous or, for instance, at least partly provided with apertures or lightening elements, or holes or, in at least a few areas thereof, grid patterns, or the like.

[0006] The chest preferably extends up to the face of the lining layer which is turned towards the intermediate layer.

[0007] In accordance with a preferred embodiment, the lining layer projects beyond the intermediate layer so that it overlaps the peripheral edge of the chest.

[0008] In a particular embodiment, the outer edge of the lining layer terminates flush with the outer peripheral wall of the chest at the open side thereof.

[0009] A layer of adhesive may be provided between the inner surfaces of the chest and the facing surfaces of the intermediate layer, especially the face of the intermediate layer adhering against the bottom of the chest.

[0010] The glue or adhesive may be of the sealing type, or a suitable sealant may be further provided between the intermediate layer and the inner surfaces of the chest, particularly between the side walls of the chest and the intermediate layer.

[0011] The adhesive and/or sealant may be of the fire retardant type or the sealant may be anyway mixed with fire retardant aggregate.

[0012] According to a further characteristic, the chest is made in such a manner that it tapers towards the bottom side with convergent inclined side walls.

[0013] As a lining layer, there may be provided any type of sheet, plate or panel of natural or synthetic materials, either single- or multilayer, such as fabric, cloths, felts, made of natural or synthetic or mixed fibers,

plastic plates, stone plates, e.g. made of marble, granite or the like, thin plates or tiles made of cotto, ceramic, glass, or other similar materials, wood, metal, etc.

[0014] As an intermediate layer, a plastic honeycomb or grid panel or the like may be used.

[0015] The plastic panel disclosed in US 4,315,050 and 4,315,051 and sold by Norcore with the trade name "birdwing", is particularly fit for the purpose. The chest may be made either of plastic or of metal, such as steel and aluminum.

[0016] With reference to the flooring and/or wall lining uses, the invention provides a combination of a plurality of said lining elements of a predetermined size, in combination with spacing and fastening elements.

[0017] To this end, structures made of longitudinal and/or cross bars may be used, which are secured to the wall and/or floor, for the elements to rest thereon. Alternatively, foot elements may be also used, arranged over the surface of the lining elements. These foot elements may be also provided at corners and be shared by adjacent lining elements, e.g. by four lining elements or by two lining elements only, particularly at the edges of the surface to be lined.

[0018] In the provision of floor linings, the spacer elements may simply rest on the floor and the lining elements may in turn simply rest thereon.

[0019] Mutual positioning interlocks may be provided.

[0020] Means for fastening the spacers to the surfaces to be lined may be also provided, e.g. by screws, dowels, gluing, walling, or the like.

[0021] Means for fastening the lining elements to the spacers may be also provided. These means may be of the screw type, for instance by forming through holes in the lining elements, or of the hook and/or interlock type, for instance by providing complementary hooklike and/or snap interlock means on the spacers and on the chests.

[0022] The aforesaid hooklike means may be hooks projecting out of the chests and cooperating with hook slots or holes formed in the spacer elements, or vice versa, or male interlock projections associated to the chests and elastically deformable snap interlock seats, associated to the spacers, or vice versa.

[0023] A non limiting example of the snap interlock means may consist of spherical elements at the ends of support stems projecting out of the chests and of complementary spherical recesses, whose angular extension, i.e. spherical sector, is above 180° and below 360° which, thanks to the elastic properties of the material, e.g. plastic, provide elastic deformation under strain upon interlock and release.

[0024] Any combination of the aforesaid fasteners may be provided for each element.

[0025] According to another characteristic, the chests may also have, alternatively to or in combination with the above, means for mutual removable coupling, such as mutual hooklike, interlock, or snap interlock

means.

[0026] These means may consist of hooklike wings of a chest in combination with hook slots in the adjacent chest, or of lateral undercut, e.g. dovetail extensions of a chest in combination with complementary recesses formed in the facing side wall of the adjacent chest, which recesses are open at their end on the bottom side of the chest, thereby allowing the undercut extensions to be inserted therein.

[0027] The snap fastening of two lining elements may be also obtained as described as regards fastening between spacer elements, the interlocking members projecting, for instance, out of one side of a chest and the snap interlocking recesses being formed in the facing side of the adjacent chest.

[0028] In this case, the chests might all have snap interlock recesses, pins or snap interlock members being provided whose two opposite ends are made like snap interlock heads for engagement in the seats of the facing sides of two adjacent chests.

[0029] The examples described herein shall be intended without limitation, and any known means for fastening panels, plates, doors or the like may be provided both as a spacer and as a fastener.

[0030] The invention relates to further improvements which form the subject of the dependent claims.

[0031] The characteristics of the invention and the advantages derived therefrom will appear more clearly from the following description of a few non limiting embodiments shown in the accompanying drawings, in which:

Fig. 1 is an exploded cross sectional view of a lining element according to the invention.

Fig. 2 is a cross sectional view of a lining element as shown in fig. 1 in the mounted condition.

Fig. 3 shows an enlarged detail of the lining element as shown in fig. 2.

Figs. 4 and 5 show a side view and a top plan view respectively of a lining element as shown in the previous figures.

Fig. 6 shows the combination of lining elements according to the invention with spacer elements for aerated lining of walls.

Fig. 7 shows the combination of lining elements according to the invention with spacers for a floating lining of floors.

Figs. 8 and 9 show two examples of removable fastening between lining elements.

Figs. 10 to 12 show a few examples of removable fastening between lining elements and support structures or spacer elements.

Figs. 13 and 14 show a variant of a lining element which may be used for roofs, or the like.

Fig. 15 shows a variant of the elements as shown in figs. 13 and 14.

[0032] Referring to the figures, a lining element

according to the invention comprises a lining layer 1 which is glued, welded or otherwise anchored to an intermediate layer 2, consisting of a honeycomb or grid panel, particularly having the typical structure of the panels sold by Norcore with the trade name "Birdwing". These panels are made of plastic, in accordance with the description of US 4,315,050 and 4,315,051. This type of material has a particular honeycomb structure which combines a high rigidity and mechanical resistance and a very light weight.

[0033] In this case, the lining layer 1 is attached by an adhesive 3 to the exposed face of the intermediate panel 2.

[0034] The lining layer 2 may be made of any natural or synthetic material, or of combinations of natural and synthetic materials, such as stone materials, ceramic, terracotta, resins, concrete, plaster, plasterboard, with stone decorative or rough elements incorporated therein, wood, glass, metal, but may also consist of plates made of a synthetic material possibly covered with layers of fabric, nonwoven fabric, natural fibers, synthetic fibers or mixtures thereof, as well as leather, imitation leather, and the like.

[0035] Obviously, both the lining layer and the intermediate layer 2 may also consist of combinations of layers with various properties so, for instance, expanded layers may be provided between the intermediate layer and the lining layer, or on the face of the intermediate layer facing the lining layer, for calibrating possibly required sound absorbing or thermal insulating properties or for providing or further ensuring watertightness properties.

[0036] The combination of the layers 1 and 2 is accommodated inside a chest 4 which has a bottom wall 104 and side peripheral walls 204. The chest 4 extends on the rear side of the intermediate layer 2 and along the peripheral edges of the two layers 1, 2 fastened together.

[0037] The side walls 204 of the chest 4 may either extend up to the surface of the exposed face of the lining layer 1, or terminate flush with the face of the lining layer 1 coupled to the intermediate layer 2. In this case, the lining layer 1 projects at its periphery out of the lateral edges of the intermediate layer 2 to such an extent as to overlap the end edge of the side walls 204 of the chest 4 which abut against the layer 1, terminating at its periphery flush with said side walls 204 of the chest 4.

[0038] The chest 4 is fastened to the intermediate layer 2 and/or even to the layer 1 or part thereof, by an adhesive layer 5. The latter may only extend along the bottom wall 104 of the chest 4.

[0039] Along the side walls 204 and where the honeycomb voids are relatively big, the use is provided of a filling sealant 6 which may also act as an adhesive. These areas where the sealant may be needed are typically, but neither necessarily nor exclusively, located at the side walls 204 of the chest 4.

[0040] The adhesive and the sealant in use, e.g. sil-

icone, expanded sealants, or injectable foams may be mixed with aggregate.

[0041] Preferably, the adhesives and/or the sealants are of the fire-retardant type or anyway mixed with fire-retardant aggregate.

[0042] With reference to fig. 3, the chest 4 tapers towards the bottom side 104 like an upturned truncated pyramid. This provides an intermediate gap between adjacent chests, which may be required for mounting them onto a bearing structure, whereas the lining layers perfectly adhere to each other. In this case, the cross section of the complete lining element has the shape of an upturned isosceles trapezoid, topped by a rectangle substantially consisting of the lining layer 1.

[0043] Figs. 6, 7 and 13 show a few applications of the lining element according to the invention.

[0044] Fig. 6 shows the use of the lining elements to form the aerated lining of a wall.

[0045] Here, a sequence of cross and/or longitudinal bars 7 forms a spacer structure for securing the lining elements 10.

[0046] The cross and/or longitudinal bars 7 are fastened to a wall 11 in any manner, such as by screws, dowels, adhesive, walling or in any other manner and form surfaces which allow the peripheral edge to rest on at least two sides of a lining element 10. Particularly, said cross or longitudinal bars have such a length as to allow at least two adjacent lining elements 10 to rest thereon.

[0047] Figure 7 shows the variant embodiment designed to make a floating floor. Here, the combination of fig. 6 might certainly be used, although costs could be reduced by providing, instead of a structure with continuous elements, a supporting and spacing structure consisting of support feet 12 designed to bear the adjacent corners of at least two or of three or four adjacent panels.

[0048] These supporting and spacing feet 12 are well known in the art of floating floors and are available in various shapes and variants.

[0049] According to a variant, as shown in dashed lines in fig. 7, the feet may be interconnected by cross bars 7 so that they can also form a bearing framework, possibly even all along the perimeter of the lining elements 10, 10', or a cross beam structure.

[0050] While in the case of a floor both the feet 12 and the possible longitudinal and/or cross bar structure 7 may simply rest on a floor and the lining elements 10 may in turn simply rest on the feet 12 or on the structure 7, in the variant embodiment designed for the aerated lining of walls, the lining elements must be secured somehow to the structure.

[0051] It has to be noted that the provision of aerated linings for walls may involve, like in the case of floor lining, a structure composed of feet 12 instead of the cross and/or longitudinal bar structure.

[0052] Figs. 10 to 12 show a few variant embodiments of possible removable hooklike and or fastening

means which might be used either individually or in combination.

[0053] Fig. 10 show hooklike means wherein the spacer structure of longitudinal and/or cross bars 7 has slots 107 for engaging hooks 304 projecting out of the bottom of the chest 4 of a lining element.

[0054] Fig. 11 shows a screw fastening 13, whereas fig. 12 shows a coupling by snap interlock means.

[0055] In this case, the structure has elastically deformable snap interlock seats 15, for instance made of plastic, for cooperation with snap interlock projections 16 associated to the chests 4. Here, the interlock projections 16 have a spherical head 116, or anyway widened with respect to a support stem 216, whereas the seats have the shape of a spherical sector with an extension above 180° and below 360°, so as to form an interlock aperture which is narrower than the diameter of the spherical head 116, which aperture may be elastically widened by the interlocking pressure or the extraction pulling force exerted on the interlock head 116.

[0056] Obviously, all the examples shown herein may be inverted as regards coupling of the two complementary elements for fastening to the structure 7 or to the lining element 10. What has been shown above as regards the longitudinal and/or cross bar structure 7 also applies to the feet 12.

[0057] As shown in figures 8 and 9, removable fastening means may be also provided between adjacent lining elements 10, 10'. These means may also be provided in combination with the means for removable fastening to the spacing structures 7, 12.

[0058] Fig. 8 shows means for mutually hooking two lining elements 10, 10'. One of the two lining elements 10 has a hook slot 17 in the bottom side of a housing recess 18 of the bottom side 104 of the chest 4. The other element 10' has an extension 19 with an end hook 119.

[0059] In the variant embodiment of fig. 9, there are provided snap interlock seats like those of fig. 12 in the adjacent side walls 204 of the two elements 10, 10'. The two chests 4 are interconnected by a pin 20 having two interlock heads at its two ends, still like those of the embodiment of the fasteners as shown in fig. 12.

[0060] Each side of the chest 4 may have one or more seats. Further, one of the chests may be provided as stably having pins with interlock heads, and the other as having the interlock seats.

[0061] With reference to figs. 13 and 14 a variant is shown related to the provision of linings for roofs or the like.

[0062] In this case, the chest 4 has an extension wing 21 at two sides adjacent at their corners. The two wings are interconnected and may be made of one piece. They are connected to an extension of the associated side wall 104 of the chest 4, which extends up to slightly above the exposed view of the lining layer.

[0063] Although this is not presumptively neces-

sary, by providing an inclined arrangement of the lining elements, the overlapping wings may extend directly from the upper edge of the side wall at the level of the face of the lining layer 1 in contact with the intermediate layer, as shown in fig. 15.

[0064] The ridge element may be also provided with an element such as the one described hereinbefore which has an appropriate curved or inverted V shape, and has in this case overlapping wings on a transverse side and on the two opposite longitudinal sides.

[0065] The above disclosure clearly shows the advantages of the present invention, which consist in providing composite lining elements which have a high mechanical resistance, reduced costs, and a very light weight. These elements provide the highest versatility as regards both the type of exposed lining, and the use thereof. Particularly, these elements ensure a heat and sound insulation effect, have fire-retardant properties and are highly versatile in their applications.

[0066] Advantageously, the lining element according to the invention may have any plan shape, and a standard size, so that it can be used with the currently available bearing structures for making aerated linings of walls, linings or roofs and floating floors, or the like.

[0067] Obviously, the invention is not limited to the embodiments described and illustrated herein, but may be greatly varied without departure from the guiding principle disclosed above and claimed below.

Claims

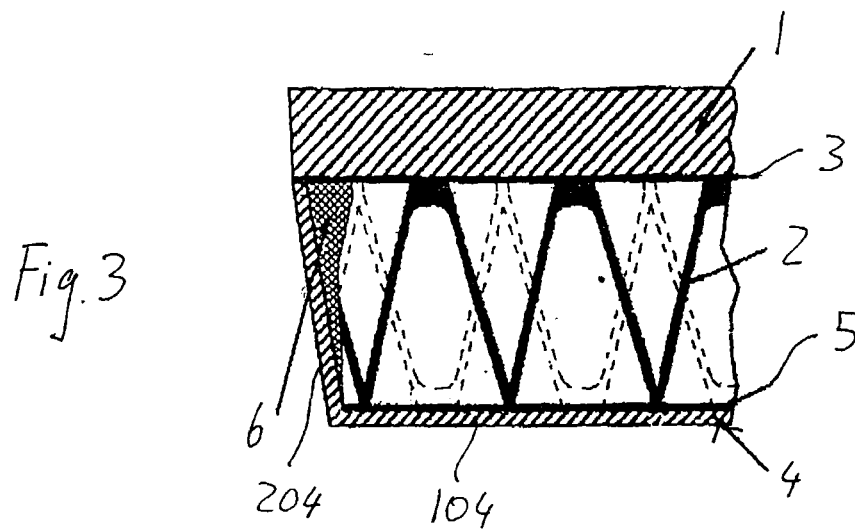
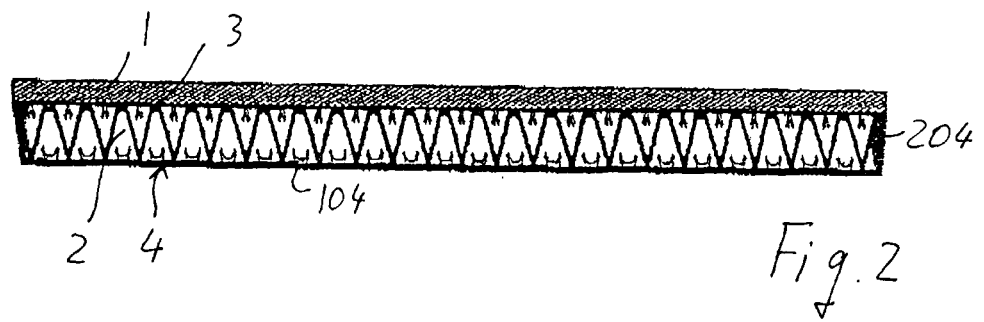
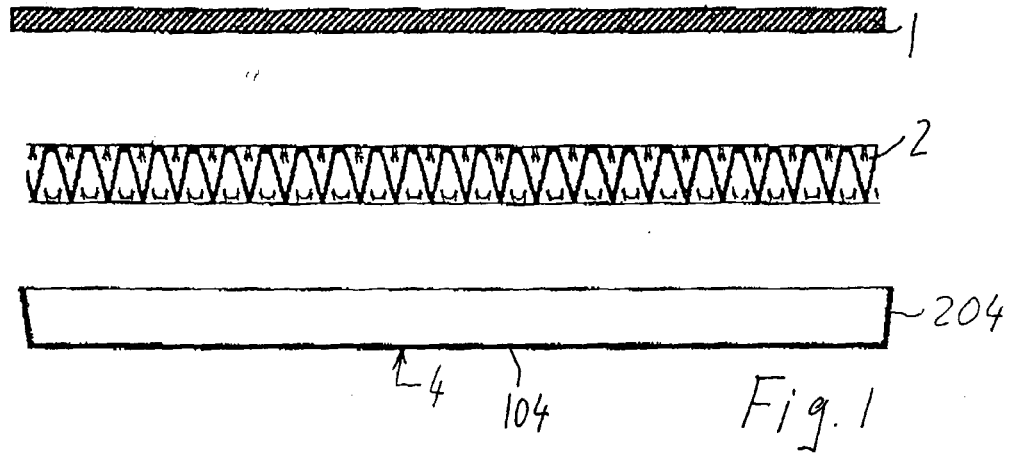
1. A lining element, particularly for aerated or floating lining of walls, floors, roofs, or the like, characterized in that it consists of a sized panel (10, 10') which comprises at least one intermediate support layer (2) having a honeycomb structure, and at least one lining layer (1) made of lining material on the exposed face which is glued (3) and/or welded and/or otherwise fastened to said exposed face, there being provided an element in the form of a box or chest (4) wherein the assembly of the lining and intermediate layers (1, 2) is accommodated, and which lays overlays over the peripheral edges and the non exposed face of said assembly.
2. A lining element as claimed in claim 1, characterized in that the box or chest (4) has walls (104, 204) which are either continuous or at least partly provided with apertures or lightening elements, or holes or, in at least a few areas thereof, grid patterns, or the like.
3. A lining element as claimed in claims 1 or 2, characterized in that the chest (4) preferably extends up to the face of the lining layer (1) which is turned towards the intermediate layer (2).
4. A lining element as claimed in one or more of the

preceding claims, characterized in that the lining layer (1) projects beyond the intermediate layer (2) so that it overlaps the peripheral edge (204) of the chest (4).

5. A lining element as claimed in one or more of the preceding claims, characterized in that the outer peripheral edge of the lining layer (1) terminates flush with the outer peripheral wall (204) of the chest (4) at the open side thereof.
6. A lining element as claimed in one or more of the preceding claims, characterized in that, on at least one side or on two sides being adjacent at corners, it has continuous and connected wings (21), which overlap one or two adjacent lining elements (10').
7. A lining element as claimed in claim 6, characterized in that the overlapping wings (21) extend from the upper edge of the side walls (204) of the chest (4) in the form of extensions or the like.
8. A lining element as claimed in claims 6 or 7, characterized in that the overlapping wing/s (21) are at the level of the upper free edge of the side walls (204) of the chest, i.e. of the non exposed face of the lining layer (1).
9. A lining element as claimed in claims 6 or 7, characterized in that the overlapping wing/s (21) are connected to an extension of the side walls (204) of the chest (4) and extend flush with or slightly above the exposed face of the lining layer (1).
10. A lining element as claimed in one or more of the preceding claims, characterized in that a layer of adhesive (3, 5) may be provided between the inner surfaces of the chest (4) and the facing surfaces of the intermediate layer (2), especially the face of the intermediate layer (2) adhering against the bottom (104) of the chest (4).
11. A lining element as claimed in one or more of the preceding claims, characterized in that the glue or adhesive is of the sealing type (6), or a suitable sealant (6) may be further provided between the intermediate layer and the inner surfaces of the chest (4), particularly between the side walls (204) of the chest (4) and the intermediate layer (2).
12. A lining element as claimed in one or more of the preceding claims, characterized in that the adhesive and/or sealant are of the fire retardant type or the sealant may be anyway mixed with fire retardant aggregate.
13. A lining element as claimed in one or more of the preceding claims, characterized in that the chest (4)

is made in such a manner that it tapers towards the bottom side with convergent inclined side walls (204).

14. A lining element as claimed in one or more of the preceding claims, characterized in that as a lining layer (1), there may be provided any type of sheet, plate or panel of natural or synthetic materials, single-, multilayer or composite, such as fabric, cloths, felts, made of natural or synthetic or mixed fibers, plastic plates, stone plates, e.g. made of marble, granite or the like, thin plates or tiles made of cotton, ceramic, glass, or other similar materials, wood, metal, and combinations of said materials. 5 10 15
15. A lining element as claimed in one or more of the preceding claims, characterized in that as an intermediate layer (2), a plastic honeycomb or grid panel or the like may be used. 20
16. A lining element as claimed in one or more of the preceding claims, characterized in that the intermediate layer is like the one disclosed in US 4,315,050 and 4,315,051 and sold by Norcore with the trade name "birdwing". 25
17. A lining element as claimed in one or more of the preceding claims, characterized in that the chest is made of plastic or metal, like steel or aluminum. 30
18. A lining element as claimed in one or more of the preceding claims, characterized in that it has a curved, concave, concave or V-shape. 35
19. A lining element as claimed in claim 18, characterized in that it has a wing (21) on two opposite longitudinal sides, with reference to the channel profile and at least one wing (21) on one transverse side. 40
20. A lining element as claimed in one or more of the preceding claims, characterized in that it has complementary hooklike means (17, 19) or complementary interlocking coupling means, or complementary snap interlocking coupling means (15, 20). 45
21. A lining element as claimed in one or more of the preceding claims, characterized in that the lining layer (1) and/or the intermediate layer (2) may consist of composite plates. 50
22. A lining element, characterized in that, on its bottom side (104), it has means (13, 304, 107, 15, 16) for removably securing it by hooking, and/or interlocking coupling and/or snap interlocking coupling and/or through means for fastening it to support structures (7, 12). 55
23. A lining element, characterized in that it is provided in combination with a bearing and spacing structure (7, 8, 12), whereon the chests (4) rest at least partly, particularly along at least a part of the peripheral edges of the bottom side (104).
24. A lining element, characterized in that it is provided in combination with a supporting or spacing structure consisting of longitudinal bars (7) possibly combined with crossbars, which are or may be fastened to floor or roof slabs or to walls.
25. A lining element as claimed in one or more of the preceding claims, characterized in that the spacing and supporting structure consists of a plurality of feet supporting the corners of one or more chests (4) together.
26. A lining element as claimed in claim 25, characterized in that the feet (12) are interconnected by cross and/or longitudinal bars or by combinations thereof (7).
27. An element as claimed in one or more of the preceding claims, characterized in that the supporting and spacing structure (7, 12) has removable fastening means which are complementary to those provided on the chests (4).
28. A lining element as claimed in one or more of the preceding claims, characterized in that it is the lining element of an aerated lining of a wall.
29. A lining element as claimed in one or more of the preceding claims, characterized in that it is a tile of a floating floor.
30. A lining element as claimed in one or more of the preceding claims, characterized in that it is the lining element of a roof slab or a roofing element.
31. A lining element as claimed in one or more of the preceding claims, characterized in that it has a standard size, so that it can be used with the currently available bearing structures for making aerated linings of walls, linings or roofs and floating floors, or the like.



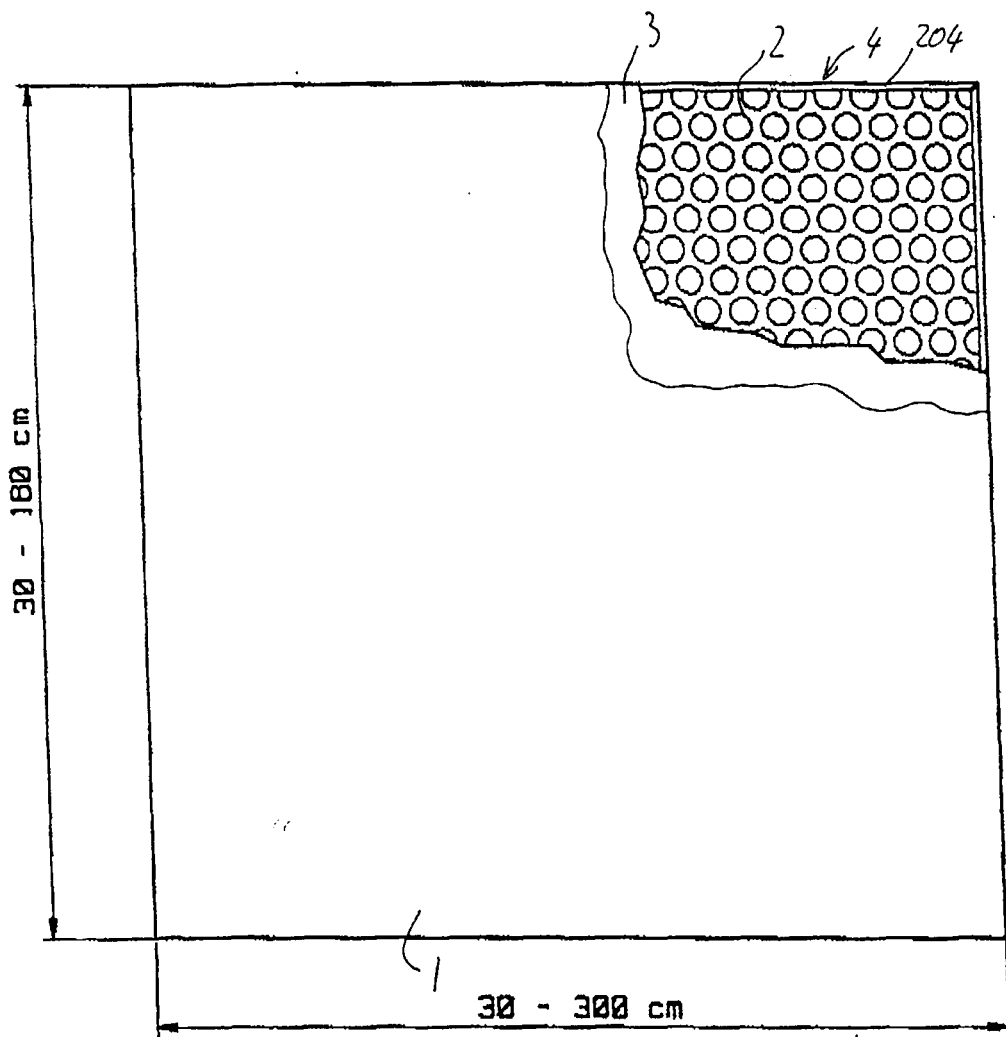
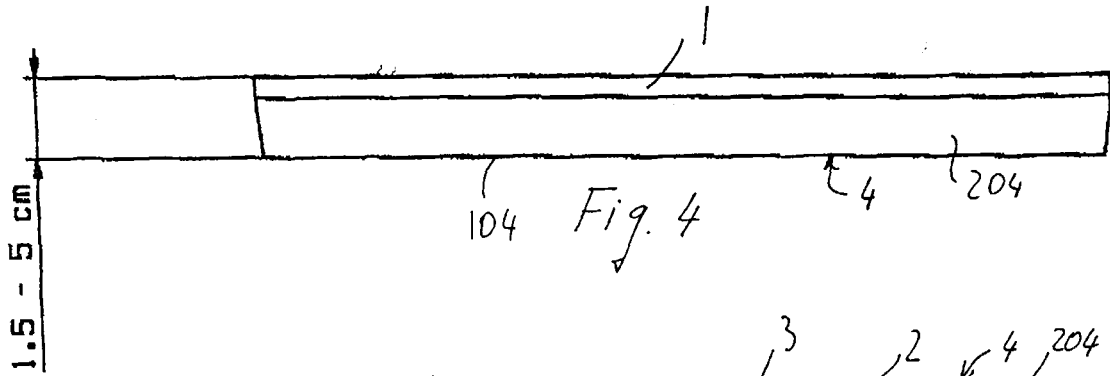


Fig. 5

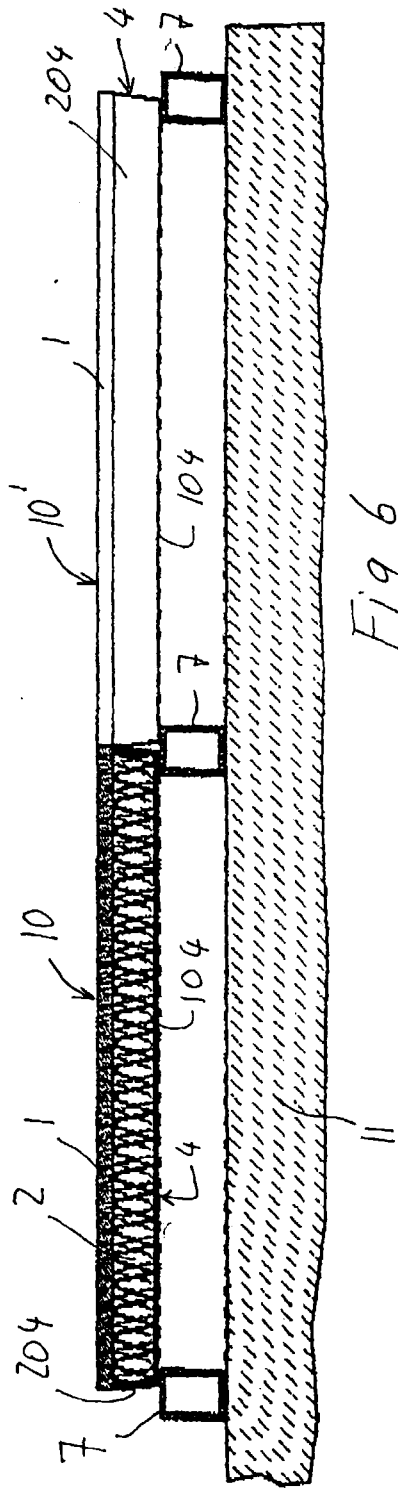


Fig. 6

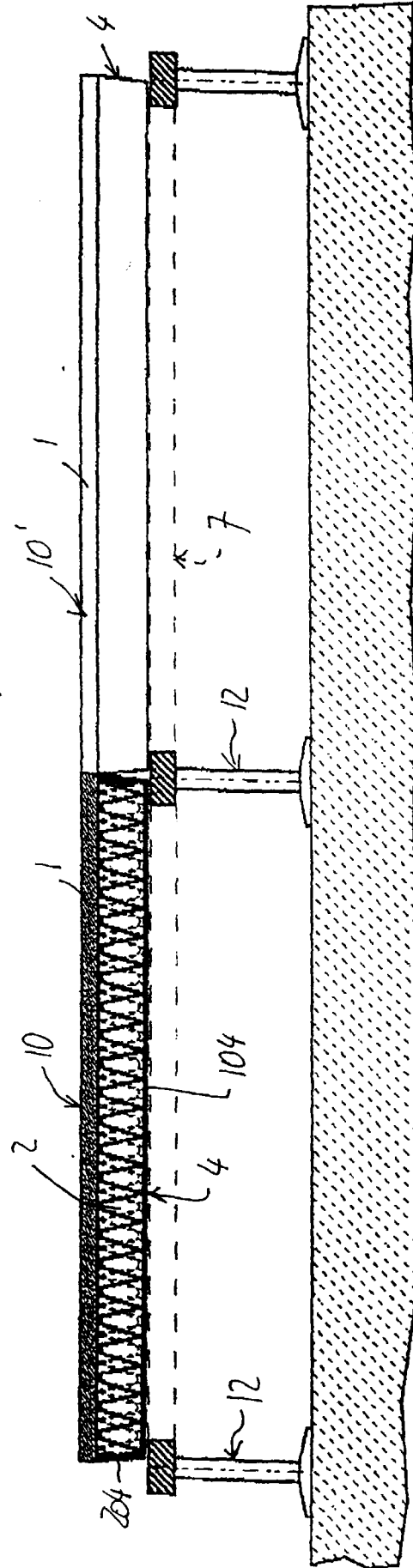
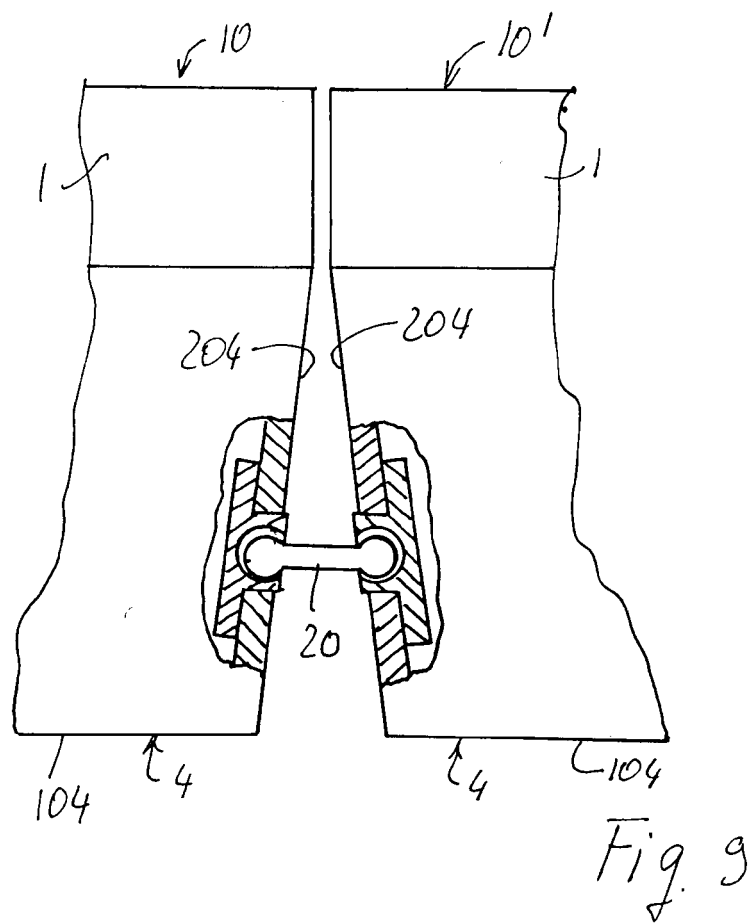
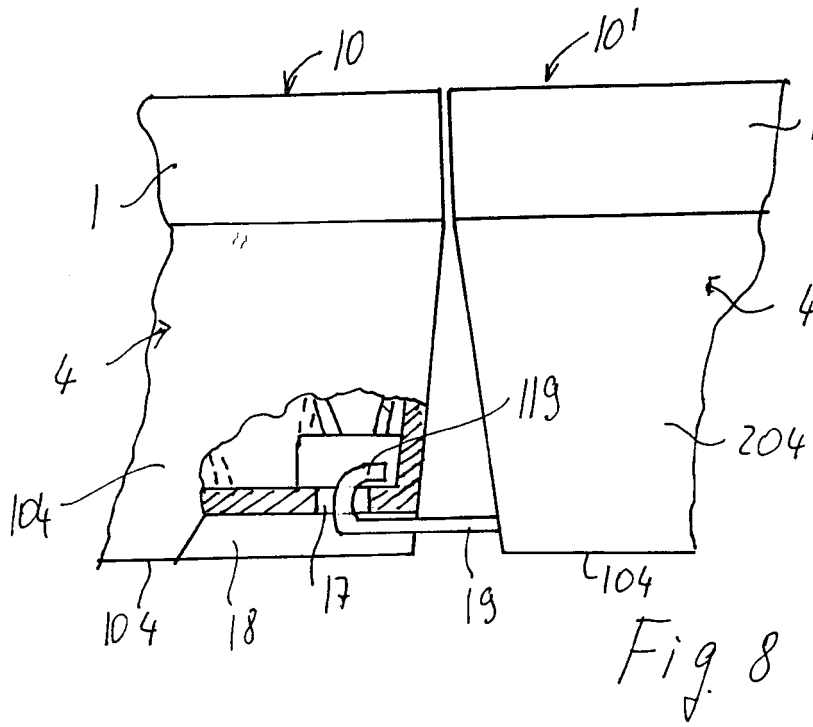


Fig. 7



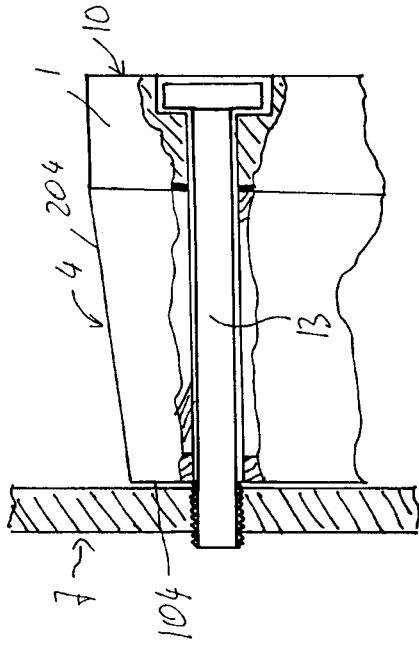


Fig. 11

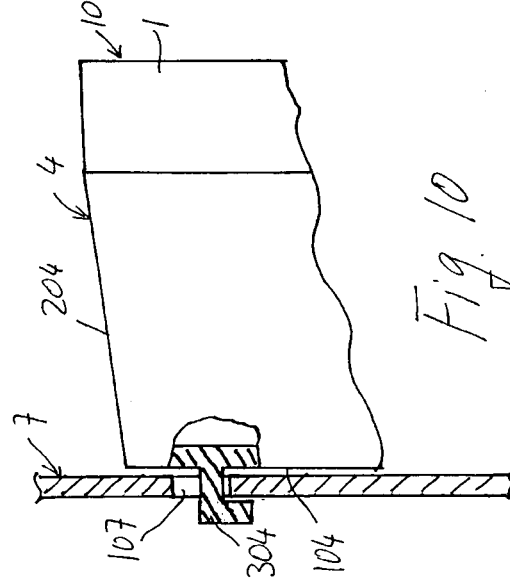


Fig. 10

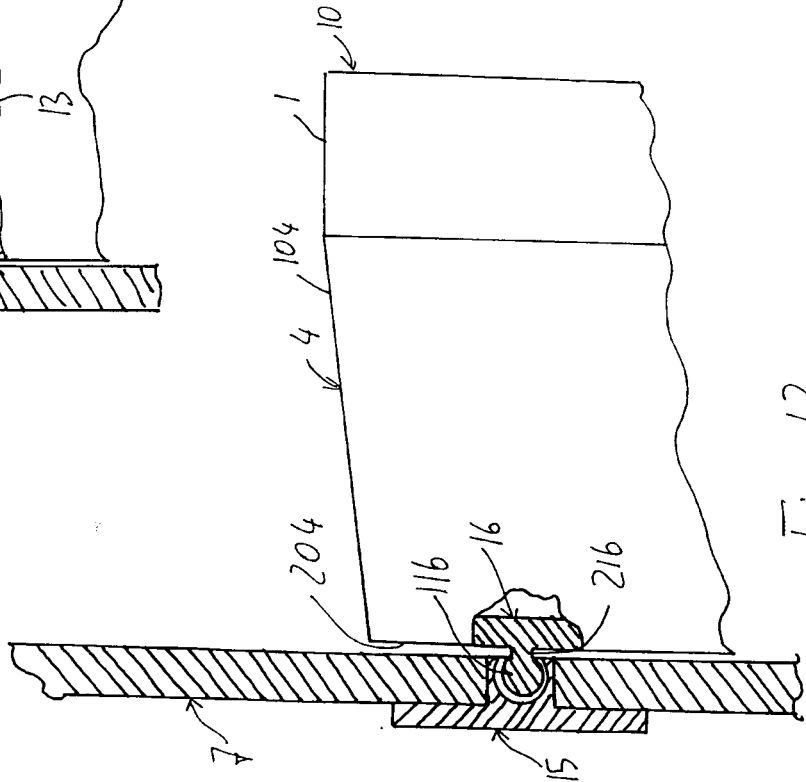


Fig. 12

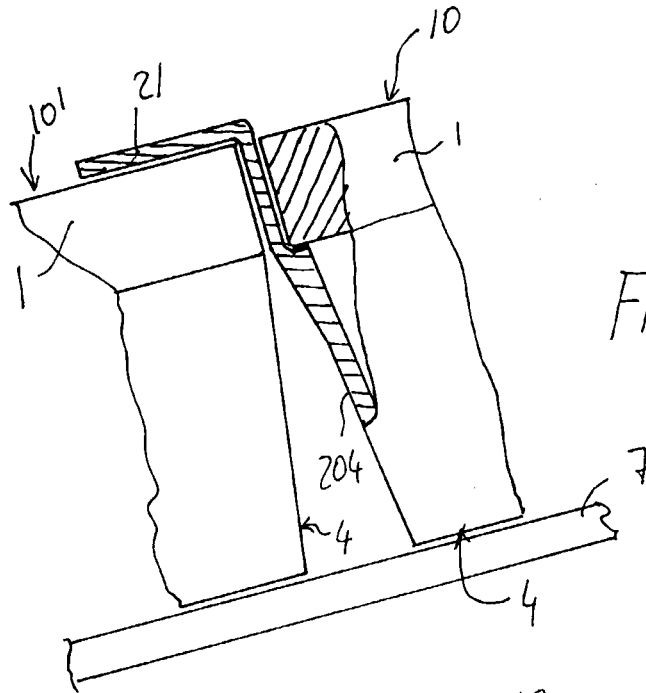


Fig. 13

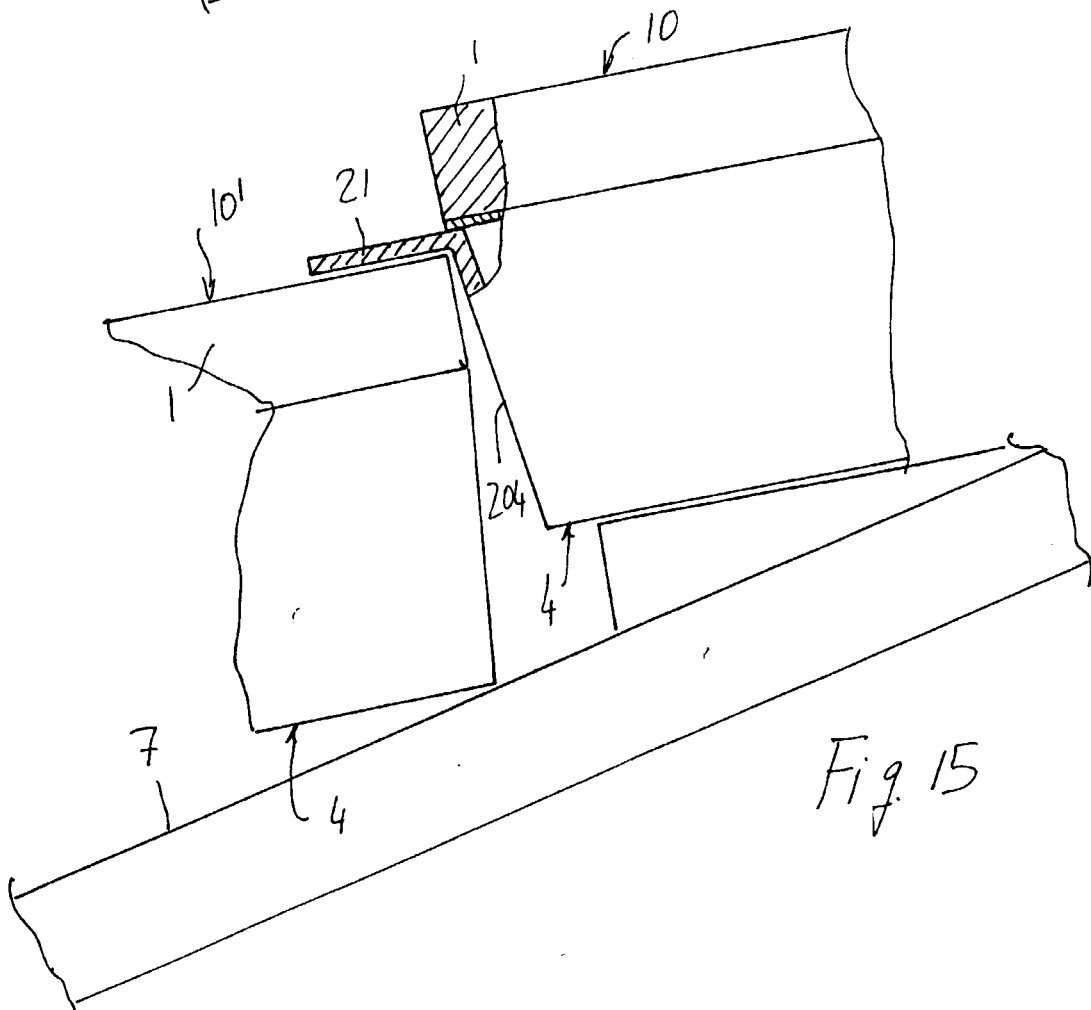


Fig. 15

