(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 1 236 840 B1

(12) **EUROPEAN PATENT SPECIFICATION**

(45) Date of publication and mention of the grant of the patent:
01.02.2006 Bulletin 2006/05

(51) Int Cl.:
E04D 3/362 *(2006.01)*

(21) Application number: **02075499.0**

(22) Date of filing: **05.02.2002**

(54) **Elongate retaining element**

Verlängertes Halteelement

Elément allongé de retenue

(84) Designated Contracting States:
AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU MC NL PT SE TR

(30) Priority: **19.02.2001 EP 01200597**
08.03.2001 EP 01200865
16.11.2001 EP 01204372

(43) Date of publication of application:
04.09.2002 Bulletin 2002/36

(73) Proprietor: **Corus Bausysteme GmbH**
56070 Koblenz (DE)

(72) Inventor: **Döhren, Hans-Jürgen**
55452 Guldental (DE)

(74) Representative: **Hansen, Willem Joseph Maria**
Corus Technology BV
Corus Intellectual Property Department
PO Box 10000
1970 CA IJmuiden (NL)

(56) References cited:
EP-A- 0 311 737
DD-A- 220 078
GB-A- 2 190 937
US-A- 3 922 828
US-A- 4 337 606
US-A- 5 511 355

EP 1 236 840 B1

Printed by Jouve, 75001 PARIS (FR)

Description

[0001] The invention relates to an elongate retaining element for building sheets, having, as seen in cross section perpendicular to its direction of elongation, a head part for engaging a shaped rib of the building sheet, a base part for mounting the elongate retaining element on a support structure by connecting elements, e.g. screws, and a connecting flange extending upwardly from said base and joining said head part to said base. The invention further relates to an assembly of at least one such elongate retaining element and at least one building sheet mounted thereby on a support structure.

[0002] An embodiment of such elongate retaining element is known from Dutch patent no. 190292 and also from US-A-4337606 and GB-A-2190937. The known elongate retaining element is an elongate extruded aluminium T-shaped profile. As seen in cross section perpendicular to its direction of elongation, the cross bar of the T-shaped profile forms the base part, which is provided with drilled holes for connecting elements such as screws to be passed through the drilled holes for connecting the elongate retaining element to a supporting structure of a building, such as for example supporting beams, T-bearers or similar structural elements manufactured from for example wood, steel, aluminium or concrete. A connecting flange extends perpendicularly from the base part, and ends in a wider head part, that is substantially triangularly shaped in its cross section. The free ends of the building sheets are flanged over the head part to allow for a longitudinal sliding movement of the building sheets relative to the elongate retaining element. The known elongate retaining elements can be e.g. T-shaped, asymmetrically shaped, or L-shaped.

[0003] A longitudinal sliding movement across the head part of a metallic elongate retaining element of the flanges building sheet can cause, for instance due to a cyclic thermal expansion and contraction of the building structure, an unpleasant noise as the metal parts slide over one another. The noise may particularly arise when the building sheets are not situated perfectly parallel to the direction of elongation, a situation that may occur for instance when the supporting structure is not so rigid.

[0004] It is an object of the invention to provide an improved elongate retaining element. A further object of the invention is to reduce the risk of occurrence of the unpleasant noise of the building sheets and the head part sliding over one another. Yet, it is another object of the invention to provide an elongate retaining element with sufficient mechanical strength and stability, such that it can fulfil its function of supporting and connecting a building sheet or sheets to a support structure, while reducing the risk of the occurrence of cold-bridges between the building sheet and the supporting structure.

[0005] According to one aspect of the invention, there is provided an elongate retaining element for building sheets, having, as seen in cross section perpendicular to its direction of elongation, a head part for engaging at least one said building sheets, a base part for mounting the elongate retaining element on a support structure, and a connecting flange extending upwardly from said base and joining said head part to said base, characterised in that the elongate retaining element is being made of a solid thermoplastic material and having a metallic reinforcement that is essentially fully embedded in said sold thermoplastic material.

[0006] For the purpose of the present application, essentially fully embedded is understood to include in addition to an essentially or fully continuous layer, a netted structure of plastic material embracing the metallic core at least over a circumference of its cross section thereby leaving only small parts of the metallic core uncovered, as well as combinations thereof.

[0007] It is a particular improvement to reduce the above mentioned problem of the unpleasant noise that may occur as the metallic elements slide over one another. Because the head part is being made of a thermoplastic material, the amount of friction that the sheet-like building elements experience while sliding over the head part, is reduced. Consequently, the risk of the occurrence of the mentioned unpleasant noise is significantly reduced. Because the thermoplastic material is solid, it will retain its essential properties during the whole economical life of the building construction, regardless of atmospheric temperature and humidity.

[0008] Since the metallic reinforcement core in the elongate retaining element according to the invention is essentially fully embedded in the solid thermoplastic material, there is a high durability against disengagement of the thermoplastic material from the metallic reinforcement core. The quality of the chemical bonding between the thermoplastic material and the surface of the metallic reinforcement core is therefore less critical.

[0009] A further advantage is that, due to improved sliding properties of the building sheet over the thermoplastic head part, it further reduces the mechanical load on the connection of the retaining element with the supporting structure.

[0010] A further advantage is that there need be no direct contact between the building sheet with any metallic part of the elongate retaining element according to the invention, nor between the supporting structure and any metallic part of said the elongate retaining element. Consequently, cold-bridges, being conductive heat transport via the metallic part of an elongate retaining element, can be readily avoided, or at least significantly reduced. This important reduction of the risk of cold-bridges is being achieved with one single elongate retaining element, whereas in the prior art fully metallic retaining elements required rather complex constructional measures to be taken in order to reduce the risk of such cold-bridges. It should be mentioned here that in the past elongate retaining elements of thermoplastic materials without any metallic reinforcement have been tried in order to avoid cold-bridges. But such fully plastic elongate retaining elements suffered from various disad-

vantages, such as insufficient mechanical stability. The plastic materials become undesirable brittle below certain sub-zero temperatures, which temperatures are not uncommon in the middle and northern Europe. And when applied in a flat roof structure, in summer time the temperatures at such a structure may easily rise to 70°C or above, resulting in that the elongate retaining element is weakened, thereby even jeopardising the mechanical stability of the whole structure.

[0011] In an embodiment, the metallic reinforcement core comprises a core head part, a core base part, and rigidly coupled to these parts a core connecting flange extending between the core head part and the core base part. Herewith a mechanically reliable connection is established between the base part and the head part of the elongate retaining element. The sheet-like elements are thus mountable on a supporting structure in a stable way. The metallic reinforcement core thus mechanically supports the thermoplastic material, in particular against dynamic and static transverse loads, without leading to the undesirable formation of cold-bridges between the building sheets and the supporting structure of a building. Consequently, also the fatigue-lifetime of the thermoplastic material is significantly enhanced.

[0012] A particular advantage is achieved when the core base part is provided with means to be used for mounting the elongate retaining element on a supporting structure. According to this embodiment, the metallic reinforcement core itself has the features of a retaining element. Consequently, should the thermoplastic material be lost or damaged, for example in case of severe wear or even fire, there is still an integral elongate retaining element in the form of the metallic reinforcement core to provide an auxiliary support and connection for the building sheets with respect to the supporting structure. The metallic reinforcement core forms a relatively low cost and reliable form of reinforcement.

[0013] The metal sheet can be made of a steel, which is not expensive and has a high strength. Preferably the metallic reinforcement core is made of galvanised steel, to further prevent corrosion of the metallic reinforcement core. Alternatively, the metallic reinforcement core can be made of stainless steel, aluminium, or an aluminium alloy, or other suitable metal. Stainless steel is especially suitable when part of the retaining element is not covered by the plastic material. The thickness of the metal sheets are typically in the range of 0.5 to 5mm, and preferably in the range of 0.5 to 3mm, and may the chosen in dependence of the expected mechanical load.

[0014] In an embodiment having a core connecting flange comprising at least one component of metal sheet, at least the core base part is coupled to the core connecting flange by a bent section in the metal sheet. A bend provides an easy to make, strong and stable mechanical connection between the base part and the connecting web of the retaining element.

[0015] Likewise, in an embodiment having a core connecting flange comprising at least one component of metal sheet, at least the core head part is coupled to the core connecting web via a bent section in the metal sheet.

[0016] In an embodiment the core head part comprises at least two core head part portions, each of which is coupled to the core connecting flange by a bent section in the metal sheet, whereby at least one bent section is bent towards one side of the core connecting flange and a bent section adjacent to the at least one bent section is bent towards the other side of the core connecting flange. Herewith the thermoplastic material in which the core head part is embedded is evenly supported by the metallic core head part.

[0017] Likewise, the core base part can comprise at least two core base part portions, each of which is coupled to the core connecting flange by a bent section in the metal sheet, whereby at least one bent section is bent towards one side of the core connecting flange and a bent section adjacent to the at least one bent section is bent towards the other side of the core connecting flange.

[0018] In another embodiment, the metallic reinforcement core is formed by two separate bent metal sheets, preferably joined to each other at their respective connecting flanges, each metal sheet having a core head part, a core base part and a core connecting flange. The core head part and core base part of each metal sheet being bent in the same direction essentially perpendicular to the connecting flange. The core connecting flanges of the two bent metal sheets are located next to each other such that the core base parts and the core head parts of the two metal sheets are directed in opposing directions. Herewith a mechanically reliable connection is established between the base part and the head part of the elongate retaining element. The sheet-like building elements are thus mountable on a supporting structure in a stable manner. Thereby, the metallic reinforcement core mechanically supports the thermoplastic material, in particular against dynamic and static transverse loads, without leading to the formation of cold-bridges between the building sheets and the supporting structure of a building. Consequently, also the fatigue-lifetime of the thermoplastic material is significantly enhanced.

[0019] In an embodiment the elongate retaining element comprises one or more supporting ribs extending between the base part and the connecting flange. Herewith, additional mechanical stability is provided, or the transverse stiffness of the retaining element is further improved. The choice of the geometry of said rib or ribs allows for optimisation of the transverse stiffness, which is of particularly importance in designing elongate retaining elements with various restraining distances between the base part and the head part. More preferably the one or more supporting ribs are formed in the thermoplastic material. Herewith, the supporting ribs are relatively easy to form.

[0020] In an embodiment, the metallic reinforcement core is covered by or embedded in an essentially continuous layer of the solid thermoplastic material. Corrosion attack will be reduced as compared to bare metallic elon-

gate retaining elements or elongate retaining elements with substantial bare metallic parts.

[0021] In an embodiment the solid thermoplastic material is an injection moulded plastic material. Herewith an elongate retaining element is provided which is easy and cost effective to manufacture. The metal core parts and solid plastic parts are integrated with each other in an easy way.

[0022] In an embodiment, the thermoplastic material is of a polyester, a polyamide, a modified polyester, or a modified polyamide. These thermoplastic materials have one or more of the properties of low friction, high wear resistance, good temperature stability to temperatures up to 100°C, good elastic properties, and high flame resistance. Furthermore, these thermoplastic materials can be processed via injection moulding techniques. Polyamides in general are found to be sufficiently durable, and to have a favourable low coefficient of friction and good flame resistance.

[0023] In another aspect of the invention there is provided a metallic reinforcement core for use in the above described elongate retaining element, which metallic reinforcement core consists of a core head part, a core base part, and coupled to these parts, a core connecting flange comprising at least one component of metal sheet, the core connecting flange extending between the core head part and the core base part, whereby at least the core base part is coupled to the core connecting flange by a bent section in the metal sheet. In particular the connecting flange may be provided with multiple holes. Further embodiments of the metallic reinforcement core according to the invention, and advantages thereof have been described above in the description of the elongate retaining element.

[0024] According to the invention in another aspect, there is provided an assembly of at least one such elongate retaining element and at least one building sheet mounted thereby on a support structure.

[0025] The invention will now be illustrated by several non-limitative embodiments, with reference to the accompanying drawings, in which:-

Fig. 1 shows a schematic perspective view of an elongate retaining element according to the invention;

Fig. 2 shows a schematic perspective view of a metallic reinforcement core according to the invention for application in the retaining element according to Fig.1.

Fig. 3 shows a schematic perspective view of another metallic reinforcement core according to the invention for application in the retaining element according to Fig.1.

[0026] Fig. 1 shows schematically an elongate retaining element consisting of a head part 1, a connecting flange 2, and a base part 3 for mounting on a supporting structure. The head part can work together with sheet-like building elements, whereby the free ends of two adjacent sheet-like building elements are flanged one on top of the other along the longitudinal head part, The base part is provided with holes 10 for working together with connecting elements, e.g. screws for mounting the elongate retaining element to a supporting structure. The elongate retaining element of Fig. 1 has a metallic reinforcement core that is essentially fully embedded in the thermoplastic material (not shown in Fig. 1). In particular the elongate retaining element can be provided with one or more supporting ribs 12 to further improve the mechanical stability of the elongate retaining element.

[0027] Fig. 2 schematically shows an embodiment of the metallic reinforcement core 4 for covering with the solid thermoplastic material to form the elongate retaining element. The metallic core consists of a core head part 5, a core connecting flange 6 and a core base part 7. The shown embodiment is formed from one piece of metal sheet provided with incisions 8a and 8b. The core head part 5, as well as the core base part 7, have been formed by bending the sheet on either side of the incision in opposite directions. Note that in the shown embodiment the bent sections that couple the core head part portions to the core connecting flange have been bent opposite to their respective core base part counterparts. This may be done to further improve the mechanical stability of the elongate retaining element. In the shown embodiment the core head part is only separated into two parts bent in two opposing directions, but it will be apparent to the skilled person that the core head part may be further divided into smaller sub-parts. The core base part 7 is provided with holes 11. These holes 11 should align with the holes in the solid thermoplastic material of the elongate retaining element, such that the connection elements work together with the metallic reinforcement core, even in absence of the solid plastic.

[0028] Fig. 3 schematically shows an embodiment of the metallic reinforcement core 4 for covering with the solid thermoplastic material to form the elongate retaining element. The metallic core comprises of two bend metal sheets, each sheet having a core head part 5, a core connecting flange 6 and a core base part 7. In each bend metal sheet the core head part and the core base part are being bend in the same direction essentially perpendicular to the direction of elongation of the connecting flange. In this way a U-shaped profile is being obtained whereby the core base part is longer than the core head part. The two metal sheets may be connected to one another to form a single metallic reinforcement core, such a connection can be made typically via adhesion bonding or welding, such as butt welding. In this embodiment of the metallic reinforcement core the base part of the elongate retaining element is fully reinforced with the metallic sheet which further improves the mechanical stability of the elongate retaining element, whereas in the embodiment of Fig. 2, the base part is only in part reinforced with metallic sheet material.

[0029] The metallic reinforcement core 4, such as the

one shown in Figs. 2 and 3, can be placed inside an injection mould for embedding it in a solid thermoplastic material. The multiple holes 9 in the connecting flanges have been made by tools, e.g. punching or drilling, for fixing the metallic reinforcement core inside the mould cavity. Furthermore, this achieves the effect that during injection moulding the thermoplastic materials will fill those holes thereby achieving also a strong mechanical bonding between the plastic retaining element and the metallic reinforcement core. For the same reason also the core head part may be provided with multiple small holes 9.

[0030] The metallic reinforcement core may be provided with one or more holes 11 in its core base part before placing it into the injection mould. Herewith is achieved that the inside of the holes will be filled in part or in whole with the thermoplastic material, such that after mounting the elongate retaining element to a supporting structure, there is no contact between the connecting elements and the metallic reinforcement core, and thereby corrosion of the metallic reinforcement core base part is avoided. The connection elements, e.g. screws or bolds, hold the elongate retaining elements firmly to the supporting structure avoiding any metallic contact between the building sheets and the supporting structure, thereby reducing or even avoiding the formation of cold-bridges.

[0031] Wear tests have been performed with an elongate retaining element in accordance with the invention, such as the one shown in Fig. 1. The elongate retaining element contained a galvanised steel reinforcement core such as shown in Fig. 2, and the reinforcement core sheet had a mean thickness of 1.0 mm. The thermoplastic material was an essentially fully continuous layer of a modified polyamide, having a thickness of 2.3 mm on either side of the connecting flange. The elongate retaining element had been made via an injection moulding process. During the wear test, an aluminium sheet building sheet of gauge 1.2 mm has been flanged over the head part, and 300,000 longitudinal cyclic sliding movements were performed. No indication of wear was observed in the head part of the elongate retaining element according to the invention.

Claims

1. An elongate retaining element for building sheets, having, as seen in a plane perpendicular to its direction of elongation, a head part (1) engageable with said building sheets when the free ends of two adjacent building sheets are flanged one on top of the other along the head part (1), a base part (3) for mounting the elongate retaining element on a support structure and having mounting holes (10) passing through the base part (3), and a connecting flange (2) extending upwardly from said base part (3) thereby joining said head part (1) to said base part (3), said head part (1) being in width narrower than said base part (3) and wider than said connecting flange (2), **characterized in that** said elongate retaining element is made of a solid thermoplastic material having a metallic reinforcement core (4) of metal sheet that is essentially fully embedded in said solid thermoplastic material, wherein said metallic reinforcement core (4) comprises a core head part (5) extending laterally in said head part (1), a core base part (7) extending laterally in said base (3), and rigidly coupled to these parts a core connecting flange (6) extending upwardly in said connecting flange (2) between said core base part (7) and said core head part (5) thereby joining said core head part (5) to said core base part (7), and wherein one or more of said holes (10) are aligned with holes (11) provided in the core base part (7) for mounting the elongate retaining element on a support structure.

2. An elongate retaining element according to claim 1, wherein the reinforcement core (4) has a mean thickness in a range of 0.5 mm to 5 mm.

3. An elongate retaining element according to claim 1, wherein the thermoplastic material is an essentially fully continuous layer on both sides of the connecting flange.

4. An elongate retaining element according to any one of claims 1 to 3, wherein the inside of said holes (11) can be filled in part or in whole with the thermoplastic material, such that after mounting the elongate retaining element to the support structure, there is no contact in use between the core (4) and connecting elements mounting the retaining element to the support structure.

5. An elongate retaining element according to any one of claims 1 to 4, wherein at least the core base part (7) is coupled to the core connecting flange (6) by a bent section in the metal sheet.

6. An elongate retaining element according to any one of claims 1 to 5, wherein at least the core head part (5) is coupled to the core connecting flange (6) by a bent section in said metal sheet.

7. An elongate retaining element according to claim 6, wherein the core head part (5) comprises at least two core head part portions, each of which is coupled to the core connecting flange (6) via a bent section in the metal sheet, whereby at least one bent section is bent towards one side of the core connecting flange (6) and a bent section adjacent to the at least one bent section is bent towards the other side of the core connecting flange (6).

8. An elongate retaining element according to claim 7, wherein the core base part (7) comprises at least

two core base part portions, each of which is coupled to the core connecting flange (6) via a bent section in the metal sheet, whereby at least one bent section is bent towards one side of the core connecting flange (6) and a bent section adjacent to the at least one bent section is bent towards the other side of the core connecting flange (6).

9. An elongate retaining element according to any one of claims 1 to 8, wherein the metallic reinforcement core (4) is formed by two separate metal sheets, each metal sheet having a core head part (5), a core base part (7) and a core connecting flange (6), and whereby the core head part and core base part of each metal sheet are bent in the same direction essentially perpendicular to the connecting flange.

10. An elongate retaining element according to any one of the preceding claims, wherein the elongate retaining element comprises one or more supporting ribs (12) extending between the base part and the connecting flange.

11. An elongate retaining element according to any one of the preceding claims, wherein the elongate retaining element is made of injection moulded thermoplastic material having an embedded metallic reinforcement core.

12. An elongate retaining element according to any one of the preceding claims, wherein the thermoplastic material is a polyester, a polyamide, a modified polyester, or a modified polyamide.

13. An elongate retaining element according to any one of the preceding claims, wherein the reinforcement core (4) has a mean thickness in the range of 0.5 mm to 3 mm.

14. An assembly comprising at least two building sheets and at least one elongate retaining element according to any one of claims 1 to 13 engaging said building sheet to retain it on a support structure, and whereby the free ends of two adjacent building sheets are flanged one on top of the other along the longitudinal head part of the elongate retaining element.

Patentansprüche

1. Längliches Rückhalteelement für Baubleche mit, in einer Ebene senkrecht zur seiner Längsrichtung gesehen, einem Kopfteil (1), der in die Baubleche eingreifen kann, wenn die freien Enden zweier benachbarter Baubleche übereinander entlang dem Kopfteil (1) geflanscht sind, mit einem Fußteil (3) zum Befestigen des länglichen Rückhalteelements auf einer Stützstruktur und mit Befestigungslöchern (10), die durch den Fußteil (3) verlaufen, und mit einem Verbindungsflansch (2), der sich oberhalb des Fußteils (3) erstreckt und somit den Kopfteil (1) mit dem Fußteil (3) verbindet, wobei der Kopfteil (1) in der Breite schmaler als der Fußteil (3) und breiter als der Verbindungsflansch (2) ist, **dadurch gekennzeichnet, dass** das längliche Rückhalteelement aus einem massiven thermoplastischen Material besteht mit einem metallischen Verstärkungskern (4) aus Metallblech, der im Wesentlichen in dem massiven thermoplastischen Material vollständig eingebettet ist, wobei im metallischen Verstärkungskern (4) enthalten sind ein Kernkopfteil (5), der in dem Kopfteil (1) zur Seite verläuft, ein Kernfußteil (7), der in dem Fuß (3) zu Seite verläuft, und ein mit diesen Teilen starr verbundener Kernverbindungsflansch (6), der in dem Verbindungsflansch (2) nach oben steht, zwischen dem Kernfußteil (7) und dem Kernkopfteil (5), und den Kernkopfteil (5) mit dem Kernfußteil (7) verbindet, und wobei eines oder mehrere der Löcher (10) in einer Linie mit Löchern (11), die in dem Kernfußteil (7) vorgesehen sind, liegen, um das längliche Rückhalteelement auf einer Stützstruktur zu befestigen.

2. Längliches Rückhalteelement nach Anspruch 1, wobei der Verstärkungskern (4) eine mittlere Dicke in einem Bereich von 0,5 mm bis 5 mm hat.

3. Längliches Rückhalteelement nach Anspruch 1, wobei das thermoplastische Material eine im Wesentlichen voll durchgängige Schicht auf beiden Seiten des Verbindungsflansches ist.

4. Längliches Rückhalteelement nach einem der Ansprüche 1 bis 3, wobei das Innere der Löcher (11) teilweise oder ganz mit dem thermoplastischen Material gefüllt sein kann, so dass es nach dem Anbringen des länglichen Rückhalteelements an der Stützstruktur bei Gebrauch zu keinem Kontakt zwischen dem Kern (4) und den Verbindungselementen, die das Rückhalteelement an der Stützstruktur befestigen, kommt.

5. Längliches Rückhalteelement nach einem der Ansprüche 1 bis 4, wobei wenigstens der Kernfußteil (7) mit dem Kernverbindungsflansch (6) durch einen gebogenen Abschnitt in dem Metallblech verbunden ist.

6. Längliches Rückhalteelement nach einem der Ansprüche 1 bis 5, wobei zumindest der Kernkopfteil (5) mit dem Kernverbindungsflansch (6) durch einen gebogenen Abschnitt in dem Metallblech verbunden ist.

7. Längliches Rückhalteelement nach Anspruch 6, wobei der Kernkopfteil (5) wenigstens zwei Kernkopf-

teilabschnitte enthält, von denen jeder mit dem Kernverbindungsflansch (6) über einen gebogenen Abschnitt in dem Metallblech verbunden ist, wobei wenigstens ein gebogener Abschnitt in Richtung auf eine Seite des Kernverbindungsflansches (6) gebogen ist und ein gebogener Abschnitt, der an den wenigstens einen gebogenen Abschnitt angrenzt, in Richtung auf die andere Seite des Kernverbindungsflansches (6) gebogen ist.

8. Längliches Rückhalteelement nach Anspruch 7, wobei der Kernfußteil (7) wenigstens zwei Kernfußteilabschnitte enthält, von denen jeder mit dem Kernverbindungsflansch (6) über einen gebogenen Abschnitt in dem Metallblech verbunden ist, so dass wenigstens ein gebogener Abschnitt in Richtung auf eine Seite des Kernverbindungsflansches (6) gebogen ist und ein gebogener Abschnitt, der an den wenigstens einen gebogenen Abschnitt angrenzt, in Richtung auf die andere Seite des Kernverbindungsflansches (6) gebogen ist.

9. Längliches Rückhalteelement nach einem der Ansprüche 1 bis 8, wobei der metallische Verstärkungskern (4) durch zwei separate Metallbleche gebildet ist, wobei jedes Metallblech einen Kernkopfteil (5), einen Kernfußteil (7) und einen Kernverbindungsflansch (6) hat, und wobei der Kernkopfteil und der Kernfußteil jedes Metallblechs in die gleiche Richtung gebogen sind und zwar im Wesentlichen senkrecht zum Verbindungsflansch.

10. Längliches Rückhalteelement nach einem der vorhergehenden Ansprüche, wobei das längliche Rückhalteelement eine oder mehrere Stützrippen (12) enthält, die zwischen dem Fußteil und dem Verbindungsflansch verlaufen.

11. Längliches Rückhalteelement nach einem der vorhergehenden Ansprüche, wobei das längliche Rückhalteelement aus spritzgegossenem thermoplastischem Material mit einem eingebetteten metallischen Verstärkungskern besteht.

12. Längliches Rückhalteelement nach einem der vorhergehenden Ansprüche, wobei das thermoplastische Material ein Polyester, ein Polyamid, ein modifiziertes Polyester oder ein modifiziertes Polyamid ist.

13. Längliches Rückhalteelement nach einem der vorhergehenden Ansprüche, wobei der Verstärkungskern (4) eine mittlere Dicke im Bereich von 0,5 mm bis 3 mm hat.

14. Eine Baugruppe mit wenigstens zwei Baublechen und wenigstens einem länglichen Rückhalteelement nach einem der Ansprüche 1 bis 13, das in das Baublech eingreift, um es auf einer Stützstruktur zu halten, und wobei die freien Enden zweier angrenzender Baubleche übereinander entlang des längslaufenden Kopfteils des länglichen Rückhalteelements geflanscht sind.

Revendications

1. Elément de retenue allongé pour tôles de construction, comportant, vu dans un plan perpendiculaire à sa direction d'allongement, une partie tête (1) qui peut se mettre en prise avec lesdites tôles de construction quand les extrémités libres de deux tôles de construction voisines sont embouties l'une sur l'autre le long de la partie tête (1), une partie socle (3) permettant de monter l'élément de retenue allongé sur une structure de support et comportant des trous de montage (10) pratiqués dans la partie socle (3), et une aile de liaison (2) s'étendant vers le haut depuis ladite partie socle (3), reliant ainsi ladite partie tête (1) à ladite partie socle (3), ladite partie tête (1) étant de largeur inférieure à ladite partie socle (3) et supérieure à ladite aile de liaison (2), **caractérisé en ce que** ledit élément de retenue allongé est fait d'un matériau thermoplastique plein comportant une âme de renfort métallique (4) en tôle qui est essentiellement entièrement noyée dans ledit matériau thermoplastique plein, dans lequel ladite âme de renfort métallique (4) comprend une partie tête d'âme (5) qui s'étend latéralement dans ladite partie tête (1), une partie socle d'âme (7) qui s'étend latéralement dans ledit socle (3), et, couplée de manière rigide à ces parties, une aile de liaison d'âme (6) qui s'étend vers le haut dans ladite aile de liaison (2) entre ladite partie socle d'âme (7) et ladite partie tête d'âme (5), reliant ainsi ladite partie tête d'âme (5) à ladite partie socle d'âme (7), et dans lequel un ou plusieurs desdits trous (10) sont alignés avec des trous (11) pratiqués dans la partie socle d'âme (7) pour monter l'élément de retenue allongé sur une structure de support.

2. Elément de retenue allongé selon la revendication 1, dans lequel l'âme de renfort (4) a une épaisseur moyenne comprise dans un intervalle de 0,5 mm à 5 mm.

3. Elément de retenue allongé selon la revendication 1, dans lequel le matériau thermoplastique est une couche essentiellement pleinement continue de chaque côté de l'aile de liaison.

4. Elément de retenue allongé selon l'une quelconque des revendications 1 à 3, dans lequel l'intérieur desdits trous (11) peut être rempli en partie ou entièrement avec le matériau thermoplastique, de sorte qu'après le montage de l'élément de retenue allongé

sur la structure de support, il n'y a pas de contact en utilisation entre l'âme (4) et les éléments de connexion qui fixent l'élément de retenue sur la structure de support.

5. Elément de retenue allongé selon l'une quelconque des revendications 1 à 4, dans lequel au moins la partie socle d'âme (7) est couplée à l'aile de liaison d'âme (6) par une section courbée dans la tôle.

6. Elément de retenue allongé selon l'une quelconque des revendications 1 à 5, dans lequel au moins la partie tête d'âme (5) est couplée à l'aile de liaison d'âme (6) par une section courbée dans ladite tôle.

7. Elément de retenue allongé selon la revendication 6, dans lequel la partie tête d'âme (5) comprend au moins deux portions de partie tête d'âme, chacune d'entre elles étant couplée à l'aile de liaison d'âme (6) via une section courbée dans la tôle, grâce à quoi au moins une section courbée est courbée vers un côté de l'aile de liaison d'âme (6) et une section courbée voisine de ladite au moins une section courbée est courbée vers l'autre côté de l'aile de liaison d'âme (6).

8. Elément de retenue allongé selon la revendication 7, dans lequel la partie socle d'âme (7) comprend au moins deux portions de partie socle d'âme, chacune d'entre elles étant couplée à l'aile de liaison d'âme (6) via une section courbée dans la tôle, grâce à quoi au moins une section courbée est courbée vers un côté de l'aile de liaison d'âme (6) et une section courbée voisine de ladite au moins une section courbée est courbée vers l'autre côté de l'aile de liaison d'âme (6).

9. Elément de retenue allongé selon l'une quelconque des revendications 1 à 8, dans lequel l'âme de renfort métallique (4) est formée par deux tôles séparées, chaque tôle ayant une partie tête d'âme (5), une partie socle d'âme (7) et une aile de liaison d'âme (6), et où la partie tête d'âme et la partie socle d'âme de chaque tôle sont courbées dans la même direction essentiellement perpendiculaire à l'aile de liaison.

10. Elément de retenue allongé selon l'une quelconque des revendications précédentes, dans lequel l'élément de retenue allongé comprend une ou plusieurs nervures de support (12) qui s'étendent entre la partie socle et l'aile de liaison.

11. Elément de retenue allongé selon l'une quelconque des revendications précédentes, dans lequel l'élément de retenue allongé est fait d'un matériau thermoplastique moulé par injection comportant une âme métallique de renfort incorporée.

12. Elément de retenue allongé selon l'une quelconque des revendications précédentes, dans lequel le matériau thermoplastique est un polyester, un polyamide, un polyester modifié ou un polyamide modifié.

13. Elément de retenue allongé selon l'une quelconque des revendications précédentes, dans lequel l'âme de renfort (4) a une épaisseur moyenne comprise dans l'intervalle de 0,5 mm à 3 mm.

14. Assemblage comprenant au moins deux tôles de construction et au moins un élément de retenue allongé conforme à l'une quelconque des revendications 1 à 13 en prise avec ladite tôle de construction pour la retenir sur une structure de support, et où les extrémités libres de deux tôles de construction voisines sont embouties l'une sur l'autre le long de la partie tête longitudinale de l'élément de retenue allongé.

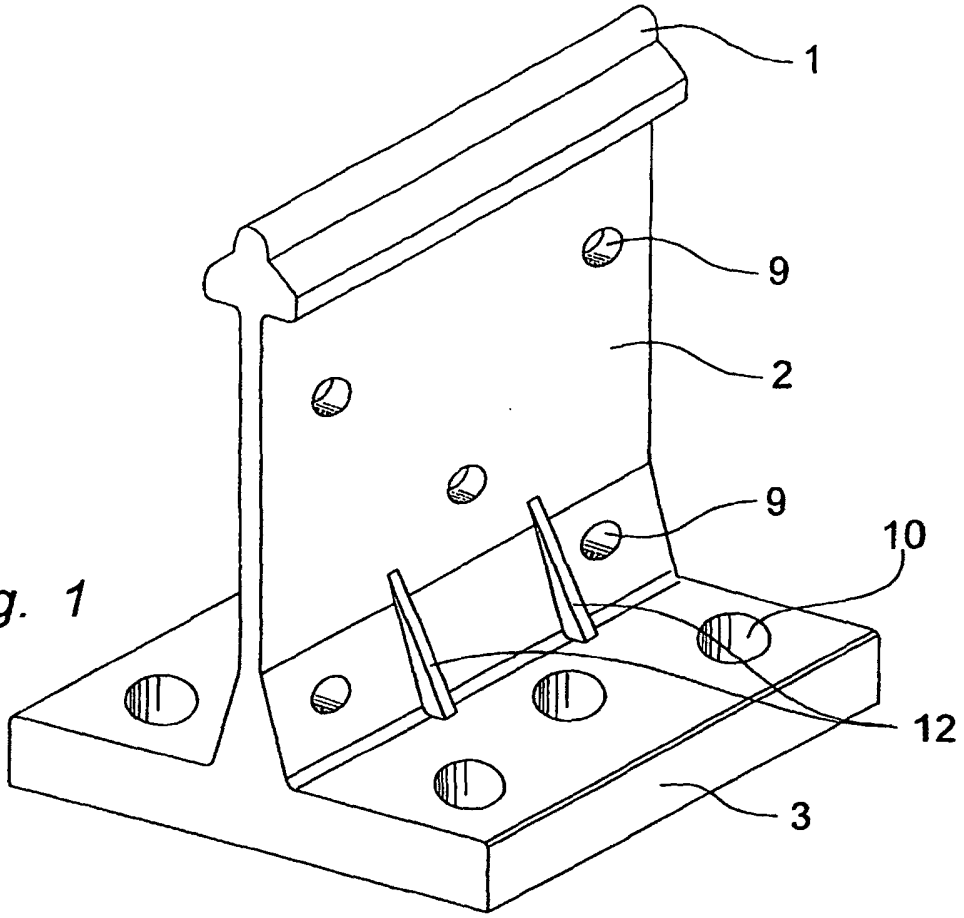

Fig. 1

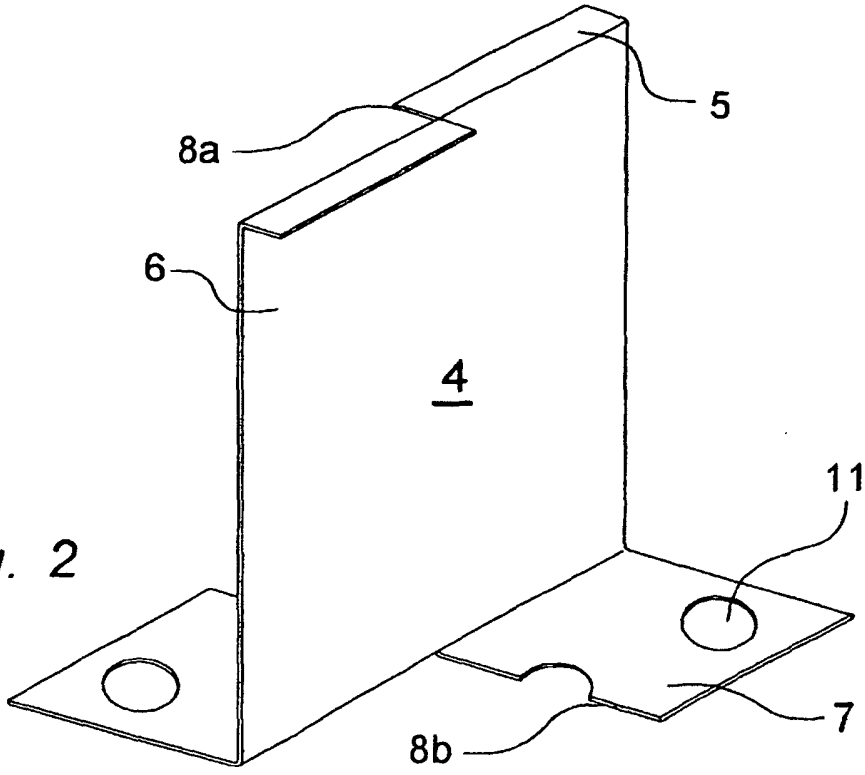

Fig. 2

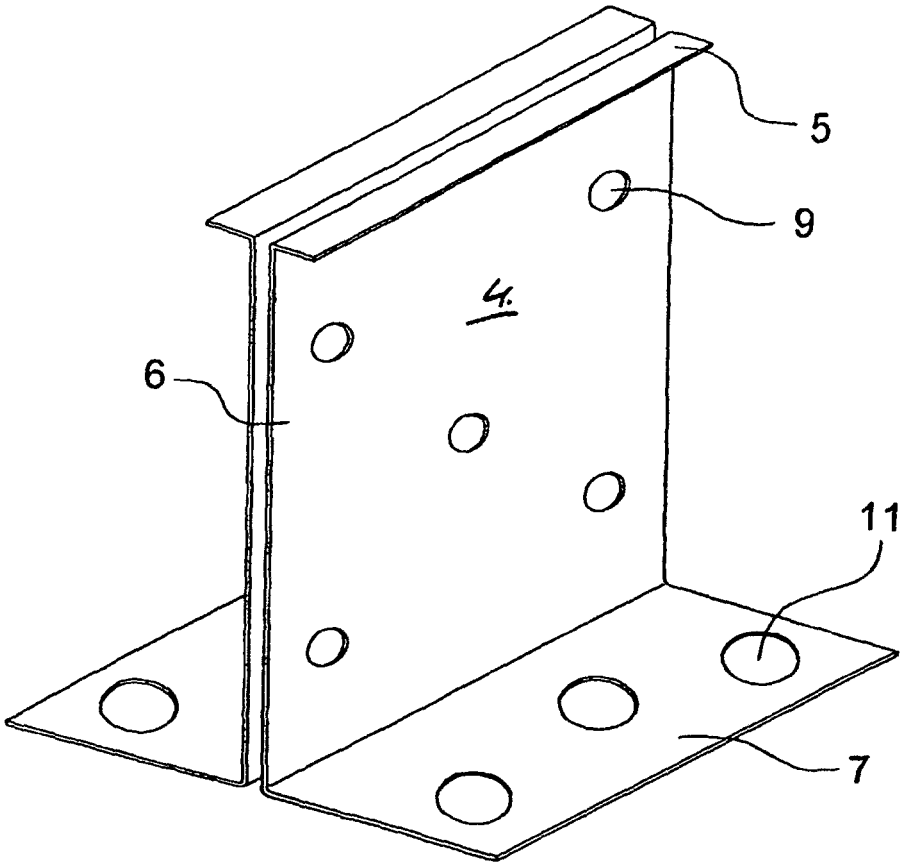

Fig. 3