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- (73) Patenthaver: **Wielens, Bernardus Hendrikus, Gruttostraat 7, 7481 BA Haaksbergen, Holland**
- (72) Opfinder: **Wielens, Bernardus Hendrikus, Gruttostraat 7, 7481 BA Haaksbergen, Holland**
- (74) Fuldmægtig i Danmark: **PATRADE A/S, Fredens Torv 3A, 8000 Århus C, Danmark**
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DESCRIPTION

[0001] The invention relates to a building system comprising a plurality of building elements having a front and back side, the back side of the building elements being provided with at least one cavity, and a plurality of clips adapted to be attached to a base and configured to removably snap into the cavity of the covering elements.

[0002] Due to this structure, not only the mounting of the building elements is easy, but at the same time it is feasible to demount and/or replace individual elements by pulling the element away from the clip(s).

[0003] FR 2 814 184 is related to a flooring which comprises flat modular panels with a recurring intermediate support with elements spaced at the pitch of the panels. Fixing of the panels on the support elements is by clips connected to the panels and clipped in dovetailed grooves in the support elements.

[0004] US 2010/096608 is related to a fence system which includes a first extruded lineal extending lengthwise along a first longitudinal axis. The first lineal has a sidewall with at least a first slot in the sidewall and the first slot extends generally perpendicular to the longitudinal axis. The fence system also includes a second extruded lineal extending lengthwise along a second longitudinal axis. The second extruded lineal includes at least a corresponding first attachment leg extending outward from the second extruded lineal and parallel to the second longitudinal axis. The first attachment leg is integrally extruded with the second extruded lineal and is received in the first slot to secure together the first and second extruded lineals.

[0005] The outer cross-section of the clips may be substantially complementary to the inner cross-section of the profiled cavity to firmly hold the building element. The clips are conveniently elastically compressible to enter or exit the cavity, which has a narrow entrance.

[0006] The cross-section of the clips is substantially U- or C-shaped having curved flexible, pliant, yet resilient legs, which are shaped like segments of a ring, the cavity in the building elements having a narrow entrance to allow snapping-in of the clips and to firmly hold the clips, so that the building element is firmly held in position. In this or in a similar embodiment, the force needed to mount a building element to a clip is much smaller than the force needed to dismount it, so that easy mounting is combined with solid attachment, while still being able to dismount the element using additional force.

[0007] The building elements are preferably extruded from a broad range of materials including plastics, such as nylon, polyester, vinyl etc., plastic containing material, such as WPC, or engineered polymer. However, the building elements might also be manufactured from metal, such as stainless steel, or wood related products. The clips can be produced out of a broad range of plastics, such as nylon, polyester or engineered polymers, all form shaped through injection molds or a wide assortment of metals form shaped through either stamping, molds or extrusion with the characteristics that the legs of the clip stay flexible, pliant and yet resilient to ensure a perfect fit and firm hold in the corresponding cavity of the element.

[0008] The cavity and clips may have a smooth and rounded outer cross section, but it is also possible that the cross section is polygonal having different surfaces, straight or curved. It is also not necessary that the outer cross section of the clip and the inner cross section of the cavity are completely complementary. It might be sufficient that the clip and cavity are in firm contact with each other at least in a plurality of spaced positions distributed around the cross section. The surfaces of the cavity and/or clip may comprise recesses, either locally or along the complete length. The cavity or cavities may extend the whole length of the element, or only along a part thereof.

[0009] In an embodiment the building elements have opposite first and second edges, the first edge being strip-shaped and extending at the back side of the building element, the second edge has at the back side of the building element a recess adapted to receive the strip-shaped first edge of an adjacent panel.

[0010] In this embodiment, the second edge of a building element will overlap the first edge of an adjacent building element, and in that case, the building element will first be pulled away from the clip(s) and then this building element will be slid away from the overlying building element until the strip-shaped first edge thereof is removed from the recess of the overlying building element.

[0011] The building elements can be used to cover walls, ceilings, floors on the inside or outside of buildings or other building structures. The building elements can also be used to form walls, in which the clips are attached to columns which are covered by the building elements and which are mainly or partly free from the base to form a wall or fence. The clip may also be attached to a building element near its edge to mount adjacent building elements to each other.

[0012] Further details and advantages of the invention will be explained with reference to the drawings showing exemplary embodiments of the invention.

Fig. 1 is a perspective view of a siding system showing 3 building or siding elements in mounted condition.

Fig. 2 is a perspective view of the siding system of Fig. 1 from another end and with the siding elements slightly moved horizontally away from each other.

Fig. 3 is an enlarged perspective side view of a part of a siding element as used in the siding system of Fig. 1.

Fig. 4 is an enlarged perspective view of a clip as used in the siding system according to Fig. 1.

Fig. 5 is a perspective side view of another embodiment of a siding element and clip for use in a siding system.

Fig. 6 is a perspective view of a further embodiment of a building element, in particular a flooring panel.

Fig. 7 is a view corresponding to that of Fig. 6, but showing a variation of the flooring panel.

Fig. 8 is a frontal perspective view of another embodiment of a building element, such as a wall panel.

Fig. 9 is a perspective view of yet another embodiment of a building element, in particular to form a sheet pile wall.

[0013] Fig. 1 - 5 show two embodiments of a building system, here a siding system for a wall of a building, like a house. The siding system comprises a plurality of rectangular panel-like building elements 20, which might be produced by extruding plastic containing material like WPC. However, it is also conceivable to construct the building elements from plastics (nylon, vinyl etc.), form-shaped materials like polyester or engineered polymers, as well as a wide assortment of metals or wood related products.

[0014] This panel-like building elements 20 have parallel first and second edges or sides, here an upper and lower edge or side, as well as a front and back side (as seen in the position of use on a vertical wall). The upper edge is shaped like a strip 21 extending at the back side of the building element, i.e. where the building element will be mounted against the wall. The lower edge of the building element 20 has a recess 22 also positioned at and open to the back side of the element 20 and adapted to receive the strip 21 at the upper edge of an underlying building element 20, as is shown in Figs. 1 and 2. The back side of the building elements 20 is provided with at least one profiled cavity 23 between the upper and lower edges. The cavity 23 is arranged closer to the lower (second) edge than to the upper (first) edge.

[0015] In this embodiment, the cavity 23 is formed in a rib 24 formed on the back side of the building element 20 which is slightly bulged there so that the rib surface is substantially planar with the back surface of the strip 21. The cavity 23 has a substantially circular cross section with the circle crossing or touching the rear surface of the rib 24 such that a rounded narrow entrance 25 is formed, which entrance is narrower than the radius of the circle and wider than half the radius. The edges of the entrance 25 flare slightly. The cavity may be lined with a, for example nylon or a metal, for example aluminium or stainless steel, lining, providing such rigidity that less (WPC) material is needed to form the building element 20. The cavity 23 is adapted to receive one or a plurality of clips 26 adapted to be attached to the wall of the building by gluing or by a fastening member (for example by screwing through a screw hole 27 in the body 28 of the clip). The clips 26 are formed to snap into the cavity 23 of the building elements 20. For this purpose, the cross-section of the clips 26 is U- or C-shaped having curved flexible, pliant, yet resilient legs 29 formed on the body 28.

[0016] In the embodiment shown, the legs 29 are shaped substantially like the segments of a circular ring which fit tightly against the wall of the cavity 23. The entrance of the cavity is shaped such (flared) that the legs 29 of the clip 26 are easily pushed toward each other to reduce the cross section of the clip 26 in order to move the legs 29 through the narrow entrance 27 until the widest part of the clip 26 has passed the entrance 27 and the clip 26 will snap into the cavity 23. Removing the clip 26 from the cavity 23 will require larger forces compared to the forces to push the legs 29 toward each other do not engage the legs near their free ends but near the body 28, so that the momentum on the legs 29 is much smaller and higher forces are needed to push the legs 29 toward each other. This means that mounting the building elements 20 is easier than removing them. The distance between the free ends of the legs 29 should preferably be sufficient to allow inward bending of the legs 29 to be moved through the entrance 27 of the cavity 23. If the cross-section of the deformable part of the clips 26 is slightly larger than that of the cavity 23, the clips 26 will stay slightly compressed in the cavity 23 and thus will hold the building element 20 firmly. The free ends of the legs 29 are directed toward each other, or in other words their extensions cross each other, which enable the legs to be easily inserted into the cavity 23, i.e. through the narrow entrance thereof.

[0017] The system has a great advantage that the building elements 20 are formed such that they allow individual removal and replacement. The only thing required for removal is pulling the respective building element 20 off of the clip 26 or clips with which it is mounted to the wall and sliding and pivoting it away such that the strip 21 at the upper edge of the building element 20 is moved out of the recess 22 of the overhanging building element 20. The strip 21 and/or recess 22 is shaped so as to allow such movement of the building element 20, while the elasticity of the material of the building elements 20 may also help. If a building element 20 must be replaced, a new building element will be placed the other way around, i.e. by moving the strip 21 into the recess 22 and then pressing the cavity 23 over the clip 26 or clips attached to the wall. The recess 22 at the lower edge of the building element 20 will then again cover the strip 21 of the underlying building element 20. The upper building element 20 will be mounted with its strip 21 in a recess of a special mounting element. This mounting element may also consist of a special building element 20 produced out of WPC or any form of plastic and comprising only the lower portion including the rib 24 (with cavity 23) and the material defining the recess 22. On the other hand, the mounting element may be a metal, plastic or wood related Z-profile comprising the recess 22 for the strip 21 of the following element 20 to slide into.

[0018] The building elements 20 may be up to a few meters long, while the clips 26 will generally be a few centimetres long, such as 30 mm. Clips 26 may be placed with a spacing of around 30 cm for example. Clips 26 may be grouped vertically, i.e. clips for building elements 20 lying one above the other must be spaced regularly, and to guarantee a correct spacing clips 26 spaced in vertical direction may be interconnected for the total height or a part of the height of the respective wall. Of course, it is also conceivable to interconnect clips 26 and/or building elements in horizontal direction, and a combination of such interconnections would be possible as well. When spacing clips 26, one should keep account of expansion of the building elements.

[0019] Fig. 5 shows a second embodiment of the siding system. The clip 26 is equal to that of the former embodiment, but the building element 20 is different in shape, especially the internal shape thereof. The building element 20 is again made by extrusion of plastic containing material like WPC, but now the rib 23 and the strip 21 are connected by a back wall 30. Several cavities 31 (hollows and/or recesses) are formed internally of the building element to save material and avoid formation of large material concentrations which would lead to uneven cooling and resulting deformation or internal stresses after extrusion. However, this building element 20 may also be made solid, i.e. without cavities 31, depending on the material from which the building element is made.

[0020] The front side of the building element will generally have a wood imitating surface, i.e. colour and/or texture, but of course, other designs are conceivable, for example to imitate brickwork, natural stone or the like.

[0021] Although the embodiments of the building system described above is constructed as a siding system for covering the outside of buildings, it will be clear that the building system can also be used to cover other parts of a building structure, such as a floor, inner wall, ceiling or another base of a structure, such as a wall, that is able to support the clips to which the building elements can be clipped. In some situations, it will not be necessary that the edges of adjacent panels overlap. For example, if the building elements are relatively small, or elongated and being at least narrow, it might be sufficient to clip the building elements to the base, such as an inner wall, while the adjacent building elements are spaced from each other or just have abutting contact. In such embodiment, the cavity may be provided in the area of the middle between the first and second (long) edges of the building element. If necessary, the building elements can expand or shrink with respect to the clips as long there is sufficient space to the adjacent building element or fixed structure. The outer shape and/or front side of the building element may be adapted to the particular purpose. For example for floorings the front side of the building elements might have anti-slip grooves or even wood texture through co-extrusion or imprinting, but the front side may also be plane.

[0022] Fig. 6 show an example of another building element 20 which can be used as a flooring panel. This flooring panel is substantially rectangular and is made of a hollow extrusion profile of WPC, engineering polymer or the like. It comprises again a strip 21 and a recess 22 at opposed parallel edges. The cavity 23 is positioned near the recess 22. The strip 21 has an inclined surface 32 on its side facing the recess 22 (when mounted) in order to facilitate removal of the strip 21 when dismounting the building element 20. The strip 21 may also be more or less bendable. The upper edges of the building element 20 above the recess and strip can be bevelled in order to form a V-shaped groove, but this is not necessary of course. The clip 26 as shown in this embodiment has a slightly different shape compared to the former embodiments. The outward boundary is more or less shell shaped and has rounded legs 29 fitting within the cavity 23 after the legs 29 have passed the narrow entrance 25 of the cavity 23. A recess 33 is formed near the free ends of the legs 29 in line with the hole 27 for inserting the fastening means. This recess 33 facilitates insertion of the fastening means and of the tool, such as a screw driver, to fasten it. The space between the legs 29, apart from the space aligned with the hole 27 and recess 33, could be filled with a resiliently compressible material and the clip could be made substantially or completely from a compressible material which could exert the required mounting force to the building element 20.

[0023] Fig. 7 shows a variation of the flooring panel 20 of Fig. 6. The front surface of the panel 20 is provided with anti-slip

grooves 34, and the cavities 31 have a circular cross-section, instead of rectangular. Such flooring panels are mainly used for larger widths and for markets which are used to solid panels.

[0024] Fig. 8 shows a building element 20 configured as a solid panel and having no recess or strip. The cavity 23 is arranged in the central part of the building element 20, here precisely in the center, to ensure a well balanced weight-width-gravity distribution in combination with the clip 26. Of course, such building element could also be provided with hollows to save material. This building element could for example be used to cover an inner wall of a building. Especially, if these building elements are relatively small and/or are made such that they hardly deform, the clips 26 may be sufficient to attach these building elements to their base.

[0025] Fig. 9 shows a building element 20 made of metal, such as steel to form a building panel, such as a sheet pile wall. In this case the clip 26 is attached to a column (not shown), so that the building element 20 is covering this column but is free from any building structure in other places, or the clip 26 is attached to a surface of the building element 20 near an edge thereof, i.e. the edge formed by strip 21. The cavity 23 is formed in a separate piece of metal secured, for example by welding or other methods of attachments to the remainder of the building element 20. The building elements 20 attached to each other form the sheet pile wall.

[0026] The invention is not limited to the embodiments described above and shown in the drawings which may be varied in different manners within the scope of the appended claims. For example, the clip and cavity may have other shapes as long as the clip fits snugly in the cavity, and is preferably removable again. For larger building elements, it would also be possible that it contains spaced cavities in which clips fit which are interconnected or not. The manner of fixing the building elements to the base depends on the orientation of the building elements. If building elements are to be attached to a ceiling, then all gravity forces are in the direction of detachment. In the case of floorings, the gravity forces are holding the building elements to the base, but of course forces caused by walking or the like should be resisted then.

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

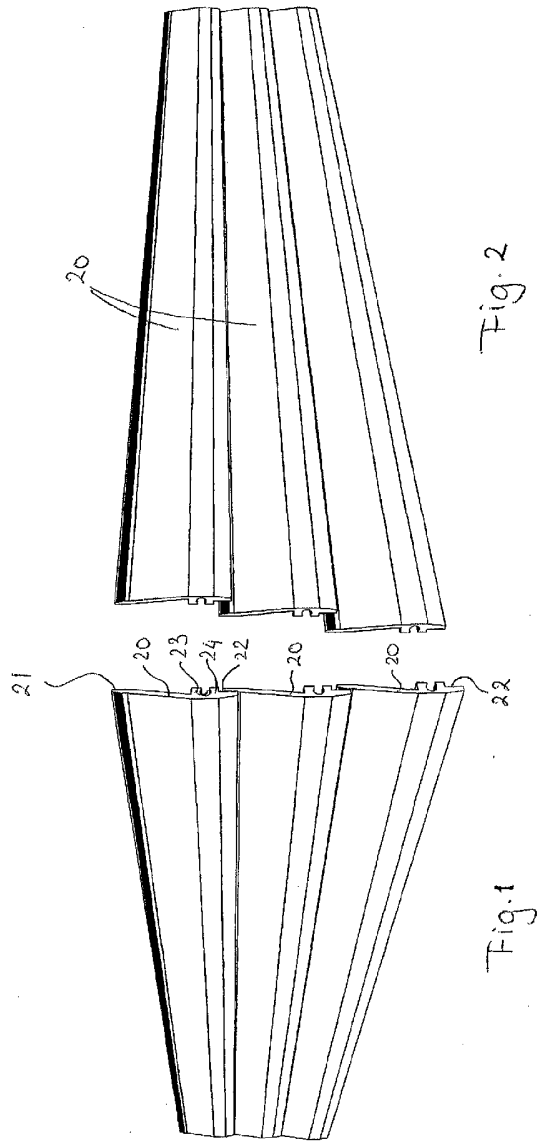
- [FR2814184 \[0003\]](#)
- [US2010096608A \[0004\]](#)

Patentkrav

1. Byggesystem omfattende en flerhed af byggeelementer (20), der har en for- og en bagside, hvor byggeelementernes (20) bagside er forsynet med mindst et hulrum (23) og en flerhed af clips (26) indrettet til at fastgøres til et underlag og udformet til aftageligt at klikkes ind i byggeelementernes (20) hulrum (23), hvori hulrummene (23) i byggeelementerne (20) har en smal indgang for at tillade indklikning af clipsene (26) og holde clipsene (26), **kendetegnet ved, at** clipsenes (26) tværsnit er i det væsentlige U-formet med elastiske ben (29), hvori benene (29) er udformet som ringsegmenter.
2. Byggesystem ifølge krav 1, hvori de panellignende byggeelementer (20) har modstående første og andre kanter, hvor den første kant er strimmelformet og strækker sig på bagsiden af byggeelementet (20), hvor den anden kant ved byggeelementets (20) bagside har en reces (22) indrettet til at optage den strimmelformede første kant af et tilstødende byggeelement (20).
3. Byggesystem ifølge krav 2, hvori hulrummet (23) er arrangeret nærmere ved den anden kant end den første kant af hvert byggeelement (20).
4. Byggesystem ifølge ethvert af de foregående krav, hvori byggeelementerne (20) indeholder hulheder og/eller recesser i afstand fra hulrummet (23).
5. Byggesystem ifølge ethvert af de foregående krav, hvori clipsene (26) og hulrummet (23) er udformet til fjernelse af clipsen (26) fra hulrummet (23) i samme retning som indgangen, men hvori kraften til at fjerne clipsen (26) fra hulrummet (23) er større end kraften til at indsætte den.
6. Byggesystem ifølge ethvert af de foregående krav, hvori clipsenes (26) ydre tværsnit er i det væsentlige komplementært til hulrummets (23) indre tværsnit.
7. Byggesystem ifølge krav 6, hvori clipsene (26) er elastisk sammentrykkelige for indføring eller udføring fra hulrummet (23).
8. Byggesystem ifølge krav 6, hvori benene (29) af de i det væsentlige U-formede clips (26) er udformet som segmenter af en cirkulær ring.

9. Byggesystem ifølge ethvert af de foregående krav, hvori byggeelementerne (20) er ekstruderet af et plastholdigt materiale.
- 5 10. Byggesystem ifølge ethvert af de foregående krav, hvori clipsene (26) omfatter et legeme (28) omfattende et hul (27) til et fikseringselement for fiksering af clipsen (26) til bygningskonstruktionen.
- 10 11. Byggesystem ifølge ethvert af de foregående krav, hvori hulrummet (23) og clipsene (26) har et glat og afrundet ydre tværsnit.
12. Byggesystem ifølge ethvert af krav 1-10, hvori tværsnittet af hulrummet (23) og clipsene (26) er manglekantet med forskellige overflader, lige eller buet.
- 15 13. Byggesystem ifølge ethvert af krav 1-10, hvori clipsenes ydre afgrænsning er mere eller mindre skalformet og har afrundede ben (29), der passer ind i hulrummet (23) efter at benene (29) har passeret hulrummets (23) snævre indgang.

DRAWINGS



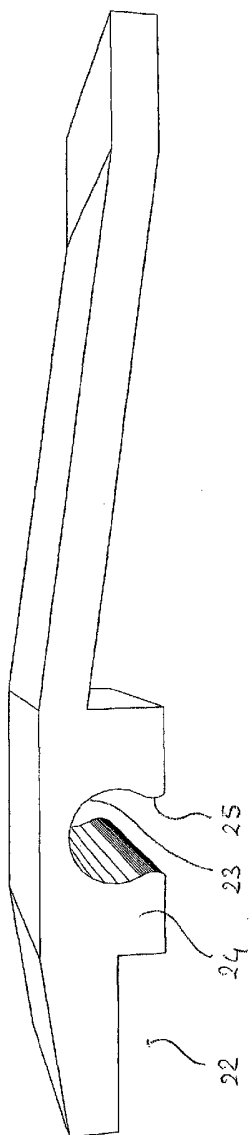
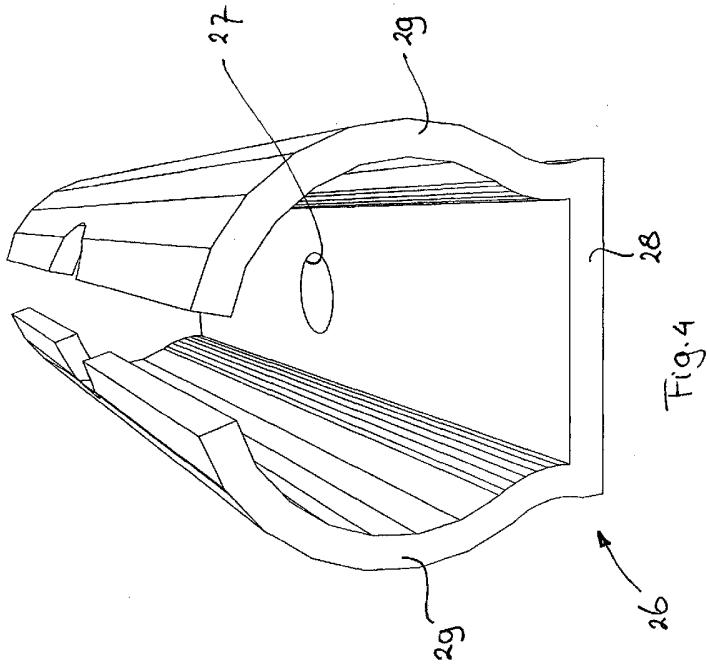


Fig. 3



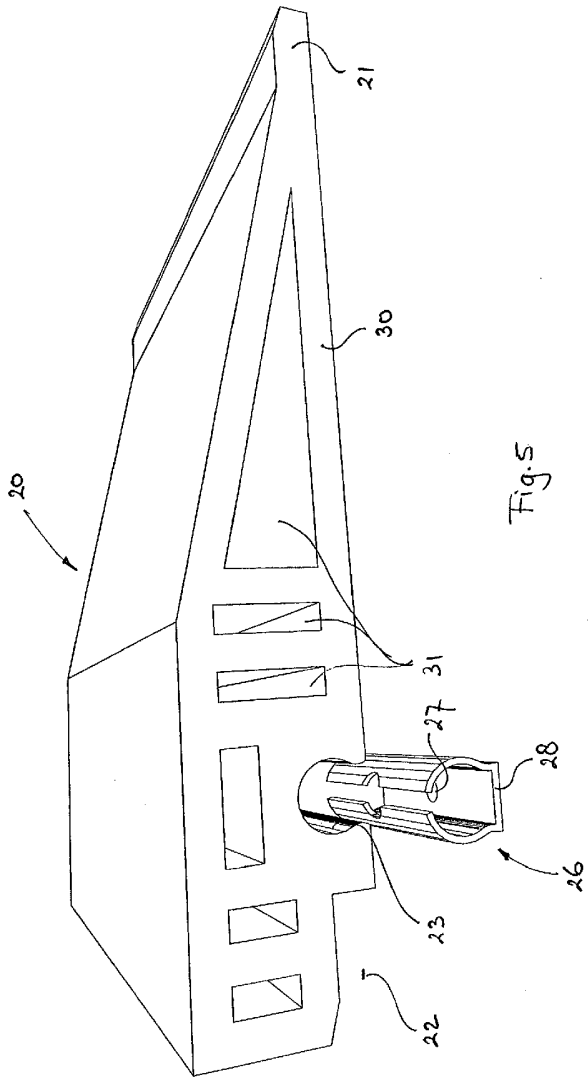


Fig. 5

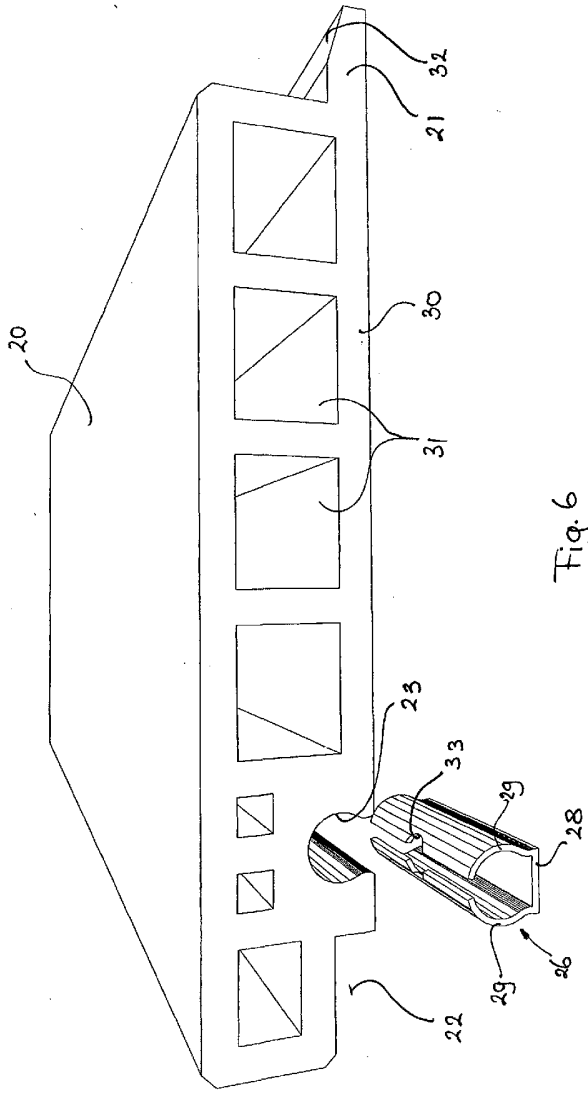


Fig. 6

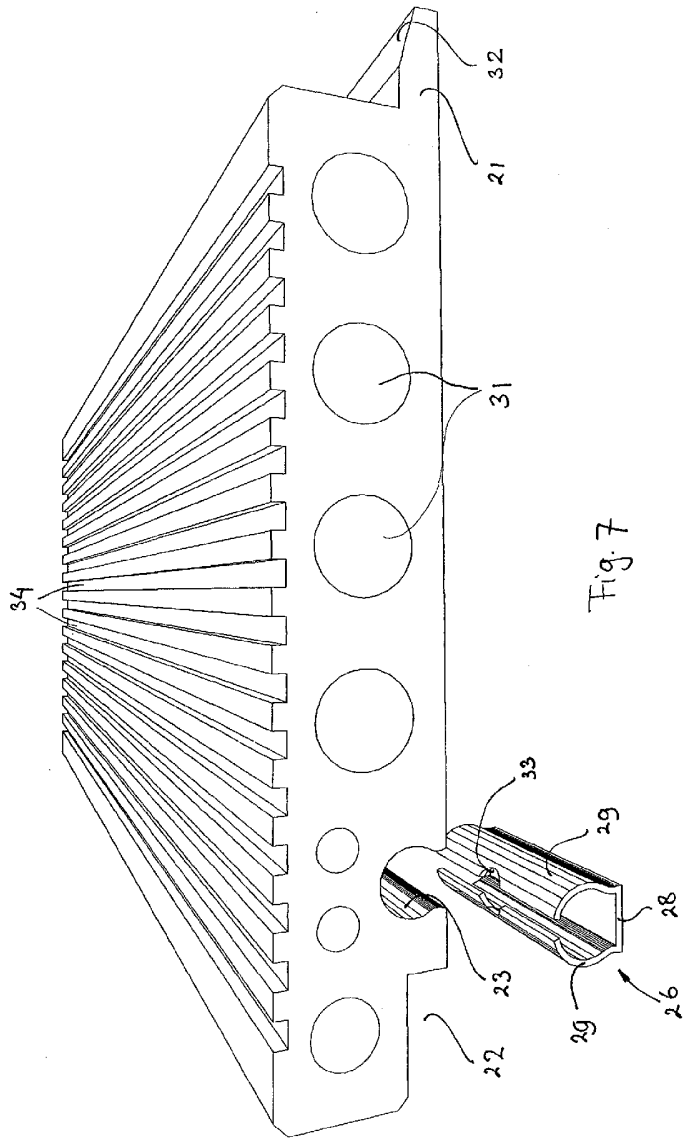


Fig. 7

