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(54) **RETAINING ELEMENTS FOR BUILDING SHEETS**

HALTERUNGSELEMENTE FÜR BAUPLATTEN

ELEMENTS DE RETENUE POUR TOLES DE CONSTRUCTIONS METALLIQUES

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

(72) Inventor: **GEHLHAAR, Horst**
D-56626 Andernach (DE)

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

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Description

FIELD OF THE INVENTION

[0001] The invention relates to a retaining element for a building sheet, having an elongate head for engaging at least one building sheet, a mounting element spaced from the head and a connecting member connecting the head and the mounting element. The invention further relates to an assembly of at least one such retaining element and at least one building sheet mounted thereby on a building structure.

DESCRIPTION OF THE PRIOR ART

[0002] GB-A-2167101 discloses elongate retaining elements for mounting building sheets whose free ends are flanges on upstanding connecting ribs of a supporting structure of a building, such as for example supporting beams, T-bars or similar structural elements manufactured from for example timber, steel, aluminium or concrete. One form of retaining element of this prior publication is illustrated in Fig. 1 of the present drawings. It is manufactured in one part, e.g. as an aluminium extrusion, and can be connected to the support structure using connecting elements such as screws through drilled holes in its base. Another retaining element illustrated in GB-A-2167101 has a base of thermally insulating material such as thermoplastics acting as a spacing member. The base has centrally located holes for securing screws and at its upper side a wide recess with overhanging side flanges retaining a base part of the aluminium extrusion which has an upstanding web carrying the enlarged head which engages the building sheet. The extrusion is therefore longitudinally adjustable in the base but appears to be clamped by the overhanging side flanges.

[0003] Such known retaining elements are mounted to a support structure using known connecting elements such as screws. The distance between two neighbouring rows of the retaining elements depends on the distance between two neighbouring supporting beams, which distance is determined by the construction of the building, and which consequently reduces the flexibility of location and positioning of the retaining elements. Further the connecting elements such as screws are responsible to a large extent for the occurrence of thermal bridges or cold cracks mainly due to their good thermal conductivity. This problem occurs even in the situation where the support structure also comprises an insulation material. A further disadvantage of the known retaining elements is that the direction of pre-setting of the retaining elements has to be done very carefully in order to establish that the various components of an assembly are positioned correctly with respect to each other. The latter is of particular importance when for example a roofing construction is to be located at an angle with respect to the supporting beams or similar structural elements.

[0004] FR-1365407-A discloses a retaining element having an elongate head, a mounting element spaced from the head and a connecting member, which connects the head and the mounting element in a fixed relation. This document discloses the use of a support element with a channel having a rectangular-shaped cross-section with an open slot between two lips, which are turned inwards from generally parallel side walls, and the use of a special mounting element which is designed such that in the connected state a shoulder of the mounting element inserted into the channel of the support element and another shoulder outside of the support element surround the lips of the support elements, such that axial movement of the mounting element is basically prevented.

[0005] WO-97-22764-A1 discloses an arrangement for fixing a bolt to a support element. The support element defines a channel and has a slot bordered by two lips, which extent inwardly from two inclined sides. The sides incline inwardly towards a spine. The head of the bolt should be in abutment with the lips, so as to ensure, that the head is positioned properly and axial loads can be transferred without bending the lips.

SUMMARY OF THE INVENTION

[0006] It is an object of the invention to provide a retaining element for building sheets which allows for a larger flexibility in positioning of the retaining element with respect to a support structure.

[0007] According to the invention there is provided a retaining element having the features of claim 1. This achieves the effect that after the support element is joined to a building structure, the mounting element can be connected tightly to the support element with a larger flexibility. The clamping action is preferably obtained by means of a frictional contact between the support element and the mounting element. The direction of elongation of the head can be chosen within a wide range of angles with respect to the direction of elongation of the support element. The position of the head of the retaining element can be altered until the very last moment that the building sheet is connected to the retaining element, while ensuring a tight connection between the mounting element and the support element.

[0008] A further advantage is that the retaining element may be fixed for mounting building sheets to a relatively brittle or a relatively soft support structure, e.g. high density thermal insulation material or a tread-proof fibre insulating board, which brittle or relatively soft support structure is connected to an underlying further support structure formed by traditional elements like supporting beams, T-bars or similar structure elements manufactured from for example timber, steel, aluminium or concrete.

[0009] The support element is elongate and has a recess to receive the mounting element, the recess being bounded by opposed overhanging flanges forming, with the base of the recess, slots which receive and clamp

edge portions of the mounting element in the second position. This achieves the effect of a relatively simple symmetric construction of the support element, which can be manufacture in a cost-effective manner. Further this elongate structure allows the mounting element to be connected with choice of a wide range of angles with respect to the direction of elongation. And further the connection between these parts is obtained in a very simple, very fast and reproducible manner. The elongate support element can be joined to a support structure very easily, while significantly fewer fixing elements, e.g. screws, may be required. Further it can be stiffened in order not to twist under loading to keep the head in an upright position. The support element can have its own load bearing capacity, to avoid the need for frequent connection to the supporting beams.

[0010] More preferably the slots, as seen in transverse cross-section of the support element, have a tapering shape such that their width reduces with increasing distance from the center of the support element and it is preferred that the undersurface of each overhanging flange, which faces the slot, is inclined at an angle of not more than 10° to a transverse plane passing through both slots. This angle of inclination may be in the range of up to 5° with respect to the transverse plane, but should be more than 1°. This construction allows the support element of the retaining element to be connected very tight to the mounting element at the desired position.

[0011] The connection obtained between the mounting element and the support element is reversible. If this connection should be made irreversible after assembly, known joining techniques may additionally be applied to fix the parts to each other after assembly, e.g. by means of adhesion, soldering or welding.

[0012] In an embodiment the exterior surfaces of the overhanging flanges have rounded edges. This achieves the effect that when in use a building sheet comes into contact with the support element under the effect of for example cyclic thermal expansion or mechanical loading, the building sheet is not instantly damaged.

[0013] The support element may have at least one projection extending downward for anchoring with a building structure. This achieves the effect that the support element can be connected with the support structure, e.g. high density thermal insulation material, by guiding or pushing it into the support structure. This can be further facilitated when the free ends of the projection(s) are provided with a saw tooth structure or the like. A further improvement can be obtained in the case where at least one of the projections extends both downward and outward with respect to a central plane of the element. The support element can be connected with the building structure by means guiding or pushing it into the building structure sideways. This achieves the effect that vertical movement of the support element with respect to the building structure is restricted.

[0014] Additionally or alternatively to the projections the support element may be connected to an underlying building structure by connecting elements such as screws. However, the number of screws required can be reduced significantly with respect to the known retaining elements or can even by reduced to zero. This achieves the effect that the occurrence of so-called cold cracks or thermal bridges may be reduced significantly, which is an important achievement over the known retaining elements.

[0015] In an embodiment the support element, as seen in cross-section perpendicular to its elongation direction, has a base wall which defines the base of the recess and is of thickness reducing from the sides of the recess to the center thereof, so that the base of the recess is concave. This achieves the effect that the mounting element does not come into contact with connecting elements, e.g. screws, mounting the support element on a building structure and further this allows the rotational connection between the support element and the mounting element.

[0016] In an alternative embodiment, the support element is provided with a recess for countersink connecting elements joining it in use to a building structure. This achieves the effect that the mounting element does not come into contact with the connecting elements for mounting the support element on the building structure and further allows the rotational connection between the support element and the mounting element.

[0017] In one embodiment the mounting element has a plate shape having a periphery comprising opposite straight side portions parallel to the elongation direction of the head and curved end portions connecting said side portions. This achieves the effect that the mounting element can be easily located in the support element and subsequently turned to a desired position with respect to the direction of elongation of the support element while simultaneously achieving the desired clamping connection between the mounting element and the support element.

[0018] In an alternative embodiment the mounting element has an essentially ellipse shape. This also achieves the effect that the mounting element can be easily located in the support element and subsequently turned to a desired position while simultaneously achieving the tight connection between the mounting element and the support element.

[0019] Preferably the mounting element has, on its side facing away from the head, a recess in order to provide clearance for a fixing element or elements joining the support element to a building structure in use. This achieves the effect that the mounting portion does not come into contact with connecting elements, e.g. screws, mounting the support element on a building structure and allows the rotational connection between the support element and the mounting element.

[0020] To a large extent the choice of the material of the retaining element depends on the requirements for its mechanical and/or physical properties. The retaining element can be manufactured from a metal, preferably aluminium, or from a plastics material. Where high me-

chanical loading is expected, then metal is preferable, and aluminium in particular, because this metal is strong yet has a low density. Where mechanical loading is expected to be low, a suitable plastics material may be chosen because this is normally less expensive than metal. A combination of for example a plastics material support element and a metal mounting element and head is possible, and vice versa. An advantage of this is the reduction of the occurrence of a so-called cold crack in the building structure.

[0021] The support element is preferably made by extrusion, roll-forming or casting techniques, which allow for the production of long elongate sections or profiles on which mounting elements may be connected at spaced intervals. An extruded section is simple and relatively inexpensive to manufacture. Alternatively the sections may be cut into sub-sections in order to provide one support element for connection with a single mounting element.

[0022] The mounting element and head in preferred embodiments constitute a symmetrical article which can be manufactured by extrusion techniques and subsequently cut into single elements which are machined to final dimensions. Alternatively, this article may be cast by known foundry techniques, such as for example both low and high pressure die-casting.

[0023] According to the invention in another aspect, there is provided an assembly comprising at least one building sheet and at least one retaining element as set out above engaging said building sheet to retain it on a building structure.

INTRODUCTION OF THE DRAWINGS

[0024] The invention will now be illustrated by several non-limitative embodiments, with reference to the accompanying drawings, in which:

Fig. 1 shows a known retaining element as described above, in cross-section, together with two building sheets with ribbed edges;

Fig. 2 shows in cross-section an embodiment of the retaining element in accordance with the invention;

Figs. 3A, 3B, 3C and 3D show cross-sections of several embodiments of the support element of the retaining element in accordance with the invention in dis-assembled state;

Figs. 4A, 4B show partial perspective views of two embodiments of the support element of the retaining element in accordance with the invention in dis-assembled state and Fig. 4C shows a cross-section of another such embodiment;

Figs. 5A and 5B show cross-sections of embodiments of the retaining element in accordance with the invention in assembled state; and

Figs. 6A, 6B and 6C show in cross-section in different planes embodiments of the retaining element in accordance with the invention.

DESCRIPTION OF THE EMBODIMENTS

[0025] Fig. 1 shows schematically a retaining element in one part in accordance with the state of the art consisting of an elongate head part 1, a connecting flange or web 2 and a base 3 symmetric relative to the central longitudinal plane (ME) of the connecting web 2, wherein the base part has a shallow recess underneath and is provided with holes for fixing means, e.g. screws, for joining it to a building support structure, and wherein the head part 1 co-operates with edge ribs of two building sheets 8 to hold them.

[0026] Fig. 2 shows a retaining element of the invention having a first component consisting of an elongate head part 1 and a connecting element in the form of a web 2 and a mounting element 3 at the base of the web 2. The second component is an elongate support element or base 4. The directions of elongation of the head part 1 and of the base 4 are perpendicular with respect to each other in Fig. 2. The base 4 has a channel-shaped recess to receive the mounting element 3, formed by upstanding flanges which overhang the base surface of the recess to provide parallel opposed lateral slots or grooves, which receive the corresponding lateral portions of the mounting element 3.

[0027] As can be seen, these grooves or slots taper towards their closed ends, and edge portions of the mounting element 3 are correspondingly tapered to make a clamping fit in the slots. The first component 1,2,3 is brought into the clamped position, in which it is frictionally held by a clamping action, by insertion of the mounting portion 3 into the recess of the base 4 followed by rotation relative to the base 4, as illustrated by Fig. 6. Fig. 6 shows that the mounting portion 3 has a long dimension and a short dimension.

[0028] It is believed to be clear for the skilled person when looking at Figs. 3A to 3D that these figures are only schematic representations of the retaining element in combination with the base part, and that the overhanging flanges may be tapered in order to provide a frictional connection or frictional engagement between the two components. The skilled person will understand, that the slots need not necessarily be tapered but may also have for example a rectangular shape such as shown in Figs. 5A and 5B. The components may have some inherent elasticity, to allow this frictional clamping to take place, in particular to permit the clamping to occur over a range of relative rotational positions of the two components.

[0029] The longitudinal position of the mounting element 3 along the base 4 can also be selected at will.

[0030] This type of join also allows a large flexibility of positioning of the direction of elongation of the retaining element with respect to the direction of elongation of the support element which is joined to a support structure. The base 4 can be a continuous element or separated to a desired specific length.

[0031] Fig. 3A shows a support element 4 of an embodiment of the invention in which the faces 6 of the over-

hanging flanges facing the base surface of the recess are at an angle α with respect to the horizontal lateral plane of the element. Preferably α is in a range of up to approximately 10° and more preferably is no more than 5°. Further Fig. 3A shows an embodiment where the base of the recess of the support element has a dished or concave shape, due to a thickness reduction from its sides to its center, to prevent contact in the assembled state of the base portion with a fixing screw shown in the Figure. Fig. 3B shows schematically the embodiment where the base of the support element is essentially flat and is further provided with a recess for receiving in a countersink manner a connecting element (e.g. screw) for joining it to a building structure. Fig. 3C shows schematically an embodiment where the surfaces 7 of the overhanging flanges facing outward have curved edges. This achieves the effect that when in use a building sheet comes into contact with the support element under the effect of for example cyclic thermal expansion or mechanical loading, the building sheet is not instantly damaged. Fig. 3D shows schematically an embodiment with the additional feature that the base 4 has side flanges provided with holes 9 for fixing means for joining it to a building structure. The shown recess for receiving connecting elements in the centre of the bottom part of the support element is optional.

[0032] Fig. 4A shows schematically the embodiment of Fig. 3B in which the base 4 is further provided with three projections 5 extending downward for anchoring the support element with a building support structure, which projections 5 extend in the direction of elongation of the base 4. The number of projections 5 and their length may be varied to depend on the circumstances of the case. Fig. 4B shows the embodiment where the free end of a single such projection 5 is provided with a saw tooth structure or the like to facilitate its pushing into a building structure. Fig. 4C shows schematically projections 5 which extend downward and outward in order to prevent vertical movement of the base 4 with respect to the building structure. In the embodiments of Fig. 4, the lateral slots under the overhanging flange are parallel-sided, so that a frictional engagement with the mounting element 3 occurs over a wide angular range. Combinations of features of the embodiments as set out here are possible and may be varied to depend on the circumstances of the case.

[0033] Fig. 5A shows schematically a retaining element in assembled state consisting of a support element 4 of Fig. 4 and the first component provided with a connecting flange 2 with a tapered shape from the head part 1 to the mounting element 3. Two shapes are shown of the outer edges of the connecting flange 2, and which are indicated by 2' and 2'' respectively. A further alternative embodiment is shown in Fig. 5B where the connecting flange 2 has essentially a rectangular shape (outer edges indicated by 2''') and is further provided with recesses in the vicinity of the lower end 3 to prevent contact with the flanges of the support element 4 to allow for a twist-lock movement during assembly.

[0034] Fig. 6A shows schematically the assembled retaining element of Fig. 2 in which the directions of elongation of the retaining element and of the support element are perpendicular to each other, while Fig. 6B and Fig. 6C show respectively two embodiments of the shape of the mounting element 3. Figs. 6B and 6C show in common a length of the support element (base 4) with the two mounting portions 3 in the clamped positions. In Fig. 6B, the plate-shaped mounting element 3 has a "racetrack" periphery, i.e. straight opposite sides parallel to the elongation direction of the head portion and semicircular ends. In Fig. 6C, the plate-shaped mounting element 3 has an elliptical periphery.

[0035] Also relative dimensions *a, b, c* and *d* are indicated in Figs. 6A, 6B, 6C. Typical values for the dimensions *a, b, c* and *d,* but by no way as a limitation, are in the range 40-70 mm, 5-15 mm, 40-70 mm and 20-50 mm respectively. In order to allow the first component 1,2,3 to be connected in assembled state to the support element 4 by a twist-lock movement it can be seen that with clearance the dimension *c* must be smaller than the dimension *a.* Further the dimension *d* is in the range of (*a-b*) in order to allow the retaining element to be inserted into the recess of the support element and subsequently turned to the desired angle. In these examples the angle between the direction of elongation of the head portion 1 and that of the support element 4 in assembled state is 90°, but this angle may depend on the circumstances of the case and for example may vary in the range of 45° to 90°, while maintaining a durable tight connection between the two components.

[0036] While the invention has been described in conjunction with the exemplary embodiments described above, many equivalent modifications and variations will be apparent to those skilled in the art when given this disclosure. Accordingly, the exemplary embodiments of the invention set forth above are considered to be illustrative and not limiting. Various changes to the described embodiments may be made without departing from the scope of the invention.

Claims

1. A retaining element for a building sheet having an elongate head (1) for engaging at least one building sheet, a mounting element (3) spaced from the head (1), a connecting member (2) connecting the head (1) and the mounting element (3) in a fixed relation and a support element (4) which detachably receives and holds the mounting element (3) in a recess thereof, wherein the support element (4) and the mounting element (3) are relatively rotatable between a first position at which the mounting element (3) is freely detachable and a second position in which the mounting element (3) is held on the support element (2), **characterized in that** the recess and the clamp

edge portions of the mounting element (3) to be engaged therewith have a corresponding shape such that in the second position the mounting element (3) is held firmly on the support element (3) by clamping action between the recess and the clamp edges in engagement therewith, and wherein the support element (4) is elongate and has a recess to receive the mounting element (3), said recess being bounded by opposed overhanging flanges forming, with the base of the recess, slots which receive and clamp edge portions of the mounting element in said second position.

2. A retaining element according to claim 1 wherein said slots, as seen in transverse cross-section of the support element, have a tapering shape such that their width reduces with increasing distance from the centre of the support element.

3. A retaining element according to claim 2 wherein the undersurface (6) of each said overhanging flange, which faces said slot, is inclined at an angle of not more than 10° to a transverse plane passing through both slots.

4. A retaining element according to claim 1, 2 or 3, wherein the exterior surface (7) of each said overhanging flange has rounded edges.

5. A retaining element according to any one of claims 1 to 4, wherein the support element, as seen in cross-section perpendicular to its elongation direction, has a base wall which defines the base of the recess and is of thickness reducing from the sides of the recess to the centre thereof, so that the base of the recess is concave.

6. A retaining element according to any one of claims 1 to 4, wherein the base of the recess has a recess adapted to receive a head of a fixing member for fixing the support element to a building structure in use.

7. A retaining element according to any one of claims 1 to 6 wherein said support element has at least one extending downwardly projection (5) for anchoring it to a building structure in use.

8. A retaining element according to any one of claims 1 to 7 wherein said mounting element (3) has a plate shape having a periphery comprising opposite straight side portions parallel to the elongation direction of the head (1) and curved end portions connecting said side portions.

9. A retaining element according to any one of claims 1 to 7 wherein said mounting element (3) has a plate shape having a periphery, which is substantially an ellipse.

10. A retaining element according to any one of claims 1 to 9 wherein said mounting element (3) has, on its side facing away from the head (1), a recess in order to provide clearance for a fixing element or elements joining the support element (4) to a building structure in use.

11. A retaining element according to any one of claims 1 to 10 wherein said connecting member (2) has a plate-like shape which, as seen in side view perpendicular to the elongation direction of the head (1), tapers from the head (1) to the mounting element (3).

12. A retaining element according to any one of claims 1 to 10 wherein said connecting member (2) has a plate-like shape which, as seen in side view perpendicular to the elongation direction of the head (1), has generally uniform width from the head (1) to the mounting element (3) with recesses adjacent the mounting element.

13. An assembly comprising at least one building sheet (8) and at least one retaining element according to any one of claims 1 to 12 engaging the building sheet to hold it on a building structure.

Patentansprüche

1. Halterungs- bzw. Rückhalteelement für eine Bauplatte, mit einem länglichen Kopf (1) zum Eingreifen in wenigstens eine Bauplatte, einem vom Kopf (1) beabstandeten Befestigungselement (3), einem Verbindungselement (2), das den Kopf (1) und das Befestigungselement (3) fest verbindet, und einem Stützelement (4), das das Befestigungselement (3) in einer Aussparung hiervon lösbar aufnimmt und hält, wobei das Stützelement (4) und das Befestigungselement (3) zwischen einer ersten Position, in der das Befestigungselement (3) frei lösbar ist, und einer zweiten Position, in der das Befestigungselement (3) auf dem Stützelement (2) gehalten wird, relativ drehbar sind, **dadurch gekennzeichnet, dass** die Aussparung und die Klemmrandabschnitte des Befestigungselements (3), das darin eingreifen soll, eine entsprechende Form haben, so dass in der zweiten Position das Befestigungselement (3) durch Einklemmen zwischen der Aussparung und den darin eingreifenden Klemmränder auf dem Stützelement (4) festgehalten wird, und wobei das Stützelement (4) länglich ist und eine Aussparung zur Aufnahme des Befestigungselements (3) hat, wobei die Aussparung durch gegenüberliegende auskragende Flansche begrenzt wird, die mit der Basis der Aussparung Schlitze bilden, die die Randabschnitte des Befestigungselements in der zweiten Position auf-

nehmen und festklemmen.

2. Rückhalteelement nach Anspruch 1, wobei die Schlitze, im Querschnitt des Stützelements gesehen, eine sich verjüngende Form haben, dergestalt, dass deren Breite mit zunehmendem Abstand von der Mitte des Stützelements kleiner wird.

3. Rückhalteelement nach Anspruch 2, wobei die dem Schlitz zugewandte Unterseite (6) jedes auskragenden Flansches in einem Winkel von nicht mehr als 10° zu einer durch beide Schlitze quer verlaufenden Ebene geneigt ist.

4. Rückhalteelement nach Anspruch 1, 2 oder 3, wobei die Außenfläche (7) jedes auskragenden Flansches abgerundete Kanten hat.

5. Rückhalteelement nach einem der Ansprüche 1 bis 4, wobei das Stützelement, im Querschnitt senkrecht zu seiner Ausdehnung in Längsrichtung gesehen, eine Basiswand hat, die die Aussparungsbasis definiert und deren Dicke von den Seiten der Aussparung zu deren Mitte hin abnimmt, so dass die Aussparungsbasis konkav ist.

6. Rückhalteelement nach einem der Ansprüche 1 bis 4, wobei die Aussparungsbasis eine Aussparung zum Aufnehmen des Kopfes eines Fixierteils hat, um das Stützelement an einer benutzten Gebäudestruktur zu fixieren.

7. Rückhalteelement nach einem der Ansprüche 1 bis 6, wobei das Stützelement wenigstens einen sich nach unten erstreckenden Vorsprung (5) hat, um es an einer benutzten Baustruktur zu verankern.

8. Rückhalteelement nach einem der Ansprüche 1 - 7, wobei das Befestigungselement (3) blechförmig ist mit einem Umfang, der gegenüberliegende gerade Seitenabschnitte parallel zur Ausdehnung in Längsrichtung des Kopfs (1) und gebogene, die Seitenabschnitte verbindende Endabschnitte enthält.

9. Rückhalteelement nach einem der Ansprüche 1 bis 7, wobei das Befestigungselement (3) blechförmig ist mit einem im Wesentlichen elliptischen Umfang.

10. Rückhalteelement nach einem der Ansprüche 1 bis 9, wobei das Befestigungselement (3) auf seiner dem Kopf (1) abgewandten Seite eine Aussparung hat, um Raum für ein Fixierelement oder -elemente zu schaffen, das/die das Stützelement (4) mit einer benutzten Baustruktur zu verbindet/verbinden.

11. Rückhalteelement nach einem der Ansprüche 1 bis 10, wobei das Verbindungsteil (2) eine blechartige Form aufweist, die von der Seite senkrecht zur Ausdehnung in Längsrichtung des Kopfes (1) gesehen, sich vom Kopf (1) zum Befestigungselement (3) verjüngt.

12. Rückhalteelement nach einem der Ansprüche 1 bis 10, wobei das Verbindungsteil (2) eine blechartige Form aufweist mit einer, von der Seite senkrecht zur Ausdehnung in Längsrichtung des Kopfes (1) gesehen, im Allgemeinen einheitlichen Breite vom Kopf (1) bis zum Befestigungselement (3) mit an das Befestigungselement angrenzenden Aussparungen.

13. Anordnung mit wenigstens einem Baublech (8) und wenigstens einem Rückhalteelement nach einem der Ansprüche 1 bis 12, das in das Baublech eingreift, um dieses auf einer Baustruktur zu halten.

Revendications

1. Elément de retenue pour une tôle de construction doté d'une tête allongée (1) permettant d'engager au moins une tôle de construction, un élément de montage (3) espacé de la tête (1), un élément de connexion (2) connectant la tête (1) et l'élément de montage (3) dans une relation fixe et un élément de soutien (4) qui reçoit de manière détachable et maintient l'élément de montage (3) dans un de ses évidements, l'élément de soutien (4) et l'élément de montage (3) étant mobiles en rotation, entre une première position à laquelle l'élément de montage (3) est détachable librement et une deuxième position à laquelle l'élément de montage (3) est maintenu sur l'élément de support (2), **caractérisé en ce que** l'évidement et les parties de bord de serrage de l'élément de montage (3) avec lequel ils doivent être engagés ont une forme correspondante telle que dans la deuxième position, l'élément de montage (3) est maintenu fermement sur l'élément de soutien (3) par une action de serrage entre l'évidement et les bords de serrage où il s'engage, et dans lequel l'élément de soutien (4) est allongé et présente un évidement permettant de recevoir l'élément de montage (3), ledit évidement étant lié par des rebords opposés en surplomb qui forment des fentes qui reçoivent et serrent des parties de bord de l'élément de montage dans ladite deuxième position avec la base de l'évidement.

2. Elément de retenue selon la revendication 1, dans lequel lesdites fentes présentent une forme effilée telle que leur largeur se réduit quand la distance du centre de l'élément de soutien augmente, comme on le voit dans la coupe transversale de l'élément de soutien

3. Elément de retenue selon la revendication 2, dans lequel la surface inférieure (6) de chacun des re-

bords en surplomb, qui fait face à ladite fente, est incliné selon un angle inférieur ou égal à 10° vers un plan transversal traversant les deux fentes.

4. Elément de retenue selon la revendication 1, 2 ou 3, dans lequel la surface extérieure (7) de chacun des rebords en surplomb présente des bords arrondis.

5. Elément de retenue selon l'une quelconque des revendications 1 à 4, dans lequel l'élément de soutien, comme on peut le voir en coupe transversale selon la direction d'allongement, comporte une paroi de base qui définit la base de l'évidement et dont l'épaisseur se réduit à partir des côtés de l'évidement en direction de son centre, afin que la base de l'évidement soit concave.

6. Elément de retenue selon l'une quelconque des revendications 1 à 4, dans lequel la base de l'évidement comporte un évidement conçu pour recevoir une tête d'un élément de fixation permettant de fixer l'élément de fixation à une structure en cours de construction quand on l'utilise.

7. Elément de retenue selon l'une quelconque des revendications 1 à 6, dans lequel ledit élément de soutien comporte au moins une saillie d'extension plongeante (5) permettant son ancrage à une structure en cours de construction, en cours d'utilisation.

8. Elément de retenue selon l'une quelconque des revendications 1 à 7, dans lequel ledit élément de montage (3) présente une forme de plaque dont la périphérie comporte des parties latérales rectilignes opposées, parallèles à la direction d'allongement de la tête (1), et des parties d'extrémité incurvées connectant lesdites parties latérales.

9. Elément de retenue selon l'une quelconque des revendications 1 à 7, dans lequel ledit élément de montage (3) présente une forme de plaque dont la périphérie est pratiquement une ellipse.

10. Elément de retenue selon l'une quelconque des revendications 1 à 9, dans lequel ledit élément de montage (3) présente sur son côté qui ne fait pas face à la tête (1), un évidement qui permet d'obtenir un jeu pour un élément ou pour des éléments de fixation liant l'élément de soutien (4) à une structure de construction en cours d'utilisation.

11. Elément de retenue selon l'une quelconque des revendications 1 à 10, dans lequel ledit élément de connexion (2) présente une forme de type plaque qui comme on le voit selon une vue de côté, perpendiculaire à la direction d'allongement de la tête (1), se réduit de la tête (1) vers l'élément de montage (3).

12. Elément de retenue selon l'une quelconque des revendications 1 à 10, dans lequel ledit élément de connexion (2) présente une forme de type plaque qui comme on le voit selon une vue de côté, perpendiculaire à la direction d'allongement de la tête (1), présente une largeur globalement uniforme de la tête (1) vers l'élément de montage (3), des évidements étant adjacents à l'élément de montage.

13. Ensemble comprenant au moins une tôle de construction (8) et au moins un élément de retenue conforme à l'une quelconque des revendications 1 à 12, où s'engage la tôle de construction à maintenir sur une structure de construction.

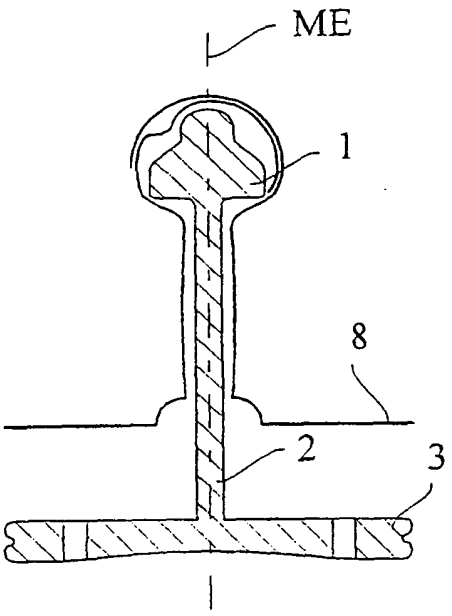

Fig. 1

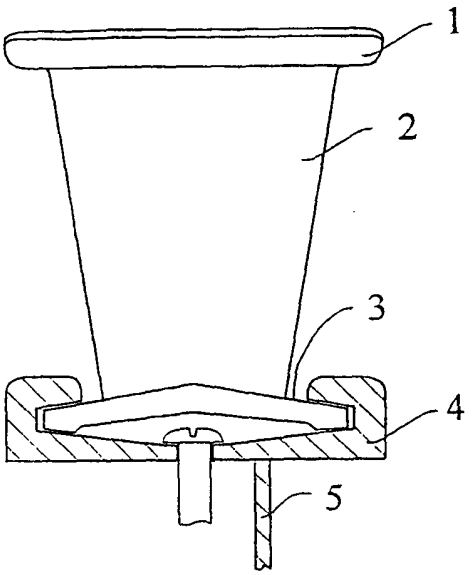

Fig. 2

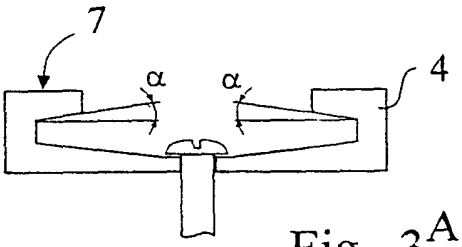

Fig. 3^A

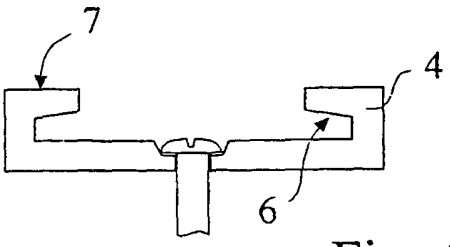

Fig. 3^B

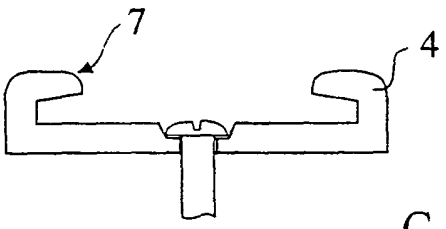

Fig. 3^C

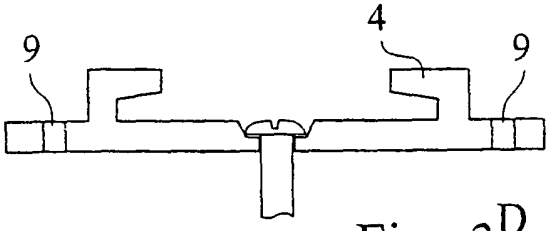

Fig. 3^D

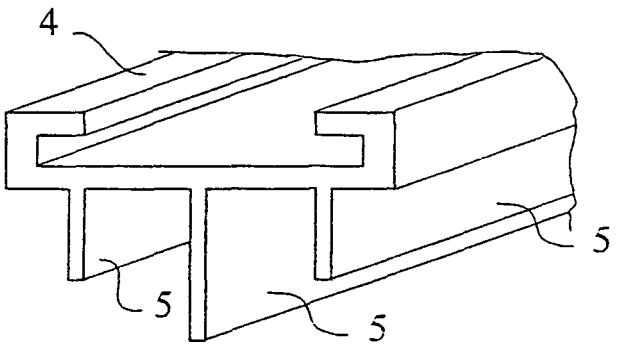

Fig. 4A

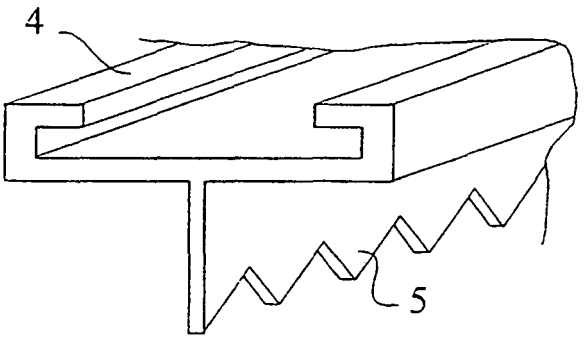

Fig. 4B

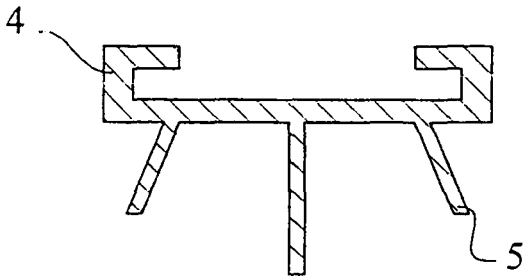

Fig. 4C

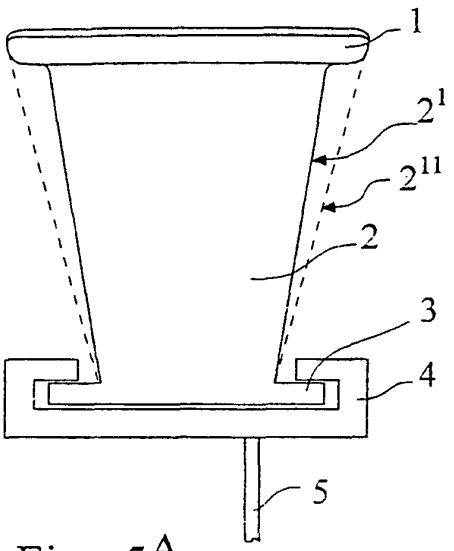

Fig. 5A

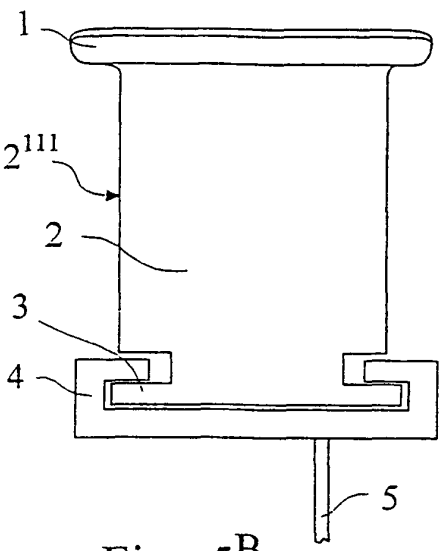

Fig. 5B

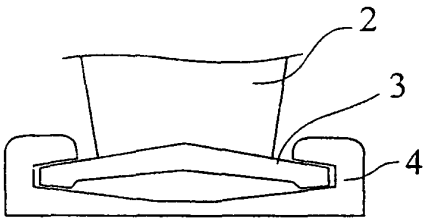

Fig. 6A

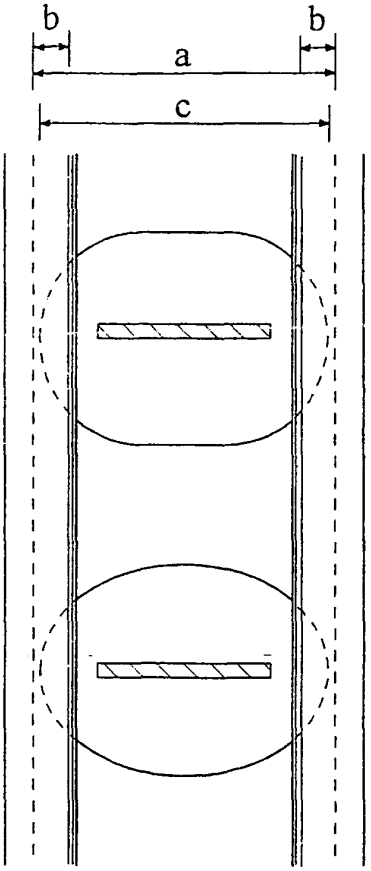

Fig. 6B

Fig. 6C