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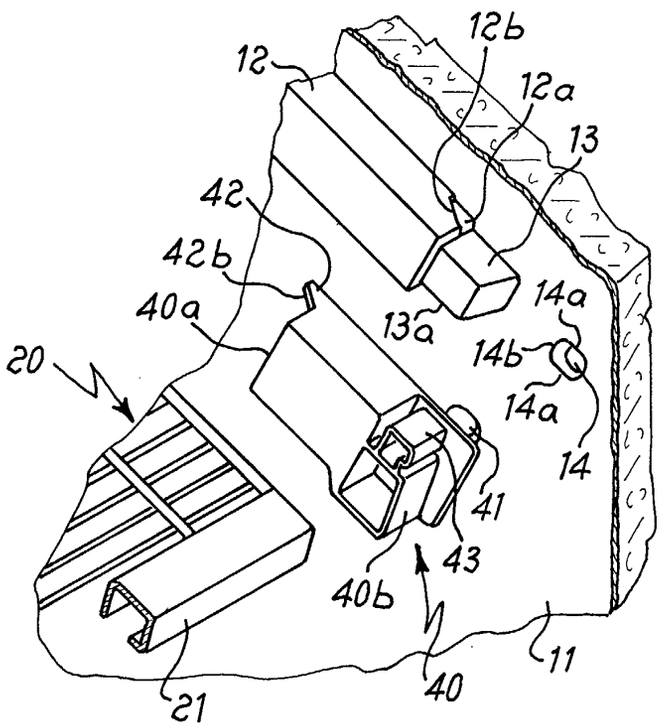
(54) Rotating bracket for locking in position shelves, in particular refrigerator shelves

(57) Bracket for locking shelves (20) of cabinets and in particular refrigerator or freezer cabinets (10), comprising side walls (11) with longitudinal guides (12) projecting towards the inside of the cabinet and having arranged at their free ends an extension (13) able to engage with the bracket, characterized in that the latter comprises a pin (41) extending in a direction perpendicular to the said wall (11) and able to be inserted inside a corresponding seat (14) thereof, said pin (41) and seat (14) having respective mating cam-like profiles (41a, 14a, 41b, 14b) able to allow rotation of the bracket (40) from a position of substantial non-alignment with said longitudinal guide (12), for insertion/extraction of the pin into/from said seat (14) of the wall (11), into a position of substantial alignment with said longitudinal guide (12), corresponding to the working position.

Fig.2



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Description

[0001] The present invention relates to a rotating bracket suitable for engagement with corresponding fixed parts of cabinets, in particular refrigerator cabinets, and with parts of a shelf, for ensuring locking in position of the latter.

[0002] It is known that refrigerator cabinets and freezer cabinets are equipped with different types of shelves such as: ordinary shelves, refrigeration evaporator shelves and trays on/inside which the products to be cooled are placed. Said evaporator shelves are normally supported on the sides and on the rear side, opposite to the door of the cabinet, by means of intermittent or continuous brackets which are formed by means of moulding on the sides of the cabinet at the time when the cooling compartment is made.

[0003] It is also known that said brackets, which are known in the art, are engaged, at their free ends, with removable, auxiliary, locking elements which are designed to keep said shelves in position and/or prevent the trays arranged underneath the said shelves from being extracted and falling when they are opened in order to take out the contents.

[0004] These locking elements are, for example, known from EP 0,534,107 which describes a U-shaped element able to be inserted, by means of a rectilinear translatory movement, onto the correspondingly shaped free end of the said brackets which are integral with the wall of the refrigerator cabinet.

[0005] Said U-shaped element also has a pin extending towards the wall of the cooling compartment and able to be inserted into a corresponding hole when the element reaches the end of its travel path.

[0006] Although fulfilling their function, said locking elements, which are known in the art, nevertheless have drawbacks arising from the fact that the sliding movement of the U-shaped element is controlled by incisions formed on the fixed guide of the cabinet wall, which makes manual assembly difficult, also because, before its insertion into the associated end-of-travel hole, the said pin is subject to a forcing action, when sliding along the wall, and this may cause scoring of the latter, resulting moreover in an inclined position of the U element with respect to the guide, thereby making the insertion operation difficult owing to the misalignment between the two parts during relative displacement.

[0007] In addition, the pin tends to come out from its seat owing to the deformation which may affect the surface when it is subject to the vertical load caused by the weight of the objects placed thereon.

[0008] The technical problem which is posed is therefore that of providing a supporting/locking element for shelves of cabinets and in particular evaporator elements of refrigerator cabinets, which solves the above-mentioned problems of the known art.

[0009] These and other objects which will be illustrated in greater detail below are all achieved according to the present invention by a bracket having the characteristic features described in Claim 1.

[0010] Other objects and advantages will emerge from the following description provided schematically by way of example with regard to an embodiment of the invention illustrated in the accompanying plates in which:

- Figure 1 shows a perspective view of a refrigerator or freezer cabinet;
- Figure 2 shows an exploded, partial, perspective view of the wall of the cabinet with the bracket according to the present invention;
- Figure 3 shows a front view of the part according to Fig. 2., with the bracket in the working position;
- Figure 4 shows a cross-section along the plane indicated by IV-IV in Fig. 3;
- Figure 5 shows a cross-section along the plane indicated by V-V in Fig. 4;
- Figure 6 shows a cross-section along the plane indicated by VI-VI in Fig. 4;
- Figure 7 shows a front view of the bracket in the disengaged position;
- Figure 8 shows a front view of the bracket in the working position;
- Figure 9 shows a perspective view of the means for engagement of the cross-piece of the evaporator element with the bracket;
- Figure 10 shows a schematic cross-section through the means for engagement of cross-piece/bracket;
- Figure 11 shows a partially sectioned top plan view of the assembly consisting of cross-piece, bracket and cabinet wall.

[0011] As shown, a refrigerator apparatus 10 has, on its side walls 11, guides 12 which project towards the inside of the refrigerator compartment and which extend parallel to the wall 11 along predefined sections, so as to form surfaces for retaining and/or sliding of evaporator elements 20 provided with an associated stiffening cross-piece 21, and/or trays 30.

[0012] In greater detail, said guides 12 have at their free ends directed towards the door 10a of the cabinet (for the sake of convenience always called "front part" below) a longitudinal extension 13 formed at the time of moulding of the cooling compartment; said longitudinal extension 13 has a vertical dimension which is smaller than that of the longitudinal guide 12 (Fig. 7) and is suitable for engagement with a bracket 40, according to the present invention, described below.

[0013] The end of the guide 12 adjacent to the extension 13 also has safety elements respectively consisting of a shaped seat 12a extending in the longitudinal direction on the upper surface of the guide 12 and delimited towards the inside of the refrigerator by an inclined side 12b.

[0014] As will emerge more clearly below, said safety elements are designed to interact with the bracket 40 so

as to prevent the movement thereof in the various directions; in particular, the seat 12a is able to form an end-of-travel stop for rotation of the bracket in the direction of its locking into the working position; the side 12b is in turn designed to form a safety locking system in the transverse direction for preventing movement of the bracket away from the wall.

[0015] The bottom surface 13a of the extension 13 forms moreover an additional safety element able to prevent rotation of the bracket in the unlocking direction.

[0016] At the time of moulding of the wall 11 of the cabinet 10, a seat 14 is also formed thereon, said seat being able to receive a corresponding pin 41 of the bracket 40 according to the present invention.

[0017] Said seat 14 is shaped so as to have at least two opposite sides 14a which are parallel and straight and at least two opposite sides 14b with a rounded concave shape.

[0018] Said bracket 40 is formed by a substantially parallelepiped body which is internally hollow and has:

- a rear end surface 40a having a longitudinal extension 42 able to be inserted inside said seat 12a of the guide 12 of the wall 11; in a preferred embodiment, said extension has an inclined inner side 42b matching the inclined inner side 12b of the seat 12a of the longitudinal guide 12;
- a rear surface 40b having a hook element 43 directed towards the front and able to engage with a corresponding seat 21a in the cross-piece 21 of the evaporator element 20;
- a side surface directed towards the wall 11 and provided with said pin 41 extending in the transverse direction and having a cam-like profile with two straight and parallel opposite sides 41a and two rounded and convex opposite sides 41b able to interact with the corresponding sides 14a,14b of said seat 14 in the wall so as to produce:
    - a relative position of free insertion therein (Fig. 7) and;
    - a locked position of the bracket (Figs. 5 and 8), which can be achieved by means of a rotation of the latter.

[0019] As shown in Figs. 9 to 11, once the pin 41 has been inserted in its seat 14 in the wall and the bracket 40 is rotated so as to come into abutment against the end-of-travel stop 12a (Figs. 8 and 11), it is possible to mount, in the vertical direction, the seat 21a - with elastically deformable walls - of the cross-piece 21 of the evaporator element 20 onto the hook element 43 so as to position stably the said evaporator element.

[0020] Along the bottom surface 40c of the bracket 40 there is formed an inclined surface 44 which forms the end-of-travel stop for the tray 30 situated underneath; it is also pointed out that, since said stop is positioned below the axis of rotation of the pin 41, it is able to act in the direction of screwing and therefore stable locking of the bracket 40, should the tray be forced in the extraction direction; likewise the evaporator element 20 or equivalent surface acts in the direction of tightening of the bracket when it is subject to a high axial load resulting from the weight of the objects positioned thereon.

[0021] The operating principle of the bracket is as follows:

- starting (Fig. 7) from a position of substantial non-alignment of the bracket 40 with the longitudinal guide 12 (90° in the example described), the pin 41 is inserted in the seat 14 of the wall 11;
- the bracket 40 is rotated in an anti-clockwise direction (Fig. 7) so as to cause fixing of the convex sides 41b of the pin 41 inside the corresponding concave recesses 14b of the seat 14 (Figs. 8, 5);
- the said rotation also causes the bracket 40 to pass over the extension 13, said bracket being elastically deformed so as to be firmly mounted on the extension 13, as a result of which:
    - its bottom surface 40c (Fig. 6) is positioned beyond the bottom surface 13a of the extension 13, thereby preventing the return movement in the unlocking direction of the bracket;
    - at the same time the extension 42 of the bracket comes into abutment inside the seat 12a forming the end-of-travel stop for rotation of the bracket, in the direction of locking of the latter in the working position;
- once the bracket 40 is positioned, the seat 21a of the cross-piece 21 of the evaporator element 20 is mounted onto the hook element 43 with a vertical movement (Figs. 10, 11), resulting in engagement therewith by means of elastic deformation and stable locking in position of the evaporator element.

[0022] It can therefore be understood how the bracket according to the invention solves the problems of the known art, allowing easy manual assembly as a result of precision insertion of the pin in the associated seat and secure fastening of the bracket to the wall of the refrigerator which opposes the unlocking movements and slackening movements in a transverse direction away from the said wall owing to the various elements for relative fastening of the bracket, the wall guide and the end extension of the said guide.

[0023] Many variations may be introduced as regards the practical realisation of the various parts forming the bracket according to the invention, without thereby departing from the scope of protection defined by the claims which follow. The mating cam-like profile of the pin 41 and the associated seat may for example be formed with different profiles and relative orientations, provided that the two fundamental positions for insertion/extraction and locking/unlocking are maintained.

Claims

1. Bracket for locking shelves (20) of cabinets and in particular refrigerator or freezer cabinets (10), comprising side walls (11) with longitudinal guides (12) projecting towards the inside of the cabinet and having arranged at their free ends an extension (13) able to engage with the bracket, **characterized in that** the latter comprises a pin (41) extending in a direction perpendicular to the said wall (11) and able to be inserted inside a corresponding seat (14) thereof, said pin (41) and seat (14) having respective mating cam-like profiles (41a,14a,41b,14b) able to allow rotation of the bracket (40) from a position of substantial non-alignment with said longitudinal guide (12), for insertion/extraction of the pin into/from said seat (14) of the wall (11), into a position of substantial alignment with said longitudinal guide (12), corresponding to the working position.

2. Bracket according to Claim 1, **characterized in that** the said pin (41) of the bracket has at least one straight side (41a) and at least one rounded profile (41b).

3. Bracket according to Claim 2, **characterized in that** the said rounded profile (41b) is convex.

4. Bracket according to Claim 2, **characterized in that** said seat (14) has at least one straight side (14a) and at least one rounded side (14b).

5. Bracket according to Claim 3, **characterized in that** said seat (14) has at least one concave rounded side (14b).

6. Bracket according to Claim 1, **characterized in that** said means for engagement with the cross-piece of the evaporator shelf (20) consist of a hook element (43).

7. Bracket according to Claim 6, **characterized in that** said hook means (43) extend in a direction parallel to the wall (11) and are able to engage with a corresponding seat (21a) of a cross-piece (21) of said evaporator shelf (20).

8. Bracket according to Claim 1, **characterized in that** it has a longitudinal extension (42) directed towards the rear part thereof and able to be inserted inside a corresponding end-of-travel seat (12a) of said longitudinal guide (12).

9. Bracket according to Claim 8, **characterized in that** said longitudinal extension (42) has an inclined inner side (42b) able to come into abutment with a corresponding inner side (12b) of said seat (12a) of the longitudinal guide (12).

10. Bracket according to Claim 1, **characterized in that** it has a bottom surface (40c) able to be engage with a corresponding bottom surface (13a) of the said extension (13) of the longitudinal guide (12) so as to prevent rotation of the bracket in the unlocking direction.

11. Bracket according to Claim 1, **characterized in that** it has a bottom surface (40c) with an inclined surface (44) arranged below the axis of rotation of the pin (41) and able to form an end-of-travel stop preventing extraction of the said trays (30).

12. Cabinet, in particular refrigerator or freezer cabinet (10), comprising side walls (11) provided with longitudinal guides (12) projecting towards the inside of the cabinet and having arranged at their free ends a longitudinal extension (13) able to engage with a bracket (40) for locking of shelves (20), a seat (14) being formed on said side walls (11), **characterized in that** said bracket (40) comprises a pin (41) extending in a direction perpendicular to the said wall (11) and able to be inserted in said corresponding seat (14) thereof, said pin (41) and said seat (14) having respective mating cam-like profiles (41a, 14a,41b,14b) able to allow rotation of the bracket (40) from a position of substantial non-alignment with said longitudinal guide (12), for insertion/extraction of the pin into/from said seat (14) of the wall (11), into a position of substantial alignment with said longitudinal guide (12), corresponding to the working position.

13. Cabinet according to Claim 12, **characterized in that** the said pin (41) of the bracket has at least one straight side (41a) and at least one rounded profile.

14. Cabinet according to Claim 13, **characterized in that** the said rounded profile (41b) is convex.

15. Cabinet according to Claim 13, **characterized in that** said seat (14) has at least one straight side (14a) and at least one rounded side (14b).

16. Cabinet according to Claim 14, **characterized in that** said seat (14) has at least one concave rounded side (14b).

17. Cabinet according to Claim 12, **characterized in that** said means for engagement with the cross-piece of the evaporator shelf (20) consist of a hook element (43).

18. Cabinet according to Claim 17, **characterized in that** said hook means (43) extend in a direction parallel to the wall (11) and are able to engage with a corresponding seat (21a) of a cross-piece (21) of said evaporator shelf (20).

19. Cabinet according to Claim 12, **characterized in that** said longitudinal guide (12) has an end-of-travel seat (12a) formed in the vicinity of its end adjacent to the extension (13) for engagement with the bracket (40).

20. Cabinet according to Claim 19, **characterized in that** said seat (12a) has an inner side (12b) inclined towards the wall (11).

21. Cabinet according to Claim 19, **characterized in that** said bracket has a longitudinal extension (42) directed towards the rear part thereof and able to be inserted inside said seat (12a) of said longitudinal guide (12).

22. Cabinet according to Claim 21, **characterized in that** said longitudinal extension (42) has an inclined inner side (42b) able to come into abutment with said inner wall (12b) of said seat (12a) of the longitudinal guide (12).

23. Cabinet according to Claim 12, **characterized in that** said bracket has a bottom surface (40c) able to engage with a corresponding abutting bottom surface (13a) of the said extension (13) of the longitudinal guide (12) so as to prevent unlocking rotation of the bracket.

24. Cabinet according to Claim 12, **characterized in that** the bottom surface (40c) has an inclined surface (44) arranged below the axis of rotation of the pin (41) and able to form an end-of-travel stop preventing extraction of the said trays (30).

Fig.1

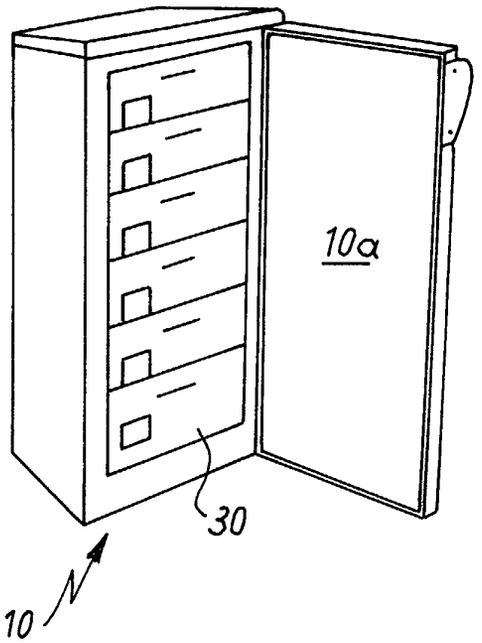


Fig.2

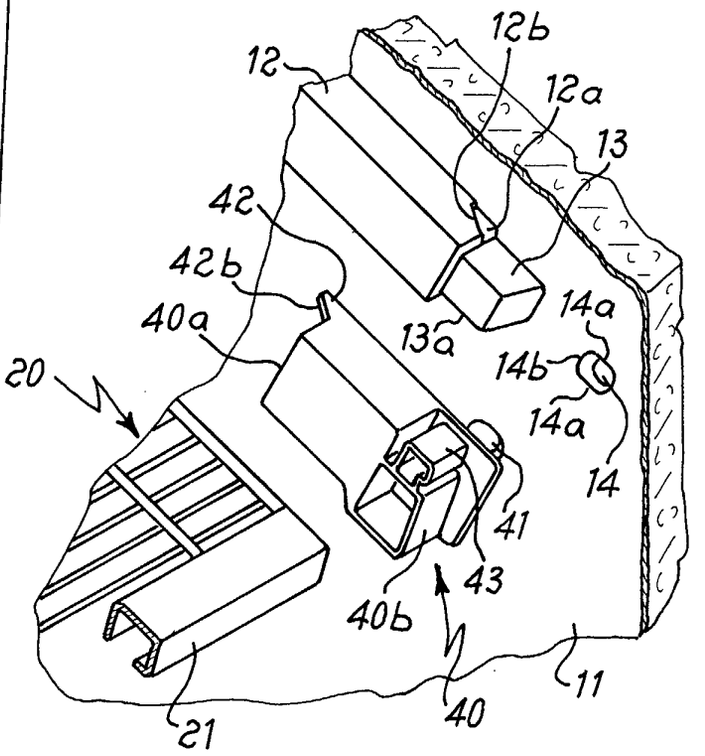


Fig.3

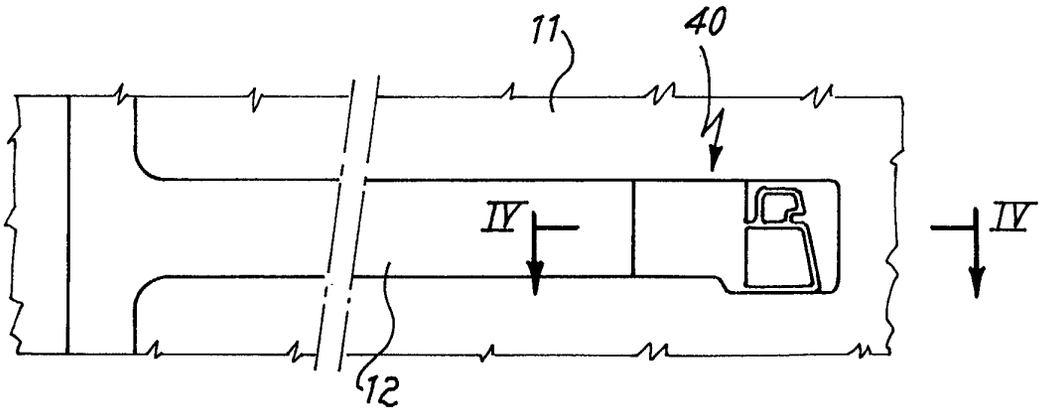


Fig.4

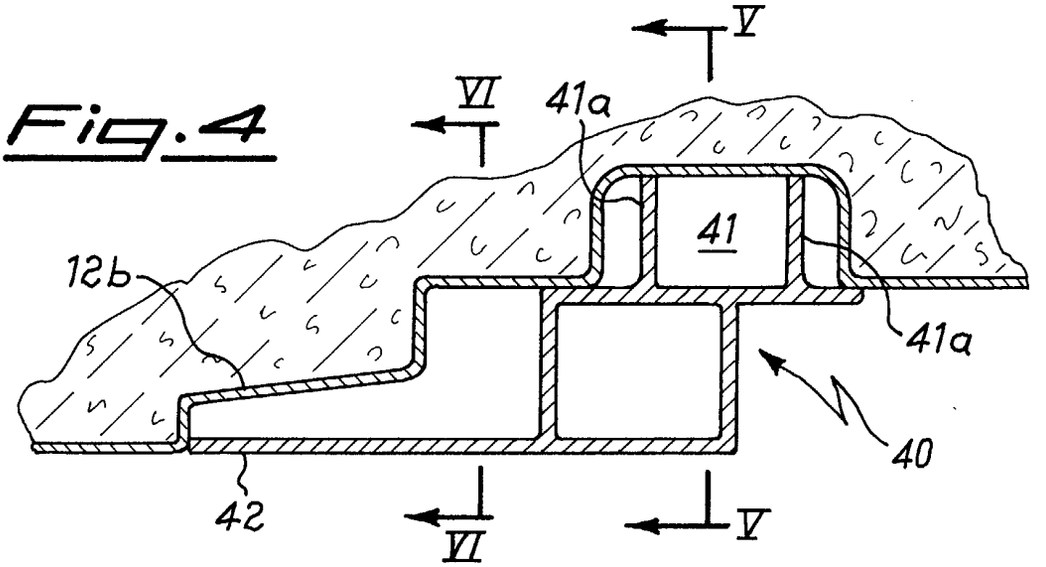
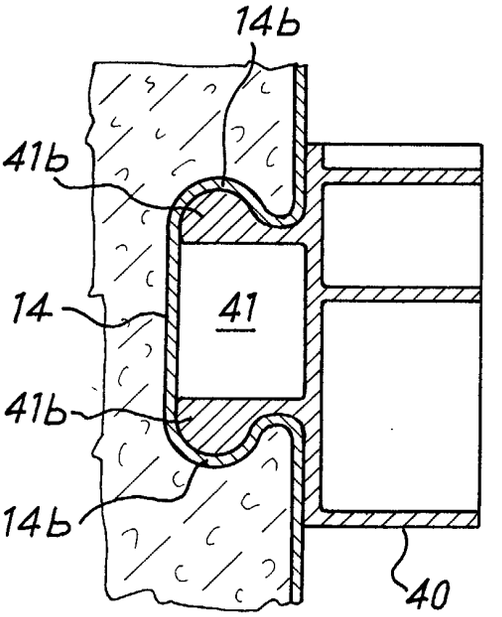


Fig.5



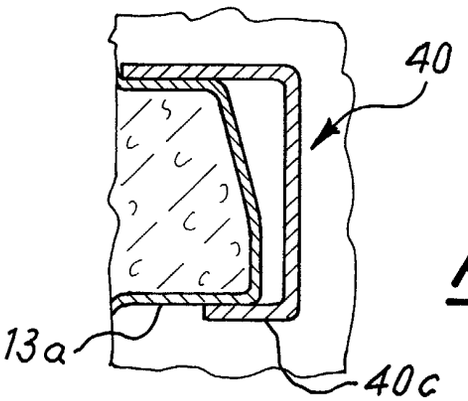


Fig.6

Fig.7

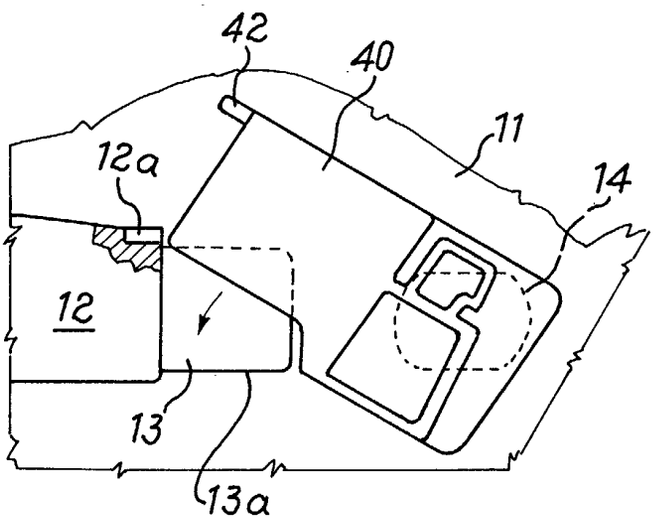


Fig.8

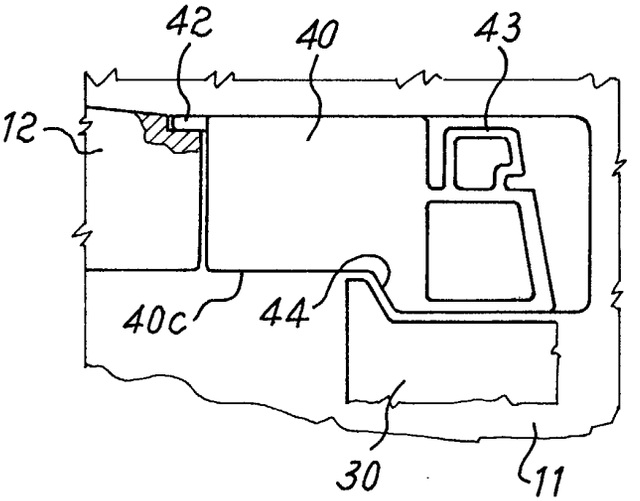


Fig.9

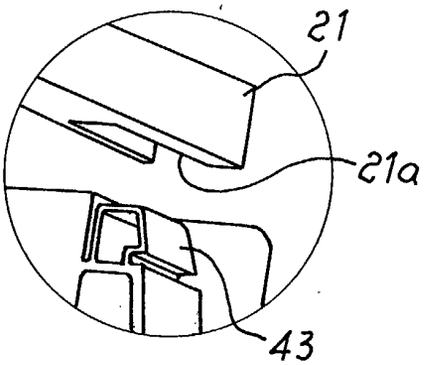


Fig.11

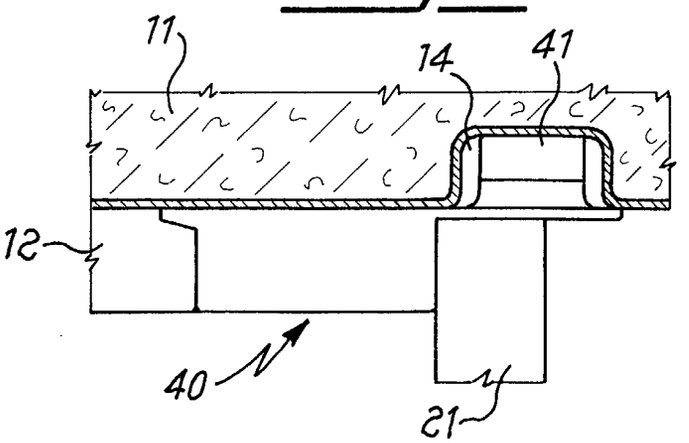
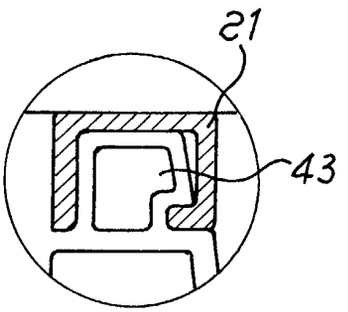


Fig.10



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EUROPEAN SEARCH REPORT

Application Number
EP 02 02 8387

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TECHNICAL FIELDS SEARCHED (Int.Cl.7)

F25D
A47B
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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	13 June 2003	SOGNO, M

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