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(54) **A concealed-hinge casement**

(57) In a casement, the movable frame (2) is hinged to the fixed frame (1) by means of a hinge (5) having a hinge pin (7) supported in a position such as to define, with the front wall (3a) of the fixed upright member (3), a passageway (16) which can house a cover (15) projecting from the movable upright member (4) and partially surrounding the hinge pin (7).

The cover (15) hides the hinge (5) from view when the casement is closed, and the movable frame (2) can perform a maximum angular movement through 180° relative to the fixed frame (1).

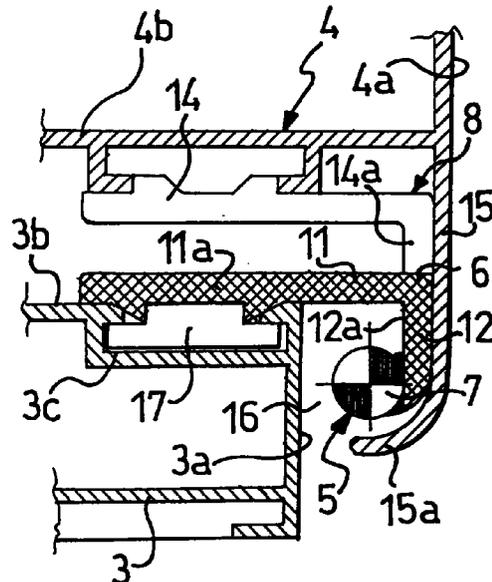


FIG.3

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Description

The present invention relates to a so-called concealed-hinge casement, that is, a casement in which the means for hinging the movable frame to the fixed frame is hidden from view at least when the casement is in the closed condition.

The invention relates more particularly, but not exclusively, to casements of the aforesaid type in which the respective fixed and movable frames are made from extruded metal sections, for example, and preferably, extruded aluminium-alloy sections.

On account of the substantially box-like structure of the extruded sections constituting the upright members and the cross-members of the concealed-hinge casements to be produced, and hence of the availability of seats or "channels" already present (or suitably provided and formed at the extrusion stage) in the sections, in order to achieve the aforesaid purpose of hiding the hinges from view, at the moment, these or other similar hinging means are positioned in the seats in a manner such that the hinge axis or pin is included between the upright members of the fixed and movable frames when the casement is closed.

Owing to this positioning and because of the structural characteristics of the hinges used, the maximum angular movement permitted for the movable casement frames of the aforementioned type relative to the fixed frame is 90°.

A technical requirement which is particularly noted in the art is that of overcoming this limitation of the angular movement of the movable frame of a concealed-hinge casement, enabling the movable portion of a casement in practice to be opened through angles of up to 180° and the satisfaction of this requirement constitutes the technical problem upon which the present invention is based.

The problem is solved, according to the invention, by a casement comprising a fixed frame and a movable frame having, respectively, a fixed upright member and a movable upright member, hinged to one another by means of a hinge comprising at least one hinge leaf associated with the fixed upright member and constituted by a first and a second portion disposed essentially at right angles, a hinge pin fixed to the second portion close to the free end thereof, an eye associated with the movable upright member and mounted rotatably on the hinge pin so as to be removable axially therefrom, the casement being characterized in that the hinge pin is in a substantially tangential arrangement with the inner side of the second portion of the hinge leaf at a predetermined distance from the first portion and is supported at a predetermined distance from the front wall of the fixed upright member, and in that a cover fixed to the front wall of the movable upright member and coplanar therewith projects outwardly from the movable upright member and has a curved free side having an arc-shaped profile and partially surrounding

the hinge pin.

The characteristics and advantages of the invention will become clearer from the following description of some embodiments of a casement according to the invention, given with reference to the appended drawings, provided by way of non-limiting example, in which:

Figure 1 shows, in perspective and in partial section, a corner portion of a concealed-hinge casement according to the invention,

Figure 2 is a cross-section taken on the line II-II of Figure 1, on an enlarged scale,

Figures 3 and 4 show respective variants of Figure 2 in cross-section,

Figures 5 and 6 show, schematically and in plan, the corner portion of the casement of Figure 1 in successive positions of use,

Figure 7 shows, in perspective and with parts separated, a concealed hinge used in the casement of Figure 1.

With reference to Figures 1 to 4, a concealed-hinge casement according to the invention comprises a fixed frame 1 and a movable frame 2 of which only the respective portions of the upright members 3, 4 which are hinged to one another are shown to simplify the following description.

The frames 1 and 2 are preferably made of extruded aluminium-alloy sections and, purely by way of non-limiting example, are of the so-called thermal cut type.

In the description given below and in the following claims, the "front walls" of the upright members 3, 4, that is, their sides which, when the casement is closed, are normally in view from inside the room in which the casement is fitted, are indicated 3a, 4a, and the "inner side walls" of the upright members, that is, their sides which face one another or are juxtaposed, again when the casement is closed, are indicated 3b, 4b.

The upright members 3 and 4 are connected to one another by hinges 5 (at least two hinges per pair of upright members) each hinge comprising a first hinge leaf 6 to which a hinge pin 7 is fixed and a second hinge leaf 8 having an eye 9 which is fitted rotatably on the hinge pin.

According to the present invention (Figure 3), and according to a structurally simplified version, the first hinge leaf 6 is constituted essentially by two portions 11, 12 disposed at right angles. The portion 11 is fixed to the upright member 3, as will be described below, in a manner such that the portion 12 extends transverse the front wall 3a of the upright member.

The hinge pin 7 is fixed to the portion 12, close to the free end thereof, in a position such as to be

arranged substantially tangentially with the inner side 12a of the portion 12 (that is, tangentially with the side of the portion 12 which faces towards the portion 11 of the hinge leaf 6), at a predetermined distance from the portion 11 and from the wall 3a, as will be explained in detail below.

The pin 7 (Figure 4) is advantageously and preferably mounted coaxially in an eye 13 formed integrally with the free end of the portion 12 of the hinge leaf 6. In this case, the length of the portion 12 must be greater than the outside diameter of the eye 13.

The portion 11 of the hinge leaf 6 is used to fit the hinge on the inside side wall 3b of the upright member 3 in a preselected position thereof.

The other hinge leaf 8 is also constituted essentially by two portions 14, 14a, disposed at right angles.

The said eye 9 (Figure 7) is fixed or formed integrally at the free end of the hinge leaf 8 and is mounted rotatably on the hinge pin 7.

The portion 14 of the hinge leaf 8 is used to fix the leaf to the inner side wall 4b of the upright member 4 in a preselected position thereof, as will become clear from the following description.

According to a further basic characteristic of the present invention, a cover 15 is fixed to the front wall 4a of the upright member 4 so as to be coplanar therewith and extends throughout the height of the upright member, projecting outwardly therefrom relative to the movable frame 2. Preferably, the cover 15 is formed integrally with the upright member 4 during the extrusion of the respective section and has the same thickness as that selected for the walls of the section.

The free longitudinal side 15a of the cover 15 is curved with an arc-shaped profile, preferably extending through a little more than 90°. The selected width of the cover 15-15a is such that it can hide the entire hinge 5 from view, surrounding the hinge pin 7-13 concentrically and partially, at least when the casement is closed.

In order to use a hinge 5 according to the invention as a connection between the fixed and movable frames of a generic casement made, for example, of extruded metal sections, the two hinge leaves 6, 8 thereof are positioned on and fixed to the fixed and movable upright members 3 and 4 to be connected.

With reference to Figures 3 and 4, the portion 11 of the first hinge leaf 6 is fixed by conventional means to the inner side wall 3b of the upright member 3 in a manner such that the portion 12 of this hinge leaf 6 extends transverse the front wall 3a of the upright member 3, spaced therefrom by a distance greater than the diameter of the hinge pin 7 (Figure 3) or of the eye 13 (Figure 4) which supports it.

In particular and advantageously, the difference between the diameter and the distance of the portion 12 from the front wall 3a is slightly greater than the thickness of the cover 15.

In just the same manner, the distance of the hinge pin 7 (or of the eye 13) from the portion 11 of the hinge

leaf 6 is slightly greater than the thickness of the cover 15.

A "passageway" 16 of a width slightly greater than the thickness of the cover 15 is thus defined between the front wall 3a of the upright member 3 and the right-angled portions 11, 12 of the hinge leaf 6.

According to a first embodiment, in order to fit the hinge leaf 6 on the upright member 3, its portion 11 is "extended" without a break in continuity by an appendage 11a (Figures 3, 4) comprising and associated with means 17 for engaging a corresponding seat 3c in the upright member 3.

The portion 14 of the other hinge leaf 8 is fixed to the inner side 4b of the upright member 4 in a manner such that the portion 14a of this hinge leaf 8 is in contact with the cover 15.

At this point, the eye 9 of the second hinge leaf 8 is fitted on the hinge pin 7, forming the desired connection between the casement frames.

By means of this connection, the cover 15, the width of which is suitably predetermined, is positioned beside the portion 12 of the hinge leaf 6 and the curved side 15a of the cover surrounds the hinge pin 7 concentrically.

The hinge 5 is consequently hidden from an observer's view when the casement in question is in the "casement closed" condition.

Moreover, the casement (Figures 6, 7) can be opened by an angular movement of the movable frame about the hinge pin 7 through up to 180° since it is not obstructed by the cover 15, the curved portion 15a of which can be fitted freely in the passageway 16.

Figure 2 shows a variant of the hinge described above.

According to this variant, in order to fit the hinge leaf 6 to the upright member 3, the appendage 11a which extends the portion 11 of the hinge leaf 6 is in turn formed as a right-angle defining a portion 18 parallel to the other hinge leaf 12 and extending in the opposite direction thereto.

This portion 18 constitutes essentially a foot for the portion 11, bearing against the front wall 3a of the upright member 3.

The hinge pin 7 can be positioned in various ways relative to the front wall 3a of the fixed upright member 3, according to the length of the foot 18.

In the preferred embodiment shown in Figures 1 and 2, the hinge pin 7 is supported close to the outer corner 3d of the upright member 3 and, in any case, in a position such that, in the "casement closed" condition, the cover 15 (with its curved end 15a) hides the entire upright member 3 from view, as well as the hinge 5.

Naturally, this advantageous result, combined with the ability of the movable frame to move angularly through 180° relative to the fixed frame can also be achieved by the hinges shown in Figures 3, 4, by the attribution of suitable lengths to the portions 12 of their hinge leaves 6 which support the hinge pins 7.

Figure 7 shows, in perspective and with parts separated, a hinge 5 according to the invention, of the so-called three-leaf type, the third hinge leaf being indicated 106 and being exactly the same as the first hinge leaf 6 described above.

Purely by way of example, in this three-leaf hinge, the feet 18 and 118 of the portions 11 of the fixed leaves 6, 106, have lengths such as to support the hinge pin 7 in an "intermediate" position relative to the front wall 2a of the upright member 3. Consequently, with the use of a hinge of this type, the cover 15 does not completely cover the front wall 3a of the fixed upright member 3 in the "casement closed" condition.

Many variations and modifications, all falling within the scope of the inventive concept, may be applied to the invention thus conceived. Moreover, the materials used, the dimensions, as well as the casements to which the concealed hinge of the invention is applied may be of any type, according to requirements, without thereby departing from the scope of protection of the invention as defined by the following claims.

Claims

1. A casement comprising a fixed frame (1) and a movable frame (2) having, respectively, a fixed upright member (3) and a movable upright member (4) hinged to one another by means of a hinge (5) which comprises at least one hinge leaf (6) associated with the fixed upright member (3) and constituted by a first and a second portion (11, 12) disposed essentially at right angles, a hinge pin (7) fixed to the second portion (12) close to the free end thereof, an eye (9) associated with the movable upright member (4) and mounted rotatably on the hinge pin (7) so as to be removable axially therefrom, the casement being characterized in that the hinge pin (7) is in a substantially tangential arrangement with the inner side (12a) of the second portion (12) of the hinge leaf (6) at a predetermined distance from the first portion (11) and is supported at a predetermined distance from the front wall (3a) of the fixed upright member (3), and in that a cover (15) fixed to the front wall (4a) of the movable upright member (4) and coplanar therewith projects outwardly from the movable upright member (4) and has a curved free side (15a) having an arc-shaped profile partially surrounding the hinge pin (7).

3. A casement according to Claim 1, characterized in that the cover (15) is formed integrally with the movable upright member (4).

3. A casement according to Claim 1, characterized in that the cover (15) extends throughout the height of the upright member (4).

4. A casement according to Claim 1, characterized in that the thickness of the cover (15) is less than the predetermined distance between the hinge pin (7) and the front wall (3a) of the fixed upright member (3) and less than the predetermined distance between the hinge pin (7) and the first portion (11) of the hinge leaf (6).

5. A casement according to Claim 1, characterized in that the hinge pin (7) is supported close to the outer corner (3d) of the fixed upright member (3) in a position such that the cover (15) hides the entire front wall 3a of the fixed upright member (3) from view when the casement is in the closed condition.

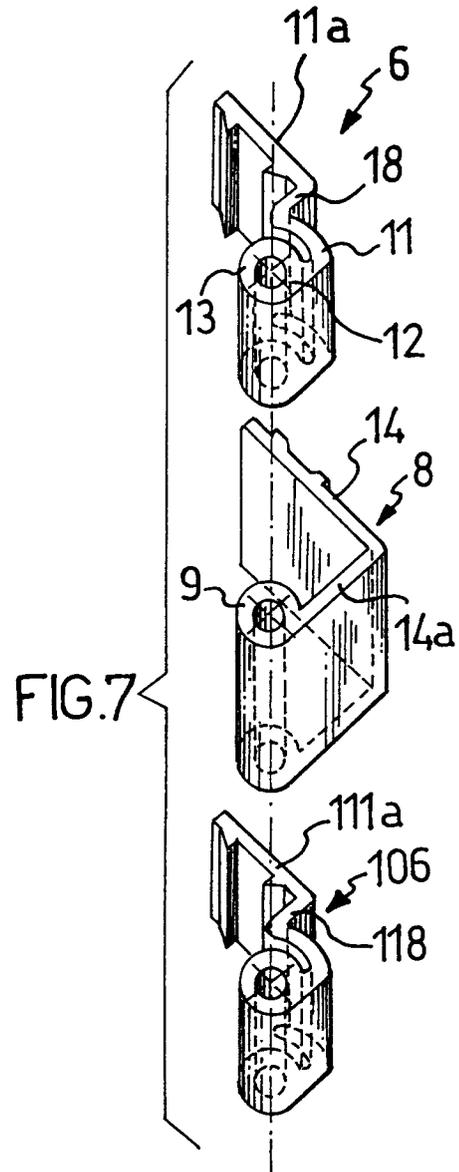
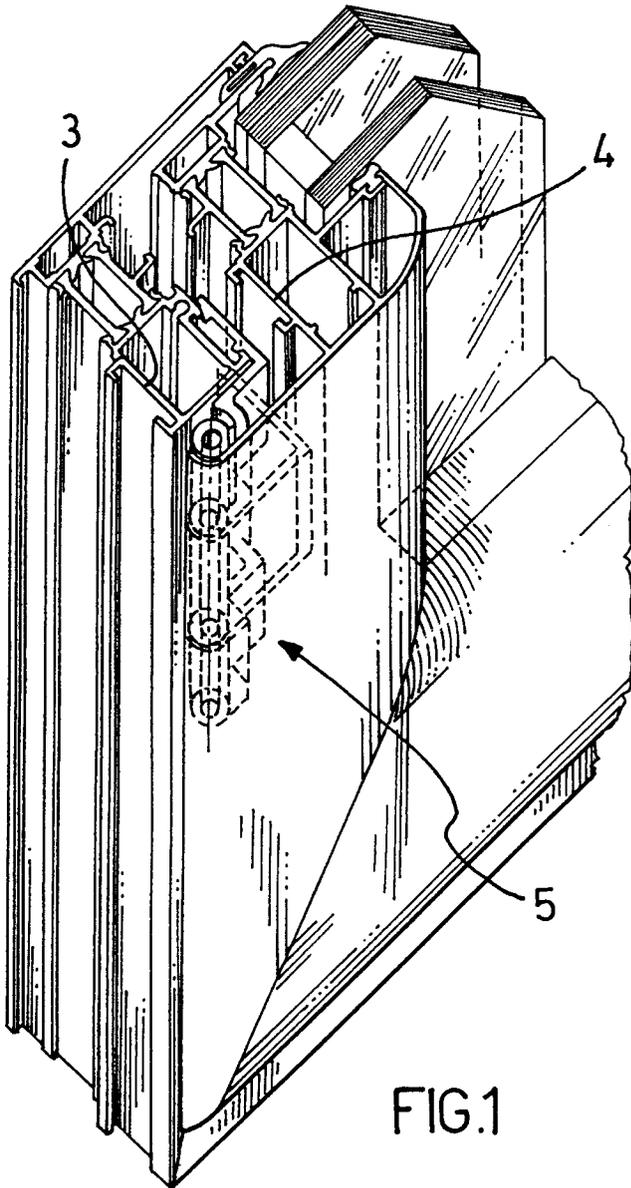
6. A casement according to any one of the preceding claims, characterized in that the first portion (11) of the hinge leaf (6) has a foot (18) for bearing on the front wall (3a) of the fixed upright member (3), the foot (18) being parallel to the second portion (12) of the hinge leaf and extending in the opposite direction thereto.

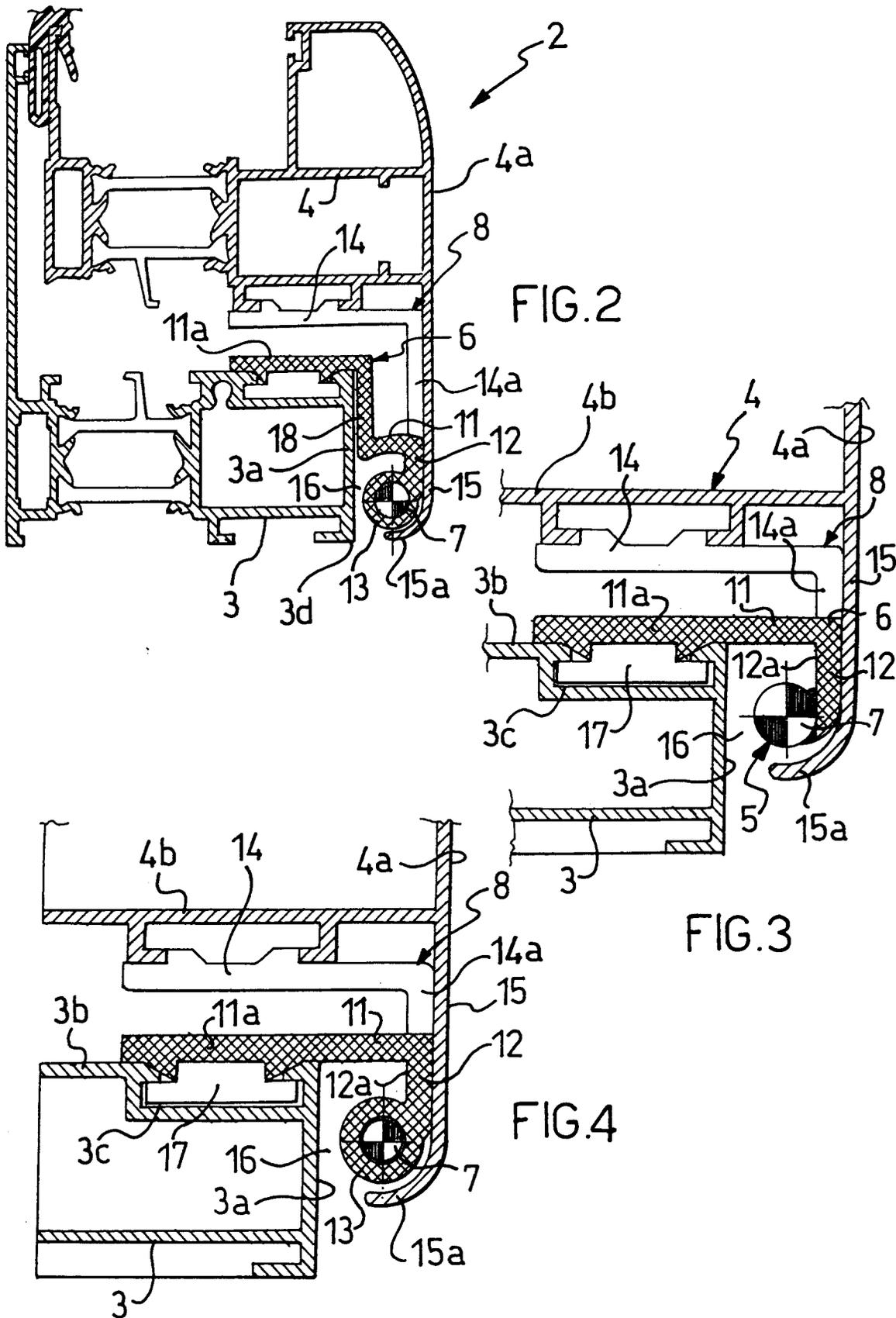
7. A hinge for so-called concealed-hinge casement, comprising at least a first and a second hinge leaf (6, 8) at least the first hinge leaf (6) being constituted by two portions (11, 12) disposed essentially at right angles, a hinge pin fixed to the second portion (12) of the hinge leaf (6) close to the free end thereof, an eye (9) fixed to the second hinge leaf (8) and mounted for rotating on the hinge pin (7) so as to be removable axially therefrom, the hinge being characterized in that the hinge pin (7) is in a substantially tangential arrangement with the inner side (12a) of the second portion (12), at a predetermined distance from the first portion (11) of the same hinge leaf.

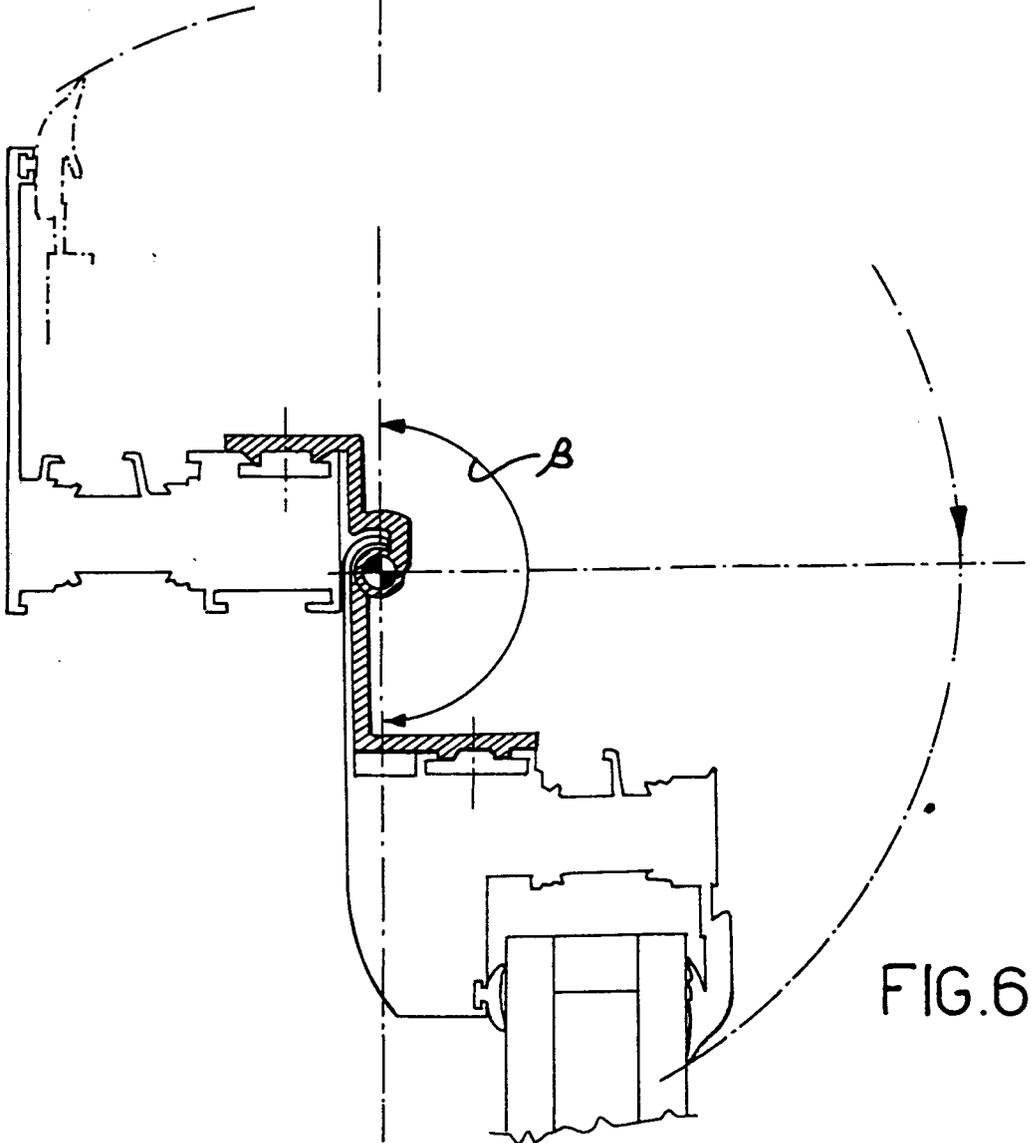
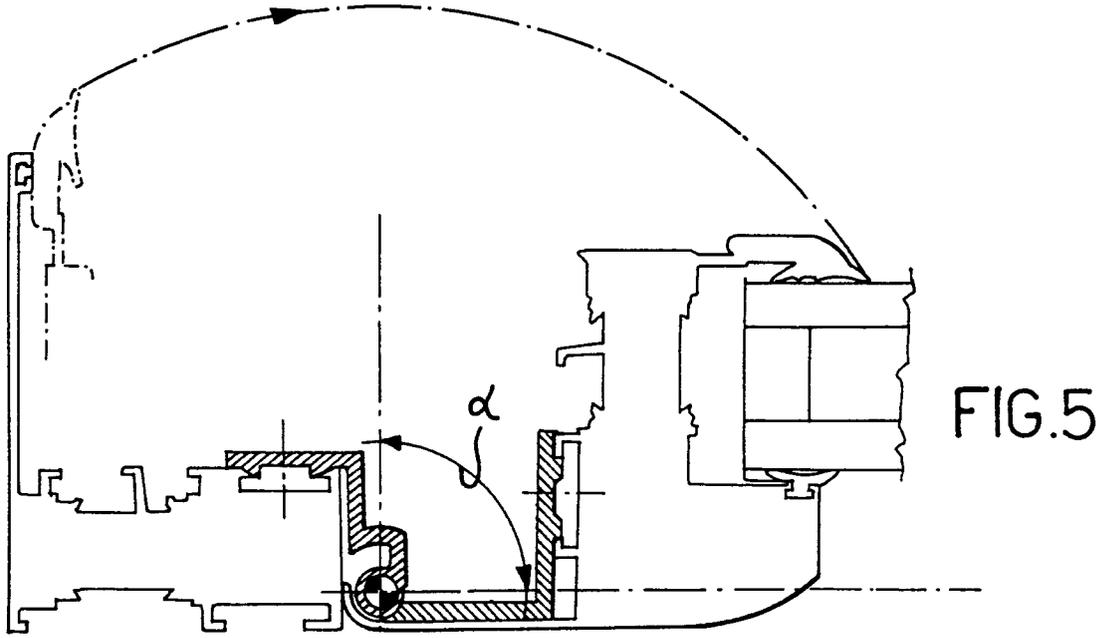
8. A hinge according to Claim 7, characterized in that the hinge pin (7) is fixed in an eye (13) formed at the free end of the second portion (12) of the hinge leaf (6) in a substantially tangential position relative to the second portion and on the side thereof which faces towards the first portion (11) of the same hinge leaf.

9. A hinge according to Claim 7, characterized in that the first portion (11) of the hinge leaf has a foot (18) parallel to the second portion of the same hinge leaf (6) and extending in the opposite direction thereto.

10. An extruded metal section for movable casement frames having a front wall (4a) with a coplanar cover (15) extending throughout the length of the section and projecting outwardly therefrom, the free longitudinal edge (15a) of the cover (15) being curved with an arc-shaped profile.









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EUROPEAN SEARCH REPORT

Application Number
EP 97 20 1985

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	FR 2 478 182 A (CARRE ALAIN) * page 1, line 21 - page 4, line 8 * * page 4, line 35 - page 5, line 9 * * page 5, line 18 - line 20 * * figures * ---	1-4,7,8, 10	E05D5/06 E06B3/36
X	EP 0 010 763 A (LOH KG RITTAL WERK) * page 1, line 1 - line 5 * * page 2, line 8 - line 14 * * page 5, line 4 - line 26 * * page 8, line 1 - line 6 * * page 8, line 29 - page 10, line 15 * * figures 1-6 * ---	1-5,7,8, 10	
X	DE 24 06 943 A (BRUEDER TSCHIRK OHG ELEKTROTEC) * page 2, paragraph 2 - paragraph 4 * * page 4, paragraph 3 - page 5, paragraph 1 * * figures * ---	1-4,7,8	
X	DE 89 10 312 U (KLÖCKNER-MOELLER ELEKTRIZITÄTS GMBH) * page 5, line 20 - page 6, line 29; figures * ---	1-10	E06B E05D
X	DE 967 781 C (ALLGEMEINE ELEKTRICITÄTS-GESELLSCHAFT) * the whole document * ---	1-4,7,8, 10	
A	FR 2 717 529 A (PECHINEY BATIMENT) -----		
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 27 March 1998	Examiner Depoorter, F
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