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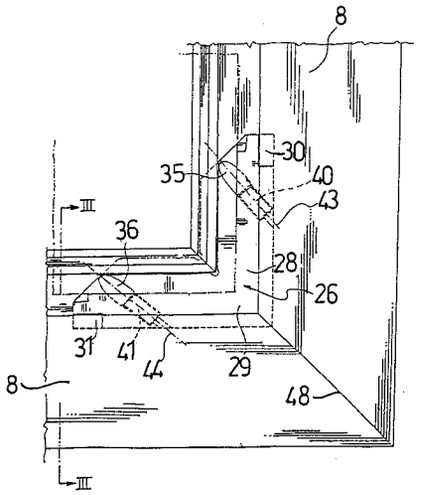
(54) A window frame formed from profiled sections joined at corners by an insert with a right-angled body fixed with threaded pins.

(57) In a frame (5) of a window (1) formed from profiled sections (8), these latter are connected together at the corners by an insert (25) with a right-angled body. To advantage this insert has threaded holes (35, 36) passing through its thickness and intended to be engaged by corresponding threaded pins (40, 41); the action of the pins (40, 41) enables the insert (25) to exert a force against the profiled sections (8) and, in particular, against glass-abutment flanges (18) of the latter, such as to ensure their firm interconnection.

FIG.2



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The present invention relates to a window frame of the type comprising a plurality of profiled sections joined at corners, each having a respective cross-section including a central portion from which extends at least one glass abutment flange having a free edge portion projecting towards the pane of glass inserted in the window frame.

The numerous different forms of the type of window just explained, which are formed from interconnected profiled sections, generally of metal, and made for housing and, more generally, for all building constructions, are well known.

It is also known that the rigidity and stability of the connections between the profiled sections constituting the frame are among the most important and also, at the same time, the most critical requirements for the manufacture of these profiled sections; in fact it not infrequently happens that the window frame does not fit correctly into its surrounding casing and hence it is necessary to force the first into the second to enable the window to be closed.

This occurs when the shape of the frame changes slightly from its original form after a more or less long period of time in use, particularly because of small misalignments which arise between the various parts constituting the window; the geometrical tolerances provided in the latter to enable it to be fitted into its casing are no longer satisfactory and thus give rise to the well known problems relating to the closure of the window mentioned above.

In the prior art, the connection of the profiled sections disposed at the corner of a window frame is achieved by means of connecting brackets; more particularly, since the profiled sections generally have a cross-section which includes a central closed, or box, portion, the angled elements of these brackets are fitted into the box central box portions.

The locking of each profiled section to the respective angled element of the bracket, which locking is necessary to avoid their coming apart, is effected with special apparatus which deforms the profiled section structurally; more particularly, this deformation is of plastic type and is generally constituted by a series of incisions in the wall of the profiled section adapted to engage grooves in the surface of the bracket, resulting effectively in a ratchet and pawl structure which locks the bracket element to the respective profiled section.

This method of locking the brackets is, however, accompanied by several considerable disadvantages among which the cost of the apparatus for deforming the profiled sections is immediately seen. Furthermore, this apparatus must be operated by qualified staff all of which has a considerable effect on the cost of the entire operation of assembling the window without, however, contributing decisively to the satisfactory achievement of the requirement mentioned above, that is, achieving a firm connection between the profiled sections. It should in fact be noted that the mechanical deformation of the profiled section is ineffective and can cause irreversible damage to the material if it is not carried out correctly with the said apparatus and results in wastage of the erroneousley worked pieces; this is a further factor which adds to the lack of economy and affects the production cycle.

The technical problem at the root of the present invention is that of providing a window frame in which the connection of the profiled sections at a corner has structural and functional characteristics such as to overcome the disadvantages mentioned with reference to the prior art.

This problem is resolved according to invention by a frame of the type mentioned above characterised in the claims which will follow.

Further characteristics and advantages of the invention will become more apparent from the description of one embodiment given below by way of non-limiting example with reference to the appended drawings, in which:

Figure 1 is a partially sectioned perspective view of a window according to the invention;

Figure 2 is a view of a detail of the window of Figure 1;

Figure 3 is a view of the window of the invention taken on the line III-III of Figure 2;

Figure 4 is a perspective view of a structural detail of the window of Figure 1.

With reference to the said drawings and in particular to Figure 1, a window according to the invention is generally indicated 1 and includes a pane of glass 2 inserted therein.

The window 1 has a frame 5 which comprises a plurality of profiled sections 8 joined at the corners; these profiled sections 8 each have a cross-section 10 which includes a central, closed, rectangular portion 12 from opposite sides of which extend a pair of flanges 18 and 19. The flange 19 is intended to constitute an abutment element for bearing against a casing for the window, not shown in the drawings, while the first flange 18 is a so-called glass abutment flange.

More particularly, the glass abutment flange 18 has a free edge portion 18a projecting towards the pane of glass 2 and provided with fixing means 20 for holding a sealing strip of conventional type, not shown in the drawings in contact with the pane of glass 2; the fixing means 20 are constituted essentially by an appendage projecting from the edge portion 18a.

A plurality of guide means 23 are provided along the flange 18 as well as on the central

rectangular portion of the profiled section and, in this example, are constituted by a plurality of projecting ribs adapted to be engaged by corresponding engagement means 24 on a right-angled insert 25 for interconnecting the profiled sections; in this example the engagement means 24 are constituted by grooves formed in the right-angled insert 25.

More particularly, the insert 25 comprises a right-angled body 26 defined by two arms 28, 29 respectively perpendicular to each other, and the grooves constituting the engagement means 24 extend longitudinally in the arms 28 and 29; in the preferred embodiment, moreover, one of the grooves is formed by a step, 30 and 31, respectively projecting from the angled arms 28 and 29.

Furthermore, the connecting insert 25 for the profiled sections has a pair of threaded holes 35 and 36, one in each element 28 and 29 respectively; these threaded holes are in fact through-holes passing through the arms 28 and 29 from one side to the other and are intended to be engaged by corresponding threaded pins 40 and 41.

In a preferred embodiment of the invention, the threaded pins 40 and 41, and thus also the respective threaded holes 35 and 36 are oriented longitudinally on respective axial directions of screwing which are parallel to each other and arranged, when the connecting insert 25 is in position juxtaposed with the glass abutment flange 18, to allow the threaded pins to be screwed from that side thereof facing the pane of glass 2; furthermore, the end of each threaded pin when screwed in projects from its hole 35 or 36 in correspondence with the portion 12 of the cross-section of the profiled section 8. To advantage the said direction of screwing 43 and 44 for the pins 40 and 41 are also parallel, with reference to a plane defined by the window frame and hence also to the pane of glass 2, to a junction line 48 (see Figure 2) which is the trace of the intersection of the plane at which the two profiled sections 8 of the window are connected at the corner.

In fact, to assemble the window according to the invention, as in the case of most window frames, the ends of the profiled sections to be connected at the corners are cut at a predetermined angle to enable the profiled sections to be coupled together as well as possible.

The engagement means 24 with which the insert 25 is provided enable the insert to be coupled with the respective guide means 23 provided on the glass-holding flanges 18 of the profiled sections so as to position it next to these at their junction; to prevent the arms 28, 29 of the insert 25 from becoming free from the respective profiled sections 8, the threaded pins 40 and 41 are screwed in and, in passing through the threaded holes 35 and 36, act on the central portions 12 of the cross sections of the profiled sections 8.

The action of the threaded pins 40 and 41 forces the connecting insert 25 against the glass abutment flange 18 so that the insert 25 itself exerts a force on the profiled sections such as to unite them effectively against any possible relative movement.

It is noted that, once the pins have been screwed in, the guide means 24, in the embodiment referred to above, together with the fixing means 20 for the sealing strip, act as stop members for the connection insert 25, being adapted to compensate for the force transmitted by the pins to the insert itself.

The advantages achieved by the present invention are many.

As regards the assembly of the window described above, the practicality of the connecting insert 25 is immediately obvious; in fact this is coupled to the profiled sections to be connected in a simple and fairly quick manner by virtue of its positioning in correspondence with the glass abutment flange 18. Naturally, even the tightening of the screws 40 and 41 in their holes 35 and 36 is an operation which does not cause any difficulty during the assembly of the window. The fact that the directions 43 and 44 of screwing of the pins are oriented so that it is possible to carry out this screwing without interference also contributes to this advantage. In fact it should be noted that, as one pin is screwed in, the insert 25 tends to move along the direction of screwing of the pin itself; since this is parallel to the direction of screwing of the other pin, when this latter is screwed in, the connecting insert 25 is practically already in its final operative position and will not therefore move any further as the second pin is screwed in. This is not the case for example when the directions of screwing, in the plane of the window frame, are perpendicular to the respective profiled sections 8; in this eventuality, in fact, as the pins are screwed in, the insert 25 would move in directions perpendicular to each other which would render its fixing problematical.

Furthermore, the substantial symmetry of the directions of screwing 43 and 44 about the junction line 48 between the ends of the profiled sections 8 to be connected provides a considerable balancing contribution to the forces which act in this zone of union of the profiled sections, conferring stability and safety on the junction of these latter.

It is thus noted that, in the assembly of the window according to the invention, the disadvantages of the prior art resulting from the need to use special mechanical tools to fix the bracket into the profiled sections are completely eliminated; this means, in favour of the present invention, a consid-

erable reduction in the cost and time needed to assemble the windows as well as the option to use personnel who are not specially qualified to carry out these operations. This result is a consequence of the fact that a window is formed in which the connecting insert is located on the outside of the section of the profiled sections constituting the frame, together with the introduction of pins for fixing the insert to the profiled sections.

Furthermore it should be noted that the connecting insert enables any deformation which may occur in the window frame as a result of use to be corrected. This occurs by virtue of the fact that the pins constitute an adjustable anchoring means for the connecting insert 25 and may thus be retightened any time this is necessary both by virtue of the positioning of the insert which means that the pins are readily accessible and also the window frame does not have to be removed entirely to enable any geometric irregularities to be corrected.

It is also noted that the pins mentioned above are also reversible means for anchoring the insert 25 which may thus be removed and replaced as necessary: previously this had not been possible because of the deformation which the profiled sections had undergone, this deformation being necessary to form a solid fixing to lock the bracket in position and being of plastic type, and thus definitive, so that, once assembled, the window could neither be adjusted nor dismantled without the frame being broken in some way.

Finally it is not out of the question that, by virtue of the positioning of the connecting insert 25 next to the glass abutment flange 18, the profiled sections 8 which make up the window frame may be made without the central portion of their cross-section being of closed or box structure; naturally, this would be allowed only for parity of mechanical characteristics of the profiled section and would result in a saving in materials in the production of the windows.

Finally it should be noted that, when the profiled sections of the window frame have a cross-section with a closed central portion, this could be used as a seat for housing a secondary, stiffening bracket which could possibly be used to improve the connection provided by the insert of the invention; such an eventuality could, for example, be considered in the case of double-glazed windows which generally have frames made with very thick profiled sections. Naturally, the secondary bracket could be assembled without any working of the profiled sections to achieve for its firm fixing in that it would have only a secondary function relative to the insert of the invention.

As a further advantage of the present invention, it should be noted that the window formed in accordance with the teaching thereof is in no way aesthetically different from the connecting insert positioned in correspondence with the glass-abutment flange while, in addition, it is not out of the question that the insert itself, in this position, could be utilised as a support element for wedges which might possibly be used in the window for fixing the pane of glass.

Finally, it is clear that several components of the embodiment of the present invention described above may be varied without thereby altering the essence of the teaching thereof. For example, the shape of the glass abutment flange which previously had a curved edge portion 18a could be changed and could instead be made with an L-shaped configuration while it is not out of the question that the engagement means 24 and the corresponding guide means 23 for positioning the connecting insert could be made in various other ways.

Finally, a greater number of threaded pins with their threaded holes may also be provided than described above; this could be considered to give greater stability and strength to the window, particularly in the case of double-glazed windows.

All these modifications and indeed others which may be made to the embodiment of the invention described in the present specification, are however to be considered as falling within the protective scope defined by the following claims.

Claims

1. A frame for a window (1) of the type comprising a plurality of profiled sections (8) joined together at corners, each having a cross-section (10) including a central portion (12) from which extends at least one glass abutment flange (18) having a free edge portion (18a) projecting towards a pane of glass (2) inserted in the frame (8) of the window (1), characterised in that it includes at least one connecting insert (25) having a right-angled body (26) defined by two limbs (28, 29) at right angles to each other, located at a corner at which the profiled sections (8) are joined and abutting that side of the glass abutment flange (18) facing the pane of glass (2), provided with removable engagement means (24) for coupling with corresponding means (23) provided on the profiled sections (8) as well as being provided with at least one pair of threaded holes (35, 36) passing through each of the said limbs (28, 29) respectively from a side thereof facing the pane of glass (2) to the side thereof facing the respective profiled section to be connected, the threaded holes (35, 36) being intended to be engaged by corresponding threaded pins (40, 41).

2. A frame for a window (1) according to Claim 1, characterised in that the threaded pins (40, 41) are screwed into corresponding holes in respective directions (43, 44) of screwing which are parallel to each other.

3. A frame for a window (1) according to Claim 1 or Claim 2, characterised in that:
   - the guide means (23) comprise a plurality of ribs which project from the glass abutment flange (18) and central portion (12);
   - the engagement means (24) include a plurality of grooves in the limbs (28, 29) of the body (26) of the insert (25); the ribs and grooves being adapted to engage each other to constitute a stop for the insert (25) when the threaded pins (40, 41) are screwed in.

4. A frame for a window (1) according to Claim 1, Claim 2 or Claim 3, characterised in that the said free edge portion (18) of the glass abutment flange (18) has fixing means (20) for a sealing strip for the window (1), comprising an appendage projecting from the free edge portion (18a) so as also to constitute guide means (23) for the insert (25).

5. A frame for a window (1) according to Claim 2, characterised in that the directions (43, 44) of screwing of the threaded pins (40, 41) lie in a first plane parallel to that of the pane of glass (2) inserted in the frame (1) and are parallel to the trace of the line of junction (48) at which the profiled sections (8) of the window (1) are joined at a corner in a second plane perpendicular to the first.

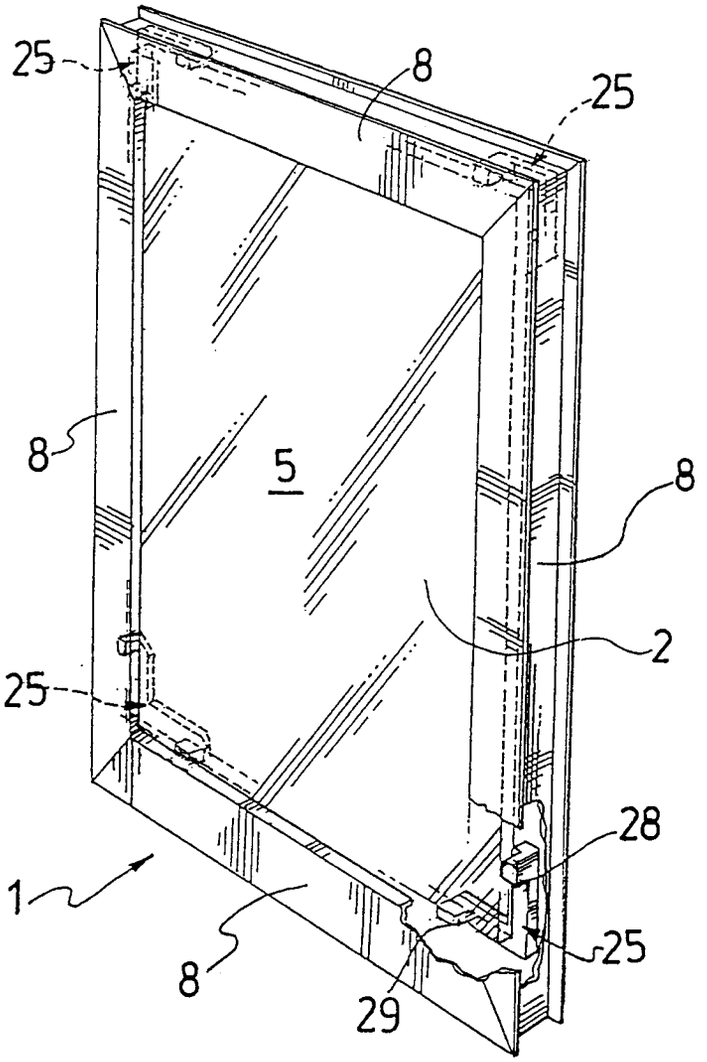
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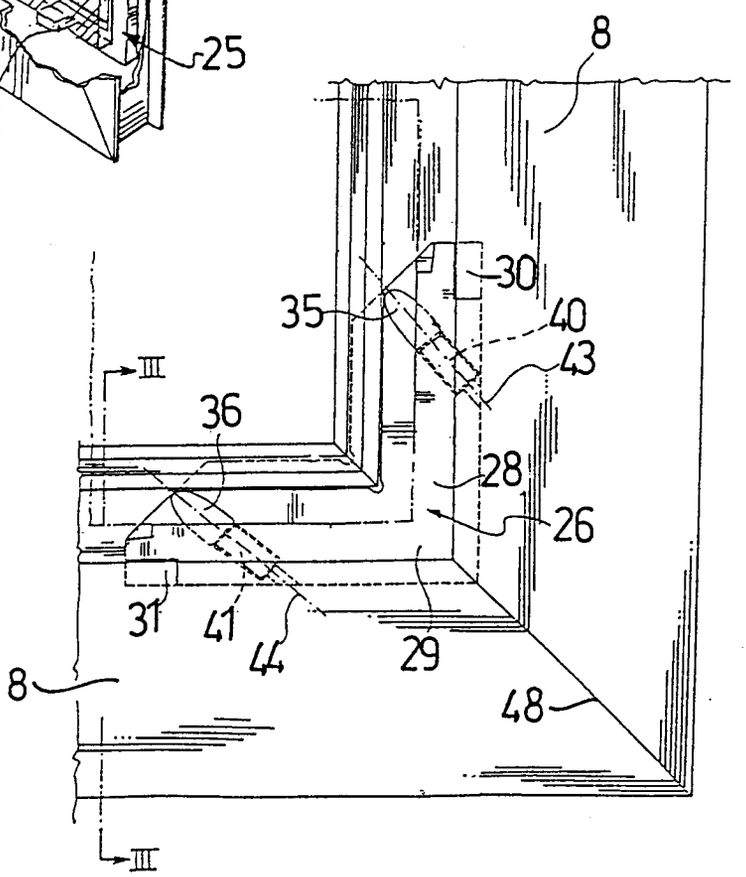
FIG.1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III

FIG.2

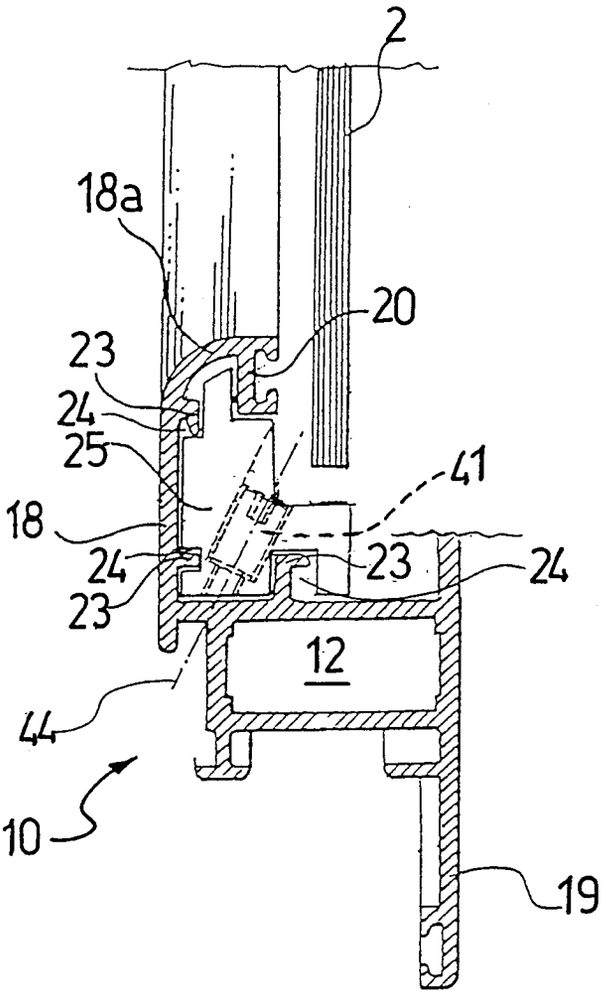
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FIG.3

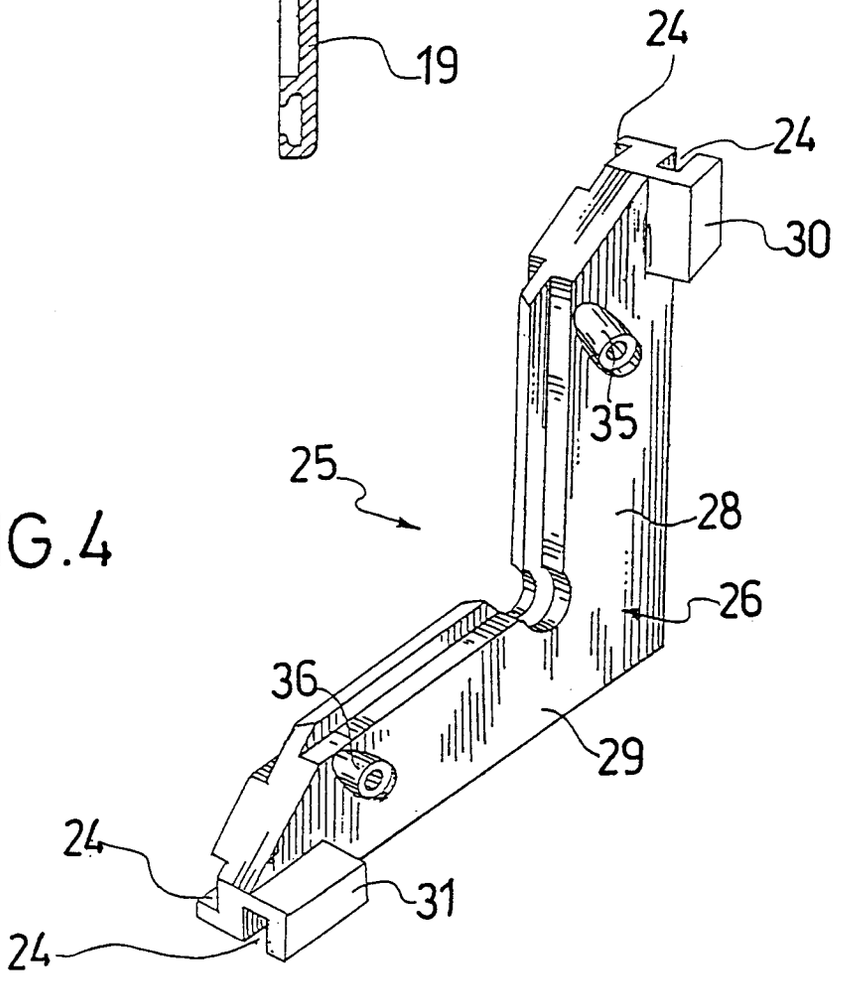
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FIG.4

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EUROPEAN SEARCH REPORT

Application Number
EP 93 20 0917

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.5)
Y	FR-A-2 287 881 (BICHET) * page 1, line 1 - line 5 * * page 2, line 28 - page 3, line 14 * * figures 1,2A *	1-4	E06B3/98
Y	FR-A-2 293 559 (BRENDLE) * page 10, line 33 - page 14, line 26 * * figures *	1-4	
A	DE-B-12 52 399 (METAUX LEGERS & METAUX NON-FERREUX) * column 3, line 5 - column 4, line 14; figures *	1,2,5	
A	EP-A-0 460 514 (VALCASA) * column 6, line 18 - line 27 * * column 10, line 18 - line 20 * * figures 1,10,24-26 *	1,3,4	
A	DE-A-34 19 411 (SÄLZER) * page 13, paragraph 4 - page 15, paragraph 2; figures *	1,3,4	TECHNICAL FIELDS SEARCHED (Int.Cl.5) E06B
A	DE-A-34 19 412 (SÄLZER) * page 11, paragraph 7 - page 13, paragraph 2 * * figures *	1,3,4	
A	EP-A-0 049 694 (R.A.I.-REYNOLDS ALUMINIUM ITALIA) * page 10, line 32 - page 11, line 8; figure 10 *	1,3	
A	US-A-2 776 735 (BANCROFT) * column 2, line 27 - column 3, line 23; figures *	1,4	

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	16 February 1994	Depoorter, F

CATEGORY OF CITED DOCUMENTS

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