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— *of inventorship (Rule 4.17(iv))*

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(54) Title: ACCESS ELEMENT FOR A REFRIGERATING STORING DEVICE AND METHOD FOR MANUFACTURING THE SAME

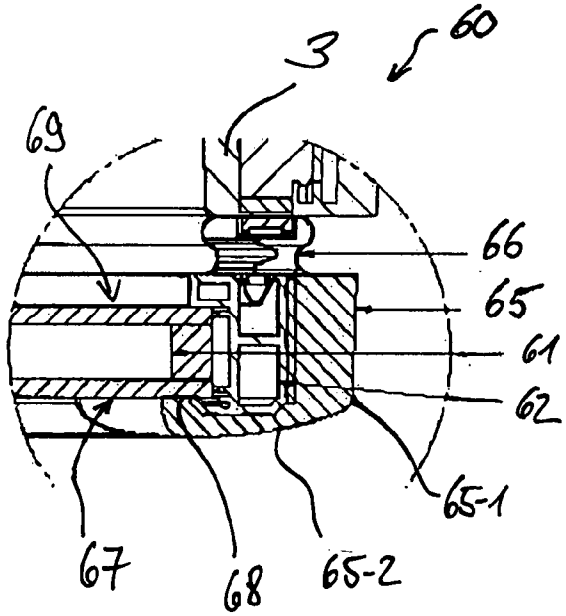


Fig. 2A

(57) Abstract: An access element (10, 60) for a refrigerating storing device (1) comprises a panel (11, 61) adapted for forming a surface part of the access element (10, 60), an extrusion profile (12, 62) arranged at least partially around the panel (11, 61) and engaging the panel on at least a circumferential portion (13, 63) thereof, and a seamless edge (15, 65) arranged at least partially on the extrusion profile (12, 62), the seamless edge being formed from plastic material. The seamless edge increases the stiffness and robustness of a front surface for correspondingly formed access members.

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Access Element for a Refrigerating Storing Device and Method for Manufacturing the same

The present invention is directed to an access element for a refrigerating storing device comprising a panel adapted for forming a surface part of the access element. Particularly, the panel may be adapted for forming a front part of the access element and may be one of a door for providing access to a storage space of the storage device, or a drawer for arrangement in a storage space of the storage device. The present invention is also directed to a method for manufacturing an access element for a refrigerating storing device. Moreover, the invention is concerned with a storage device adapted for the storage of goods requiring refrigeration comprising an access element according to the invention.

Refrigerating storing devices for providing chilled or refrigerated goods to customers or for storing of goods requiring refrigeration, for example, in bars or the like are known in a variety of constructions. For example, such refrigerating storing device may have the construction of a refrigerating cabinet having a vertically oriented storage space for the storing of goods, which storage space may be accessed by opening a door of the cabinet, the door thus representing an access element for accessing the storage space of the cabinet. According to another implementation, the refrigerating storing device may be constructed as a storage container having one or a plurality of drawers which may be pulled out from the container in order to have access to the goods stored in the drawers. Thus, such drawer represents an access element of the storage container for providing access to the goods stored therein.

Various known types of cabinets comprise one or multiple front doors such as glass doors covering the display space in the front viewing area from top to bottom of the display case, wherein the doors have to be opened in order to gain access to the stored goods. According to another type, such front doors are formed from sheet metal panels having an insulation between an inner and

outer sheet metal panel being formed as an insulated door for covering the display space in the front access area of the display case. This has the advantage that ambient air is prevented from entering into the display space heating up the stored goods, improving efficiency of the cabinet. Likewise, refrigerating storing devices having storage containers provided with drawers may have drawers with front panels constructed from either glass panels or insulated sheet metal panels. Disadvantageously, such sheet metal panels or glass panels for refrigerating storing devices usually have limited design freedom, particularly as regards the front viewing area of the panels.

Therefore, it would be beneficial to provide an improved access element, such as a door or a drawer, for a refrigerating storing device, the construction of which provides increased design freedom at limited manufacturing costs.

According to one aspect, embodiments of the invention provide an access element for a refrigerating storing device, which is used for storing of goods requiring refrigeration, the access element comprising a panel adapted for forming a surface part of the access element, an extrusion profile arranged at least partially around the panel and engaging the panel on at least a circumferential portion thereof, and a seamless edge arranged at least partially on the extrusion profile, the seamless edge being formed from plastic material.

According to another aspect, embodiments of the present invention provide a method for manufacturing an access element for a refrigerating storing device, comprising the steps of: providing a panel adapted for forming a surface part of the access element, arranging an extrusion profile at least partially around the panel and engaging the panel with the extrusion profile on at least a circumferential portion thereof, and arranging a seamless edge at least partially around the extrusion profile, the seamless edge being formed from plastic material.

According to a further aspect, embodiments of the invention are concerned with a storage device adapted for the storage of goods requiring refrigeration, the storage device comprising an access element according to the principles of

the present invention for providing access to a storage space of the storage device.

According to an embodiment, the access element is one of a door for providing access to a storage space of the storage device, or a drawer for arrangement in a storage space of the storage device.

Further embodiments and aspects of the invention are evident from the dependent claims.

The invention will now be described with reference to the following disclosure of embodiments of the invention taken in conjunction with the accompanying drawings, wherein:

Figure 1A shows steps of manufacturing an embodiment of an access element of a refrigerating storage device, the access element being in the form of a drawer having a front panel comprising, for example, a sheet metal panel,

Figure 1B shows steps of manufacturing another embodiment of an access element of a refrigerating storage device, the access element being in the form of a drawer having a front panel being formed from a glass panel,

Figure 2A shows a cross-sectional view of a portion of the front of an access element according to an embodiment of the invention having a glass front panel,

Figure 2B shows a cross-sectional view of a portion of the front of an access element according to another embodiment of the invention having, for example, a sheet metal front panel,

Figure 3 shows a cross-sectional view of an embodiment of a storage device having an access element according to the invention.

In Figures 1A and 1B there are illustrated several steps of manufacturing a respective exemplary access element according to an embodiment of the invention, wherein the exemplary access element in the present embodiment is formed as a drawer which may be placed inside a storage space of a corresponding refrigerating storage container.

According to step 1 of the manufacturing process according to Figure 1A, there is provided an extrusion profile 12, which extrusion profile 12 comprises in the present embodiment a line of portions 21 to 25 which are interconnected with each other, wherein each of the portions 21 to 25 of the line of portions is formed to get in engagement with a panel portion of the access member, as further explained herein below. The line of portions 21 to 25 of the extrusion profile 12 comprises cut-off portions 31 of the extrusion profile, which cut-off portions 31 are designed for folding the line of portions 21 to 25 at the cut-off portions 31.

Likewise, according to Figure 1B, there is provided an extrusion profile 62 which comprises a line of portions 71 to 75 which are interconnected with each other, wherein the extrusion profile 62 comprises cut-off portions 81 at which the line of portions 71 to 75 may be folded as further described herein below.

According to step 2 as shown with reference to Figure 1A, a sheet-material inner part 11-1 is placed to be in engagement with portion 23 of the line of portions 21 to 25 of the extrusion profile 12. The sheet-material inner part 11-1 is forming an inner part of panel 11 which forms a front part of the access element, as described herein below. The panel 11 may be formed by any type of suitable material, such as metal. Other materials may be plastic, wood, textile or any other type of suitable material. Likewise, in step 2 according to Figure 1B a glass frame 61-1 is placed in engagement with portion 73 of the line of portions 71 to 75 of the extrusion profile 62.

According to step 3 as shown in Figure 1A, sheet-material outer part 11-2 forming the outer part of panel 11 is placed in engagement with portion 23 of the extrusion profile 12. According to Figure 1B, glass 61-2 is placed in the glass frame 61-1 to form the glass panel 61.

In the next step 4, with reference to Figure 1A, the extrusion profile 12 with its line of portions 21 to 25 is folded about the circumferential edge 13 of the panel 11, wherein the cut-off portions 31 of the extrusion profile 12 are placed at respective corners of the panel 11. Likewise, according to Figure 1B, the line of portions 71 to 75 of the extrusion profile 62 is folded about the circumferential edge 63 of the glass panel 61 with the cut-off portions 81 of the extrusion profile placed in the respective corners of the panel 61. Accordingly, the extrusion profile 12, 62 is arranged partially around the panels 11 and 61, respectively, and engages the respective panel on at least a circumferential portion thereof.

As shown with respect to step 5, the outermost portions 21 and 25 of extrusion profile 12 are folded about the respective cut-off portions 31, so that they are in engagement with the upper circumferential edge 13 of the panel 11. Likewise, as shown in Figure 1B, the outermost portions 71 and 75 of the extrusion profile 62 are folded to be in engagement with the upper part of the circumferential edge 63 of the panel 61. As a result, as shown in Figures 1A and 1B, the extrusion profiles 12, 62 are arranged around the respective panel 11, 61 and engage the respective panel on a circumferential portion thereof, particularly wherein each of the portions of the line of portions 21 to 25 and 71 to 75, respectively, is in engagement with a different portion of the circumferential panel edge 13 and 63, respectively.

Further, in step 5 isolating polyurethane material is injected into the space between sheet-material inner part 11-1 and sheet-material outer part 11-2 of panel 11. In this regard, any other suitable isolating material may also be used.

According to step 6, the panels 11 and 61 together with the respective extrusion profiles 12 and 62, respectively, are provided with a seamless edge 15 and 65, respectively, which is arranged at least partially around the extrusion profile 12, 62, wherein the seamless edge 15, 65 is formed from plastic material. The seamless edge may be arranged according to a particular process, as described in more detail below. For example, the seamless edge 15, 65 may be formed from plastic material including polyurethane material. According to an

embodiment, the seamless edge 15, 65 has a rounded shape in at least a portion of the seamless edge adjacent to the circumferential panel edge 13, 63.

According to step 7 as shown in Figures 1A and 1B, hand grips 20 and 70, respectively, are mounted to the respective front parts of the drawers 10, 60, which are thus formed by finally mounting a drawer container 14 and 64, respectively, to the front parts comprising panels 11 and 61. Further, a magnetic gasket (not shown in Figures 1A and 1B) is mounted to the rear side of the extrusion profiles 12 and 62, respectively.

Turning now to Figure 2A, there is illustrated a cross-sectional view of a portion of the front of the access element 60 according to an embodiment of the invention having a glass front panel 61 as described herein above. The glass panel 61 forms a surface part of the access element 60, as also shown in step 7 of Figure 1B, and having a front surface 67 facing the outside of the drawer, whereas a rear surface 69 of the panel 61 is facing the inside of the drawer. The circumferential panel edge of the panel 61 is covered by the extrusion profile 62 which is arranged on the circumferential panel edge.

In step 6 as shown with reference to Figure 1B, the seamless edge 65 may be arranged at least partially on the extrusion profile 62, for example, according to a process as described in DE 41 10 150 A1. Other processes for the same purpose may also be used.

In DE 41 10 150 A1, a possible process is described for manufacturing an edge around a panel, the panel particularly used for the manufacture of office furniture. In the present case, for manufacturing the seamless edge 65 on the extrusion profile 62 and around the panel 61, a similar process may be used as described in DE 41 10 150 A1, using an upper pressure plate and a lower pressure plate having a flexible mould placed in between and which is subsequently placed around the panel. The mould used for forming the seamless edge 65 has at least one injection opening via which a liquid material such as polyurethane material can be injected into a respective cavity of the mould, wherein the cavity is formed with a cross-section corresponding to the form of the seamless edge 65 as shown in Figure 2A. After filling the mould and the

cavity, respectively, with liquid material, the material cures within the mould, thus forming the seamless edge as shown.

Analogously to Figure 2A, Figure 2B shows a cross-sectional view of a part of the front of an access element 10 according to an embodiment of the invention as shown with reference to Figure 1A, the front having a panel 11 as shown in Figure 1A. The panel 11 has a front surface 17 and a rear surface 19, the front surface 17 facing the outside of the access element and the rear surface 19 facing the inside of the drawer 10. Similar to the seamless edge 65, the seamless edge 15 is arranged on the extrusion profile 12, wherein the process of applying the seamless edge 15 is the same as described with respect to seamless edge 65.

In both embodiments, the seamless edge 15, 65 has a rounded shape in at least a portion of the seamless edge adjacent to the circumferential panel edge. The seamless edge 15, 65 is directly attached to the extrusion profile 12 and 62, respectively, and is directly attached to at least a portion of the panel 11, 61 for integrally fixing the extrusion profile 12, 62 to the panel 11 and 61, respectively. This provides the advantage that no additional fixtures are needed for fixing the extrusion profile 12, 62 to the panel 11 and 61, respectively.

Referring back to step 5 of Figures 1A and 1B, the outermost portions 21, 25 of the extrusion profile 12 and the outermost portions 71 and 75 of the extrusion profile 62, which are placed adjacent to one another when in engagement with the panel 11 and 61, respectively, are not directly connected with each other by any additional fixture. Rather, according to the invention, the portions 21, 25 and portions 71, 75 are covered by the seamless edge 15 and 65, respectively, as shown with reference to step 6 of Figures 1A and 1B, when arranging the seamless edge around the circumferential panel edge.

Returning to Figures 2A and 2B, the seamless edge 15, 65 is attached to the panel 11 and 61, respectively, in a portion of the front surface 17, 67 of the panel (portions 18 and 68, respectively), thus embracing the extrusion profile 12, 62 and fixing the extrusion profile to the panel in a circumferential panel edge portion. In the present embodiment, the seamless edge 15, 65 comprises a

substantially rounded L-shaped cross-sectional form. One leg 15-1, 65-1 of the L-shaped form covers at least a portion of the extrusion profile 12 and 62, respectively, and the other leg 15-2, 65-2 of the L-shaped form covers at least a portion of the front surface 17 and 67, respectively, of the panel, such as shown in portions 18 and 68. As further shown in Figures 2A and 2B, the seamless edge 15, 65 does not cover the rear surface 19 and 69, respectively, of the panel 11, 61 which is facing a frame 3 of the storage device when the access element 10, 60 is in a closed position.

Therefore, as shown in Figures 1A, 1B and Figures 2A and 2B, the seamless edge 15, 65 is arranged on a circumferential panel edge 13, 63 and on parts of a front surface 17, 67 of the respective panel 11, 61 in a circumferential outer area (portions 18, 68) of the front surface adjacent to the panel edge, so that at least a portion of the front surface 17 and 67, respectively, is covered by the seamless edge 15, 65.

As further shown in Figures 2A and 2B, the extrusion profiles 12, 62 each comprise means 16 and 66, respectively, for fixing the panel with respect to a frame of a storage device. Particularly, the means for fixing the panel to the storage device is comprising a gasket 16, 66 which is attached to the extrusion profile 12, 62 on the rear side of the respective access member 10, 60. In an embodiment, the gasket 16, 66 is a magnetic gasket for interacting with at least a counterpart element 3 of the storage device. According to another embodiment, the counterpart element interacting with the magnetic gasket may be attached to the storage device.

According to Figure 3, there is shown a storage device 1 having a casing 3 formed as a storage container which includes a storage space 2 for the storage of goods requiring refrigeration. The casing 3 is designed for receiving a number of drawers for the storage of the goods, such as drawers 10, 60 as explained herein above.

The present invention provides the advantage that by means of the seamless edge manufactured with a technology as described in DE 41 10 150 A1, different kinds of front panels such as glass and insulated sheet metal panels can be

used for manufacturing access members such as doors or drawers, and can be applied in a refrigeration system. With providing of the extrusion profile, a magnetic door seal or gasket may be mounted after the PU-moulding. Because the PU-material for forming the seamless edge is applied for using a corresponding mould, this technique provides a plurality of design freedom parameters without increasing the manufacturing costs thereof.

In a further beneficial aspect, the seamless edge increases the stiffness, robustness and enhances the design aspect of a front surface for correspondingly formed access members. The glass and sheet metal panels are interchangeable in service and production. This way of assembling an access member enables future change of isolation material and use of plates instead of injected polyurethane material used in connection with sheet metal panels as described. Further, the front part of the access member has high impact resistance in the edge part thereof where the seamless edge is arranged, is easy to clean as a result of no seams and/or gaps at the front surface, and no additional fixtures are needed for fixing a frame to a panel, as described.

While the invention has been described with reference to exemplary embodiments, it will be understood by those skilled in the art that various changes may be made and equivalents may be substituted for elements thereof without departing from the scope of the invention. In addition, many modifications may be made to adapt a particular situation or material to the teachings of the invention without departing from the essential scope thereof. Therefore, it is intended that the invention not be limited to the particular embodiments disclosed, but that the invention will include all embodiments falling within the scope of the appended claims.

Claims

1. An access element (10, 60) for a refrigerating storing device (1), comprising
- a panel (11, 61) adapted for forming a surface part of the access element (10, 60),
- an extrusion profile (12, 62) arranged at least partially around the panel (11, 61) and engaging the panel on at least a circumferential portion (13, 63) thereof,
- a seamless edge (15, 65) arranged at least partially on the extrusion profile (12, 62), the seamless edge being formed from plastic material.

2. The access element according to claim 1, wherein
the seamless edge (15, 65) is formed from plastic material including polyurethane material.

3. The access element according to claim 1 or 2, wherein
the panel (11, 61) comprises a circumferential panel edge (13, 63), wherein the extrusion profile (12, 62) is arranged at least partially on the circumferential panel edge.

4. The access element according to claim 3, wherein
the seamless edge (15, 65) has a rounded shape in at least a portion of the seamless edge adjacent to the circumferential panel edge (13, 63).

5. The access element according to one of claims 1 to 4, wherein
the seamless edge (15, 65) is directly attached to the extrusion profile (12, 62) and is directly attached to at least a portion of the panel (11, 61) for integrally fixing the extrusion profile to the panel.

6. The access element according to claim 5, wherein
the seamless edge (15, 65) is attached to the panel (11, 61) in a portion of a front surface (17, 67) of the panel embracing the extrusion profile (12, 62) and

fixing the extrusion profile to the panel in a circumferential panel edge portion (13, 63).

7. The access element according to one of claims 1 to 6, wherein the seamless edge (15, 65) is arranged around a circumferential panel edge (13, 63) and on a front surface (17, 67) of the panel in a circumferential outer area (18, 68) of the front surface adjacent to the circumferential panel edge (13, 63), so that at least a portion of the front surface (17, 67) is covered by the seamless edge (15, 65).

8. The access element according to claim 7, wherein the seamless edge (15, 65) does not cover a portion of the rear surface (19, 69) of the panel (11, 61) which is facing a part of a frame (3) of the storage device (1) when the access element (10, 60) is in a closed position.

9. The access element according to one of claims 1 to 8, wherein the seamless edge (15, 65) comprises a substantially rounded L-shaped cross-sectional form.

10. The access element according to claim 9, wherein wherein one leg (15-1, 65-1) of the L-shaped form covers at least a portion of the extrusion profile (12, 62) and the other leg (15-2, 65-2) of the L-shaped form covers at least a portion of a front surface (17, 67) of the panel.

11. The access element according to one of claims 1 to 10, wherein the extrusion profile (12, 62) comprises means (16, 66) for fixing the panel (11, 61) with respect to a frame (3) of the storage device (1).

12. The access element according to one of claims 1 to 11, further comprising a gasket (16, 66) attached to the extrusion profile (12, 62).

13. The access element according to claim 12, wherein the gasket (16, 66) is a magnetic gasket for interacting with at least a counter-part element (3) of the storage device (1) or attached to the storage device (1).

14. The access element according to one of claims 1 to 11, wherein
the access element (10, 60) is one of a door for providing access to a storage space (2) of the storage device (1), or a drawer for arrangement in a storage space (2) of the storage device (1).

15. The access element according to one of claims 1 to 14, wherein
the panel (11, 61) is adapted for forming a front part of the access element (10, 60).

16. A storage device (1) adapted for the storage of goods requiring refrigeration, comprising an access element (10, 60) according to one of the preceding claims for providing access to a storage space (2) of the storage device.

17. A method for manufacturing an access element (10, 60) for a refrigerating storing device (1), comprising the steps of:
- providing a panel (11, 61) adapted for forming a surface part of the access element,
- arranging an extrusion profile (12, 62) at least partially around the panel (11, 61) and engaging the panel with the extrusion profile on at least a circumferential portion (13, 63) thereof,
- arranging a seamless edge (15, 65) at least partially around the extrusion profile (12, 62), the seamless edge being formed from plastic material.

18. The method according to claim 17, wherein
the extrusion profile (12, 62) comprises a line of portions (21-25; 71-75) which are interconnected with each other, wherein each of the portions of the line of portions is in engagement with a different portion of a circumferential panel edge (13, 63).

19. The method according to claim 18, wherein
the line of portions (21-25; 71-75) of the extrusion profile (12, 62) is folded about the circumferential panel edge (13, 63) with cut-off portions (31, 81) of the extrusion profile placed at respective corners of the panel (11, 61).

20. The method according to one of claims 17 to 19, wherein

portions (21, 25) of the extrusion profile (12) which are placed adjacent to one another when in engagement with the panel (11) and which are not directly connected with each other are covered by the seamless edge (15) when arranging the seamless edge at least partially around the panel.

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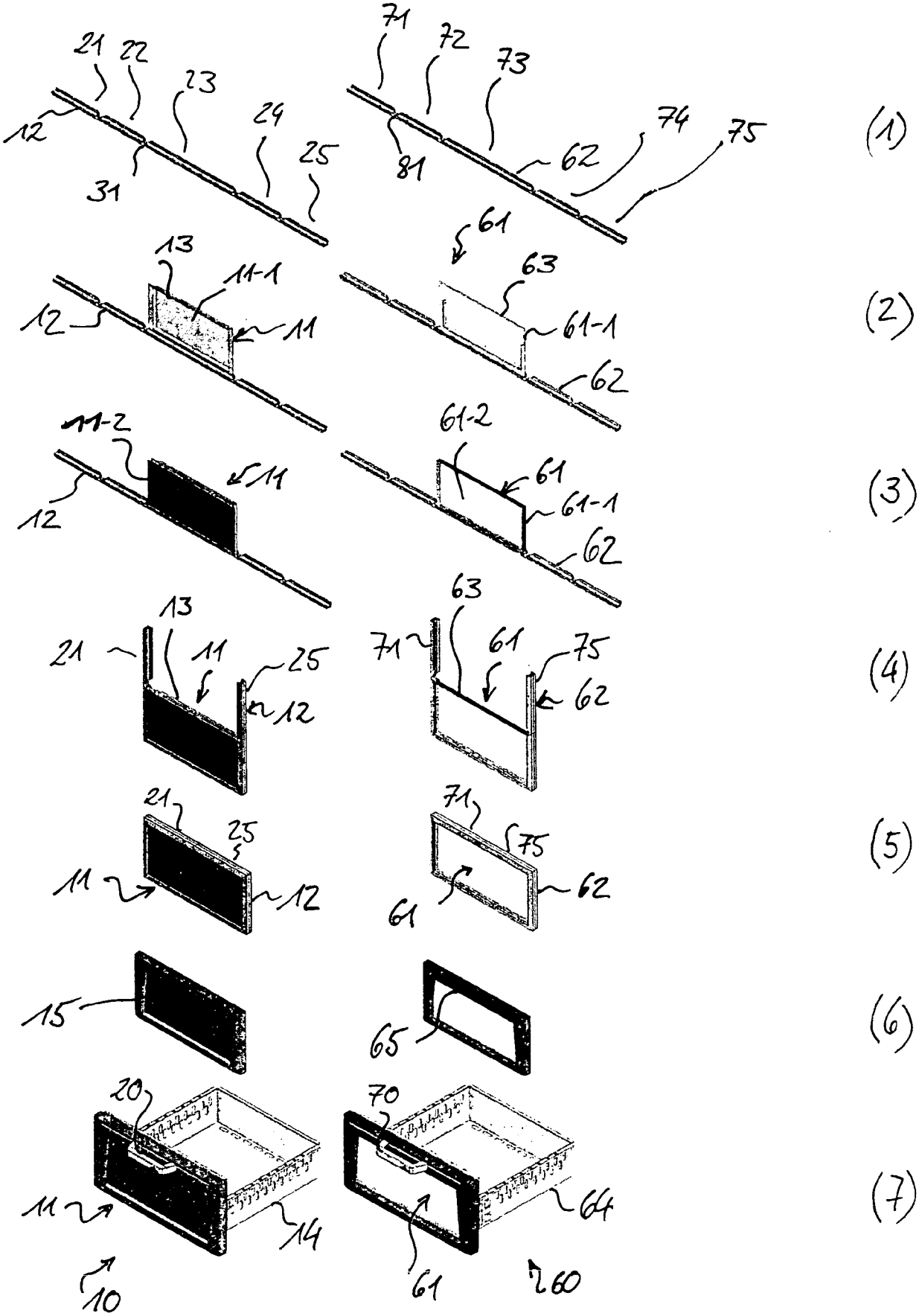

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Fig. 1A

Fig. 1B

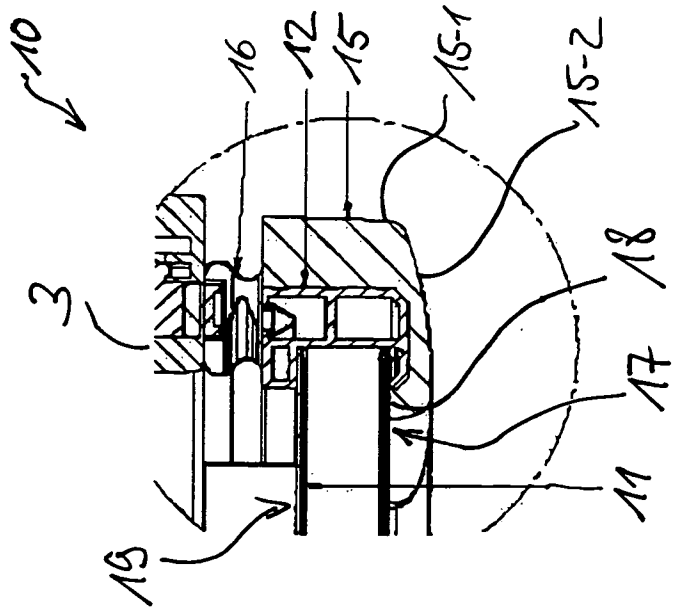


Fig. 2B

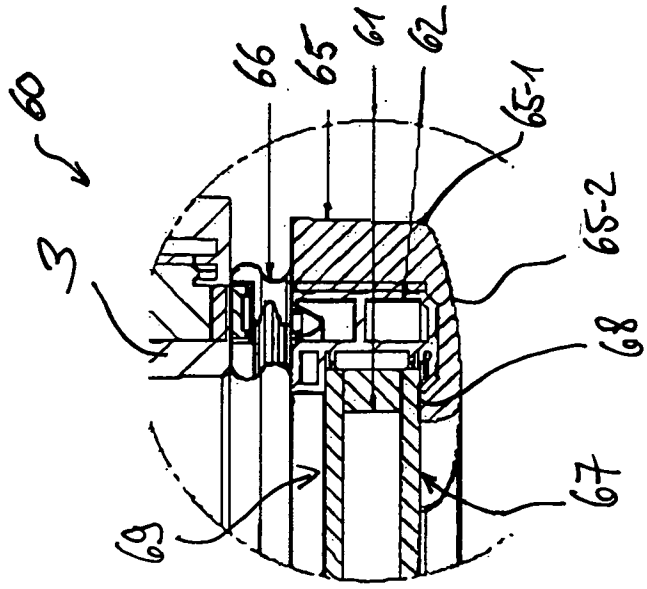


Fig. 2A

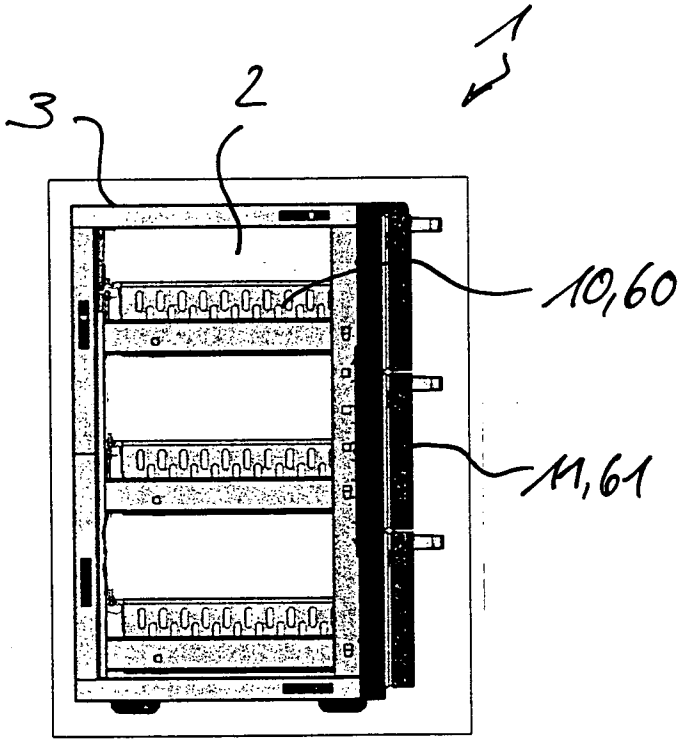


Fig. 3

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2008/000011

A. CLASSIFICATION OF SUBJECT MATTER
INV. F25D23/08
ADD. F25D23/02

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
F25D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 00/58580 A (HUSSMANN CORP [US]) 5 October 2000 (2000-10-05) page 20, line 7 - page 23, line 10; figures 2-4 page 7, line 2 - page 11, line 26	1-12, 14-20
X	US 5 704 107 A (SCHMIDT CHRISTOPHER G [US] ET AL) 6 January 1998 (1998-01-06) the whole document	1-4,7, 9-20
X	WO 2004/106823 A (BSH BOSCH SIEMENS HAUSGERAETE [DE]; GRASY SIEGFRIED [DE]; PFISTER BERN) 9 December 2004 (2004-12-09) figures 1-3	1,3-20

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[X] Further documents are listed in the continuation of Box C.

[X] See patent family annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

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"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

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Date of the actual completion of the international search	Date of mailing of the international search report
9 October 2008	20/10/2008

Name and mailing address of the ISA/	Authorized officer
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International application No
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C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 2006/079517 A (LIEBHERR HAUSGERAETE [DE]; HECHT JOSEF [DE]; DORNER GEORG [DE]) 3 August 2006 (2006-08-03) the whole document	1-20
A	US 2 190 233 A (GEYER HARVEY D) 13 February 1940 (1940-02-13) the whole document	1-20
A	WO 2005/021886 A (MCKINLAY ROSS CAMPBELL [AU]; PICKFORD MURRAY CHRISTIAN [AU]; MCKINLAY) 10 March 2005 (2005-03-10) the whole document	1-20
A	GB 2 307 035 A (ORRELL LTD [IE]) 14 May 1997 (1997-05-14) figures 5,13-15	
A	DE 41 10 150 A1 (KROMKAMP GERHARDUS HENDRIKUS [NL]) 10 October 1991 (1991-10-10) cited in the application the whole document	

INTERNATIONAL SEARCH REPORT

Information on patent family members

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