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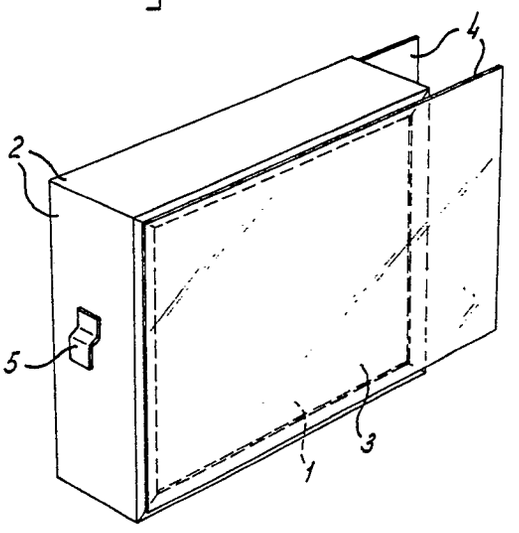
(54) Structural member.

(57) The structural member for constructing building structures comprises a sheet-type core of foam plastic (1), whose edges are provided with edge profiled sections (2) and whose side faces are covered with a film (3) stretched between the edge profiled sections (2). At least one pair of edge profiled sections (2) is provided with complementary fixing means, for example a hook (5) and bracket (not shown).

Fig-1b



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Structural member

The present invention relates to a structural member for constructing building structures such as walls or floors and the like.

Various designs for structural members are known, for example in the form of gas-concrete blocks. In general, they are used for non-bearing structures such as internal walls, thin partition walls and the like. For those applications they are attractive in view of their low weight and simple workability. Nevertheless, disadvantages are also associated with these structural members for certain applications. Thus, they cannot readily be used, for example, outside the applications mentioned above, for, for example, small hothouses. Despite their relatively low weight, they are in fact still too heavy to be used for said purpose without first laying a foundation. In particular, in marshy regions problems occur in this connection. They are also less suitable as a result of this for other purposes such as, for example, forming a base for a garden landscape with arbitrary contours.

The object of the invention is therefore to provide a structural member of the type mentioned in the introduction which is light and can be very easily worked.

This object is achieved in that the structural member comprises a sheet-type core of a foam plastic whose edges are provided with edge profiled sections and whose side faces are covered with film stretched between the edge profiled sections.

The structural members according to the invention can be joined to each other simply by means of their edge profiled sections without the core thereby being damaged or being overloaded by point loads. The core can consequently be composed of a light and fragile material; preferably, for example, polystyrene or polyurethane foam is chosen for this purpose. The structural members consequently also have outstanding thermal and acoustic insulation properties, with the result that they are also suitable to be installed, for example, as additional insulation on existing walls. They are also suitable for constructing a noise abatement wall.

If a fire-resistant or fire-delaying material is chosen for the foil, the structural element can also be used in situations where there is a risk of fire. Examples thereof are the shielding of welding sites, open hearths and the like. In the last case, the foil surface may also be provided with a layer of silver sand in order to increase the fire-resistant capability further.

According to the invention, it may further be of importance that, between core and film, a sheet of a rigid material is installed against the entire surface of at least one side face of the core. Said sheet may be composed of hardboard, water-resistant board such as masonite, gypsum and other materials. The sheet is preferably glued to the core before the film is installed. Said sheet can absorb point loads and increase the fire resistance. The film may be glued to the sheet.

Furthermore, according to the invention, the film may be provided on the outside with a layer which is composed of a polyester nonwoven fabric. Such a polyester nonwoven fabric forms a suitable adhesive base for, for example, paint, concrete or another coating. A hard type of polyester may also be chosen for the layer, as a result of which the mechanical properties of the structural member may be improved still further. The polyester nonwoven fabric may be finished with polyester resin in which a mineral is dispersed or to which a stucco layer is applied. This improves the mechanical properties of the structural element and yields many possibilities of an aesthetic nature.

An advantage of the structural member according to the invention is that its weight is very low. It can consequently be worked in a very simple manner, even by a DIY enthusiast. In building, for example, summerhouses or hothouses, no foundation or only a light foundation needs to be laid. Waterproofness may also be ensured by the film coating on both sides of the member. In that case, the structural members may be used not only for a wall but also for a floor, in particular if a sheet is installed on the core which can absorb point loads. Because of its considerable buoyancy, said floor is particularly suitable for marshy regions because no foundation is necessary in that case.

The polyester nonwoven fabric, in particular a fibrous fabric, opens up further finishing possibilities. A stucco layer may be applied to it. A polyester resin may be applied to it in which a granular material, for example a mineral, is dispersed before the resin cures. As a result of this, many external appearances may be imparted to the member. A suitable mineral is, for example, gravel.

As stated, the members may be joined to each other in a simple manner by means of the profiled sections in that at least one pair of edge profiled sections situated opposite each other is provided with complementary fixing means, for example a hook and bracket.

If fixing means are situated on both pairs of profiled sections, the structural elements can be joined to each other both in their height and in their length direction.

According to another embodiment, the struc-

tural elements may be designed in a manner such that the edges are provided with a longitudinal groove, and the edge profiled sections are composed of two halves which each cover half an edge between longitudinal groove and side face, in which longitudinal groove a joining tongue of hardwood can be accommodated for joining the structural members to each other. The tongues make it possible to obtain a good sealing connection between the structural members, which is desirable if they are used for building, for example, a summerhouse or hothouse.

Furthermore, according to a second embodiment, provision may be made that the structural elements can be joined to each other at an angle by means of a wedge-shaped filling member whose side faces enclose the desired angle and are also provided with complementary joining means. In this embodiment, the structural members are particularly suitable to act as supporting means for, for example, an open-plan office or an artificial pool, the cloth forming the base and banks of the pool being draped over a row of structural members which are continuous on all sides.

In this embodiment, the members may also be assembled in a simple manner so that a more or less arbitrary base is provided for likewise forming an artificial landscape with a cloth or film, as is described in the not-prepublished earlier Dutch Patent Application 8700630.

The structural members may also be joined at an angle to each other without filling members being necessary if the edges are bevelled or rounded off and are provided with a number of complementary fixing means which form an angle with each other in a plane perpendicular to the edges.

According to a preferred embodiment of the members, provision is made that the films each have a projecting strip with respect to at least one edge profiled section.

By joining the projecting strip of film of the member in each case to that of the adjacent member, the impermeability of, for example, a wall constructed with the structural members can be improved. In order to achieve a high degree of impermeability of a wall or floor constructed with the structural members, the invention also relates to a method which provides that the open spaces between the edges facing each other are filled with a curable substance, preferably a polyurethane foam.

If a foam type, for example a polyurethane foam, is chosen for the curable substance, a good insulating effect is also obtained at the position of the seams. Preferably, a member is used for this purpose which, as already described above, is provided at the longitudinal edges with two separate covering profiled sections. In that case, the possibility is avoided that a cold bridge exists across the profiled sections: one covering profile is only connected to one side (for example, cold side) of the structural element, the other profiled section being connected to the other side (for example, the warm side).

The invention will be explained further below with reference to a few exemplary embodiments.

Figure 1a shows a first embodiment of a structural element according to the invention in section;

Figure 1b shows the element of Figure 1a in perspective;

Figure 2 shows two assembled structural members according to a second embodiment;

Figure 3 shows two members according to Figure 1 joined to each other at an angle;

Figure 4 also shows two structural members joined to each other at an angle in another way;

Figure 5 shows a variant of the joints of the members according to Figure 1,

Figure 6 shows a number of other possibilities.

The structural member which is shown in Figures 1a and 1b and which is suitable, for example, as a pool panel, is composed of a rectangular lightweight core of polystyrene, for example. At the edges, said core is provided with covering profiled sections 2 between which sheets of film 3 are stretched which are attached to the profiled sections, for example, by welding and cover the two side faces of the core 1. With respect to one profiled section, the film sheets 3 have projecting strips 4 whose function will be explained later. At least one pair of covering profiled sections situated opposite to each other is provided with hook means, such as the hook 5 and the bracket 6. The structural elements can be joined to each other therewith. Of course, the other pair of edge profiled sections can also be provided with hook means.

Figure 2 shows a pair of structural members according to a second embodiment. These are likewise composed of a core 1, but have a groove 7 in their edge and also two separate edge profiled sections 8 in each case. Said structural members are joined by a tongue 9 inserted in the grooves 7, and consisting of hard wood. The separate profiled sections on either side of the tongue 8 prevent the formation of a cold bridge across the thickness of the structural members. A further improvement of the insulation can be obtained by foam filling the remaining part of the gap between the elements, for example with polyurethane foam 10. The gap may finally be finished by joining the strips 4 of one member to the other member.

Figure 3 shows how the structural members

can be joined to each other at an angle. For this purpose, a filling piece 11, whose side faces form a desired angle and, for example, have the hook means already described is joined between the structural members. The gap can again be sealed off by the strips 4.

Figure 4 shows a second possibility for joining the structural members at an angle to each other. Said structural members are provided with profiled sections having a polygonal cross-section n, with hooks 5 and brackets 6 on their three faces 13, 14, 15. With this design, the structural members can also be attached to each other at various angles.

Finally, Figure 5 shows a pair of structural members which are supported by a pillar 16 and which is suitable for forming a rigid wall.

Figure 6 shows two members 20 and 21 which are joined to each other in the manner shown in Figure 2. On one side of the core of the member 20 there is a sheet 22 of hardboard or gypsum which is glued to the core and across which there is the film 23 which is securely welded to the end profiled sections 8 which are also composed of a plastic. The member 21 is provided on the film 3 with a nonwoven fabric 24 and a stucco layer 25 is applied thereto. At the other side, a nonwoven fabric 26 is applied to the film 3 and a resin layer 27 in which a fine gravel 28 is dispersed is applied thereto.

Claims

1. Structural member for constructing building structures such as floors, walls or the like, characterized in that the structural member comprises a sheet-type core of a foam plastic whose edges are provided with edge profiled sections and whose side faces are covered with a film stretched between the edge profiled sections.

2. Structural member according to Claim 1, characterized in that the core is composed of polystyrene or polyurethane foam.

3. Structural member according to Claim 1 or 2, characterized in that the film is provided on the outside with a layer composed of a polystyrene nonwoven fabric.

4. Structural member according to Claim 1, 2 or 3, characterized in that, between core and film, a sheet of a rigid material is installed against the whole surface of at least one side face of the core.

5. Structural member according to Claim 4, characterized in that said sheet is composed of hardboard.

6. Structural member according to Claim 4, characterized in that the sheet is composed of gypsum.

7. Structural member according to Claim 4, 5 or 6, characterized in that the sheet is firmly glued to the core.

8. Structural element according to one or more of the preceding claims, characterized in that the polyester nonwoven fabric is finished with a layer of polyester resin in which another material, such as a mineral, is dispersed.

9. Structural member according to one or more of the preceding claims, characterized in that a stucco layer is applied to the polyester nonwoven fabric.

10. Structural member according to one or more of Claims 1 to 9 incl., characterized in that at least one pair of edge profiled sections situated opposite each other is provided with complementary fixing means, for example a hook and bracket.

11. Structural member according to one or more of the preceding claims, characterized in that the edges are provided with a longitudinal groove, and the edge profiled sections are composed of two halves which each cover half the edge between longitudinal groove and side face, in which longitudinal groove a joining tongue can be accommodated for joining the structural members to each other.

12. Structural member according to Claim 10, characterized in that the structural members can be joined to each other at an angle by means of a wedge-shaped filling member whose side faces enclose the desired angle and are also provided with complementary joining means.

13. Structural member according to Claim 10, characterized in that the edges are bevelled or rounded off and provided with a number of complementary fixing means which form an angle with each other in a plane perpendicular to the edges.

14. Structural member according to one or more of the preceding claims, characterized in that the films each have a projecting strip with respect to at least one profiled section.

15. Method for constructing a wall or floor with structural members according to Claim 11, characterized in that the open spaces between the edges facing each other are filled with a curable substance, preferably a polyurethane foam.

fig-1a

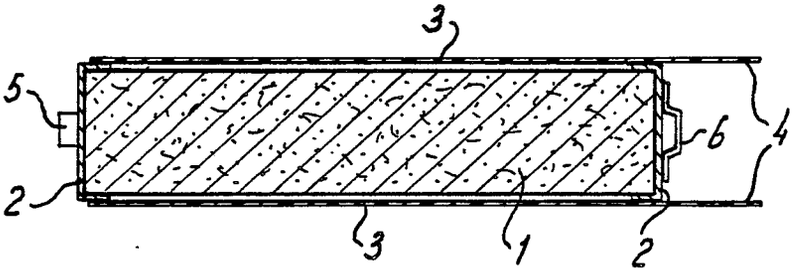


fig-1b

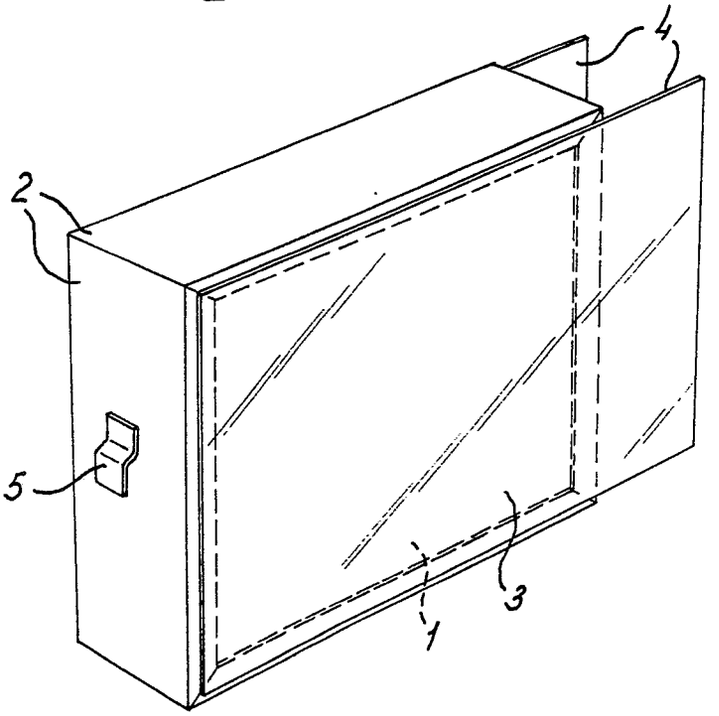


fig-2

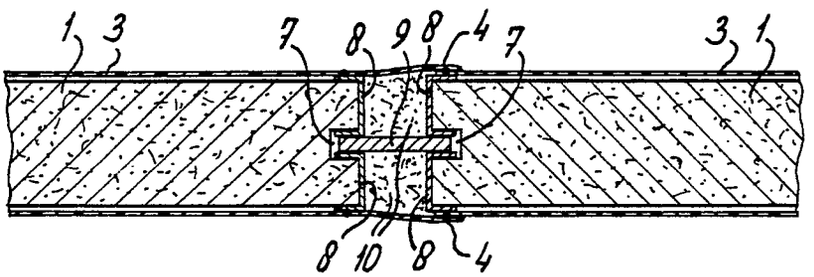


Fig - 3

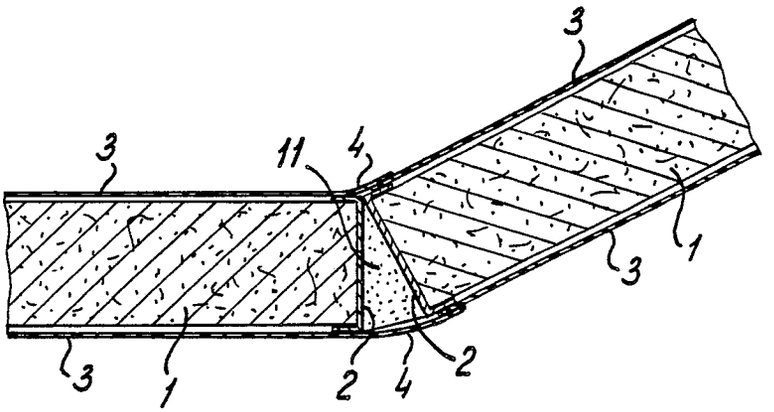


Fig - 5

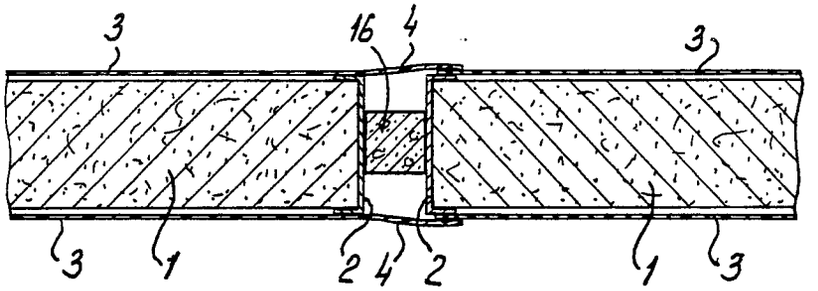


Fig-4

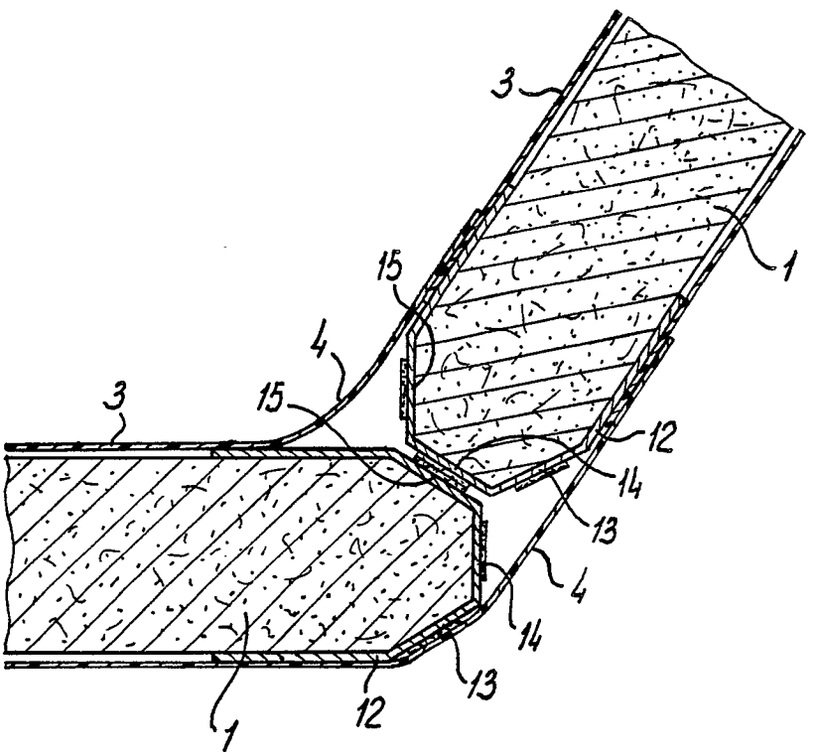
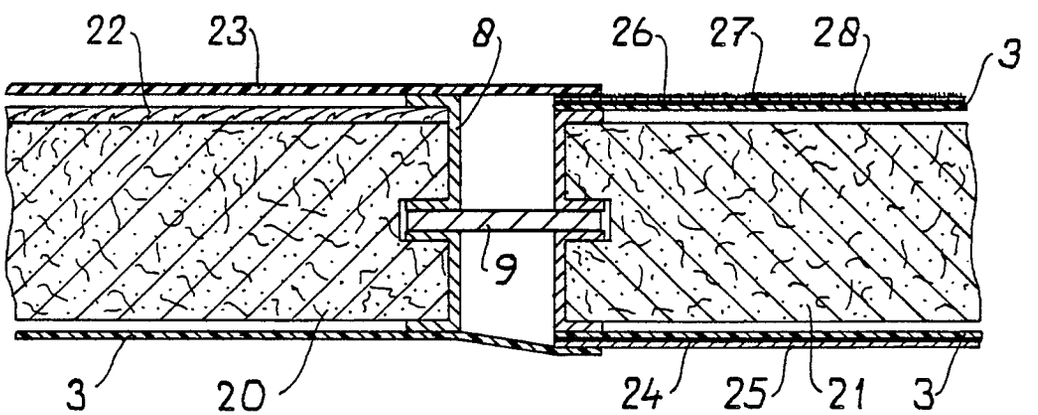


Fig-6



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EUROPEAN SEARCH REPORT

Application Number

EP 89 20 0318

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.4)
A	US-A-3 113 401 (ROSE) * Column 1, line 69 - column 2, line 45; figures *	1-4,7,9,10	E 04 C 2/26 E 04 C 2/24
A	DE-A-2 043 794 (THE DURAMIN)		
A	DE-A-2 619 020 (SÜLLHÖFER)		

TECHNICAL FIELDS SEARCHED (Int. Cl.4)

E 04 C

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	19-05-1989	VANDEVONDELE J.P.H.

CATEGORY OF CITED DOCUMENTS

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