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(54) A profile for mounting between an inner part and an outer part in a frame structure

(57) A profile (1) for mounting between an inner part and an outer part in a frame structure preferably for windows, doors and the like. On one side (9), the profile (1) has areas of materials (7, 8) of varying thickness. This gives the profile (1) a lattice-like structure, which ensures that the profile (1) achieves a maximum strength with a smaller consumption of materials and a low heat transmission number. The profile (1) may be provided with projections on the opposite side (10) for the reception or engagement of sealing strips preferably in the opening parts in a frame structure.

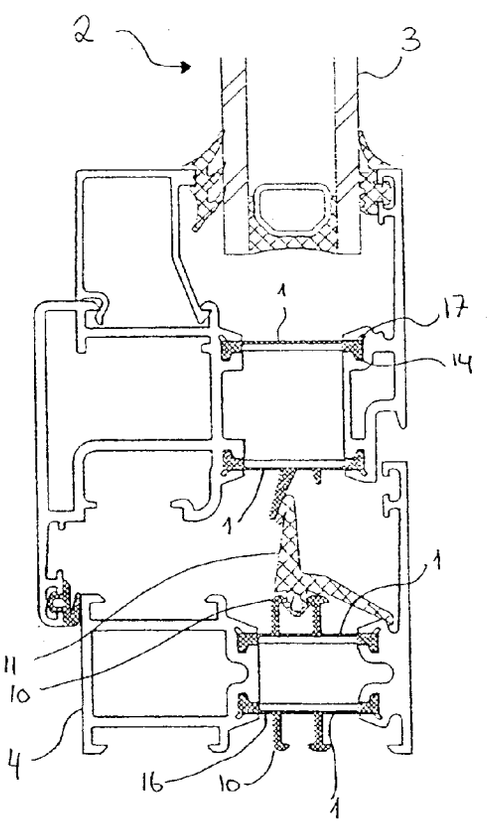

Fig.9

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Description

The present invention relates to a profile for mounting between an inner part and an outer part of a frame structure to ensure a fixed distance between these parts, said profile comprising connecting areas for cooperation with corresponding connecting areas in the inner part and the outer part, respectively, of the frame structure.

It is known to use a plate-shaped profile for mounting between an inner part and outer part in a frame structure. A plate-shaped profile of the known type is manufactured with a square cross-sectional area, see e.g. DK-B-156 229. This, however, is vitiated by several drawbacks, because the consumption of material is considerable, and because the transmission of heat between the inner and outer parts of the frame structure is relatively great.

Further, DE 30 26 261 A1 discloses a plate-shaped connecting profile which is made of an elastically resilient material and has special edge shapes so that the profile can be mounted in the parts of the frame structure.

This complex cross-sectional geometry in the mounting areas means that a good deal of material is used for the manufacture of the profile, and furthermore the profile has a relatively low compressive strength.

It is moreover known from German Patent Specification DE 42 38 750 to provide a profile having a thin-walled, cellular structure, which is also used for mounting in a frame structure for e.g. a pane. The profile is composed of two parts which are clamped to each other and positioned between the inner and outer parts of the frame structure. The first part of the cellular structure is a main part which is fixed to the outer and inner parts of the frame structure, while the second part is a removable part which is mounted on the main part to give the profile a cellular, thin-walled structure. Thus, the second part does not contribute to improving the compressive strength of the profile.

A profile of this type, however, is rather complex in its structure and thereby difficult to manufacture and also has an inexpediently low compressive strength, as mentioned above. This does not ensure that the outer and inner parts of the frame structure are secured at a fixed distance from each other, which is a desirable property.

Accordingly, the object of the present invention is to remedy the above-mentioned drawbacks by providing a profile for a frame structure which is preferably used for doors and windows or the like, where the transmission of heat between the inner and outer parts of the frame structure is reduced to an optimally low value because of a reduced cross-sectional area (consumption of material) and a profile which, with a reduced consumption of material, maintains the strength of the profile so that the outer and inner parts of the profile are secured at a desirable fixed distance from each other.

This object is achieved by a profile which is characterized in that the profile, between the connecting areas, is plate-shaped and formed with projections in a lattice structure, thereby exhibiting at least one first area of material surrounded by a second area of material having a larger cross-sectional dimension than the first area of material.

Thus, with a profile of the above-mentioned type it is possible to provide a profile which, with a reduced consumption of material (cross-sectional area) substantially has the same strengths as a profile of a square cross-section. This is ensured by giving the profile a lattice-like structure which ensures stability in the structure capable of withstanding the possible compressive forces which are generated between the inner and outer parts of a frame structure. Because of the reduced consumption of material, the material through which the transmission of heat is to take place will also be reduced, and this will minimize the flow of heat through the profile and thereby the constructional frame.

Since a profile of the above-mentioned type is frequently made of a plastics product, such as e.g. polyamide, preferably polyamide 66 with 25% glass, which is a relatively expensive material, a reduction in the consumption of material in the profile will also be desirable for economic reasons. However, the profile may be made of any other material having the necessary strength and low heat transmission number.

The lattice-like structure of the profile may be shaped in several different ways, but will frequently be triangular for strength calculation reasons, as a triangular profile will be capable of absorbing compressive as well as shear forces which can often occur in a frame structure. To ensure that these compressive and shear forces are absorbed, it will be particularly expedient to arrange the first areas of material as isosceles triangular areas. Such isosceles triangular areas absorb transverse as well as compressive forces expediently.

However, in special embodiments of the profile there may be first areas of material which extend perpendicularly to the attachment areas. Such a shape, however, will primarily occur when the frame structure is subjected to great compressive forces.

The present invention will be explained more fully below with reference to the accompanying drawing, in which

fig. 1 is a lateral view of a profile according to the present invention,

fig. 2 is a longitudinal cross-section through the profile shown in fig. 1,

fig. 3 is a lateral view of another embodiment of a profile,

fig. 4 is a longitudinal cross-section through the profile shown in fig. 3,

fig. 5 is a cross-section through a profile according to the present invention seen in the longitudinal direction of the profile,

fig. 6 shows two profiles in a structure which consists of an outer part and an inner part,

fig. 7 shows two profiles in a frame structure where the lower profile is provided with a projection,

fig. 8 shows, like figs. 6 and 7, two profiles between an outer part and an inner part, where both profiles are provided with projections to receive a sealing strip, and

fig. 9 shows four profiles according to the present invention in an opening frame structure.

According to the present invention a profile 1 is to be provided whose primary task is to separate an outer part 5 from an inner part 4 in a frame structure 2, cf. figures 1 to 9. Thus, with such a profile 1 it is possible to ensure that at high temperatures there will be no great transmission of heat through a frame structure 2 when the frame structure 2 is used e.g. for glass fronts and the like. Therefore, a profile 1, which serves as an insulator in the frame structure 2, is interposed between the outer and inner parts 5, 4.

To reduce the transmission of heat through the frame structure 2 it is desirable that the cross-sectional dimension of the profile 1 is reduced without diminishing the strength of the profile 1. As a result, the transmission of heat through the frame structure 2 is reduced, and the consumption of material for the profile 1 is reduced, which is desirable since the cost price of the profile 1 is relatively high. Usually higher than the costs of material for the outer and inner parts 5, 4 of the frame structure.

Fig. 1 illustrates the profile 1 of the present invention. The profile 1 is formed with two connecting areas 12 which extend along the outer edges 15 of the profile 1. Two areas of material 7, 8 are provided between the connecting areas 12. The first area of material 7 has a smaller cross-sectional dimension than the second area of material 8. In this embodiment, a lattice-like structure is imparted to the profile 1 on at least one side 9, which gives the profile 1 a relatively great strength with a smaller cross-sectional area than a profile 1 having a constant cross-sectional thickness.

The second areas of material 8, which are formed in at least one side 9 of the profile 1, preferably extend rectilinearly to give the profile 1 the desirable/necessary strength, as mentioned above. It should thus be noted that the number of the second areas of material 8, which surround several of the first areas of material 7, varies from profile 1 to profile 1, as any frame structure 2 varies with respect to the field of use of the frame structure 2.

The first areas of material 7, which are positioned between the connecting areas 12, are all surrounded by the second areas of material 8 having the larger cross-sectional dimension. The second areas of material 8 thereby form part of the connecting areas 12.

Fig. 2 shows a longitudinal cross-section through the embodiment of a profile 1 of the present invention shown in fig. 1. It is shown clearly in fig. 2 that the connecting areas 12 have a larger cross-sectional area than the areas of material 8, which in turn have a larger cross-sectional dimension than the areas of material 7. A bead 14 is also provided at both outer edges 15 of the profile 1.

Fig. 3 shows another embodiment of a profile 1 of the present invention. This embodiment of the profile 1 has a different lattice structure, where some of the second areas of material 8 of the larger cross-sectional dimension extend perpendicularly to the connecting areas 12. The lattice structure therebetween is formed by non-isosceles triangles, as shown in figures 1 and 2.

Fig. 4 shows a cross-section through a profile 1 shown in fig. 3. It appears clearly, as shown in fig. 2, that the connecting areas 12 have a larger cross-sectional area than the areas of material 8, which in turn have a larger dimension of material than the areas of material 7.

It appears from the above description with reference to figures 1 to 4 that the first areas of material 7 may have any shape. In the embodiments shown, however, the areas of material 7 have triangular shapes. The triangles formed in the first areas of material 7 will preferably have an angle of between 30° and 60° with respect to the outer edges 15 of the profile 1, without this being restrictive for the shape of the profile 1.

Thus, the profile 1 might also be formed with the second areas of material 8 which exclusively extend perpendicularly to the connecting areas 12 to thereby form the first areas of material 7 having a square shape. This, however, will not be an optimum embodiment, since the length (the distance through the second areas of material 8 of the profile 1 from the first part 4 to the second part 5) of the material, through which the transmission of heat is to take place through the first and second parts of the frame structure, is thus reduced.

A profile 1 of the present invention will preferably be made of a plastics material, which may e.g. be polyamide. For example polyamide 66 with glass preferably 25%, PVC or the like. Since the insulation material, of which the profile 1 is made, has a relatively high cost and production value with respect to e.g. the outer and inner parts 5, 4 of the frame structure 2, which are normally made of aluminium, it is a desire that the profile 1 has a relatively small extent.

Fig. 5 is an end view of a profile 1 according to the present invention. It appears from the figure how the areas between the connecting areas 12 form a continuous member. This is an important prerequisite for a profile 1 of the present invention to be useful. The profile 1 must be air-tight to obtain a good insulation. Such a good insulation is obtained with the frame structure 2 where the various cavities of the frame structure 2 are separated

physically ("hermetically") from each other, cf. figures 6 to 9.

Fig. 6 shows a frame structure 2 in which two profiles 1 are positioned between an inner part 4 and an outer part 5 of a frame structure 2. The profiles 1 are positioned such that the profiles 1 face each other in the plane 9 in which the areas of material 7, 8 are formed. Thus, in a frame structure 2 it is not possible to see the lattice-like structure provided in the profile 1.

It is thus possible to provide one side 16 of the profile 1 with a projection 10. Such a projection 10 may be formed in several different ways and will preferably serve as an engagement face for a sealing strip 11 or to receive an edge area of the sealing strip 11 (se figures 7, 8 and 9).

Like fig. 6, figs. 7, 8 and 9 show various embodiments and uses of a profile 1 in a frame structure 2 according to the present invention. Thus, it appears that the profile 1 may be provided with various projections 10 on the outer side 16 opposite the one side 9 in which the profile 1 is formed with the different areas of material 7, 8, as also stated above. The shown embodiments of projections 10 are just to be considered as examples, it being evident to a skilled person that these projections 10 may have practically any shape. As also stated above, the shape of the projections 10 will vary according to the intended use of the projections 10.

A profile 1 according to the present invention, which is relatively made of plastics material, as mentioned above, will usually have a thickness in the second area of material 8 of between 3 and 8 mm and a thickness in the first area of material 7 of between 0.1 and 2 mm, preferably 0.3 mm, and a height (width from one outer edge 15 to the other outer edge 15 on the profile 1) of between 15 and 40 mm, preferably 22 mm. It is evident, however, that an increase in the height (width) of the profile 1 will also involve an increased thickness of preferably the second area of material 8.

As shown in figures 1 to 9, the profile 1 of the present invention is formed with the bead 14 at the connecting areas 12. The bead 14 is intended to be received in a cut-out 17 provided in the inner part 4 and the outer part 5, respectively, of the frame structure 2. The cut-out 17 will usually be provided with an undercut to ensure that the outer and inner parts 4, 5 of the frame structure 2 cannot move with respect to each other. This ensures that e.g. a pane 3 in the frame structure 2 (see figure 9) is secured. The structure thus remains stable and does not subject the pane 3 to unnecessary impacts, such as torsion or compression.

Claims

1. A profile for mounting between an inner part (4) and an outer part (5) of a frame structure (2) to ensure a fixed distance between these parts (4, 5), said profile comprising connecting areas (12) for cooperation with corresponding connecting areas (13) in the inner part (4) and the outer part (5), respectively, of the frame structure (2), **characterized** in that the profile (1), between the connecting areas (12), is plate-shaped and formed with projections (8, 12) in a lattice structure, thereby exhibiting at least one first area of material (7) surrounded by a second area of material (8) having a larger cross-sectional dimension than the first area of material (7).

2. A profile (1) according to claim 1, **characterized** in that the second area of material (8) is contiguous and surrounds several of the first areas of material (7).

3. A profile (1) according to claim 1 or 2, **characterized** the second area of material (8) extends along the connecting areas (12) at outer edges (15) of the profile (1), and that rectilinear subareas of the second area of material (8) extend between these edges (15).

4. A profile (1) according to claim 3, **characterized** in that the rectilinear subareas of the second area of material (8) has an angle of between 30° and 90° with respect to the outer edges (15) of the profile (1).

5. A profile (1) according to claims 1 to 4, **characterized** in that the second area of material (8) has a thickness of between 3 and 8 mm, and that the first area of material has a thickness of between 0.1 and 2 mm, preferably 0.3 mm.

6. A profile (1) according to claims 1 to 5, **characterized** in that one side (16) of the profile (1) is plane.

7. A profile (1) according to claims 1 to 6, **characterized** in that projections (10) are provided on the plane side (16) of the profile (1) for the reception of sealing strips (1) or for the engagement of sealing strips (11).

8. A profile (1) according to claims 1 to 7, **characterized** in that the profile (1) is formed with a bead (14) at the outer edges, said bead (14) substantially corresponding to an undercut (17) in the inner part (4) and the outer part (5), respectively, of the frame structure (2) in which the profile (1) is positioned.

9. A profile (1) according to claims 1 to 8, **characterized** in that the profile (1) is made of a plastics material such as e.g. polyamide, such as e.g. polyamide 66 with glass preferably 25%, PVC or the like.

10. A profile (1) according to claims 1 to 9, **characterized** in that the first areas of material (7) preferably have a triangular shape, and that the angles in the first areas of material (7) are 60°.

11. A frame structure for windows, doors, glass fronts and the like, comprising an outer part (5) and an inner part (4) connected with one or more, preferably two, connecting profiles according to claims 1-10.

12. A composite profile comprising two profile parts (4, 5) between which one or more, preferably two, connecting profiles according to claims 1-10 are arranged.

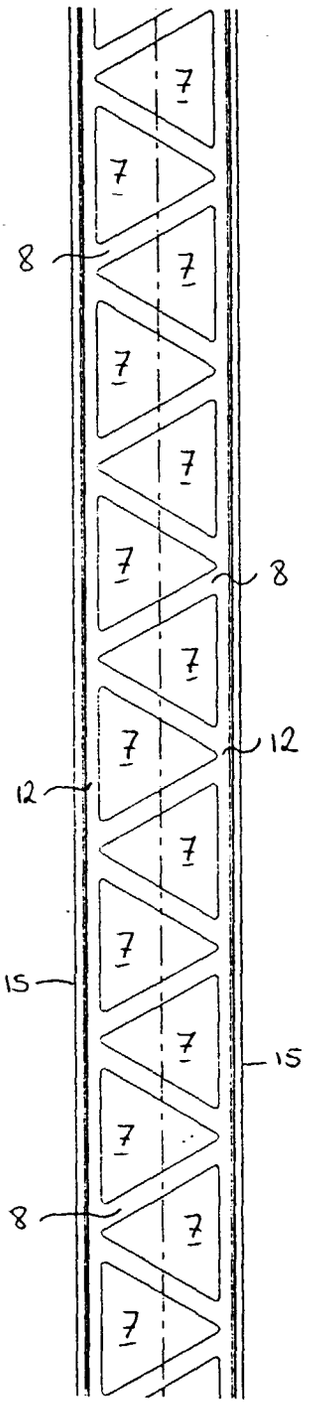

Fig.1

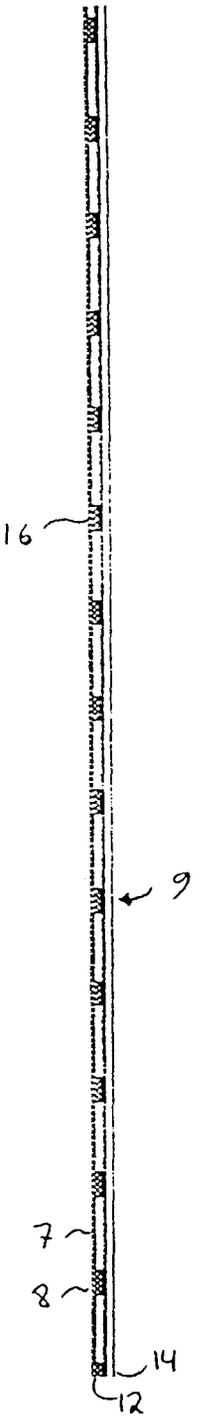

Fig.2

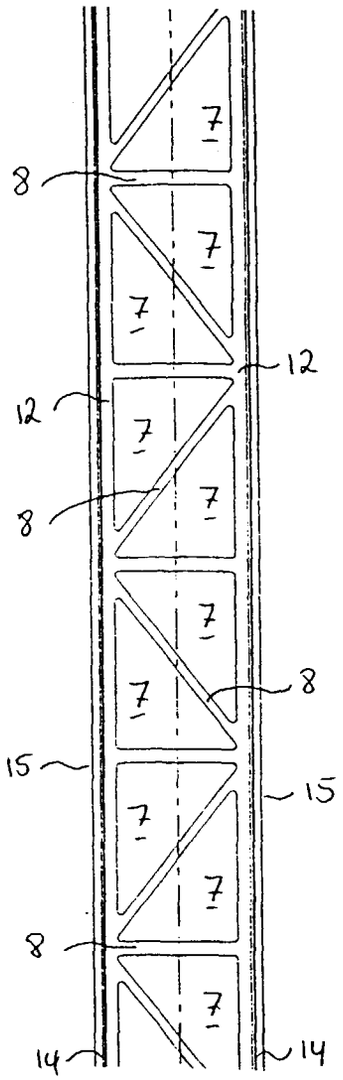

Fig.3

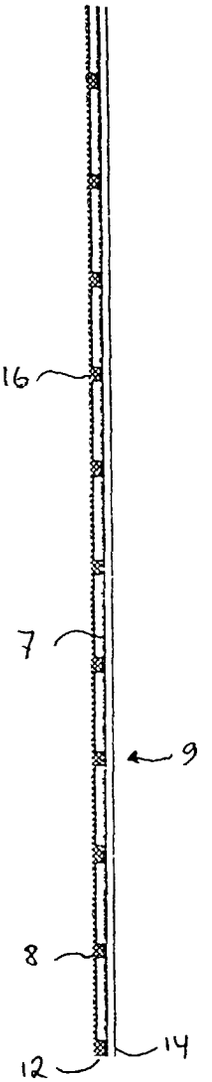

Fig.4

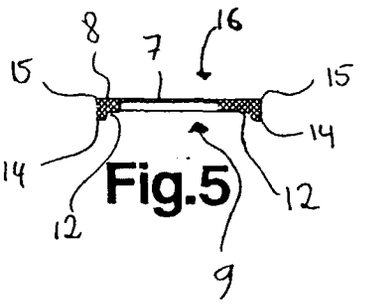

Fig.5

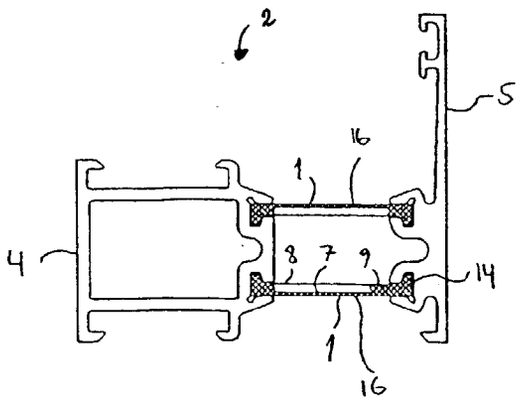

Fig.6

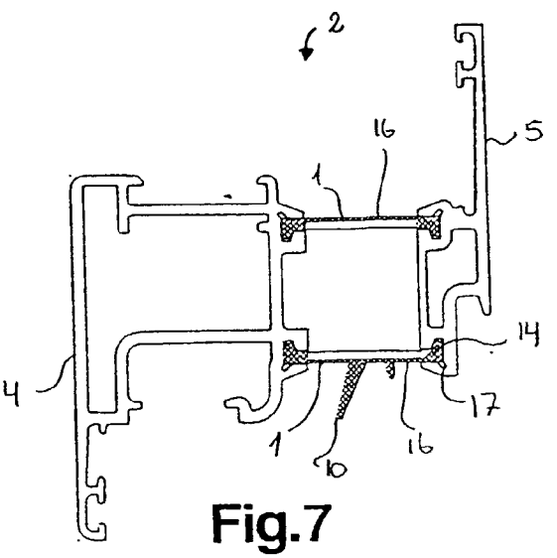

Fig.7

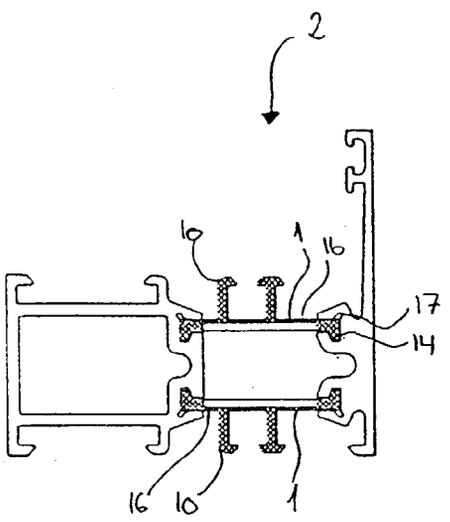

Fig.8

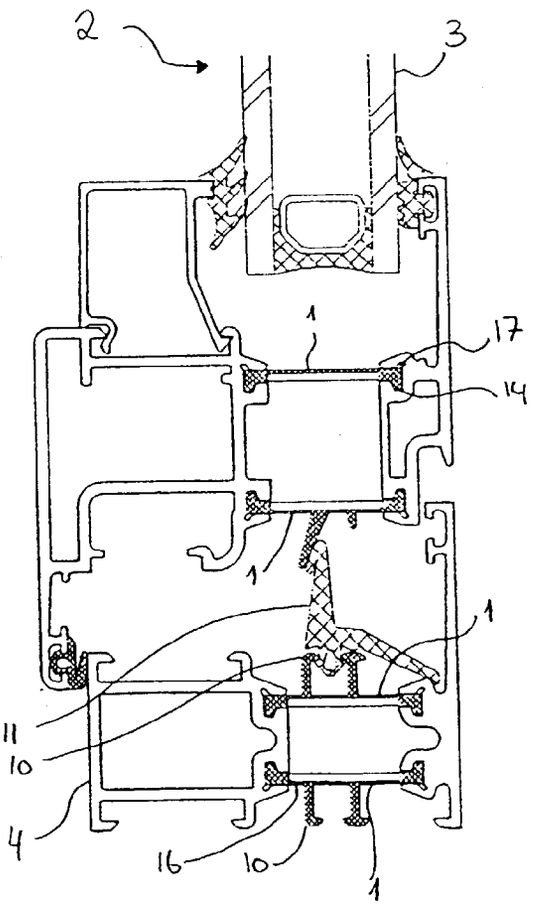

Fig.9

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EUROPEAN SEARCH REPORT

Application Number
EP 97 61 0008

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
X Y	DE 26 10 466 B (I.C.B.) * column 1, line 67 - column 4, line 31; figures *	1-6,8, 11,12 7,9,10	E06B3/263
X	DE 28 50 428 A (NAHR) * page 6, paragraph 1 - page 13, paragraph 3; figures 1-6 *	1,11,12	
Y	DE 34 12 530 A (KELLER) * claim 1; figure 1 *	7	
Y	DE 44 09 315 A (TECHNOFORM CAPRANO + BRUNNHOFER) * claims 1,11; figures *	9	
Y A	EP 0 553 688 A (SCHÜCO) * column 2, line 41 - column 3, line 30 * * column 4, line 9 - line 33 * * figures *	10 1-4	
A	BE 1 003 197 A (ALURO) * page 5, paragraph 1 - page 7, paragraph 3; figures *	1-3,6, 11,12	TECHNICAL FIELDS SEARCHED (Int.Cl.6) E06B
A	FR 2 307 093 A (I.C.B.) * page 4, line 30 - line 35 * * page 6, line 13 - page 7, line 15 * * page 7, line 26 - line 31 * * figures 1-3 *	1	
A	DE 87 01 054 U (GARTNER) * page 10, line 1 - line 15 * * page 10, line 29 - line 35 * * figures 7,8,10 *	1	

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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	23 July 1997	Depoorter, F

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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EUROPEAN SEARCH REPORT

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DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
A	DE 25 02 584 A (RITTER ALUMINIUM) * page 3, paragraph 6 - page 4, paragraph 2; figures *	1,3,4	
A	FR 2 358 578 A (SYCO PRODUKT)		
P,A	EP 0 717 165 A (SCHÜCO) * column 3, line 41 - column 4, line 28; figures 1-3 *	1-4,8, 10-12	
			TECHNICAL FIELDS SEARCHED (Int.Cl.6)

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