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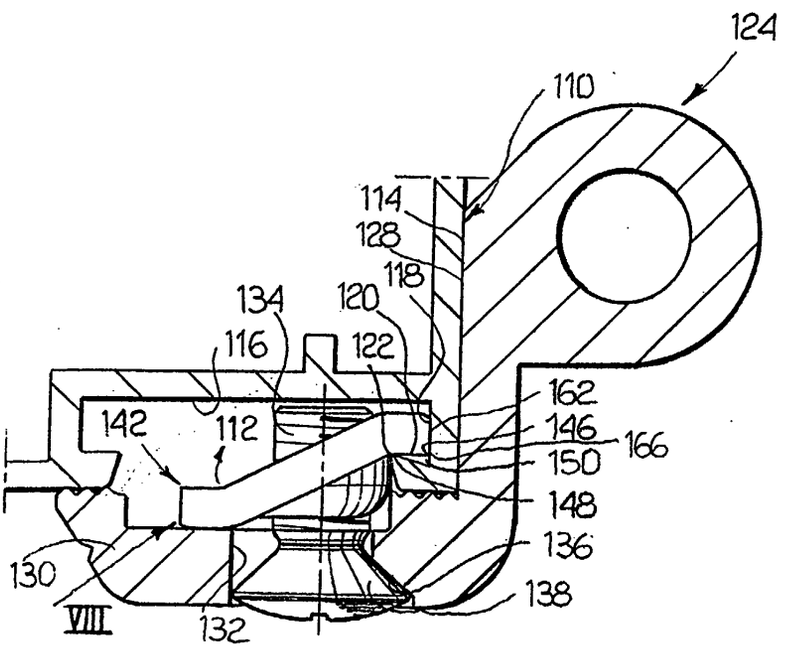
(54) "A hinge for doors, windows and similar destined for mounting on metal frames"

(57) A hinge for doors, windows and similar destined for mounting on a metal frame (110), comprising:

- a hinge element (124),
- an anchorage plate (142) with a mating surface (144) destined to rest against an undercut surface (120) of the frame (110) and a number of teeth (150) protruding from the contact surface (144), and
- at least one screw (130) that is used to engage a seat (136) of the hinge element (124) and a hole (140) on the anchorage plate (142) to tighten the mating surface (144) of the anchorage plate (142) against the undercut surface (120) of the groove (112), so as to force the teeth (150) to bite into the material forming the frame (110).

The said teeth (150) have a pyramidal shape with a triangular base and a vertex (164) arranged in correspondence to the external border (146) of the mating surface (144) such that when used, the vertex of each of the said teeth (150) bites into the corner (166) defined between an undercut surface (120) and the corresponding side surface (118) of the said groove (112).

Fig. 7



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Description

TEXT OF DESCRIPTION

[0001] The present invention relates to a hinge for doors, windows and similar destined for mounting on metal frames, and aluminium frames in particular.

[0002] Figures 1 to 4 illustrate a commercially available hinge that represents prior art known by the Applicant closest to the present invention. With reference to these figures, item 10 indicates an aluminium frame having an external contact wall 14 and an undercut groove 12. The groove 12 has a bottom face 16, two parallel side walls 18, and two undercut surfaces 20 that terminate with their respective corners 22.

[0003] Reference number 24 indicates a hinge element with a cylindrical seat 26 that is destined to engage with a pin (not illustrated) carried by a complementary hinge element, also not illustrated. The hinge element 24 has a contact surface 28 that is destined to rest against the contact surface 14 of the frame 10 and a mounting portion 30 equipped with holes 32 through which fixing screws 34 pass. Each hole 32 opens onto a seat 36 destined to receive the head 38 of the respective screw 34.

[0004] The screws 34 engage the respective holes 40 of an anchorage plate 42 that, in use, is inserted in the undercut groove 12. The anchorage plate 42 has a flat mating surface 44 that, in use, is pressed against the corresponding undercut surface 20. The mating surface 44 has an external border 46 and an internal border 48 that, in use, is pressed against the corner 22 of the frame 10. A number of triangular shaped anchorage teeth 50 protrude from the mating surface 44. The part of each tooth 50 that protrudes the most is arranged in correspondence with the internal border 48 of the mating surface 44. Figures 2 and 3 illustrate the operation of mounting the hinge element 24 to the frame 10. It may be noted that, during tightening of the screws 34, the internal border 48 of the anchorage plate 42 is pushed against the corner 22 of the frame 10, and as tightening of the screws proceeds, the teeth 50 gradually bite into the edge 22 until they reach the final mounting position illustrated in Figure 3.

[0005] The teeth 50 produce incisions on the border 22 that tend to impede movement of the hinge along the axis of the groove 12. Nevertheless, experience demonstrates that when the hinge is subjected to blows and/or high intensity loads in the direction of its axis (parallel to the axis of the groove 12), the incisions produced by the teeth 50 do not offer sufficient resistance and the hinge tends to slide with respect to the frame 10. This necessitates adjusting the position of the hinge again.

[0006] The object of this invention is to provide an enhanced type of hinge that allows the drawbacks of the hinge in accordance with the prior art to be overcome.

[0007] According to the present invention, this object is achieved by a hinge having the characteristics forming the subject of claim 1.

[0008] The characteristics and advantages of this invention will become clear from the detailed description that follows, supplied merely as a non limitative example, where:

- Figures 1 to 4, as previously described, are cross-sections illustrating the mounting sequence of a hinge in accordance with the prior art,
- Figure 4 is a perspective view of the anchorage plate, indicated by arrow IV in Figure 1, of the hinge in accordance with the prior art,
- Figures 5, 6 and 7 are cross-sections illustrating the mounting sequence of a hinge in accordance with the present invention, and
- Figure 8 is a perspective view of the anchorage plate, indicated by arrow VIII in Figure 5, of the hinge in accordance with the present invention.

[0009] In Figures 5 to 8, the details corresponding to those previously described are indicated using reference numbers incremented by 100. With reference to Figure 8, the anchorage plate 142 includes a series of spaced-out sectors 160, each having a mating surface 144 and a front surface 162. The mating surface 144 has an external border 146 and an internal border 148. The external border 146 essentially forms a 90° angle between the front surface 162 and the mating surface 144. Anchorage teeth 150 are formed on the mating surface 144. In accordance with the present invention, the anchorage teeth 150 have a substantially pyramidal shape with a triangular base and with the part that protrudes most from the mating surface 144 arranged in correspondence with the external border 146. Each tooth 164 has two sides that protrude from the mating surface 144 and converge to an edge that terminates in a vertex 164. This edge is tapered from the vertex 164 towards the internal border 148. The base of each pyramidal tooth is effectively contained in a plane passing along the front surface 162.

[0010] With reference to Figures 5 to 7, the position of the seat 136 with respect to the contact surface 128 of the hinge element 124 is determined such that in the hinge's final mounting configuration, the front surface 162 of the anchorage plate 142 is pressed against the side surface 118 of the channel 112. In this way, the vertex 164 of each of the teeth 150 comes into alignment with the corner 166 formed between the side surface 118 and the undercut surface 120 of the groove 112. As is clearly illustrated in Figures 6 and 7, during tightening of the screws 134, the teeth 150 cut the corner 166 and bite into the material forming the frame 110. The form of the teeth 150 favours their penetration, since the teeth start to bite from the vertex 164, as illustrated in Figure 6.

[0011] Experimental tests carried out by the Applicant have demonstrated that, where other conditions are equal, the hinge in accordance with the present invention offers a significantly more robust mounting with re-

spect to the previously described hinge in accordance with the known technique. In fact, while the border 22 of the frame section is relatively fragile and can easily be deformed under the action of blows or high-intensity loads acting along the axis of the hinge, the corner 166 represents a significantly more robust zone. The insertion of the teeth 150 in the corner 166 of the frame section 110 provides extremely solid anchoring of the plate 142 and prevents the plate 142 from sliding in the direction of the hinge's axis in a very effective manner. The anchorage effect of the teeth 150 is also particularly effective because, during solicitations, it prevents movement between the wall 162 of the plate 142 and the wall 118 of the frame.

Claims

1. A hinge for doors, windows and similar destined for mounting on a metal frame (110), comprising:

- a hinge element (124), with a contact surface (128) destined to rest against an external surface (114) of the frame (110),
- an anchorage plate (142) with a mating surface (144) destined to rest against an undercut surface (120) of the frame (110), where the mating surface (144) has an external border (146) and an internal border (148), where the anchorage plate (142) has a front surface (162) facing towards a side surface (118) of the said groove (112) and which forms, together with the said mating surface (144), the said external border (146), and where the anchorage plate (142) includes a number of teeth (150) protruding from the mating surface (144), and
- at least one screw (130) that is used to engage a seat (136) of the hinge element (124) and a hole (140) on the anchorage plate (142) to tighten the mating surface (144) of the anchorage plate (142) against the undercut surface (120) of the groove (112), so as to force the said teeth (150) to bite into the material forming the frame (110),

characterized by the fact that the said teeth (150) have a pyramidal shape with a triangular base and are arranged such that the part that protrudes the most (164) is on the said external border (146) of the mating surface (144), such that when mounted, the vertex (164) of each of the said teeth (150) bites into the corner (166) defined between the undercut surface (120) and the corresponding side surface (118) of the said groove (112).

2. A hinge according to Claim 1, **characterized by** the fact that the said seat (136) of the hinge element (124) is positioned with respect to the contact surface (128) such that, in use, the said front surface (162) of the anchorage plate (142) is pressed against the side surface (118) of the groove (112).

3. A hinge according to Claim 1, **characterized by** the fact that each of the said teeth (150) has two sides converging to an edge that is tapered from the vertex (164) to the mating surface (144).

PRIOR ART

Fig. 1

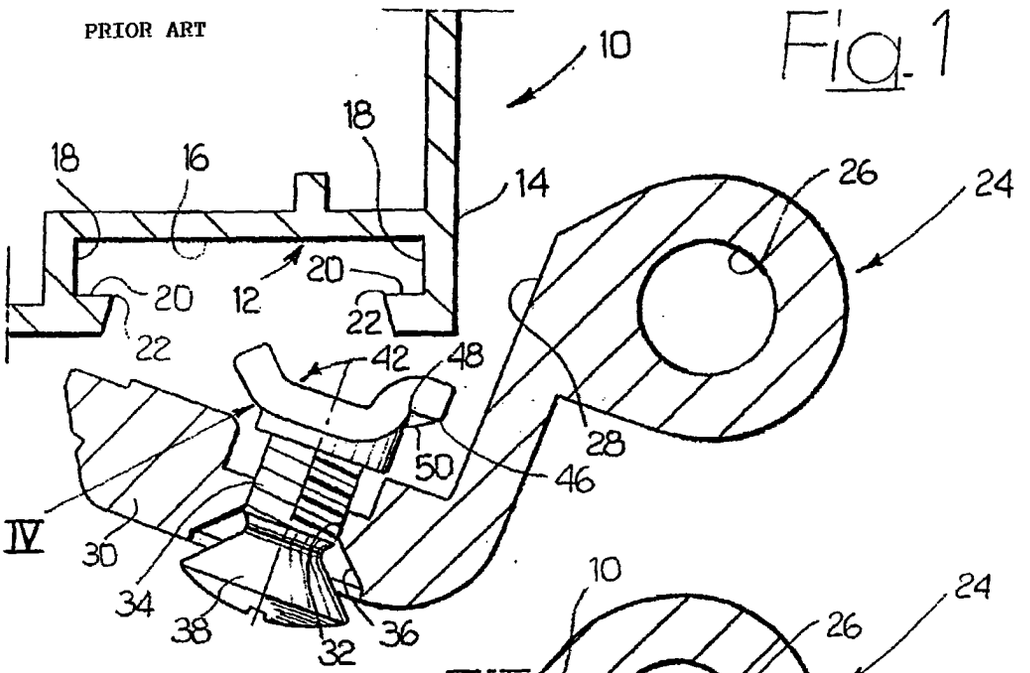


Fig. 2

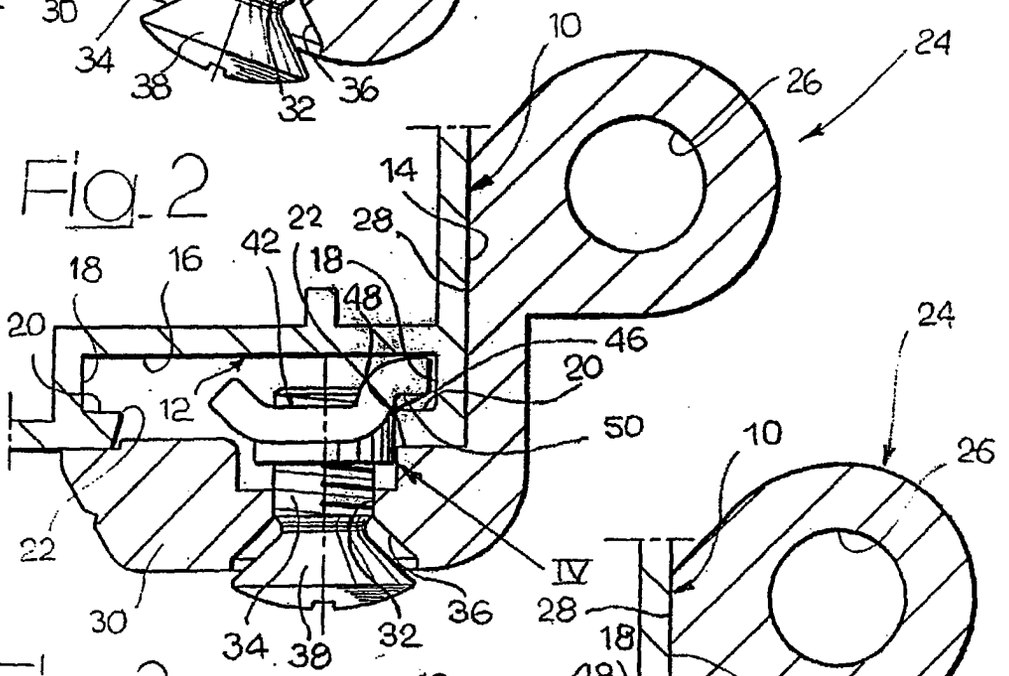


Fig. 3

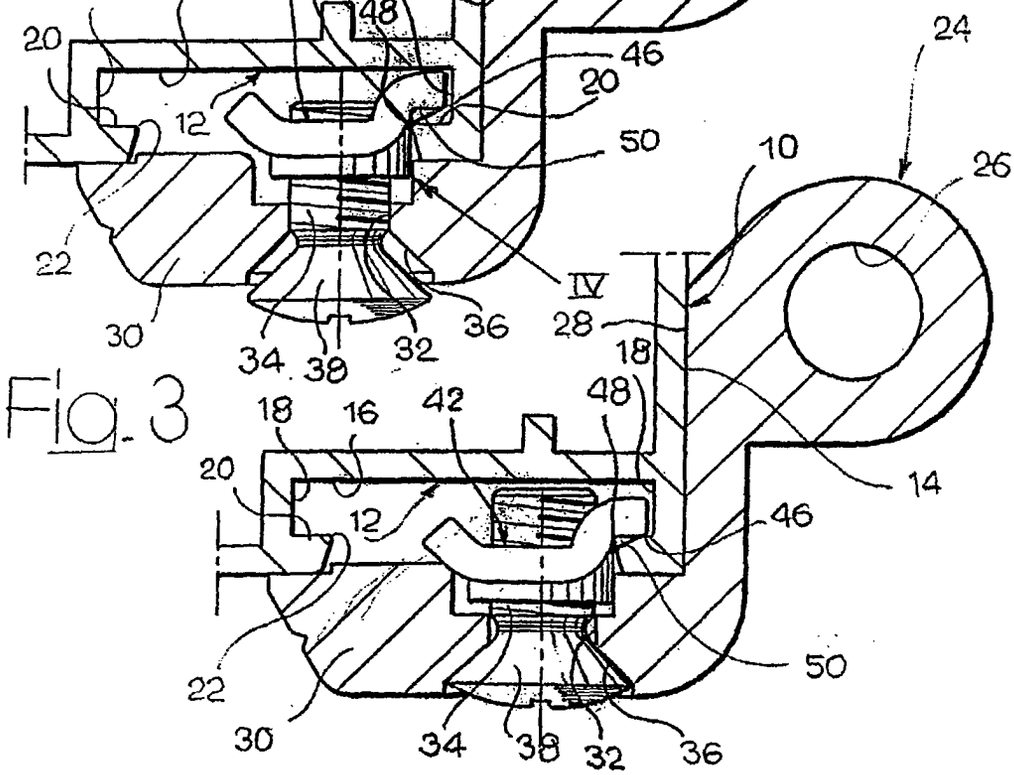
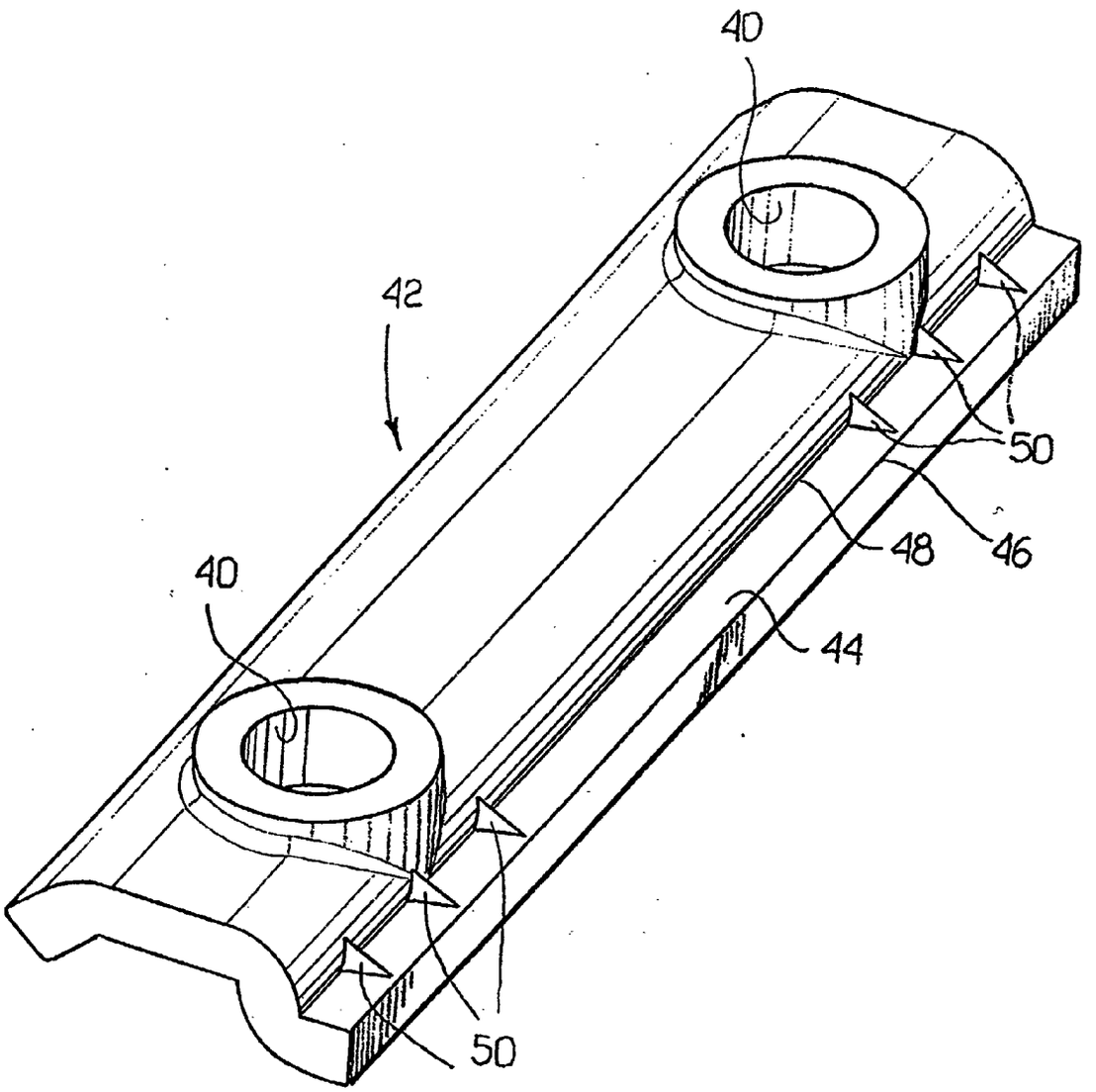


Fig. 4



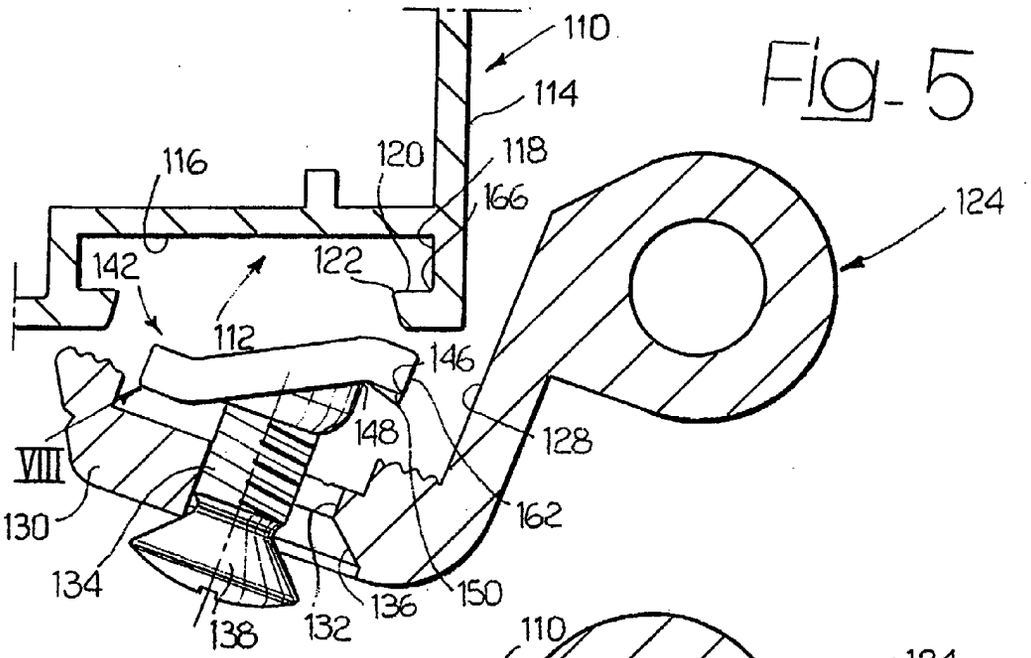


Fig. 5

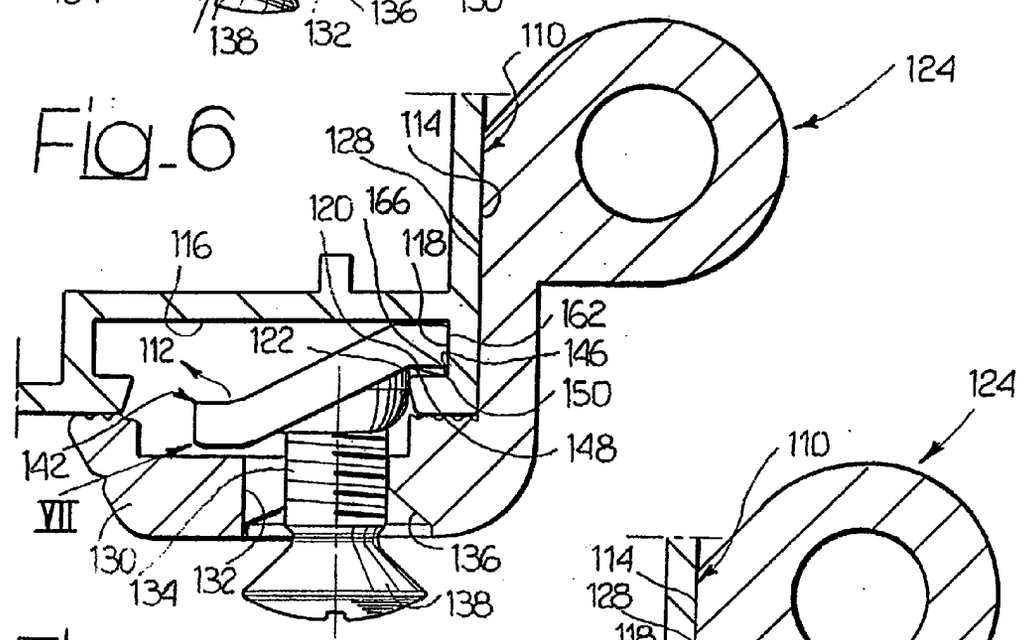


Fig. 6

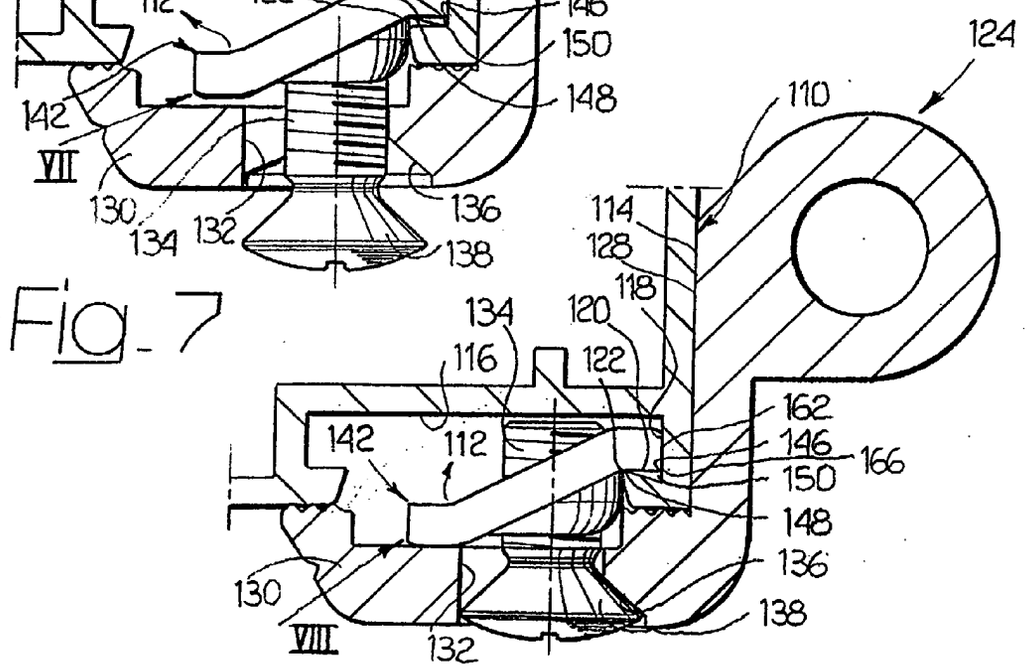
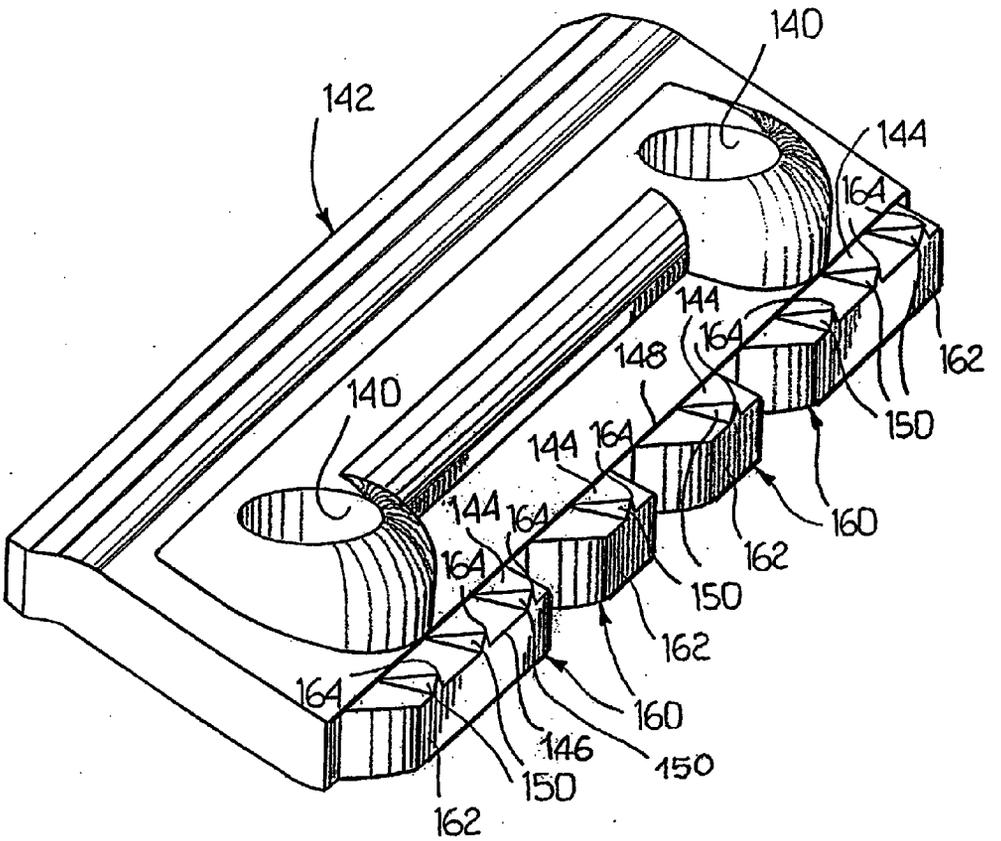


Fig. 7

Fig. 8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EUROPEAN SEARCH REPORT

Application Number
EP 02 00 5830

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.7)
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A	DE 18 17 951 A (VER BAUBESCHLAG GRETSCH CO) 13 March 1975 (1975-03-13) * page 6, paragraph 2; figure 1 *	1	

TECHNICAL FIELDS SEARCHED (Int.Cl.7)

E05D
E05C

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	25 June 2002	Moreau, C

CATEGORY OF CITED DOCUMENTS

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EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 02 00 5830

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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25-06-2002

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