(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) Publication number: **0 012 575**
A1

(12) EUROPEAN PATENT APPLICATION

(21) Application number: **79302812.7**

(22) Date of filing: **06.12.79**

(51) Int. Cl.³: **E 05 D 11/10**

(30) Priority: **09.12.78 GB 4785378**

(43) Date of publication of application: **25.06.80 Bulletin 80/13**

(84) Designated Contracting States: **AT BE CH DE FR GB IT LU NL SE**

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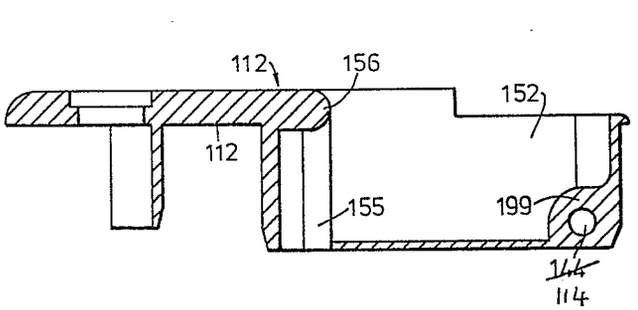
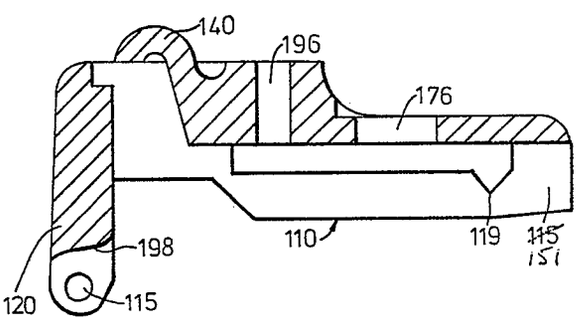
(54) Cabinet hinge.

(57) A cabinet hinge has two leaves (110, 112) each moulded from synthetic plastics material and pivotted together (114, 115) on assembly. One leaf (110) is L-shaped and the other (112) has a well to receive one limb (120) of the other leaf (110), which has a resilient extension part (140) presenting a convexity to engage on abutment (156) on the one leaf (112) and give successive progressive resistance and progressive latching of the leaves into their 90° position. The L-shaped leaf (110) is of channel section to fit by a screw through holes 176 on a mounting plate having grooving to cooperate for location and adjustment purposes with teeth (119) and forming a bearing surface for another screw through hole (196) also for adjustment purposes. The hinge leaves may have integral pivot formations and the L-shaped leaf can be secured directly rather than via a mounting plate.





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Applicant: Pyramid Plug Company Limited

Title: Cabinet Hinge.

DESCRIPTION

The invention relates to hinges and has particular, though not necessarily exclusive, application to so-called cabinet hinges for the attachment of doors to furniture units such as casings of cupboards, cabinets or like articles of furniture.

It is advantageous if such hinges can be provided with resilient means to serve as a catch for a door in its closed position by its action in a final small arc of closing movement. Also, of course, further advantage accrues if such hinges can be made, especially moulded, from synthetic plastics material that incorporate such resilient means and are readily assembled together. It is therefore an object of this invention to provide a hinge construction that meets these objectives.

To this end, we propose a hinge comprising two leaves that are each wholly of moulded plastics material and are hinged together at a pivot axis for relative rotation of the leaves, one of said leaves having an integral resilient part presenting a convexity, and the other of said leaves having a cavity and an abutment past which said resilient part must pass to enter into said cavity during a final arc of relative rotation of

the leaves to their closure position, said resilient part and said abutment having a mutual sliding action that first progressively compresses said convexity with subsequent holding-entrapment by the abutment, preferably by way of progressive expansion of said convexity.

In using the term "convexity" we do not intend necessarily to imply a surface of continuous or constant curvature, though such is generally preferred and will be specifically described. However, U-, or V-shapes or chamfers separated by a medial land or flat might be employed, as could asymmetrical curvatures and slopes.

Preferred hinges have a first leaf of generally L-shape and a second leaf having a well or slot as said cavity to accommodate one limb of the first leaf in a "closed" position of the hinge leaves wherein surfaces to which the hinge leaves are to be attached are at substantially 90^{o} one to the other. Mutual hinging may be on a metal pivot pin or may be between formations at or near the end of said one limb and at or near the bottom of said well or slot. The first leaf then may have said integral resilient part as an extension directed generally oppositely and, often, towards said one limb to terminate in a bent or hooked end turned towards said one limb. A suitable cooperating abutment of the second leaf is a ledge or

lip at or near the top of the well or slot of the second leaf.

Preferred hinge leaves with integral pivot formations permit of ready assembly of their inter-engaging formations without the use of tools. Thus, the desired pivotting and retention may be provided by protrusions on one leaf to cooperate with recesses on the other leaf also having lead-in grooves of progressively reducing depth for the protrusions so that the two leaves may be slid one into the other in assembly. Furthermore, mutual abutments may be provided in the hinge leaves to limit relative rotation of the assembled hinge leaves to give a maximum of substantially 90^{o} of permitted movement.

Specific embodiments of the invention will now be described, by way of example, with reference to the accompanying drawings, in which:

Figures 1 and 2 show plan and part-section side views of a first embodiment;

Figures 3 and 4 show plan and part-section side views of disassembled leaves of a second embodiment;

Figure 5 is another sectional view of the embodiment of Figures 3 and 4 with the leaves assembled and the hinge in its "closed" position;

Figures 6 and 7 are plan and side views of parts of a third embodiment;

Figure 8 is a section of what is shown in Figures 6 and 7;

Figures 9 and 10 are plan and side views of a mounting plate; and

Figure 11 is a side view of an alternative mounting plate.

Referring first to Figures 1 and 2, a hinge is shown comprising two leaves 10 and 12 each moulded from synthetic plastics material. Hinge leaf 12 will normally be affixed to a door and hinge leaf 10 to a casing of a furniture unit. Hinge leaf 10 is of generally L-shape and one of its limbs includes an affixing plate portion 16 with a raised boss 18 and extension 20 of less width but much greater thickness than the plate portion 16. The other limb 22 of the hinge leaf 10 extends from the free end of the extension 20 substantially at right angles to the plate portion 16 and beyond affixing abutment surface 24 thereof to terminate with side recesses 25A for pivot pin protrusions 25B of the other leaf 12.

The affixing plate portion 16 has screw-accommodating elongate holes 26, 28 for positional adjustment purposes and a locking hole 30, all in surface recesses of the affixing plate portion. A further hole 32 is provided extending through the hinge leaf 10 from a recess 34 in the boss portion 18 for a screw-fitting adjuster or bolt (not shown) to lift the hinge leaf in accommodating to surface irregularities or warping.

The extension 20 of the hinge leaf 10 has a hole

36 through its thickness and bounded at the free end of the extension by a wall 38 that can be viewed as an extension of the other limb 22 of the hinge leaf 10. Extending across the outer end of the hole 36 from the boss portion is a resilient curved or hooked part 40, protruding convexly from the top of the boss and extension portions 18 and 20, and terminating in a free end 42. The resilient convex part 40 is thus free to flex with its free end 42 entering into the hole 36 to a variable extent.

The other hinge lead 12 has upper fixing flanges or ears with affixing screw-accommodating holes 46, 48 for fitment with a central portion in a recess. This central portion forms an inner well or slot 50 dimensioned to accommodate limb 22 and extension 20 of the hinge leaf 10 preferably with a close tolerance on the extension 20 by virtue of the width of well or slot part 54 beyond a wider part 52. An abutment 56 in the form of a ledge at the termination of well or slot part 54 is provided to coact with the resilient convex part 40 of hinge leaf 10. The abutment 56 is above a slot 58 to accommodate the part 40 when the leaf 10 is rotated, from the position shown, through 90^{o} counterclockwise.

During a small final arc of such rotation of the hinge leaf 10, the resilient convex part 40 will engage the abutment ledge 56 and, in sliding thereover,

present a progressive resistance whilst the convex part is compressed. This will be followed by a progressive decrease of such resistance once the position of maximum convexity of the part 40 has passed the lower edge 60 of the abutment ledge 56. At that time, expansion of the compressed convex part 40 will positively assist in bringing the hinge leaf 10 to its terminal "closed" hinge leaf position, i.e. towards the abutment of the leaf end wall 38 and the abutments 56. Such action is enhanced and facilitated by smooth curvature of the lower edge 60 of the abutment 56 which may depend below a thickening or reinforcement 62 of the abutment 56 to resist flexing thereof and thus improve final positive forces exerted by the resilience of the convex part 40 alone.

Limitation of movement beyond the 180° position shown is provided for by lugs 64 on the leaf limb 22 cooperating with cut back parts of the slot or well walling of the other leaf at positions flanking its accommodation of the leaf limb 22 for pivotting purposes.

The hinge of Figures 3, 4 and 5 has leaves 10' and 12' corresponding generally with those of Figures 1 and 2 and only the more advantageous modifications will be described. Thus, the resilient part 40' starts from below the top level of the boss 18' so that its convexed

free part is longer and so may be more robust for the same resistance to flexing. An alternative 40" is also shown with a heavier duty root attachment to the hose 18'. Also, the cooperating abutment 56' has no depending lip and is thus simpler to mould. Greater detail is also shown of the pivot pins 25B' and recesses 25A', and the lugs 64' to limit outward opening with curvature of the cut back parts 66 of the other leaf to facilitate close spacing therebetween.

Reducing depth lead-in grooves 20 are also shown on hinge leaf 10 to allow its insertion into leaf 12 from below as viewed in Figure 3. These grooves are offset from recesses 25A' at least at their deepest entry parts and sufficiently therefrom to allow the abutment lugs 64' to clear the pin mounts below cut-backs 66 that are shown as being curved to cooperate with curving of the lower part of lugs 64' in lightly latching the two leaves at the limit of their outward opening from their 90^{o} position. The open hinge slot and tapers on the hinge pins 25B' assisting flexing to allow the small amount of relative movement required for the keys 64' to clear the slight obstruction presented by the forward edges of the cutbacks 66.

Figures 6 to 8 show hinge leaves 110 and 112 hinged by way of a metal pivot pin 111 press-fitted through holes 113, 114 in leaf 112 and holes 115 in leaf 110 at a location position whereat a bifuration

of leaf 110 carrying holes 115 straddles a tongue of leaf 112 carrying hole 114 aligned with holes 113.

The leaf 112 is shown with a continuous outer wall 151 abouts its inner wall 150, which will be generally rectangular with light walling 153 thereto. The wall 151 is also provided with slightly proud ribbing on up to one half thereof about the hinging position to aid location in a mounting hole of a cupboard.

Also, the leaf 112 has an affixing plate 117 that is at a level above thetop of the forward hinge-bearing, half of the leaf 112. Single screw fixing is optional but adequate,as shown at 146, because the leaf will then be located also by a hole cut to house the wall 151. However, additional location is afforded by a quadrant projection 147.

Compared with the other embodiments, leaf 110 is narrow in overall dimensions. It has a boss 118,and a curved latching part 140 that resembles the part 40' of Figures 3 and 4 to cooperate with an abutment ledge 186 of leaf 112 below which the well walling 153 is apertured between strong posts 155 each integral with well wall 151 at one corner.

The mounting portion 116 of leaf 110 is actually of channel section, see Figure 8, and each side wall 115 thereof has an inner and upper thickening or rib 117 that terminates at its rearward end in a tooth 119. The rib 117 and tooth 119 cooperate with a generally

rectangular mounting plate, see Figures 9 to 11, that fits within the channel with a raised central part 182, to fit between the ribs 117, and side ledges 183, 184 butting under the ribs 117 at medial parts thereof and relieved with to multiple grooves towards their ends, e.g. 185, to locate on the teeth 119.

Three holes 186, 187 and 188 are shown through the mounting plate, the end ones 186 and 187 being for securement of that plate to a cupboard or the like and the third 188 to serve for a self-tapping screw 175 by which the leaf 110 is secured to the mounting plate via an elongate hole 176 in the mounting portion 116 of leaf 110. The elongation of that hole 176, and the grooving 185 of the mounting plate in cooperation with the teeth 119, readily permit adjustment of the position of leaf 110 along the length of the mounting plate.

Two versions 180 and 181 of the mounting plate are shown, the former for screw fixing via the holes 186 and 187, and the latter with integral exteriorly grooved or toothed cylindrical projections 189 and 190 of those holes for mounting by way of dowels 191, 192 to spread the projections after they have been inserted into pilot holes.

Further adjustment of the leaf 110 is obtained using a screw 195 that is self-tapping in hole 196 through the boss 118 to bear on the raised portion 182 of the mounting plate 180, 181.

It will also be noted that the limb or extension 120 of the leaf 110 is, in this embodiment, provided with undercuts 193 at its sides to clear cut-backs 166 on the leaf 112 and that the bridge surface 198 between bifurcations carrying holes 115 is curved to clear upper surface 199 of the tongue carrying hole 114. Preferably, the latter cooperate to latch the hinge leaves lightly, or at least frictionally, at or near their open limit.

The invention offers very substantial advantages in permitting the hinge leaves, and the mounting plate of Figures 9 to 11, to be made entirely from synthetic plastics material each in a single moulding operation and thereby avoids the disadvantages of fitting together plastics and metal parts (save for screws and the hinge pin of Figures 6 to 8) and thus different sources of manufacture and supply for such parts. Such substantially "all-plastics" hinges are thus cheaper and more convenient to manufacture and the various features thereof contribute and combine in various ways to enable the achievement of a device of appropriate strength and convenience of operation.

It will be appreciated that the hinges illustrated are capable of substantial variation of detail and overall design, for example as to size and shape of affixing parts, location of screw holes, alternative affixing means, position and shape of movement

limiting abutments, and position, shape and number of the resilient part or parts and abutment or abutments therefor . For example, the resilient part could extend from wall 38 in the opposite direction to that shown, or be wholly within the leaf structure and cooperate with obtruding abutment means in the other leaf, or even be on the other hinge leaf. Also its convexity could have differing curvatures to each side of its parts to be of double wedge shape. Also, the pins and recesses for pivotting may be on either leaf, and/or lead-in grooves may be on either leaf.

It will be appreciated that, with leaves 12, 12' fitted to a door and leaves 10, 10' to interior casing wall, the hinges described will be wholly concealed when the door is closed. Also, the hinges are fully adjustable on the elongate holes 26, 28 and via an adjuster in hole 32 without removal from a door or carcase. The positive closure forces from the resilient parts 40, 40' are substantial and can provide a net bias in the closed position of a door that can obviate any need for door catches. It should also be noted that especially the hinge of Figures 3 and 4 is well suited to having its hinge leaves moulded from synthetic plastics material, such as a thermoplastic composition, so that the resulting hinge will be substantially free of corrosion and metal fatigue in normal use.

It will be appreciated that the hole 32 is not readily moulded with a screw thread for its adjuster screw or bolt so that the latter is preferably of a self-tapping type. As this type of adjustment may not always be called for, we also envisage an incorporated break-off leaf or disc for engagement by the adjuster end, both to give a preferred bottom finish of the hinge leaf and to protect the fitting surface, even to spread the adjuster end loading thereof.

Applicant: Pyramid Plug Company Limited

Title: Cabinet Hinge.

CLAIMS

1. A cabinet hinge comprising two leaves each comprising a single plastics moulding and hinged together when assembled for relative rotation of the leaves, one of said leaves having an integral resilient part presenting a convexity, and the other of said leaves having a cavity and an abutment past which said convexity must pass on entry into said cavity during a final arc of relative rotation of the leaves into their closure position during which said resilient part and said abutment have a sliding action that first progressively compresses said convexity before subsequent holding entrapment by the abutment.

2. A cabinet hinge according to claim 1, wherein the convexity and the abutment ensure that said holding entrapment is accompanied by progressive relaxation of said convexity, and wherein said one leaf is of generally L-shape to hinge to the other leaf at or near one end, and the other leaf has a well as said cavity, the well accommodating the hinged limb of the one leaf in a closed position of the hinge where the unhinged limb of the one leaf and the other leaf extend substantially at right angles to each other.

3. A cabinet hinge according to claim 2, wherein the

one leaf has said resilient part as an extension from a medial part of its unhinged limb first towards the other leaf in the closed position of the hinge and then curved therefrom towards the unhinged limb to afford a bent or hooked shape as said convexity, and wherein said extension is from within a recess of the unhinged limb.

4. A cabinet hinge according to claim 3, wherein the abutment is a lip-like ledge near the top of said well.

5. A cabinet hinge according to any one of claims 2 to 4, wherein the well is a slot open to its side at the hinging position.

6. A cabinet hinge according to claim 5, wherein the hinge leaves have integral cooperating formations affording said hinging when snap fitted together.

7. A cabinet hinge according to claim 6, wherein the one leaf has recesses accommodating hinge pin projections of the other leaf and its said slot, and the one leaf has grooves leading to said recesses with progressively decreasing depth to aid assembly.

8. A cabinet hinge according to any one of claims 2 to 4, wherein the other leaf has a substantial wall about its well for location purposes in conjunction with a spaced screw mount hole in a flange.

9. A cabinet hinge according to claim 8, wherein the flange also has a locating extension adjacent its screw mount hole.

10. A cabinet hinge according to claim 8 or claim 9, wherein the wall about the well has part-circumferential

grooving to aid retention in an accommodation therefor.

11. A cabinet hinge according to any one of claims 8 to 10, wherein the flange is proud of the well embodied in the height of the leaf.

12. A cabinet hinge according to any one of claims 8 to 11, wherein the leaves are hinged by a metal pin pressed therethrough.

13. A cabinet hinge according to any one of claims 2 to 12, wherein the other limb of the one leaf is of channel section to fit over a mounting plate of moulded plastics material, and wherein the mounting plate is shaped to fit within and below ribs on upper parts of walls of the channel section, end edge parts of the mounting plate being grooved to assist selective location on end teeth of said ribs.

14. A cabinet hinge according to claim 13, wherein the mounting plate has a hole to which the one hinge leaf is adjustably secured by a self-tapping screw through an elongate hole in the leaf, and the one leaf has a further hole for a self-tapping screw to pass and bear against the mounting plate.

Agents: ROYSTONS P646

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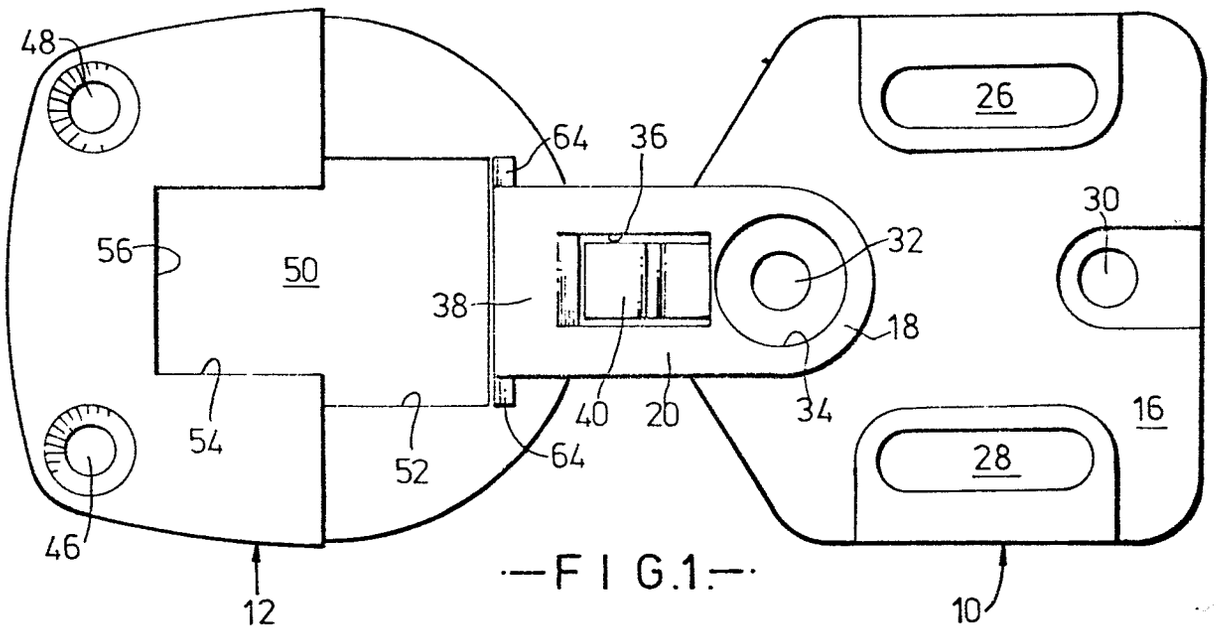
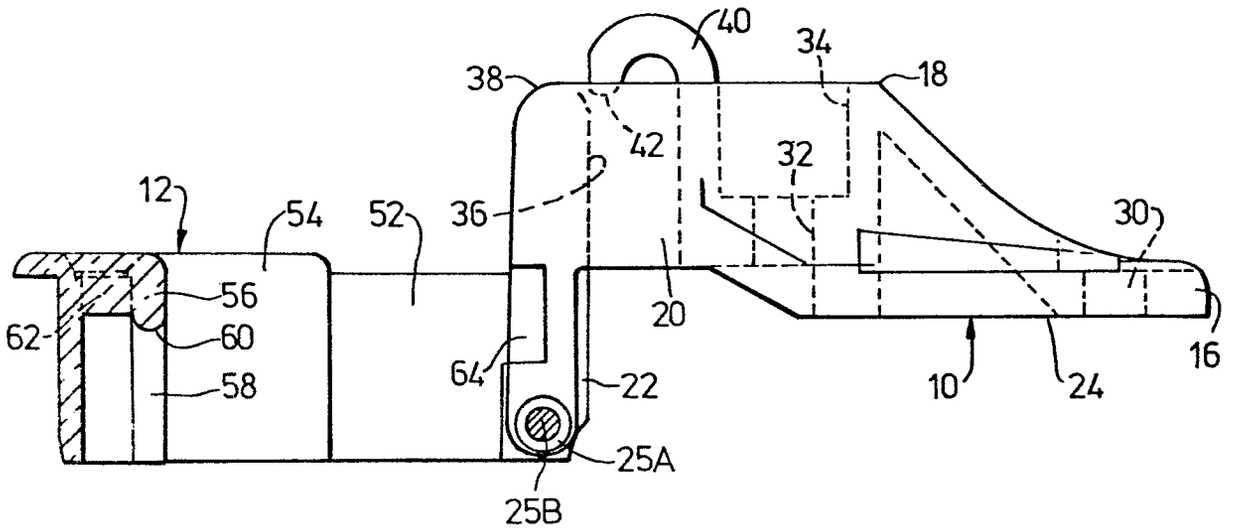


—FIG.1—



—FIG.2—

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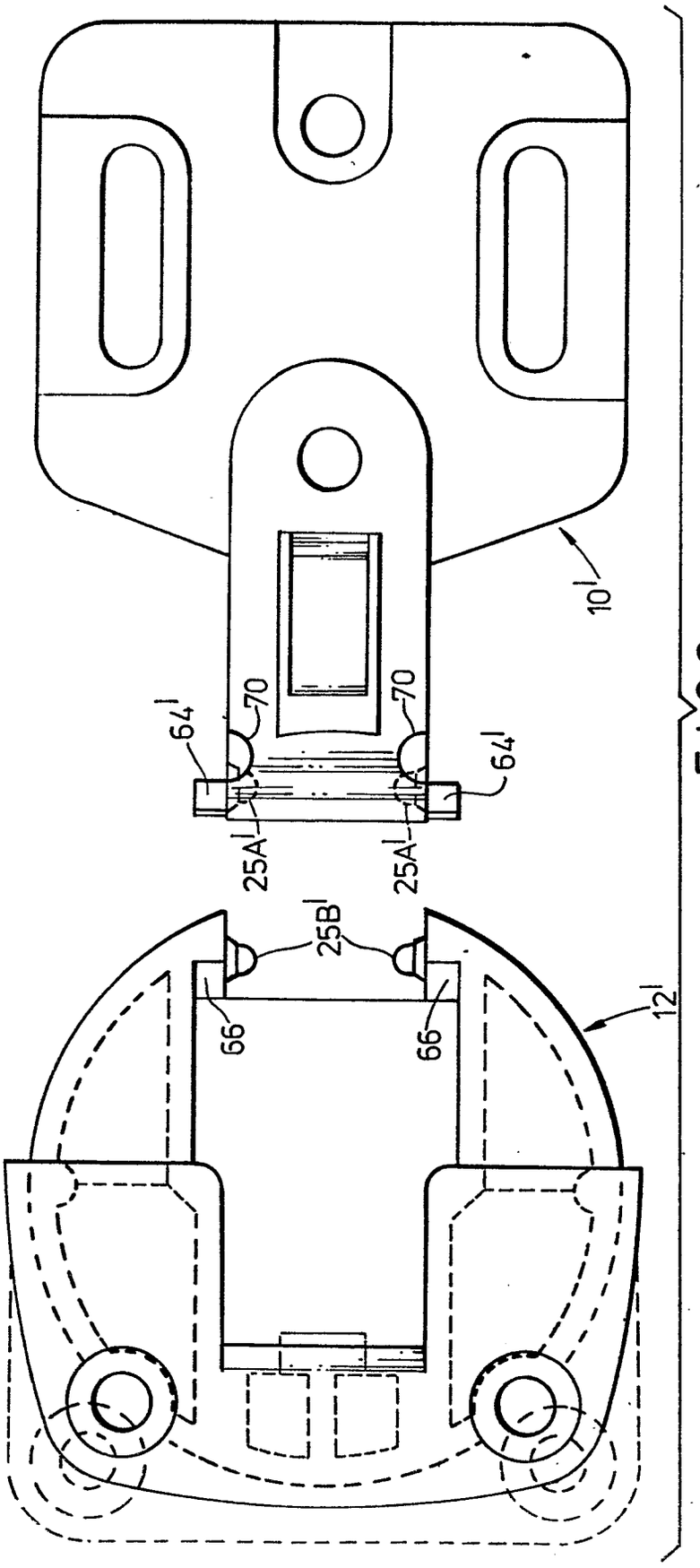

FIG.3.

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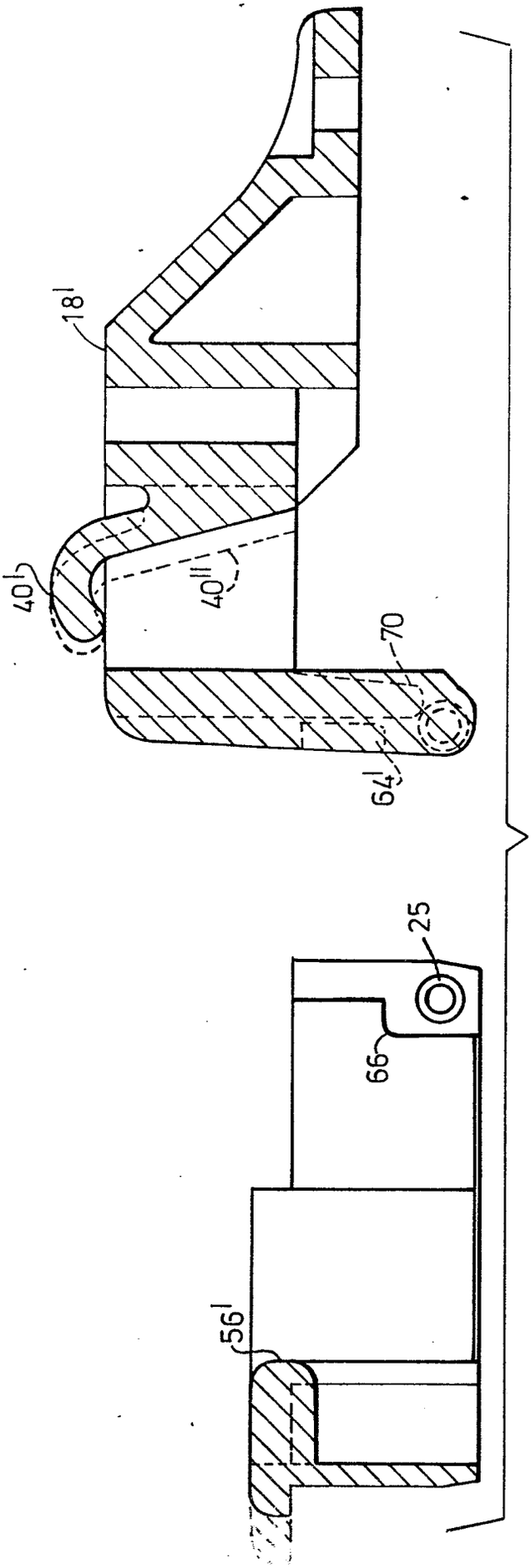

FIG.4.

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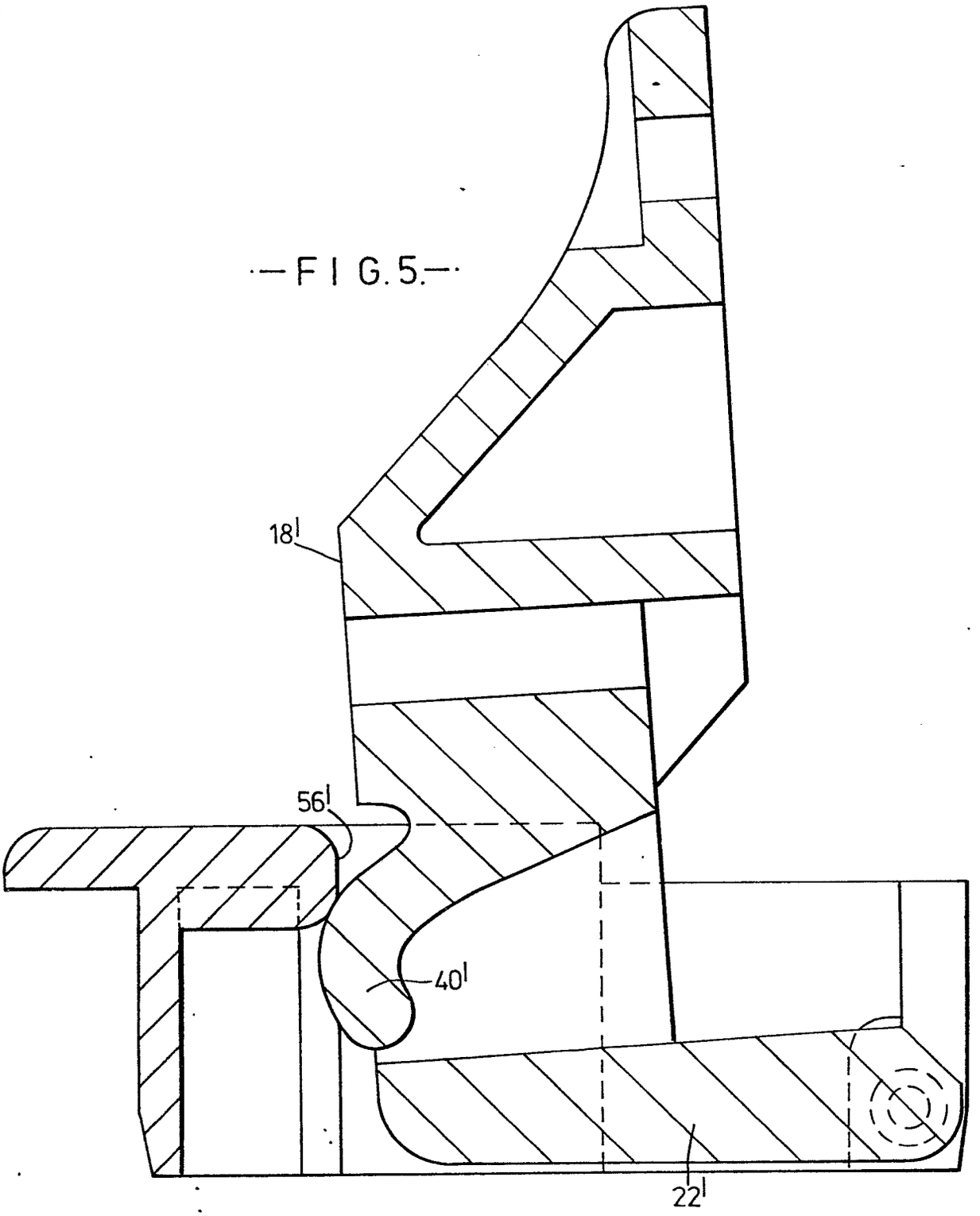
—FIG.5.—



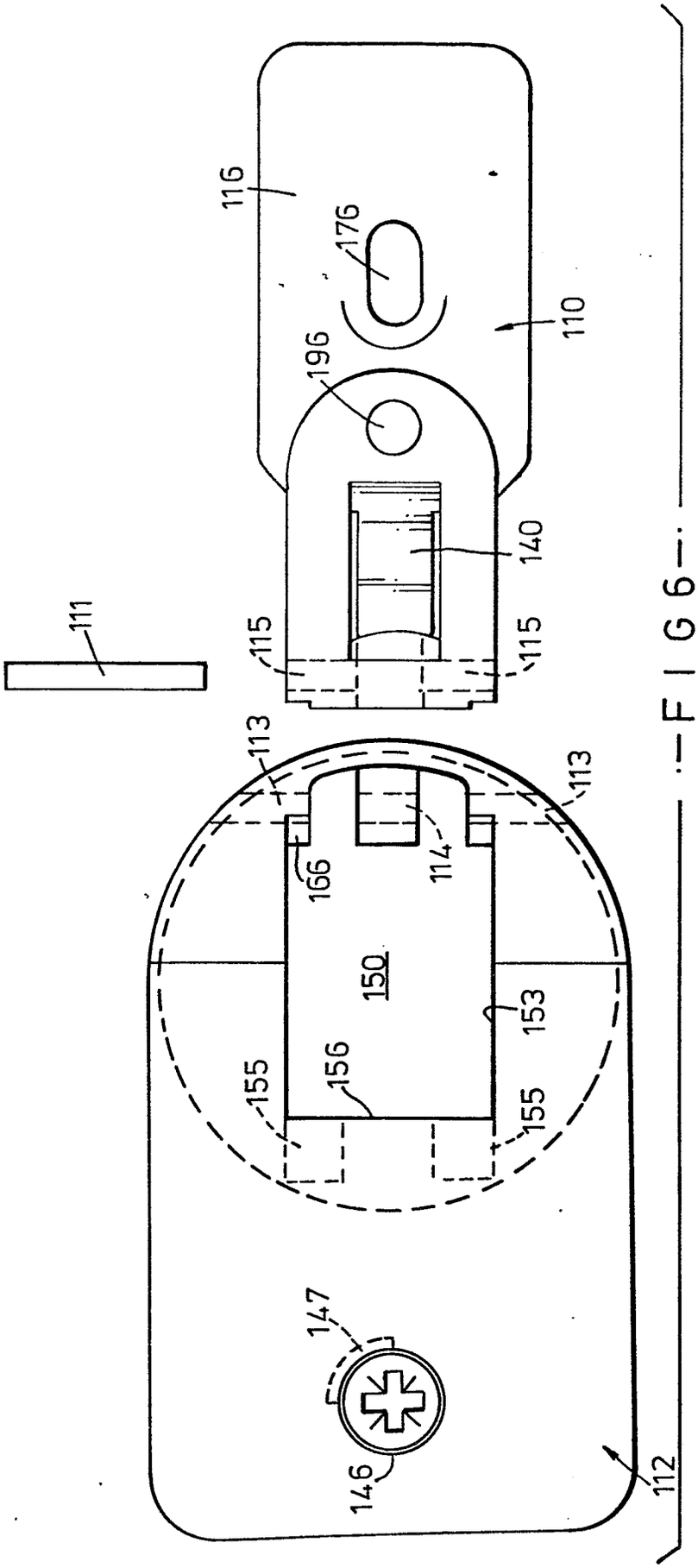

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FIG 6

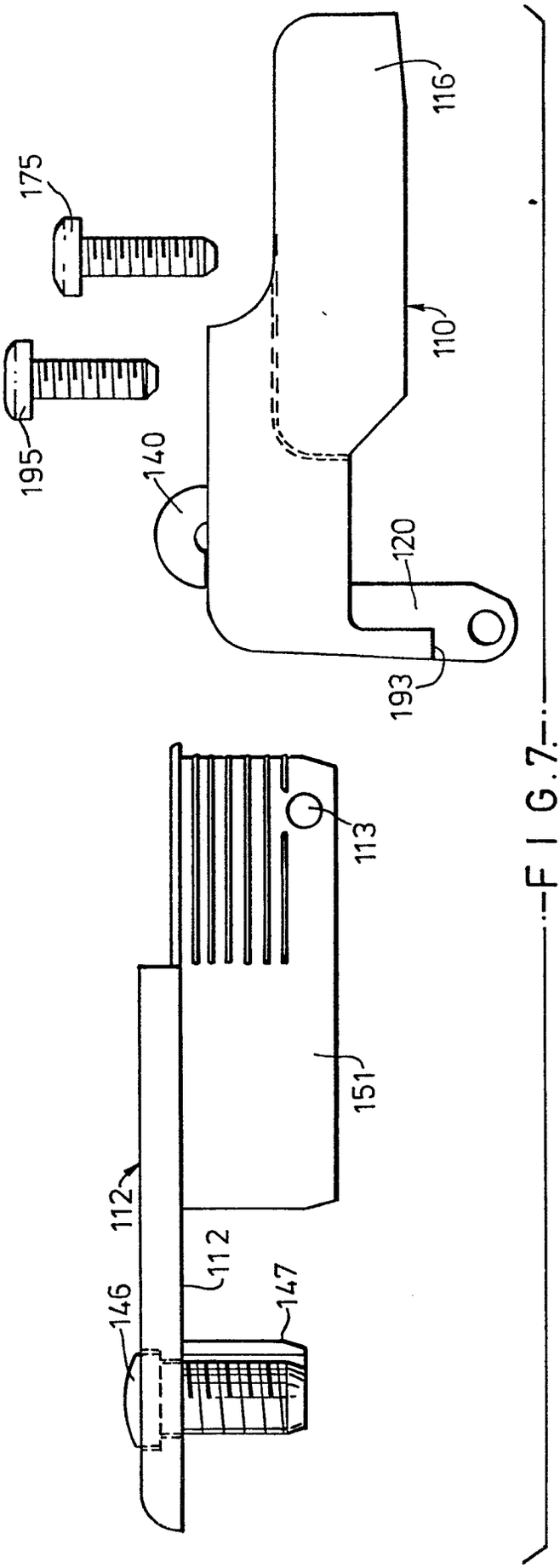

FIG.7.

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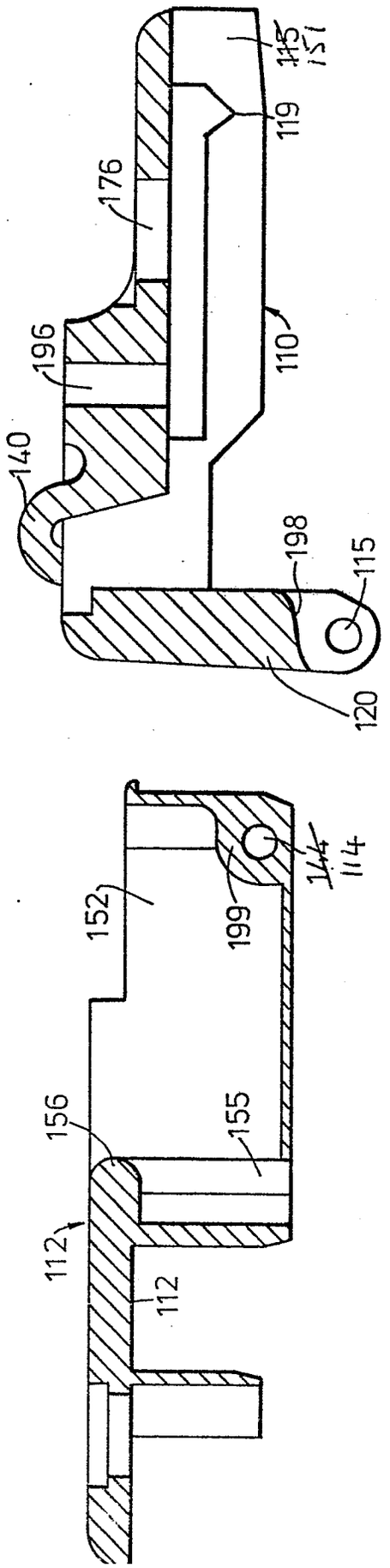

FIG.8.

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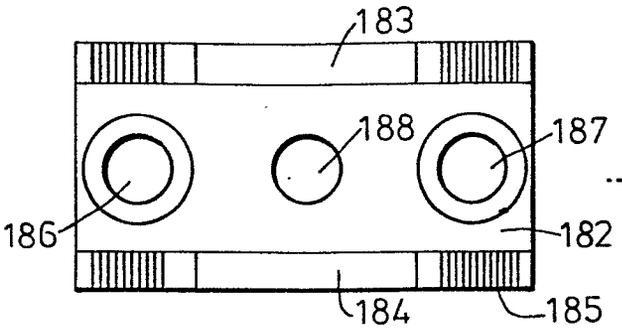

FIG.9

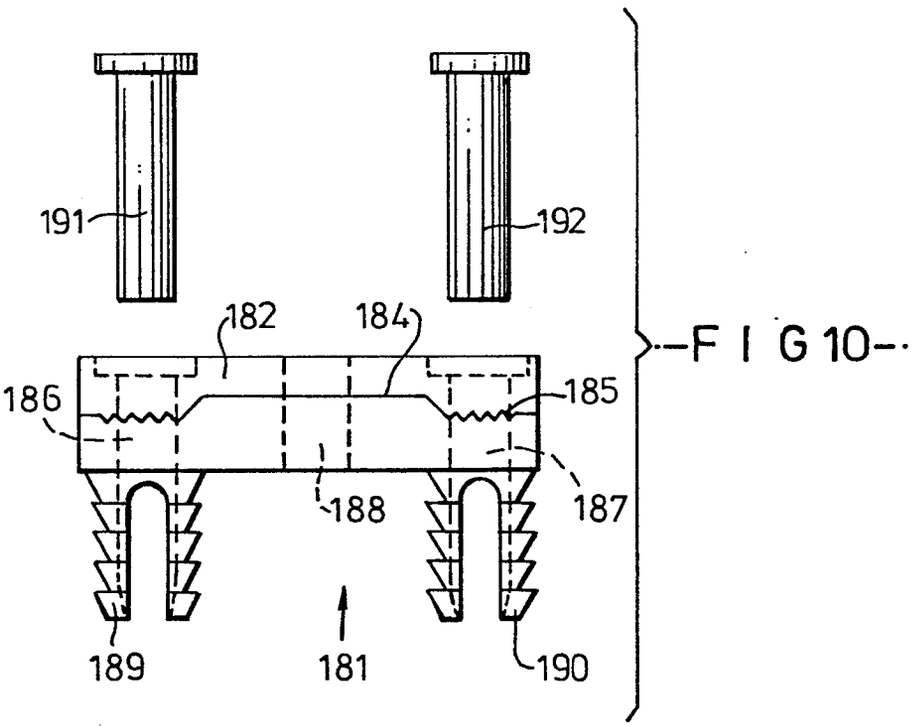

FIG 10

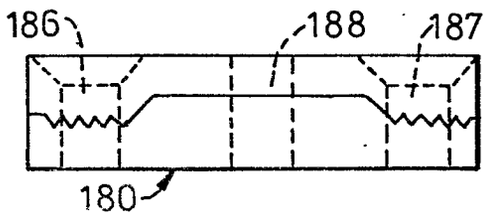

FIG.11

European Patent Office

EUROPEAN SEARCH REPORT

Application number 0012575
EP 79 30 2812

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim
	GB - A - 1 474 747 (MACKENZIE KING) * Page 1, lines 63-98; page 2, lines 1-69; figures 1-3 *	1,2,3, 6,7,13, 14
	AT - B - 325 990 (BLUM) * Page 2, lines 45-50; figure 1 *	1,2,4, 13,14
	FR - A - 2 092 456 (LAUTENSCHLÄGER) * Page 2, lines 34-40; page 3, lines 1-26; figures 1,2 *	1,2,3, 12-14
	FR - A - 2 005 853 (SERIN) * Page 2, lines 8-28; figures 1-6 *	1,2,12, 13,14

CLASSIFICATION OF THE APPLICATION (Int. Cl. 3)

E 05 D 11/10

TECHNICAL FIELDS SEARCHED (Int.Cl. 3)

E 05 D

CATEGORY OF CITED DOCUMENTS

X: particularly relevant
A: technological background
O: non-written disclosure
P: intermediate document
T: theory or principle underlying the invention
E: conflicting application
D: document cited in the application
L: citation for other reasons

&: member of the same patent family, corresponding document

[X] The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	06-03-1980	NEYS

EPO Form 1503.1 06.78