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(71) Applicant: **Corus Bausysteme GmbH**
56070 Koblenz (DE)

(72) Inventor: **The designation of the inventor has not yet been filed**

(74) Representative: **Blauw, Frans Gerard**
Corus Technology BV
P.O. Box 10000
1970 CA IJmuiden (NL)

(54) Retaining element for building sheets

(57) The invention relates to a retaining element (1) for building sheets, having a base part for mounting the retaining element (1) on a support structure, a head part (2) engageable with said building sheets and a connecting part (3) connecting the head part (2) to the base part. The head part (2) comprises a first portion (4) and a second portion (5), wherein the first portion (4) is made at least partially from a plastic material and the second portion (5) from a metal, the second portion (5) enclosing at least partially the first portion (4). The second portion (5) is intended to serve as a base whereto fastening means, for fastening a building sheet to the retaining element (1), can engage upon.

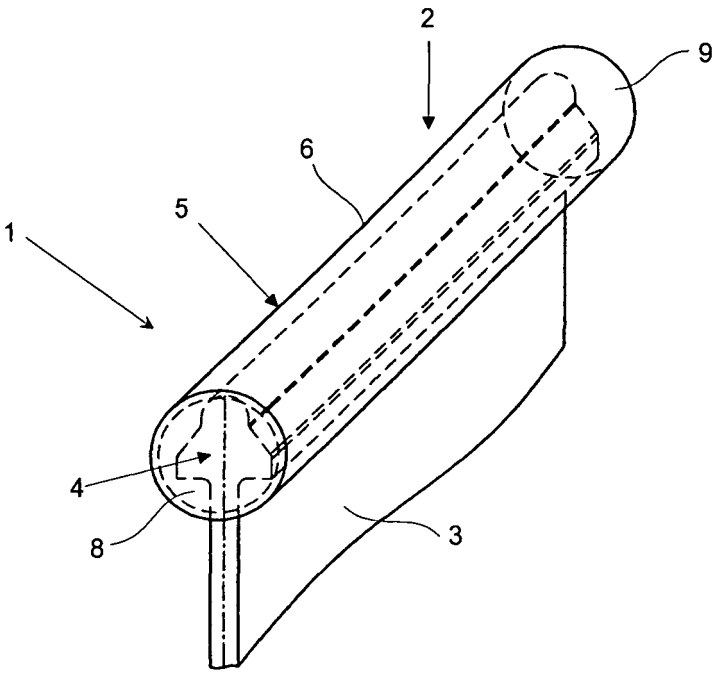

Fig. 1

EP 1 767 718 A1

Description

[0001] The invention relates to a retaining element for building sheets, having a base part for mounting the retaining element on a support structure, a head part engageable with said building sheets and a connecting part connecting the head part to the base part, the retaining element being made at least partially from a plastic material.

[0002] Such a retaining element is known for example from European patent application EP-A- 1 236 840. These retaining elements are used to secure a building sheet, for instance a roofing sheet, to a structure, the head part of the retaining element having such a shape that the sheets may slide over the retaining elements in order to be able to accommodate thermal expansion of the sheets. However, each of the sheets are fastened to a retaining element at a point where the sheet is not subject to longitudinal changes, so as to prevent the sheets from gliding of the retaining elements. This may happen because of an external load such as for example a layer of snow. The building sheets are fastened to a retaining element by bolting or riveting, in which two adjacent sheets may be bolted to the connecting part of the retaining element or a sheet is fastened with a rivet in the head part of the retaining element. With the last method the seam of the next building sheet covers the rivet.

[0003] Retaining elements made from a plastic material have the advantage that there is no thermal bridge between the building sheet and the structure on to which the retaining element is mounted. However, a retaining element with a head part substantially of plastic material has the disadvantage that fastening a building sheet with a rivet to the head part most often lead to fracture of the head part with the result that the sheet is not secured at all or that the fastening point is not able to take a load of any significance.

[0004] The invention aims to overcome this disadvantage to which end a retaining element is provided with the head part comprising a first portion and a second portion, the first portion being made at least partially from a plastic material and a second portion being made from a metal, the second portion enclosing at least partially the first portion. The second portion of the head part being of a metal makes it possible to secure a building sheet with a rivet thereto without any danger of failure of the fixing point. At the same time the second portion engages the first portion of the head part, which is out of a plastic material, so that a thermal bridge between the building sheet and the substructure is prevented.

[0005] According to a further embodiment it is provided that the second portion of the head part is substantially sleeve shaped with at least one outer end of the sleeve being closed off. If the sleeve shaped second portion is provided with only one closed outer end, the second portion will be engaging the first portion in a sufficiently safe manner if the open end of the second portion is pointing in the direction of inclination of the head part and/or the structure on which the retaining element is mounted.

[0006] The shape of the sleeve might be anywhere between a close fit to the first portion and a shape having only a number of contact lines or points with the first portion. According to a further embodiment it is provided that the second portion has such a shape that at least one free space is present between the first portion and second portion of the head part in order to have enough free space to accommodate a part of the fastening means with which a building sheet is fastened to the second portion of the head part. Said free space may be located directly between the first and second portion of the head part or between an extension of the second portion extending past an outer end of the first portion of the head part. However, it is not absolutely necessary to have such a free space between the first portion and the second portion, because since the rivet engages the metal portion the attachment of the building sheet to the retaining element is guaranteed, no matter if therewith any damage or deformation of the plastic portion of the head part would have been caused. The more so, because with no free space or substantially no free space between the first and second portion the first portion is tightly enclosed and by that strengthened by the second portion.

[0007] According to another embodiment it is provided that the second portion is provided with a longitudinal slot to take up the connecting part of the retaining element. With the width of the longitudinal slot of the second portion being smaller than the width of the first portion of the head part, seen in the direction perpendicular to the plane of the connecting part it is attained that the second portion can not be lifted in upward direction from the first portion.

[0008] According to a further embodiment it is provided that the second portion of the head part, as seen in cross section, is substantially circular. Furthermore, it is provided that that the first portion of the head part, as seen in cross section, is substantially triangular shaped, the three respective corners abutting the inner wall of the second portion. Herewith it is achieved that the load of the building sheet on the retaining element is directly transferred through successively the second portion and the first portion, the connecting part and the base part to the substructure, without any unnecessary movement occurring between first and second portion of the head part. Furthermore, with a triangular shaped first portion within a second portion with a circular cross section there will be enough free space at least at one side to accommodate one end of fastening means such as rivets. However, also with for instance an oval shaped second portion as seen in cross section enough space between the first and second portion could be realised to be able to accommodate part of said fastening means.

[0009] In order to provide a further improvement it is provided that the second portion of the head part abuts against the inside planes of the outer ends against the outer ends of the first portion of the head part. Herewith, the first portion of the head part, except for the connection with the connecting part, is fully enclosed, preventing any

movement between the first and second portion of the head part.

[0010] The retaining element according the invention is illustrated by the example given in the drawing in which:

Fig.1 shows a schematic perspective view of the head part and portion of the connecting part of the retaining element;

Fig.2 shows a schematic side view of the head part and portion of the connecting part of the retaining element, and

Fig.3 a schematic cross-section of the head part and portion of the connecting part of the retaining element.

[0011] Fig.1 shows schematically a perspective view of part of the retaining element 1 with a head part 2 and a connecting part 3, connecting the head part 2 to a base part, not shown in the drawing. The head part 2 comprises a first portion 4, directly connecting to the connecting part 3, and a second portion 5 enclosing the first portion 4. The second portion 5 comprises a tubular shaped sleeve 6 with a longitudinal slot 7 with a width corresponding to the thickness of connecting part 3, see also fig.3. At the outer ends sleeve 6 is provided with end plates 8,9, the circumference of which corresponds to the circumference of sleeve 6.

[0012] Fig.2 and 3 show respectively a side view and cross section of the head part 2 and connecting part 3 in which also a portion of stiffening members 10 for connecting part 3 are shown. These stiffening members 10 connect to the connecting part 3 and the base part.

[0013] From fig.2 it can be seen that end plates 8,9 abut against the outer ends of first portion 4 of the head part and a part of the flanges 11,12 of connecting part 3. With the sides of longitudinal slot 7 directly against connecting part 3, the second portion as much as possible encloses the first portion of the head part.

[0014] The cross section of fig.3 shows that the first portion is substantially triangular with lateral extending parts 13,14 and a rounded top part 15, said parts 13,14,15 all abutting against the inside wall of sleeve 6, by that preventing any radial movement of the second portion 5 with respect of the first portion 4.

[0015] The second portion 5 is preferably made of a metal, preferably of aluminium, steel or stainless steel.

[0016] Furthermore, because it is made out of a plastic material, the retaining element 1 is preferably reinforced. This can be done by incorporating a stiffening member, such as a metal structure, substantially within the plastic material or by integrating a fibrous material, such as glass fibre or carbon fibre, in the plastic material.

Claims

1. Retaining element (1) for building sheets, having a base part for mounting the retaining element (1) on a support structure, a head part (2) engageable with said building sheets and a connecting part (3) connecting the head part (2) to the base part, the retaining element (1) being made at least partially from a plastic material, **characterised in that** the head part (2) comprises a first portion (4) and a second portion (5), the first portion (4) being made at least partially from a plastic material and the second portion (5) being made from a metal, the second portion (5) enclosing at least partially the first portion (4).

2. Retaining element according to claim 1, **characterised in that** the second portion (5) of the head part (2) is substantially sleeve shaped with at least one outer end of the sleeve (6) being closed off.

3. Retaining element according to claims 1-2 **characterised in that** at least one free space is present between the first portion (4) and second portion (5) of the head part (2).

4. Retaining element according to claim 2, **characterised in that** the second portion (5) is provided with a longitudinal slot (7) to take up the connecting part (3) of the retaining element (1).

5. Retaining element according to claim 4, **characterised in that** the width of the longitudinal slot (7) of the second portion (5) is smaller than the width of the first portion (4) of the head part (2), seen in the direction perpendicular to the plane of the connecting part (3).

6. Retaining element according to claims 2-5, **characterised in that** the second portion (5) of the head part (2), as seen in cross section, is substantially circular shaped.

7. Retaining element according to claim 6, **characterised in that** the first portion (4) of the head part (2), as seen in cross section, is substantially triangular shaped, the three respective corners (13,14,15) abutting the inner wall of the second portion (5).

8. Retaining element according to claims 2-7, **characterised in that** the second portion (5) of the head part (2) abuts with the inside planes of the outer ends (8,9) against the outer ends of the first portion (4) of the head part (2).

9. Retaining element according to claims 2-8 **characterised in that** the second portion (5) is made of a metal, preferably of aluminium, steel or stainless steel.

10. Retaining element according to claims 1-9 **characterised in that** one or more parts (2,3,4,10) of the retaining element (1) are reinforced.

11. Retaining element according to claim 10, **characterised in that** the retaining element (1) is reinforced with a metal structure substantially within the plastic material.

12. Retaining element according to claim 10, **characterised in that** the retaining element (1) is reinforced with a fibrous material embedded in the plastic material of the retaining element (1).

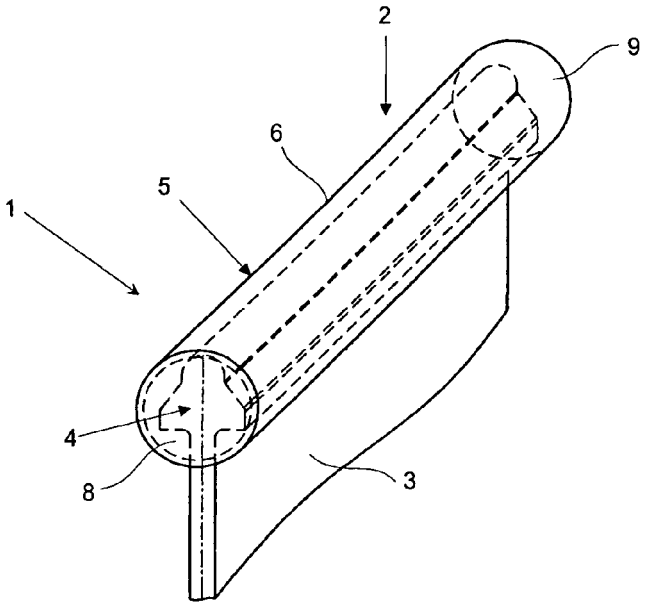

Fig. 1

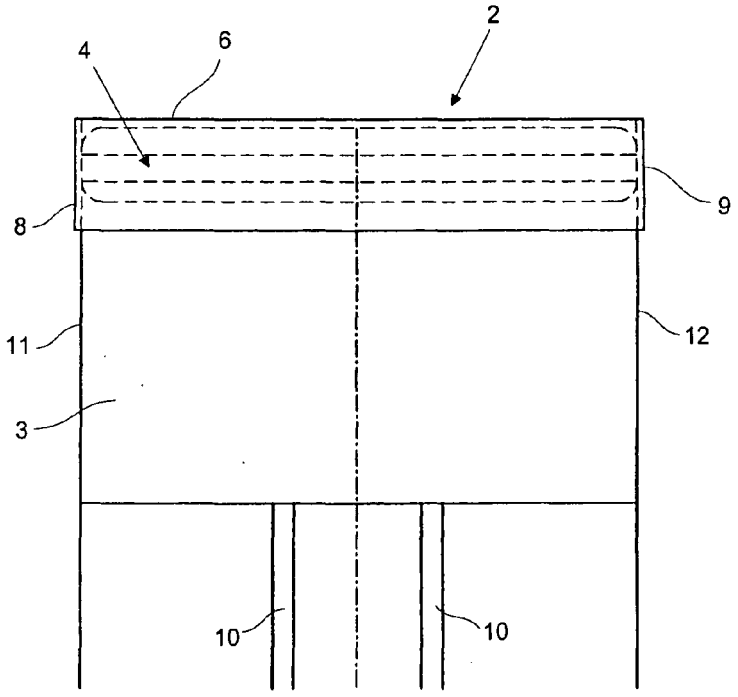

Fig. 2

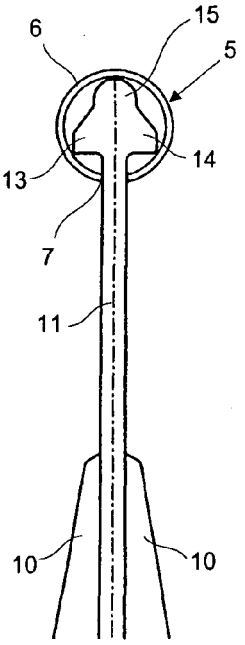

Fig. 3

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 05 07 7184

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	DE 91 01 827 U1 (ZAMBELLI, FRANZ, 8352 GRAFENAU, DE) 6 June 1991 (1991-06-06) * page 9, paragraph 2 - paragraph 3; claims 8-10; figures * -----	1,3,9	E04D3/362
X	US 3 664 080 A (JAMES D. KLINGENSMITH ET AL) 23 May 1972 (1972-05-23) * column 2, line 5 - line 8; figures * -----	1,3,6,9	

TECHNICAL FIELDS SEARCHED (IPC)

E04D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	22 February 2006	Demeester, J

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
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T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
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& : member of the same patent family, corresponding document

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ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 05 07 7184

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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22-02-2006

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
DE 9101827 U1	06-06-1991	AT 401789 B	25-11-1996
		AT 23992 A	15-04-1996
US 3664080 A	23-05-1972	NONE	

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

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