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(54) Device for fixing a heating radiator

(57) A device for fixing a heating radiator on a bearing structure, for instance a wall, which device comprises:

support means for fixing to the bearing structure in order to support the radiator;
fixation means for fixing the position of the radiator in the supported state of this radiator.

The device comprises the characteristic that at least the fixation means comprise at least one attachment zone which is adapted for attachment of the radiator to the fixation means.

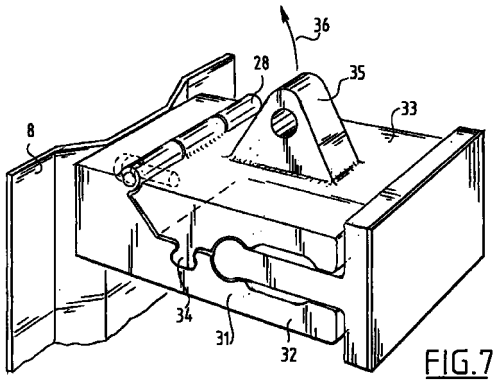

FIG.7

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Description

[0001] The invention relates to a device for fixing a heating radiator on a bearing structure, for instance a wall, which device comprises:

support means for fixing to the bearing structure in order to support the radiator;
fixation means for fixing the position of the radiator in the supported state of this radiator.

[0002] Such a device is known in many embodiments.

[0003] It is an object of the invention to adapt the known device such that a modular structure is possible, wherein if desired the fixation means on the top side of the radiator are not visible, which can greatly enhance the aesthetically attractive appearance.

[0004] It is a further object of the invention to embody a device of the stated type such that a radiator can be mounted on the device without tools and that the radiator can be removed again from the device with simple provisions.

[0005] These and further objectives of the invention are realized with a device of the type stated in the preamble which has the feature that at least the fixation means comprise at least one attachment zone which is adapted for attachment of the radiator to the fixation means.

[0006] A specific embodiment has the special feature that the attachment zone comprises a permanent magnet. The use of a permanent magnet may in certain conditions meet with the problem that a permanent magnet which must be capable of producing the requisite force is relatively expensive and takes up rather a lot of space.

[0007] In this respect a preferred embodiment of the device according to the invention has the special feature that the attachment zone comprises a glue layer.

[0008] A very practical and inexpensive embodiment has the special feature that the glue layer forms part of double-sided adhesive tape.

[0009] Attention is drawn to the fact that the double-sided adhesive tape can be prearranged as desired on the fixation means or on the radiator. Seen as being practical is mounting of double-sided adhesive tape on the fixation means in the factory, the outward directed adhesive surface of which tape must co-act adhesively with the radiator for fixing. Use will generally be made for this purpose of a pressure-sensitive glue type covered by a protective foil. This prearranged protective foil comprises a layer which is provided with wax or silicone material and which adheres only lightly to the glue layer. The protective foil is removed from the glue layer prior to fixing of the radiator.

[0010] The advantage of the structure according to the invention further lies in the fact that a radiator has identical front and rear surfaces. The radiator is therefore reversible, so that it is possible to suffice with a single type of radiator for different applications without a left-oriented and a right-oriented version being necessary. This is a very practical aspect in terms of installation technique and production cost.

[0011] A further aspect of the invention is that the fixation means are releasable from the support means. It must be appreciated that when the fixation means are connected to the radiator by means of a glue connection, the connection becomes permanent in the case of some glue types, i.e. the non-reusable types, and that when the radiator is removed from the support means the fixation means continue to form part of the radiator. Use can if desired also be made of a reusable glue type.

[0012] A specific embodiment, which is very practical because it can be placed without tools, has the special feature that the fixation means and the support means are connected by a snap coupling.

[0013] A specific embodiment has the feature that the snap coupling has two stable snap positions such that a radiator can be placed in two different angular positions relative to the support means.

[0014] In order to have a certain freedom of positioning in the placing of a radiator use can be made of a variant wherein the fixation means comprise at least one first coupling member and the support means comprise at least one second coupling member co-acting therewith, which first and second coupling members are mutually slidable such that the position of the radiator has a substantially horizontal degree of freedom of translation in its main plane, while the support means allow the same degree of freedom.

[0015] Attractive and inexpensive from a production engineering viewpoint is an embodiment in which a coupling member is manufactured by extrusion, for instance from plastic or aluminium.

[0016] It will be apparent that other production methods may also be suitable, for instance injection moulding, sintering, punching, bending and so on.

[0017] A further aspect of the invention is that the support means and/or the fixation means consist of steel.

[0018] In order to prevent the attachment between the fixation means and the radiator leaving something to be desired due to a lack of parallelism between the attachment zone and the radiator part for coupling thereto, use can be made of an embodiment in which the fixation means have at least one degree of freedom of rotation relative to the support means such that tolerances in the mutual parallelism of the attachment zone and the radiator can be accommodated.

[0019] The invention will now be elucidated with reference to the annexed drawings. Herein:

figure 1 shows a perspective view of a random embodiment of a radiator;
figures 2(a), (b), (c), (d) and (e) show respective side views of a device according to the invention in

which a radiator is placed and subsequently removed in five successive stages;

figure 3(a) shows a partly broken-away perspective view of a detail of fixation means in a first embodiment;

figure 3(b) shows a perspective view of alternative fixation means as according to figure 3(a) from a different angle of view;

figure 4 shows a perspective view of a second embodiment;

figure 5 shows a perspective view of a third embodiment;

figure 6 is a perspective view of a fourth embodiment;

figure 7 is a perspective view of a fifth embodiment;

figure 8 is a perspective view of a sixth embodiment;

figure 9 is a perspective view of a seventh embodiment;

figure 10 shows a perspective view of an eighth embodiment;

figure 11 shows a perspective view of a ninth embodiment;

figure 12 shows a perspective view of a tenth embodiment;

figure 13 shows a perspective view of an eleventh embodiment;

figure 14 is a side view of a twelfth embodiment which can be seen as a variant of the first embodiment as according to figure 3;

figure 15 is a partly broken-away perspective view of a detail of the support means in a first embodiment;

figure 16 is a perspective view of the support means in a second embodiment;

figures 17A and 17B show respectively a side view and a perspective view of a twelfth embodiment;

figures 18A, 18B and 18C show a thirteenth embodiment respectively in longitudinal section, perspective view from the front and perspective view from the rear;

figure 19 shows a perspective view of a fourteenth embodiment;

figure 20 shows a perspective view of a fifteenth embodiment;

figure 21 shows a perspective view of a sixteenth embodiment; and

figure 22 shows a perspective view of a seventeenth embodiment.

[0020] Figure 1 shows a radiator 1 comprising two hollow panels 2, 3 through which can flow heat transfer medium, in particular water, and which are mutually connected in per se known manner and jointly connected to an inlet pipe stub 4 and an outlet pipe stub 5 for heat transfer medium.

[0021] Figure 2(a) shows a device 6 according to the invention for attaching radiator 1 to a wall 7. The device comprises a bracket 8 which can be fastened to wall 7 by means of screws 9. In the mounted situation as according to figure 2(b) a protective foil 10 can be removed as according to arrow 11, whereby a glue layer is left clear. The glue layer is of pressure-sensitive type and suitable for adhering to a radiator 1 optionally provided with a cover layer.

[0022] Bracket 8 bears on its top an extruded profiled block 14 of aluminium or plastic, for instance of polyamide, POM, ABS or other suitable heat-resistant plastic.

[0023] Figure 3(a) shows the internal profiling on larger scale. It will be apparent that block 14 serves as first coupling member which co-acts fixedly with bracket 8 and which can co-act snappingly with a likewise extruded second coupling member 15, on the outside of which the double-sided adhesive tape 12 is arranged.

[0024] At the stage shown in figure 2(b) the device is suitable for arranging of radiator 1. For this purpose the bottom edge of panel 3 is placed in a profiled support element 16 and from an initially inclining position the radiator is then displaced as according to arrow 17 in the direction of adhesive tape 12 to the position shown in figure 2(d), in which the radiator is supported by support element 16 and is fixed in the supported vertical position by means of adhesive tape 12.

[0025] In order to remove the radiator the top part of the radiator can be tilted forward as according to arrow 18, whereby the snap connection between second coupling member 15 and first coupling member 14 is broken. Second coupling member 15 remains fixedly connected to radiator 1 due to the presence of the glue connection consisting of adhesive tape 12.

[0026] Figure 3(a) shows that bracket 8 comprises a number of slotted holes 19 for coupling to wall 7 by means of screws 9. Block 14 has a general U-shape, wherein the inner surfaces of the legs have prismatic recesses. Into these recesses fits a widened end 20 of second coupling member 15. For installation purposes use can also be made, in addition to the shown fixation position of figure 3(a), of an intermediate position wherein the widened end, otherwise than drawn, does not rest in the end recess 21 between the legs of the U but in an intermediate recess 22.

[0027] Figure 3(b) shows an embodiment in which block 14' has only an end recess 21 and is not provided with the intermediate recess 22.

[0028] Figure 4 shows an embodiment in which block 23 takes a form which is adapted to the profiled form of bracket 8. This can enhance stability under certain conditions.

[0029] Figure 5 shows a variant in which block 24 has a shoulder 25 which rests on the top end of bracket 8. This embodiment also serves to enhance stability.

[0030] Figure 6 shows a block 26 which, at variance with block 14, does not form a snap connection with second coupling member 15 but comprises a fixed leg 27 and a movable leg 29 connected thereto via a hinge

28. In the coupled situation shown in figure 6 the movable leg 29 can be fixed by means of a bolt 30.

[0031] Figure 7 shows a block 31, wherein the lower leg 32 supports an upper leg 33 via hinge 28, wherein leg 33 can be fixed clampingly relative to leg 32 by means of a snap coupling 34. An upward directed force as according to arrow 36 can be exerted on leg 33 by means of a pulling eye 35 in order to disengage snap coupling 34.

[0032] Figure 8 shows a variant of the embodiment shown in figure 7. In this embodiment block 37 comprises a fixed leg 38 and a movable leg 39. These legs 38, 39 are mutually connected by a snap connection. This snap connection comprises an undercut 40 and a snap protrusion 41 on, in this case, respectively the fixed leg 38 and the movable leg 39. By exerting a force 36 on a pulling eye 42 the protrusion 41 can be released from the undercut 40.

[0033] Figure 9 shows a block 43 with a fixed lower leg 44 and a movable leg 45. Movable leg 45 comprises a control lever 46 which, via a zone 47 acting as hinge, can operate a snap lever 48 with a snap protrusion 49 by exerting a force as according to arrow 50. This force serves to cause protrusion 49 to pass over the free end 50 of fixed leg 44, whereby the upper leg 44 can be folded upward as according to arrow 51.

[0034] Figure 10 shows an embodiment in which a bracket 52 has a hole 53 through which a shank 54 of a block 55 can pass. The shank has two widened portions 56 and 57 respectively which serve for fixation of block 55 relative to bracket 52.

[0035] It is noted that block 55 is the direct carrier of double-sided adhesive tape 12.

[0036] Figure 11 shows an embodiment in which a block 58 is fixable in hole 53 by means of a resilient snap connection with two rise cams 59, 60. Depressing of a control cam 61 enables displacement of a first leg 62 toward a second leg 63, whereby cams 59, 60 are pressed downward and can pass through hole 53 to release block 58 from bracket 52.

[0037] It is noted that in this embodiment the second coupling member 64 is only slidable in lengthwise direction in an undercut 65.

[0038] Figure 12 shows an embodiment in which bracket 66 bears a block 67. This block comprises two relatively resilient legs 68, 69, wherein it supports the widened portions 56, 57 in the case of leg 68. Upper leg 68 can be pressed downward with an external control block 70, whereby in the manner indicated in figure 11 block 67 can be separated from bracket 66.

[0039] Figure 13 shows an embodiment in which two relatively resilient legs 62, 71 can be displaced toward each other by tightening a nut 72. In the rest position the nut is not tensioned, in the situation where block 73 must be removed nut 72 is tightened relative to threaded rod 74.

[0040] Figure 14 shows a variant of the embodiment according to figure 3(a). When second coupling member 15 is displaced as according to arrow 75 from the position indicated with full lines to the position in broken lines, the free end of a plate 77 loaded by a spring 76 passes over a protrusion 78 on the top of coupling member 15, whereby plate 57 will move into the upright position shown with broken lines. This position is designated 77'. A warning can thus be obtained that the intended displacement has occurred.

[0041] Figure 15 shows that support element 16 is adjustable as according to arrow 80 by means of an adjusting screw 79.

[0042] Figure 16 shows a variant in which support element 81 is adjustable relative to bracket 82. Use is made of a certain spring load which presses rounded protrusions 83 of support element 81 downward such that stable positions are obtained in the valleys between elevations 84 on bracket 82.

[0043] Figures 17A and 17B show a steel mounting bracket 101 for mounting on a wall (compare figure 2) which carries on the underside a block 102 with a recess 103 in which the bottom edge of a radiator 1 can rest. On the top side of bracket 101 a support block 100 comprising two parts 105, 106 is accommodated by means of a fastening bolt 104, which block bears on its top side a bent steel plate 107, to the vertical front face of which is adhered a strip of double-sided adhesive tape 108.

[0044] Figure 18 shows a bracket 110 with an upper zone 111 bent forward into a horizontal position. This upper zone has on its upper surface two holes 112, 113 for co-action with a snap protrusion 116 which is pressed out of the main surface 114 of a fixation element 115 and can be operated from outside. As shown particularly clearly in figure 18A, snap protrusion 116 engages resiliently into hole 112. After upward displacement of the protruding part of snap protrusion 116 the fixation element 115 can be pushed forward until protrusion 116 is in snapping co-action with hole 113.

[0045] In the manner shown particularly clearly in figure 18C, the element 115 engages slidably round the upper and forward protruding zone 111 of support bracket 110. An attaching element, for instance a glue layer, double-sided adhesive tape or a flat magnet, can be fixed on the front surface 116 of element 115.

[0046] All three figures 19, 20 and 21 show a block with the expandable lips 105, 106 as according to figure 17B. By tightening bolt 104 a substantially V-shaped pressing element 121 is moved upward with force against correspondingly formed inclining surfaces of lips 105, 106, which are thereby displaced outward with force.

[0047] In the embodiment of figure 19 the block 122 bears a perforated front surface 123. Perforation 124 takes a form such that it can allow passage of the split shank 125 of a fixation element 126, the front surface of which has an attachment zone. The structure is such that element 126 has a certain freedom of rotation such that tolerances in the mutual parallelism of the attach-

ment zone and a radiator for coupling thereto can be accommodated.

[0048] Figure 20 shows an embodiment in which a block 130 bears a sphere 131 which can co-act in the manner of a ball joint with the split hollow shank 132 of a fixation element 133. There is also in this embodiment a high degree of freedom of movement of the fixation element 133 mounted on block 130, whereby the radiator and fixation element 133 can be placed in perfect mutually parallel relation.

[0049] Figure 21 shows a block 141 with a substantially U-shaped coupling element 142 with an undercut front edge and two protrusions 145 on the undersides. A shank 143 of a fixation element 144 widened at its end can be pushed from above into element 142 and pass over said protrusions 145 in snapping manner.

[0050] Figure 22 shows an alternative in which a mounting bracket 150 comprises a number of mutually registered slotted holes 151 in which fixation cams 152, 153 of a fixation block 154 can rest under spring tension.

[0051] It is noted that the figures show in each case a glue connection between the second coupling member and the radiator. Use can also be made of a permanent magnet instead of this glue connection preferably embodied as double-sided adhesive tape.

Claims

1. Device for fixing a heating radiator on a bearing structure, for instance a wall, which device comprises:

   support means for fixing to the bearing structure in order to support the radiator;
   fixation means for fixing the position of the radiator in the supported state of this radiator;
   characterized in that
   at least the fixation means comprise at least one attachment zone which is adapted for attachment of the radiator to the fixation means.

2. Device as claimed in claim 1, wherein the attachment zone comprises a permanent magnet.

3. Device as claimed in claim 1, wherein the attachment zone comprises a glue layer.

4. Device as claimed in claim 3, wherein the glue layer forms part of double-sided adhesive tape.

5. Device as claimed in claim 1, wherein the fixation means are releasable from the support means.

6. Device as claimed in claim 5, wherein the fixation means and the support means are connected by a snap coupling.

7. Device as claimed in claim 6, wherein the snap coupling has two stable snap positions such that a radiator can be placed in two different angular positions relative to the support means.

8. Device as claimed in claim 5, wherein the fixation means comprise at least one first coupling member and the support means comprise at least one second coupling member co-acting therewith, which first and second coupling members are mutually slidable such that the position of the radiator has a substantially horizontal degree of freedom of translation in its main plane, while the support means allow the same degree of freedom.

9. Device as claimed in claim 8, wherein a coupling member is manufactured by extrusion, for instance from plastic or aluminium.

10. Device as claimed in claim 1, wherein the support means and/or the fixation means consist of steel.

11. Device as claimed in claim 1, wherein the fixation means have at least one degree of freedom of rotation relative to the support means such that tolerances in the mutual parallelism of the attachment zone and the radiator can be accommodated.

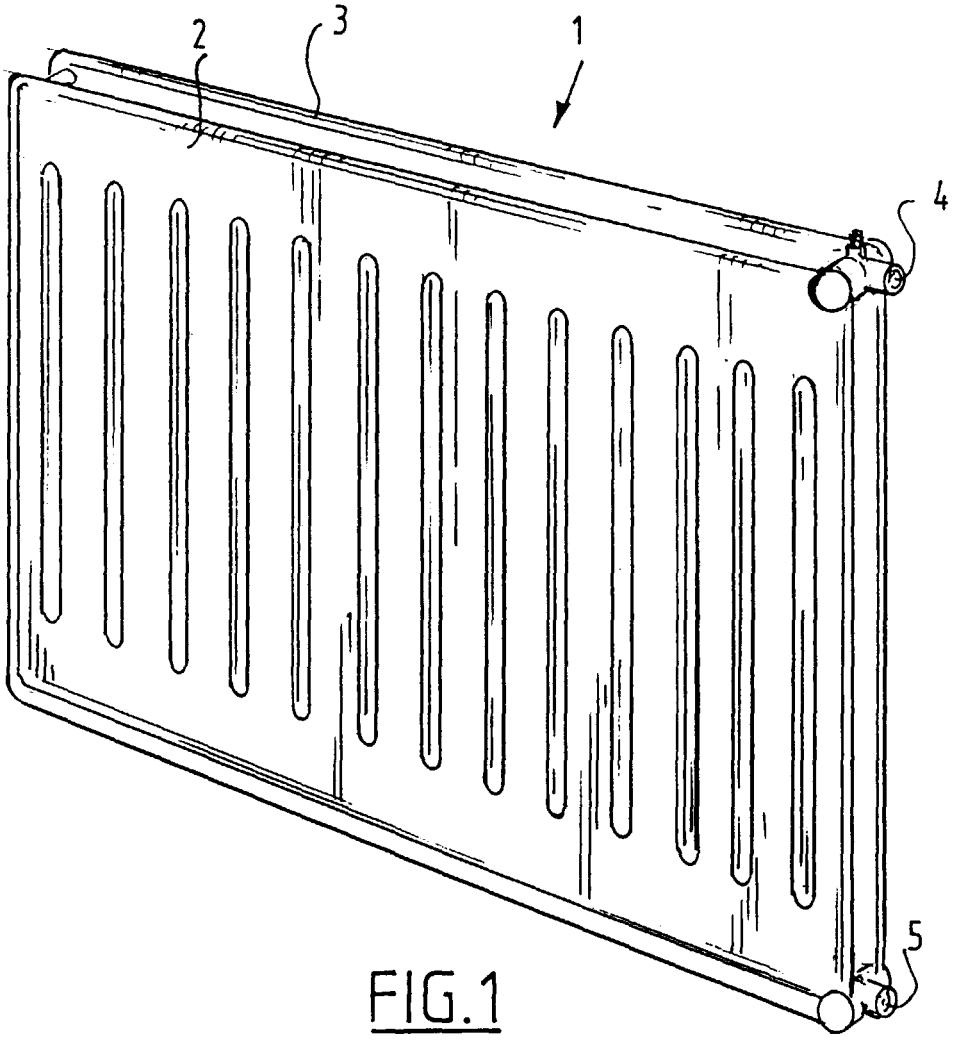


FIG.1

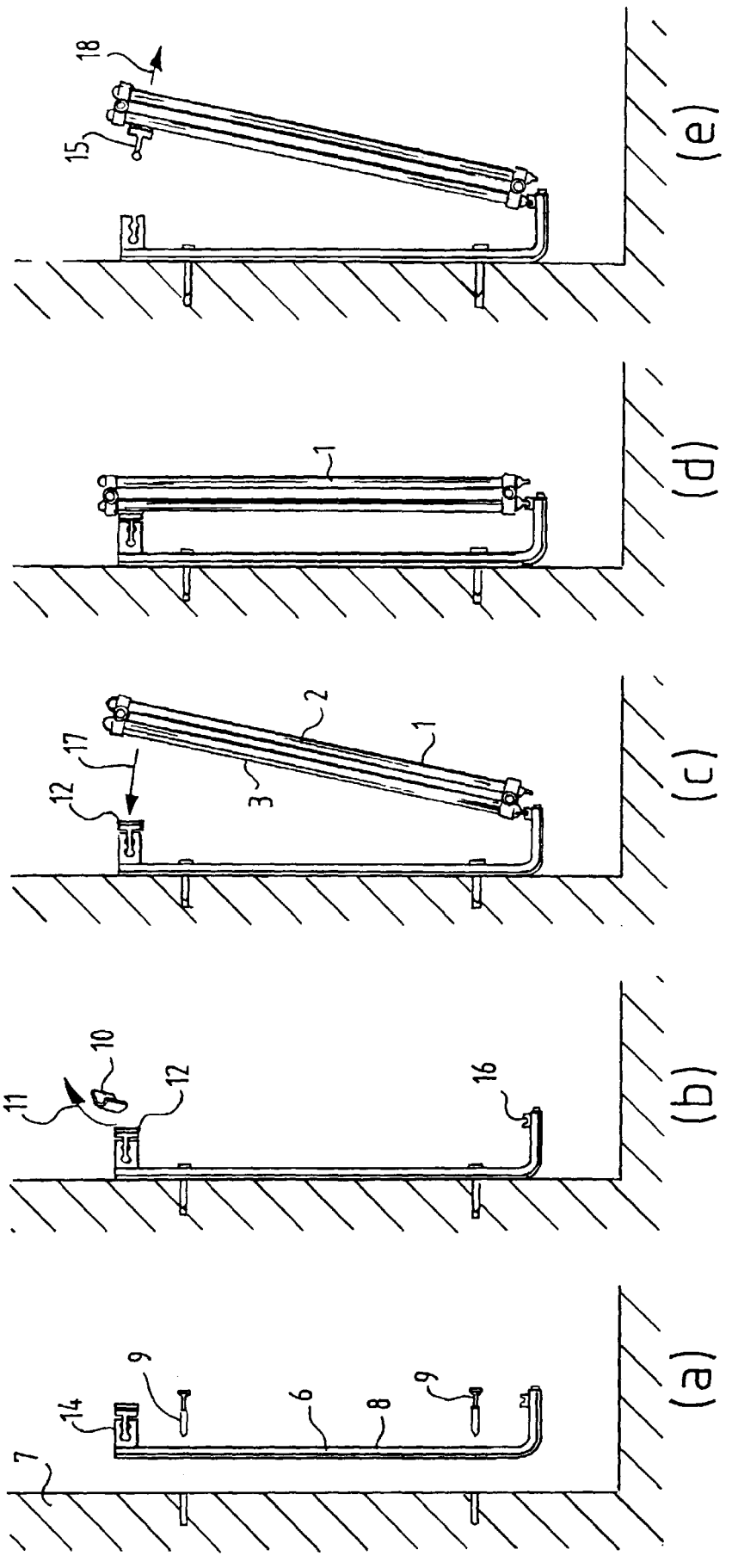


FIG.2

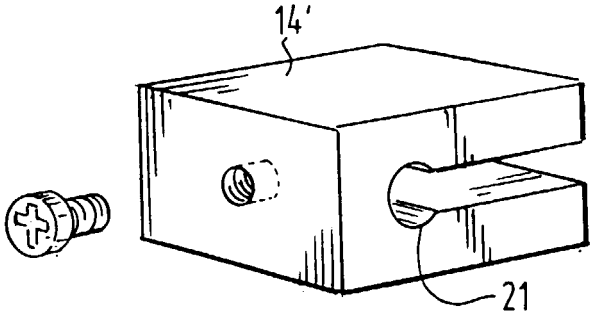
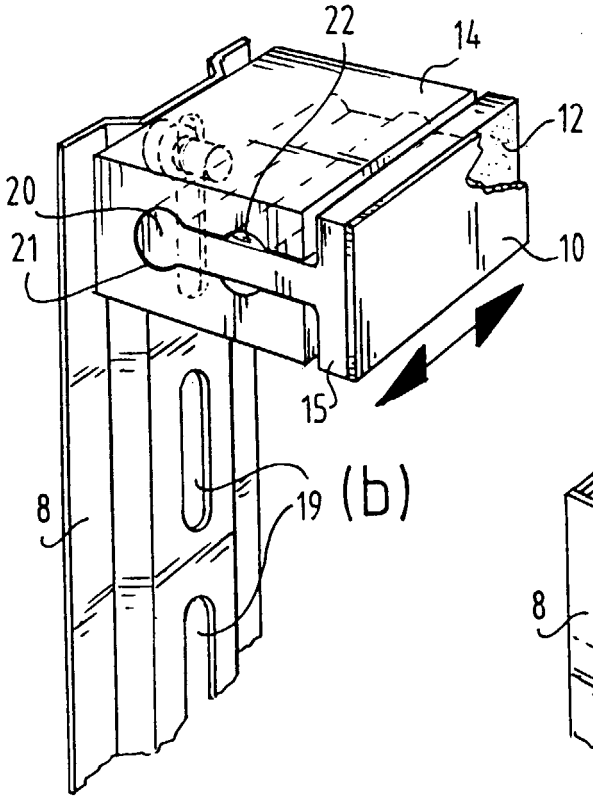


FIG.3



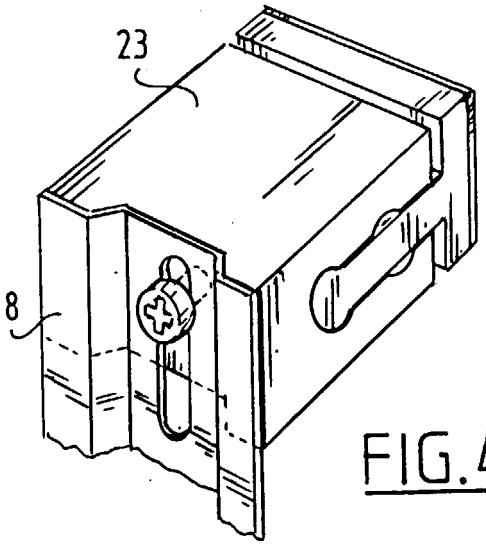


FIG.4

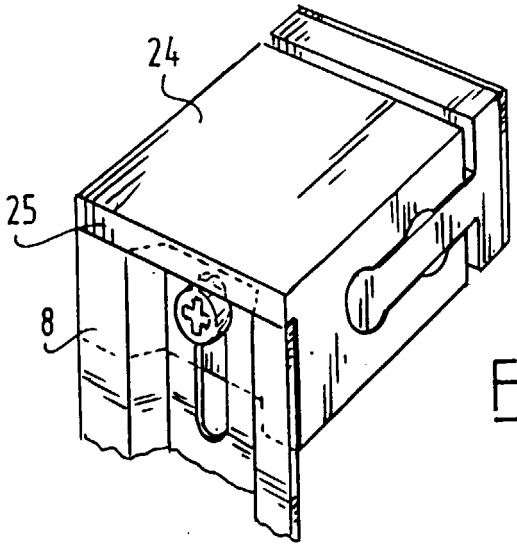


FIG.5

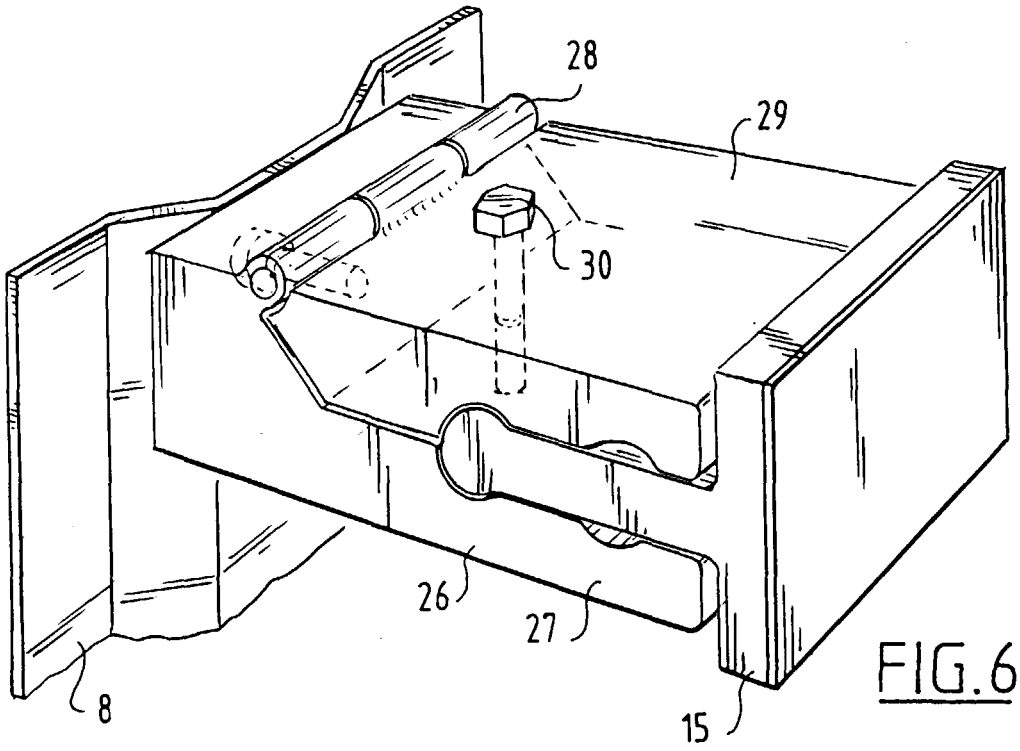


FIG.6

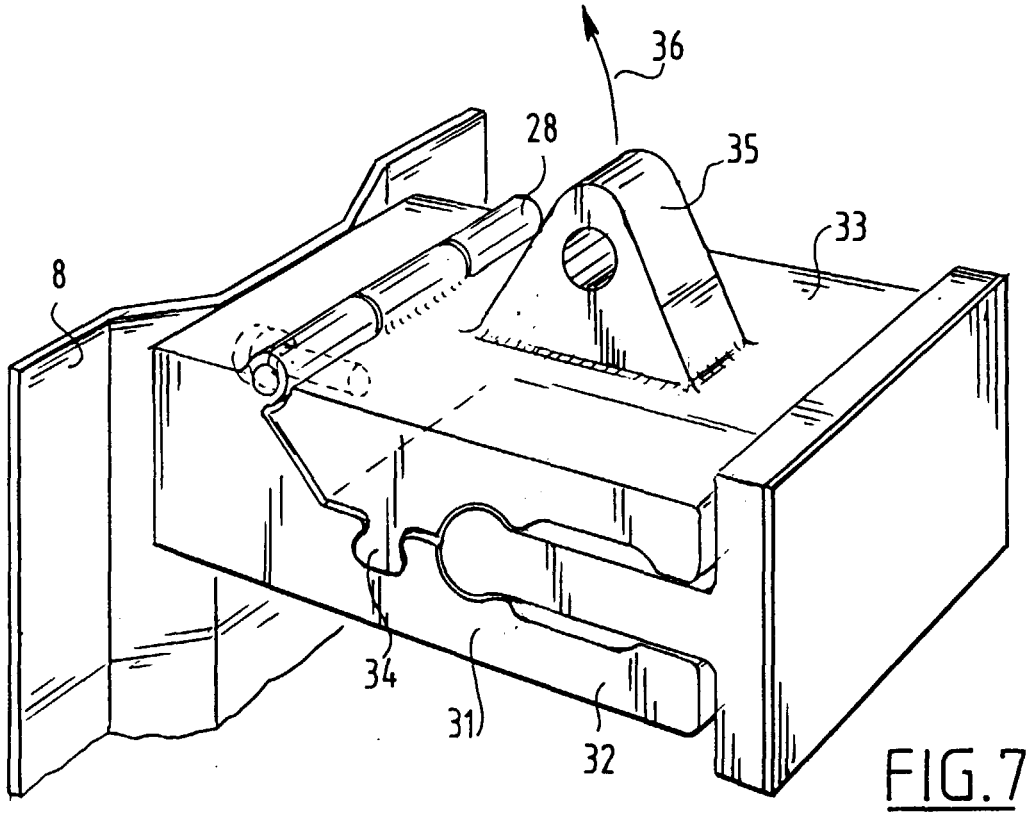


FIG.7

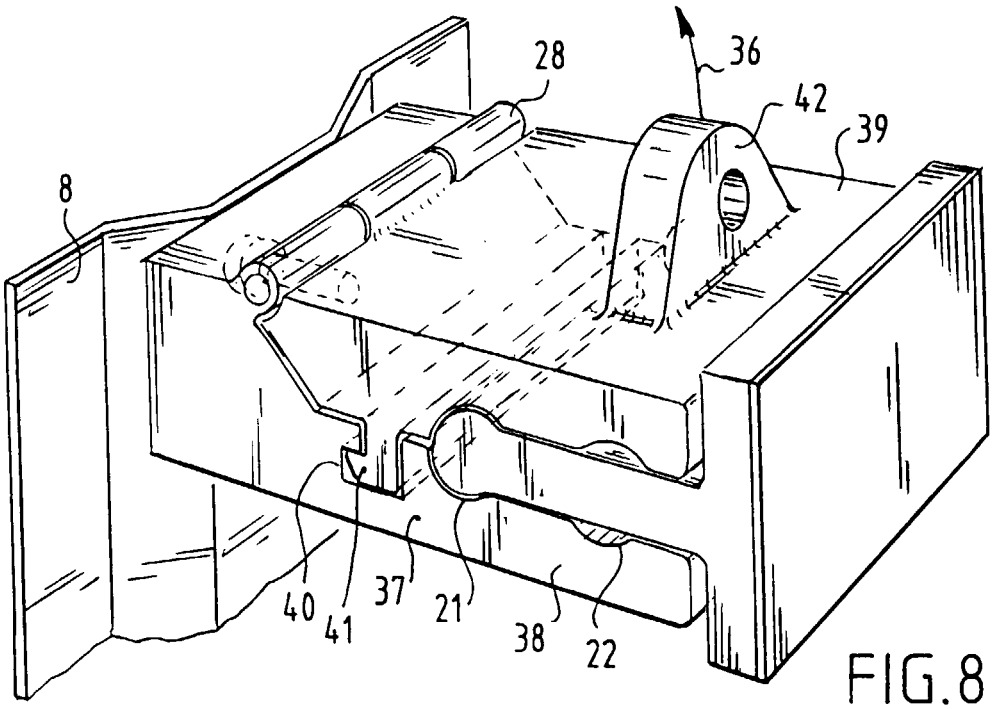


FIG.8

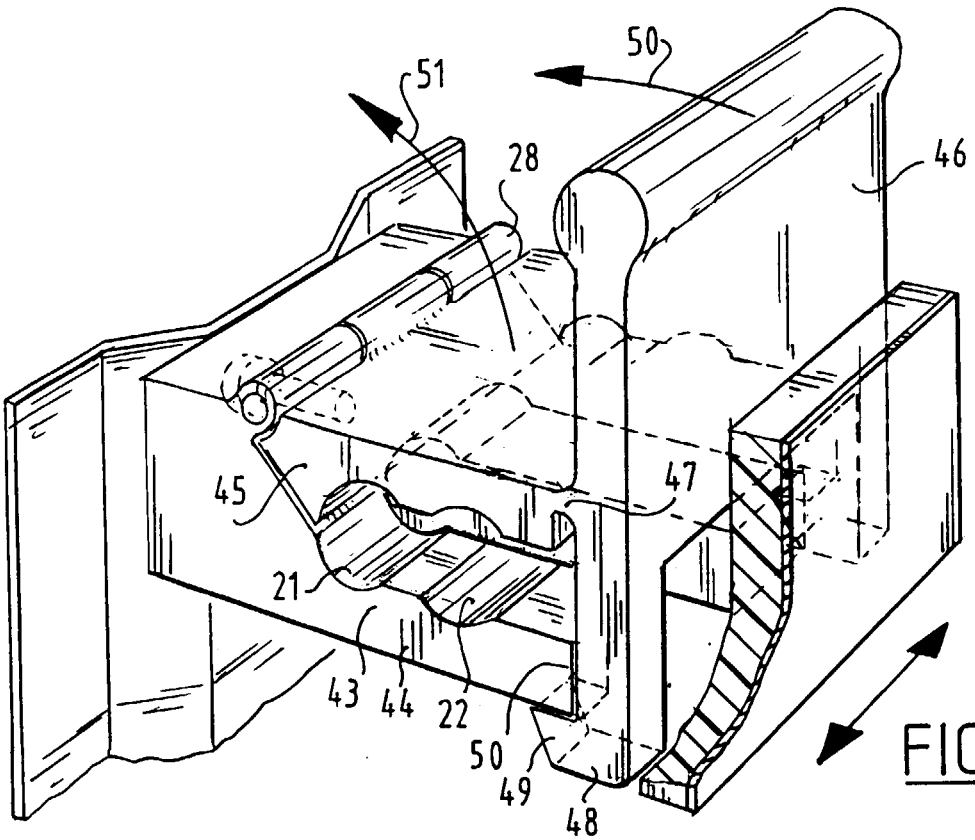


FIG.9

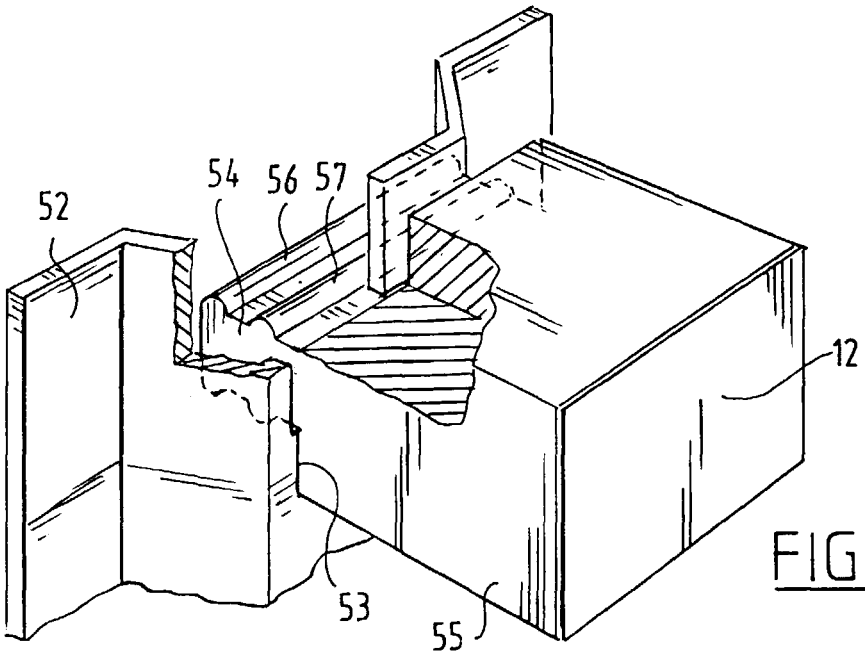


FIG.10

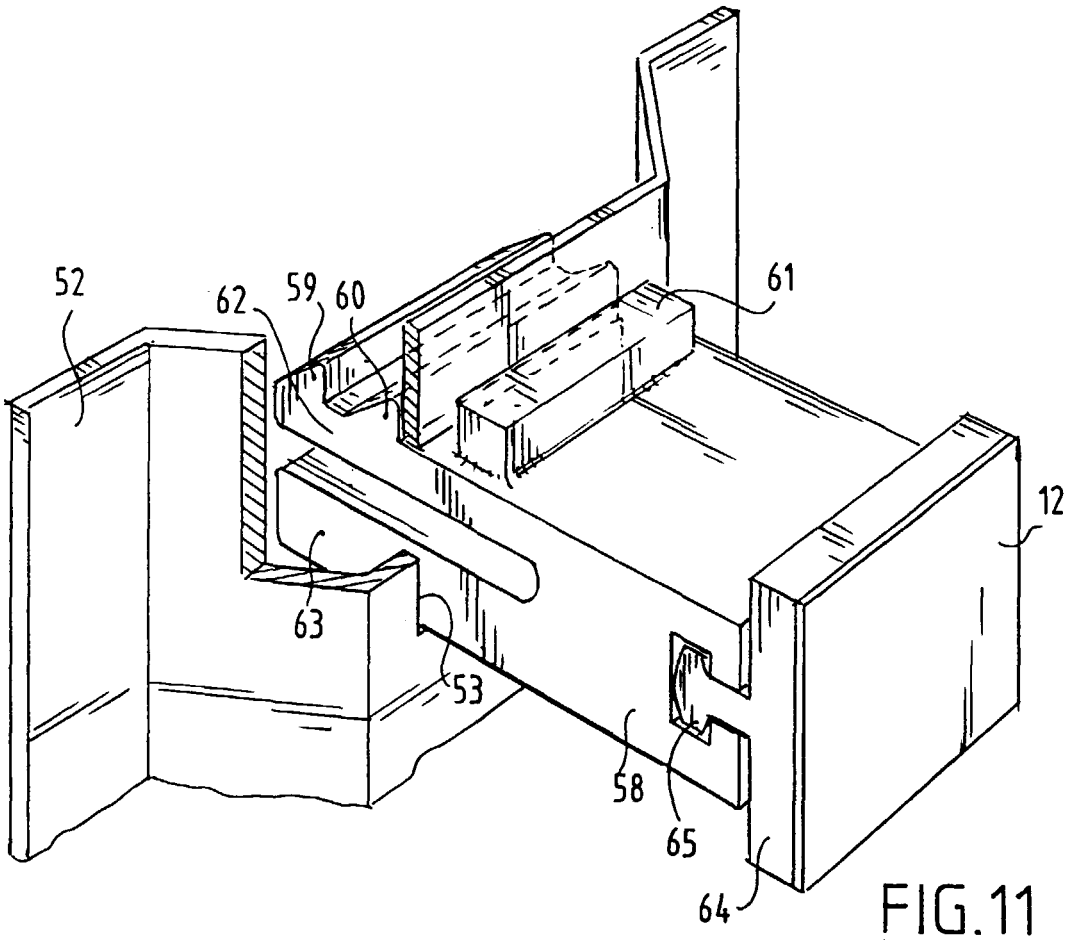


FIG.11

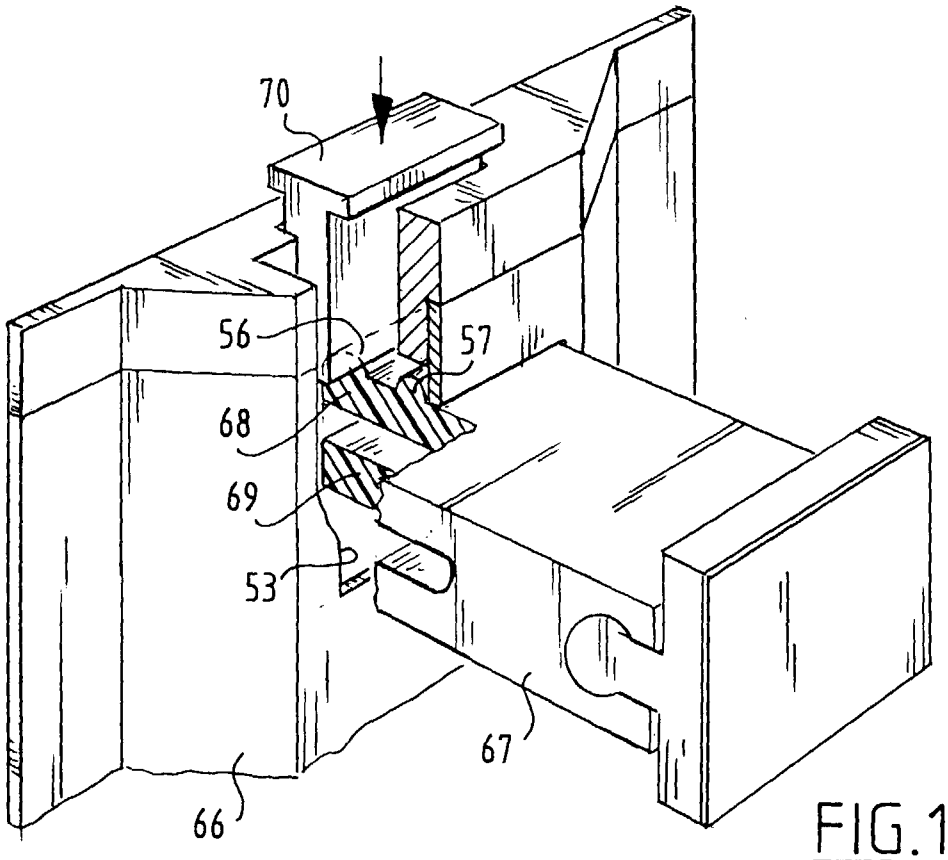


FIG.12

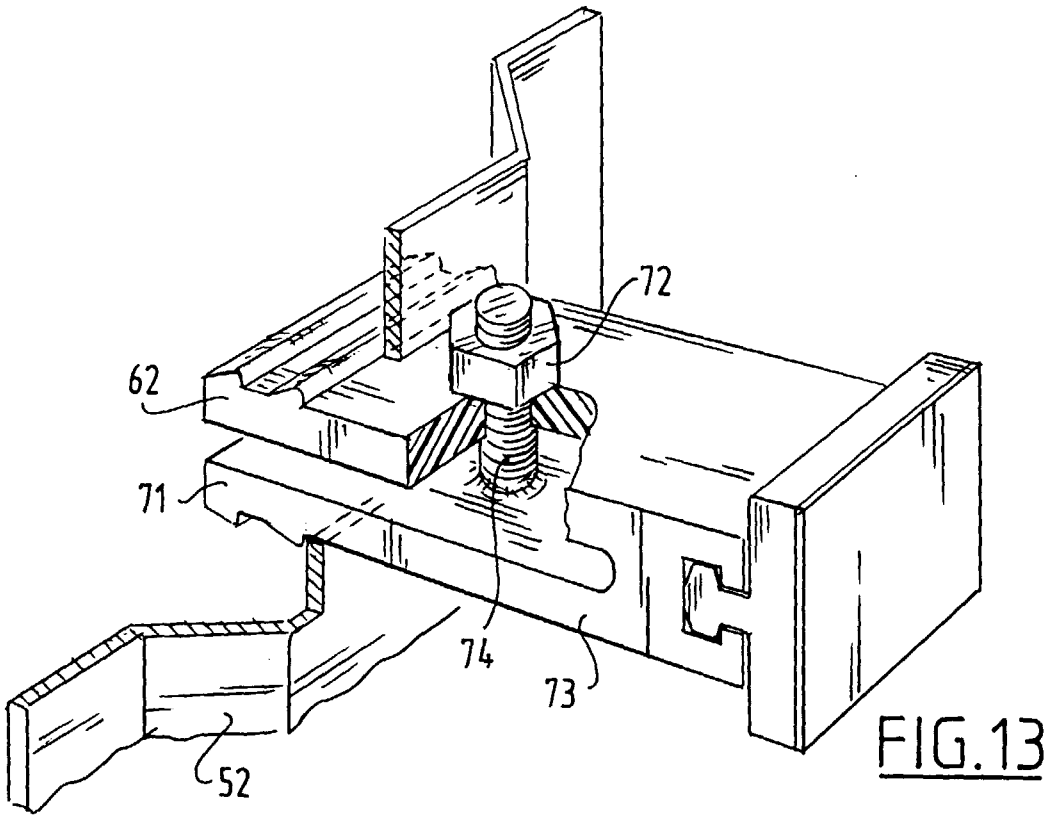


FIG.13

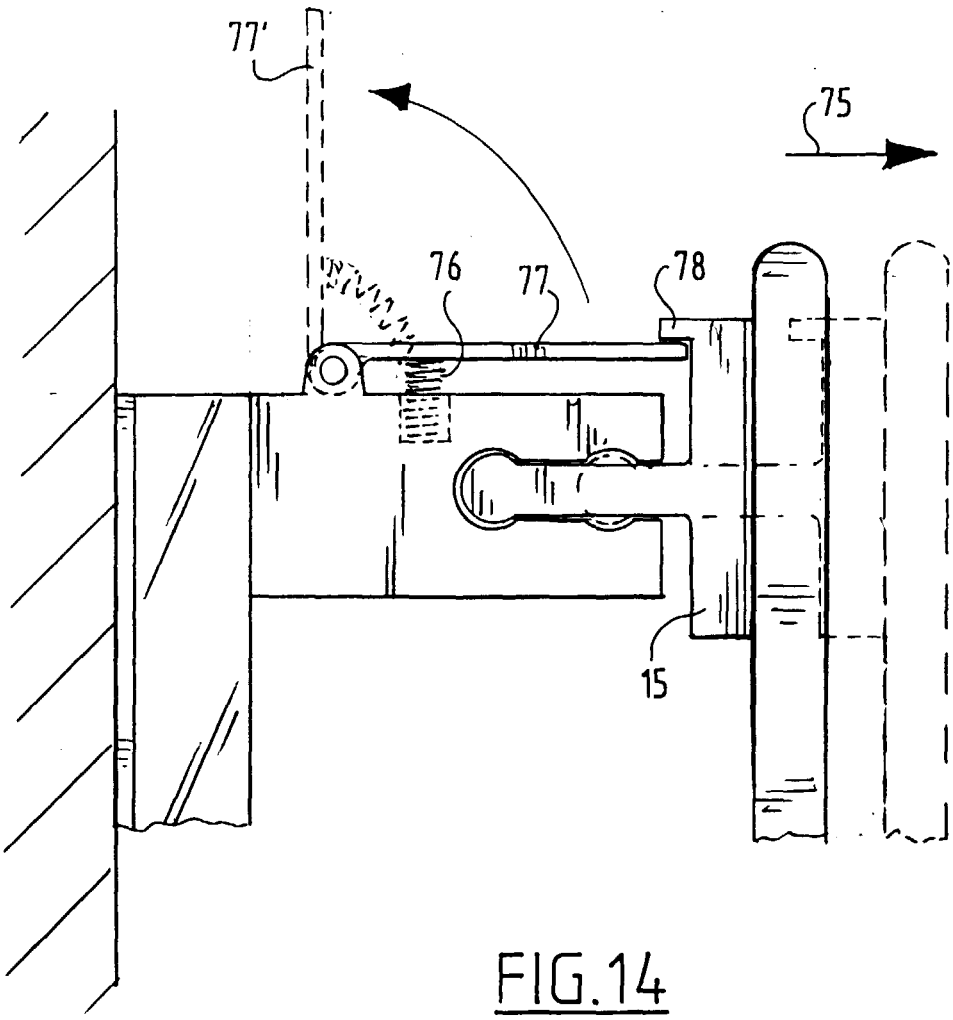


FIG.14

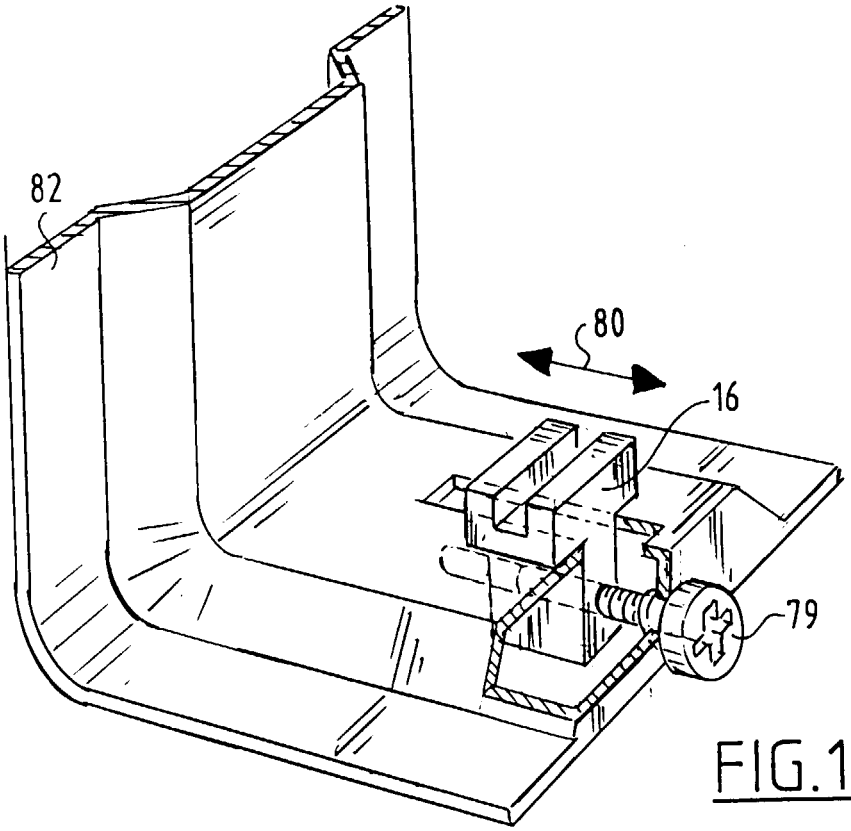


FIG.15

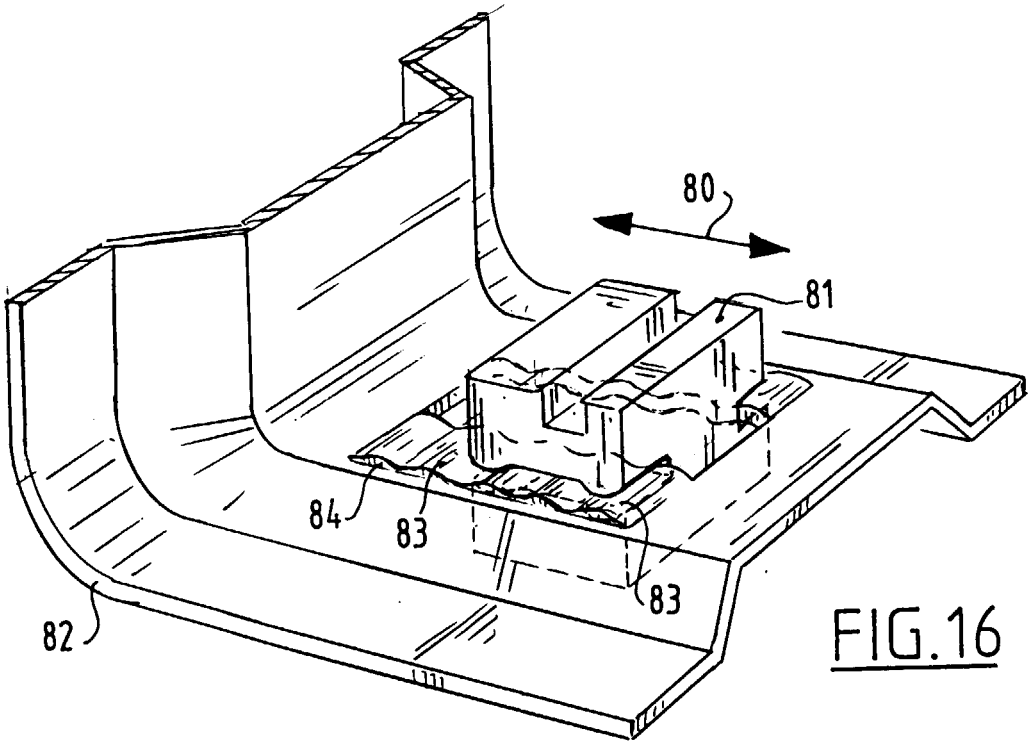


FIG.16

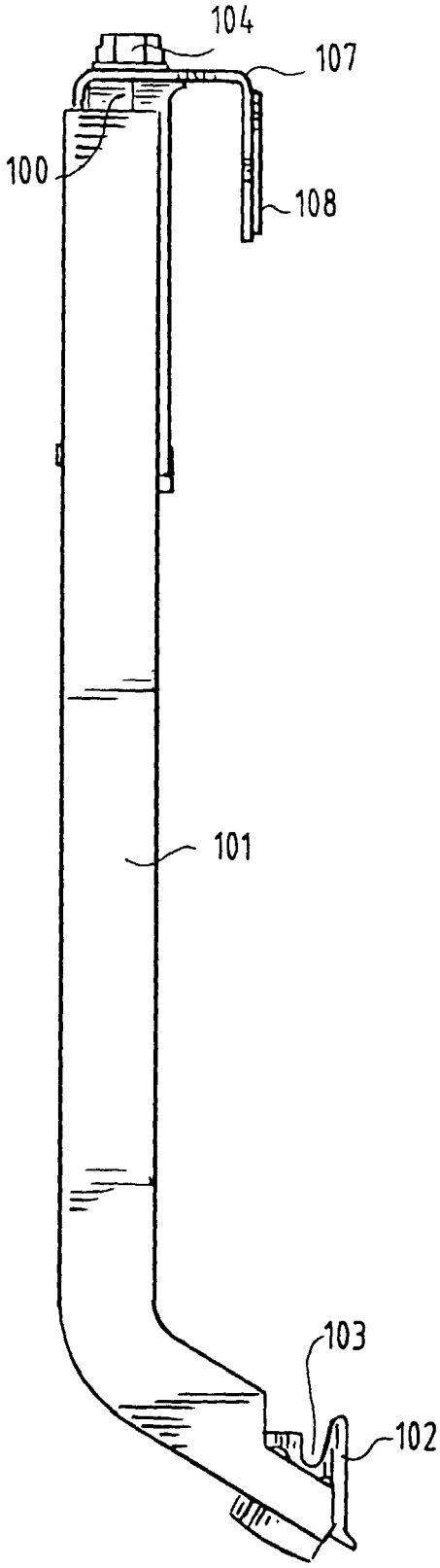


FIG.17A

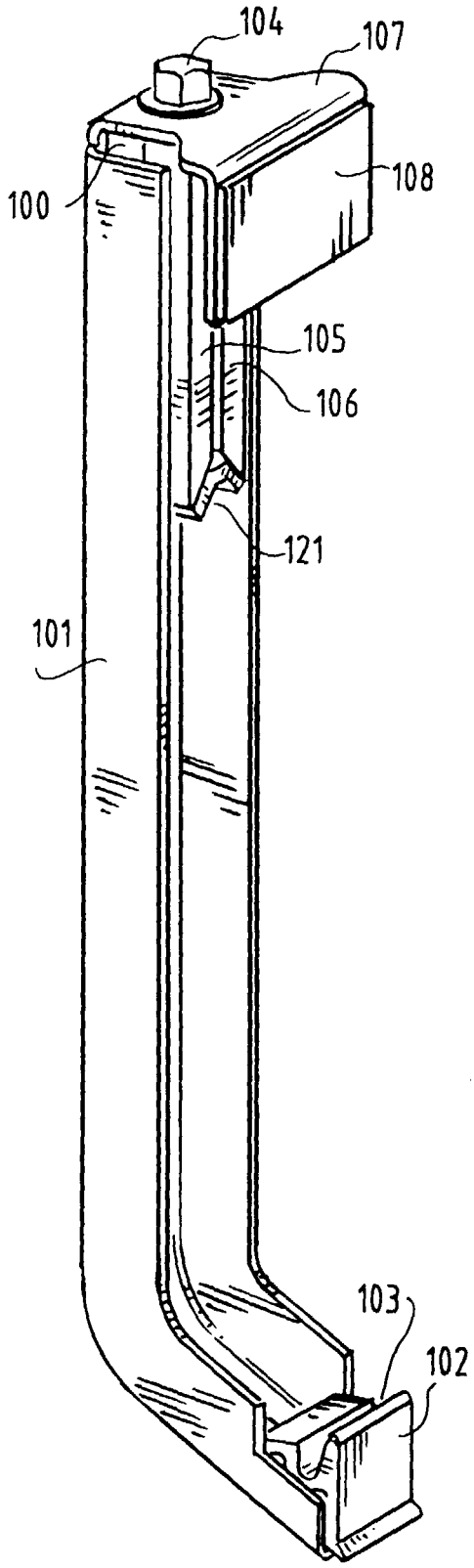


FIG.17B

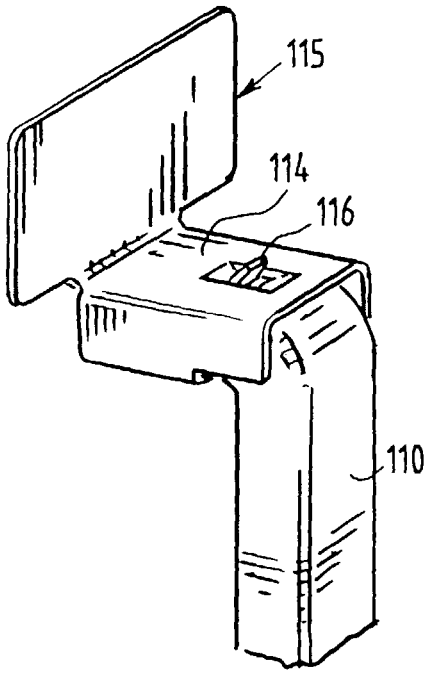


FIG.18B

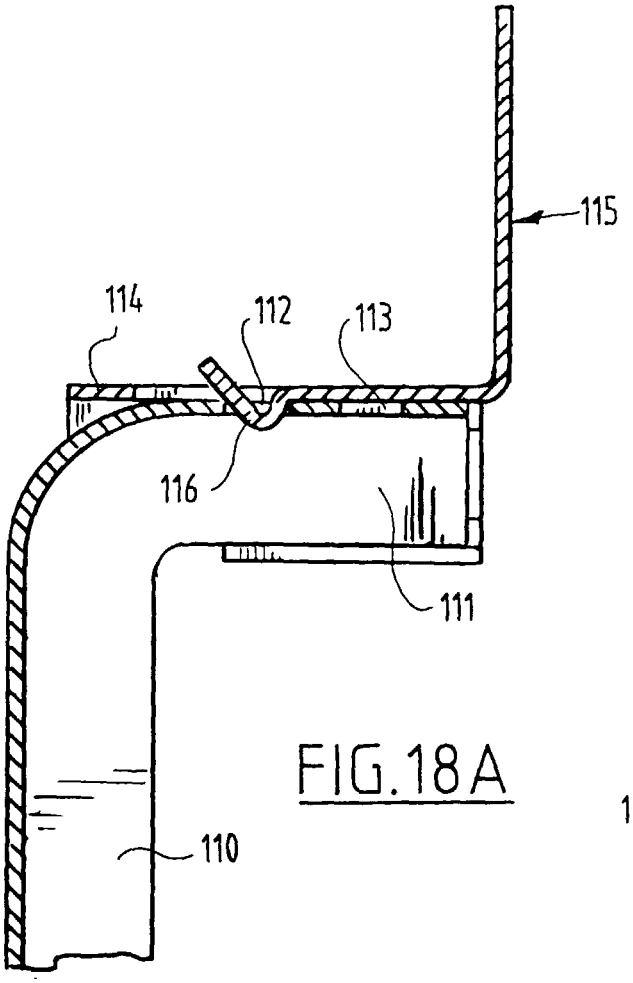


FIG.18A

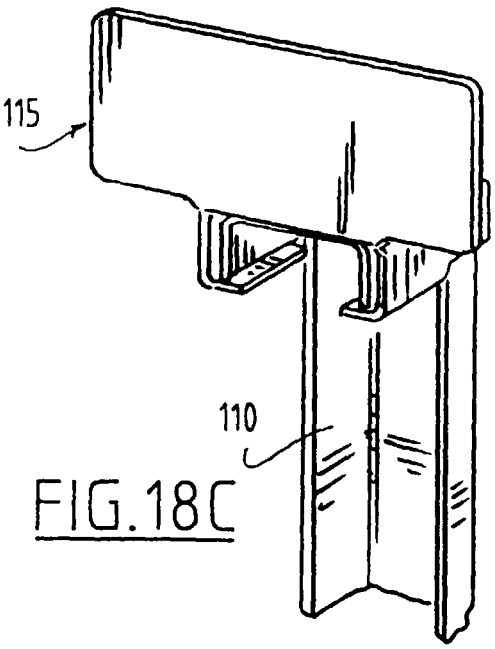
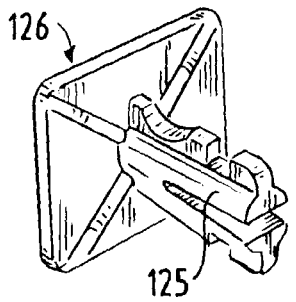


FIG.18C



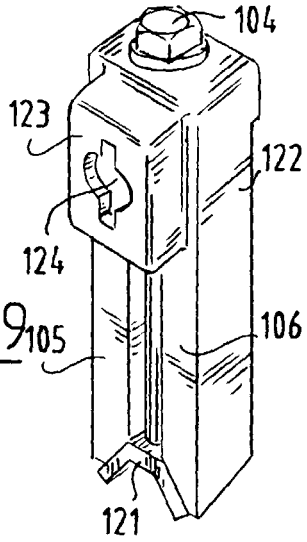


FIG.19

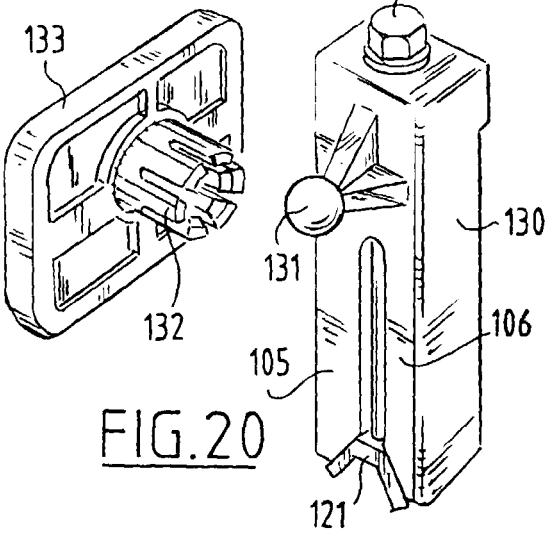
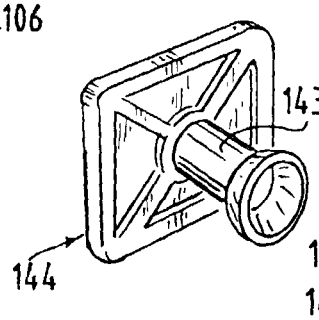


FIG.20



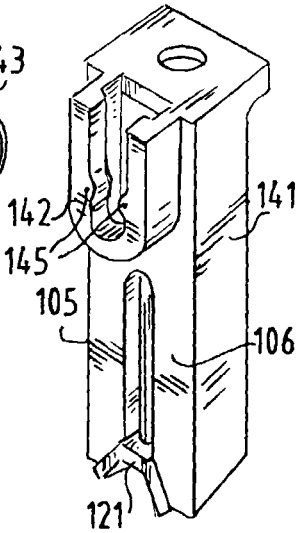
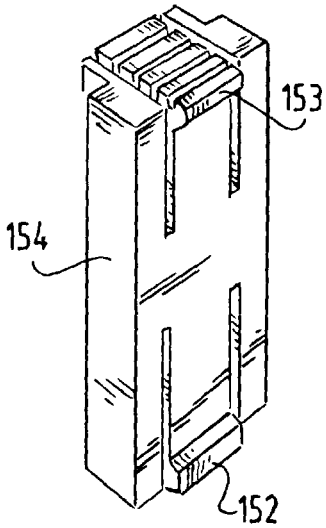


FIG.21



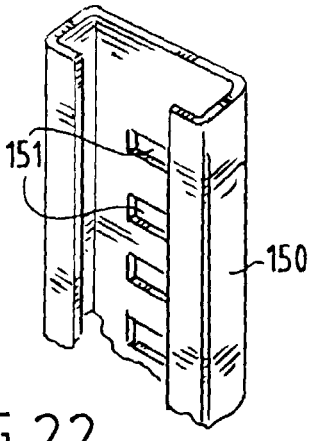


FIG.22

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EUROPEAN SEARCH REPORT

Application Number
EP 99 20 3468

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
A	NL 1 002 043 C (BAAL TECHNIEK B V VAN) 9 July 1997 (1997-07-09) * abstract; figures *	1,2,6	F24D19/02
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TECHNICAL FIELDS SEARCHED (Int.Cl.7)

F24D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	20 April 2000	Van Gestel, H

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