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(54) **Device for coupling an access door of a household appliance, in particular a dishwashing machine, to a covering panel**

(57) The invention relates to a device (20) for coupling an access door (5) of a household appliance (1), in particular a dishwashing machine, to an outer decorative covering panel (15); the device includes a top sliding coupling (21) between door (5) and panel (15) and a bottom hinge connection (22) for connecting panel (15) to a casing (2) of appliance (1); the hinge connection (22) is

formed by at least one fulcrum adapter (27), having a seat (28) engaged by a pin (29) that is integrally carried by an inner surface (24) of the panel (15) facing the door (5); the adapter (27) is fixed by connection members (30) to a recessed bottom portion (8) of the appliance in such a way the adapter (27) projects frontally from the appliance and below and spaced apart from a bottom edge (7) of the door (5).

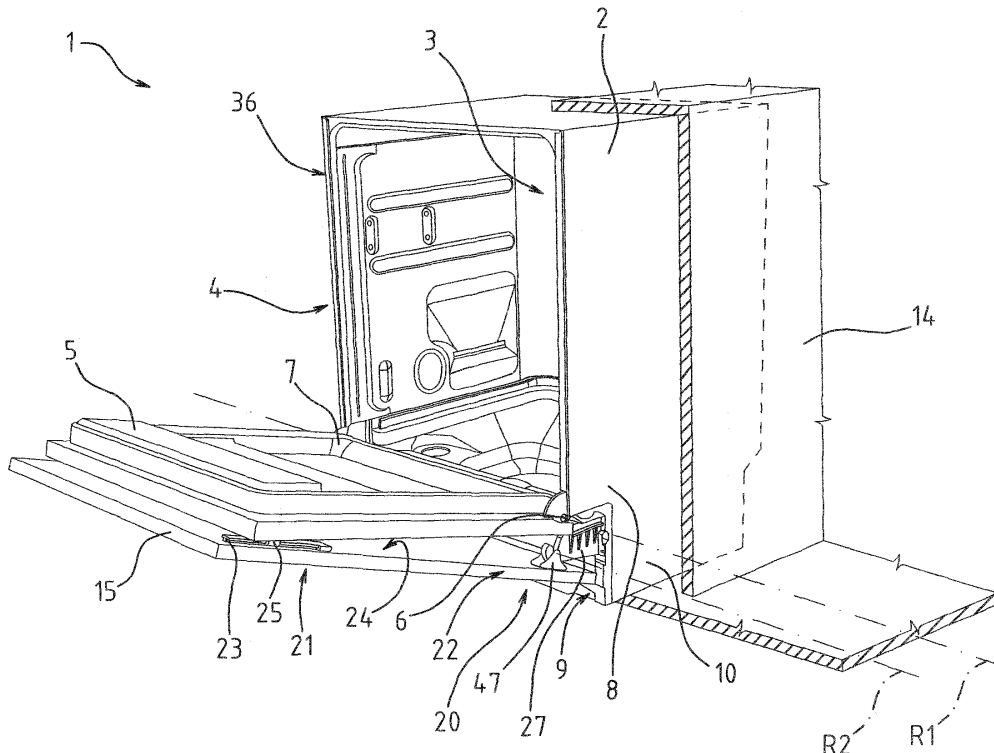


Fig.1

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## Description

[0001] The present invention relates to the field of built-in domestic appliances, and in particular to a device for coupling an access door of a household appliance to an outer covering panel.

[0002] While reference is made hereinafter to a dishwashing machine, it is clear that the invention also applies to any other domestic appliance having an inner hinged door associated to an outer covering panel.

[0003] As it is known, so-called "fully integrated" domestic appliances, e.g. dishwashing machines, are installed and fully enclosed in kitchen furniture; the front door of the appliance is covered and completely hidden by a covering decorative panel having the same appearance as the surrounding furniture. The panel is applied to the appliance door and is mechanically connected to the door, so that the user, by opening the outer panel, also open the inner door.

[0004] Many coupling devices are known to connect the outer covering panel to the inner machine door.

[0005] For example, according to known kinds of coupling device, a bottom end of the panel is hinged directly to either the furniture or the machine structure, and a top portion of the panel is slidably connected to the machine door.

[0006] This kinds of solutions, however, are relatively complicated, and/or require a high number of component parts to be assembled, and/or are poorly flexible needing specifically designed parts of the machines.

[0007] Moreover, since the bottom end portion of the panel is supported by hinges that are directly fixed to either the machine structure or the furniture, the length of the decorative panel that can be applied is limited, while current design trend for furniture would require longer decorative panels.

[0008] It is an object of the present invention to provide a device for coupling an access door of a household appliance, in particular a dishwashing machine, to a covering panel and free from the aforementioned drawbacks.

[0009] According to the present invention, there is provided a device for coupling an access door of a household appliance, in particular a dishwashing machine, to a covering panel, the device comprising a top sliding coupling between the door and the panel and a bottom hinge connection for the panel; the device being **characterized in that** the hinge connection comprises at least one fulcrum adapter, having a seat engaged by a pin that is integrally carried by an inner surface of the panel facing the door; and connection members for fixing the adapter to a recessed bottom portion of the appliance in such a way the adapter projects frontally from the appliance and below and spaced apart from a bottom edge of the door.

[0010] A first advantage of the device according to the invention is the extreme structural simplicity, which makes the solution easy and cheap; a few components are required, and all components are easy and cheap to be manufactured and assembled. At the same time, the

device of the invention is also fully effective and reliable in use.

[0011] Moreover, the device of the invention allows the covering panel to be easily and simply mounted on the inner door, without requiring any modification of either the machine structure or the furniture.

[0012] According to another aspect of the invention, it is also provided a mounting kit for coupling an access door of a household appliance, in particular a dishwashing machine, to a covering panel; the kit comprising at least one guide, to be fixed to an inner surface of the panel and engaged by a slide that slides along the guide and is hingedly connectable to the door; at least a support element provided with a pin and to be fixed to the inner surface of the panel; at least one fulcrum adapter, having a seat for housing the pin; and connection members for fixing the adapter to the appliance.

[0013] Also the kit as a whole is very simple and cheap to manufacture, and can be used with different appliances.

[0014] These and other advantages and features of the present invention will be clear from the following detailed description of an embodiment thereof, with reference to the attached drawings, in which:

- Figure 1 is a schematic perspective view of a built-in dishwashing machine provided with a device according to the invention for coupling a machine access door to an outer covering panel;
- Figure 2 is a perspective larger-scale view, with parts removed for clarity, of a detail of the machine of Figure 1;
- Figure 3 is a schematic side view, with parts removed for clarity and sectioned parts, of the machine of Figure 1;
- Figure 4 is a larger-scale perspective view of another detail of the device according to the invention;
- Figures 5 and 6 are opposite side perspective views of a fulcrum adapter which is part of the device of the invention.

[0015] With reference to Figures 1 to 3, number 1 indicates an electric household appliance, in particular an inbuilt ("fully-integrated") dishwashing machine; nevertheless, the following description also applies to any type of household appliance having a casing with an inner chamber closed by an access door hinged to the casing.

[0016] Appliance 1 comprises a casing 2, having an inner chamber 3 and an opening 4 for access to chamber 3, and an access door 5, hingedly connected to casing 2 for opening/closing opening 4.

[0017] Door 5 is mounted on casing 2 in a known way, for example by conventional hinges 6 positioned in a front lower portion of casing 2; door 5 is hinged to casing 2 along a bottom edge 7 of door 5 and moves about a substantially horizontal rotation axis R1.

[0018] Appliance 1 comprises a recessed bottom portion 8 having a bottom front recess 9 that is defined by a

front projection of casing 2 with respect to a base or plinth 10 of appliance 1. Recess 9 is delimited by a rear wall 11 and an upper wall 12, substantially perpendicular to one another, of portion 8.

**[0019]** Appliance 1 is housed inside a piece of furniture 14 (only partially and schematically shown) and door 5 is coupled to an outer decorative covering panel 15 applied to door 5 and connected to door 5 by a coupling device 20.

**[0020]** Device 20 comprises a top sliding coupling 21 between door 5 and panel 15 and a bottom hinge connection 22 for connecting panel 15 to casing 2 and specifically to portion 8 of appliance 1.

**[0021]** With reference also to Figure 4, sliding coupling 21 comprises at least one guide 23, fixed to an inner surface 24 of panel 15 facing door 5 and engaged by a slide 25 sliding along guide 23; slide 25 is hingedly connected to door 5, for example by a pin 26 projecting from door 5 and rotatably housed in a hole formed in slide 25.

**[0022]** Preferably, sliding coupling 21 comprises a pair of guides 23 engaged by respective slides 25 hingedly connected to door 5 and positioned at respective side ends of door 5.

**[0023]** With reference also to Figures 5 and 6, hinge connection 22 comprises at least one fulcrum adapter 27, having a seat 28 engaged by a pin 29 that is integrally carried by inner surface 24 of panel 15; and connection members 30 for fixing adapter 27 to portion 8 of appliance 1 in such a way adapter 27 projects frontally from appliance 1 and below and spaced apart from bottom edge 7 of door 5.

**[0024]** In particular (Figure 2), adapter 27 is fastened to portion 8 by a rear connection 31 and by a side and/or upper connection 32 and along two connection directions D1, D2 substantially perpendicular to one another.

**[0025]** Adapter 27 has a monolithic bracket-like body 33, preferably made of a plastic (polymeric) material.

**[0026]** Advantageously, adapter 27 consists of a single-piece element of plastic (polymeric) material.

**[0027]** In the non-limitative embodiment shown, body 33 is substantially plate-shaped and has a peripheral edge 34 and reinforcing ribs 35.

**[0028]** Adapter 27 is positioned in recess 9 and projects frontally from appliance 1 beyond a front edge 36 of appliance.

**[0029]** Adapter 27 is connected to portion 8 of appliance 1 by a rear connection portion 41 and by a side/upper connection portion 42 spaced apart from one another along peripheral edge 34; peripheral edge 34 contacts both walls 11, 12.

**[0030]** Fastening members 30 comprise, for example, fastening seats 30a formed in connection portions 41, 42, and fastening elements 30b, for example fastening pins or screws, engaging seats 30a along connection directions D1, D2 and fixed to walls 11, 12. It is however understood that other kinds of fastening members may be used.

**[0031]** Adapter 27 extends substantially along an axis

A between two longitudinal ends 43, 44; end 43 is a connection end connected to appliance 1, and end 44 is a free end provided with seat 28.

**[0032]** In particular, seat 28 is defined by an end hook portion 45 of adapter 27 positioned at free end 42; seat 28 has an upper insertion opening 46 formed in peripheral edge 34.

**[0033]** Pin 29 is carried by a support element 47 (Figure 2) fixed to and projecting from inner surface 24 of panel 15.

**[0034]** Support element 47 comprises a pair of lateral sides 48 and pin 29 is positioned between respective free ends of sides 48 to define a housing 49 in which hook portion 45 is inserted, so that pin 29 engages seat 28.

**[0035]** Preferably, bottom hinge connection 22 of device 20 comprises a pair of fulcrum adapters 27, provided with respective seats 28, and a pair of support elements 39, provided with respective pins 29 engaging seats 28, as described above, and positioned on opposite sides of recessed portion 8 of appliance 1.

**[0036]** In use (Figure 3), panel 15 is connected to door 5 by device 20; opening of panel 15 by a user also causes door 5 to open. Panel 15 rotates around a rotation axis R2 defined by pin(s) 29 inserted in seat(s) 28, and a bottom end portion 50 of panel 5 moves in recess 9. Rotation axes R1, R2 (of door 5 and panel 15 respectively) are substantially parallel and vertically spaced apart from one another.

**[0037]** Guide(s) 23 with slide(s) 25, support element(s) 47 with pin(s) 29, fulcrum adapter(s) 27 with fastening members 30, and possibly additional fastening members for fastening guide(s) 23 and support element(s) 47 to inner surface 24 of panel 15, form a mounting kit for coupling door 5 to panel 15.

**[0038]** Clearly, many changes may be made to the device and the kit as described and illustrated herein without, however, departing from the scope of the present invention as defined by the enclosed Claims.

## Claims

1. A device (20) for coupling an access door (5) of a household appliance (1), in particular a dishwashing machine, to a covering panel (15), the device comprising a top sliding coupling (21) between the door and the panel and a bottom hinge connection (22) for the panel; the device being **characterized in that** the hinge connection (22) comprises at least one fulcrum adapter (27), having a seat (28) engaged by a pin (29) that is integrally carried by an inner surface (24) of the panel (15) facing the door (5); and connection members (30) for fixing the adapter (27) to a recessed bottom portion (8) of the appliance in such a way the adapter (27) projects frontally from the appliance and below and spaced apart from a bottom edge (7) of the door (5).

2. A device as claimed in Claim 1, **characterized in that** the appliance (1) has a bottom front recess (9) in which a bottom end portion (50) of the panel moves when the door (5) is opened; and the adapter (27) is positioned in the recess (9). 5
3. A device as claimed in Claim 1 or 2, **characterized in that** the adapter (27) is fastened to the recessed portion (8) by a side and/or upper connection (42) and a rear connection (43). 10
4. A device as claimed in one of the foregoing Claims, **characterized in that** the adapter (27) is connected to the recessed portion (8) along two connection directions (D1, D2) substantially perpendicular to one another. 15
5. A device as claimed in one of the foregoing Claims, **characterized in that** the adapter (27) is connected to the recessed portion (8) by two connection portions (41, 42) spaced apart from one another along a peripheral edge (34) of the adapter (27). 20
6. A device as claimed in one of the foregoing Claims, **characterized in that** the adapter (27) has a monolithic bracket-like body (33). 25
7. A device as claimed in the preceding Claim, **characterized in that** the body (33) is made of plastic material. 30
8. A device as claimed in one of the foregoing Claims, **characterized in that** the seat (28) is formed at a free end (44) of the adapter (27) opposite a connection end (43) connected to the appliance (1). 35
9. A device as claimed in one of the foregoing Claims, **characterized in that** the seat (28) is defined by a hook portion (45) of the adapter (27). 40
10. A device as claimed in one of the foregoing Claims, **characterized in that** the adapter (27) projects frontally from the appliance (1) beyond a front edge (36) of the appliance. 45
11. A device as claimed in one of the foregoing Claims, **characterized in that** the pin (29) is carried by a support element (47) fixed to and projecting from the inner surface (24) of the panel (15). 50
12. A device as claimed in the preceding Claim, **characterized in that** the support element (47) comprises a pair of lateral sides (47) and the pin (28) is positioned between respective free ends of the sides to define a housing (49) in which a hook portion (45) of the adapter (27) is inserted. 55
13. A device as claimed in one of the foregoing Claims, **characterized in that** the top sliding coupling (21) comprises at least one guide (23), fixed to the inner surface (24) of the panel (15) and engaged by a slide (25) that is hingedly connected to the door (5) and slides along the guide (23).
14. An household appliance (1), in particular a dishwashing machine, comprising a casing (2), having an inner chamber (3) and an opening (4) for access to the chamber; an access door (5), hingedly connected to the casing for opening/closing the opening; an outer covering panel (15); and a device (20) for coupling the door to the panel; the appliance being **characterized in that** the device (20) is a device according to any one of the preceding Claims.
15. A mounting kit for coupling an access door (5) of a household appliance (1), in particular a dishwashing machine, to a covering panel (15); the kit comprising at least one guide (23), to be fixed to an inner surface (24) of the panel and engaged by a slide (25) that slides along the guide (23) and is hingedly connectable to the door (5); at least a support element (47) provided with a pin (29) and to be fixed to the inner surface (24) of the panel (15); at least one fulcrum adapter (27), having a seat (28) for housing the pin (29); and connection members (30) for fixing the adapter (27) to the appliance (1).



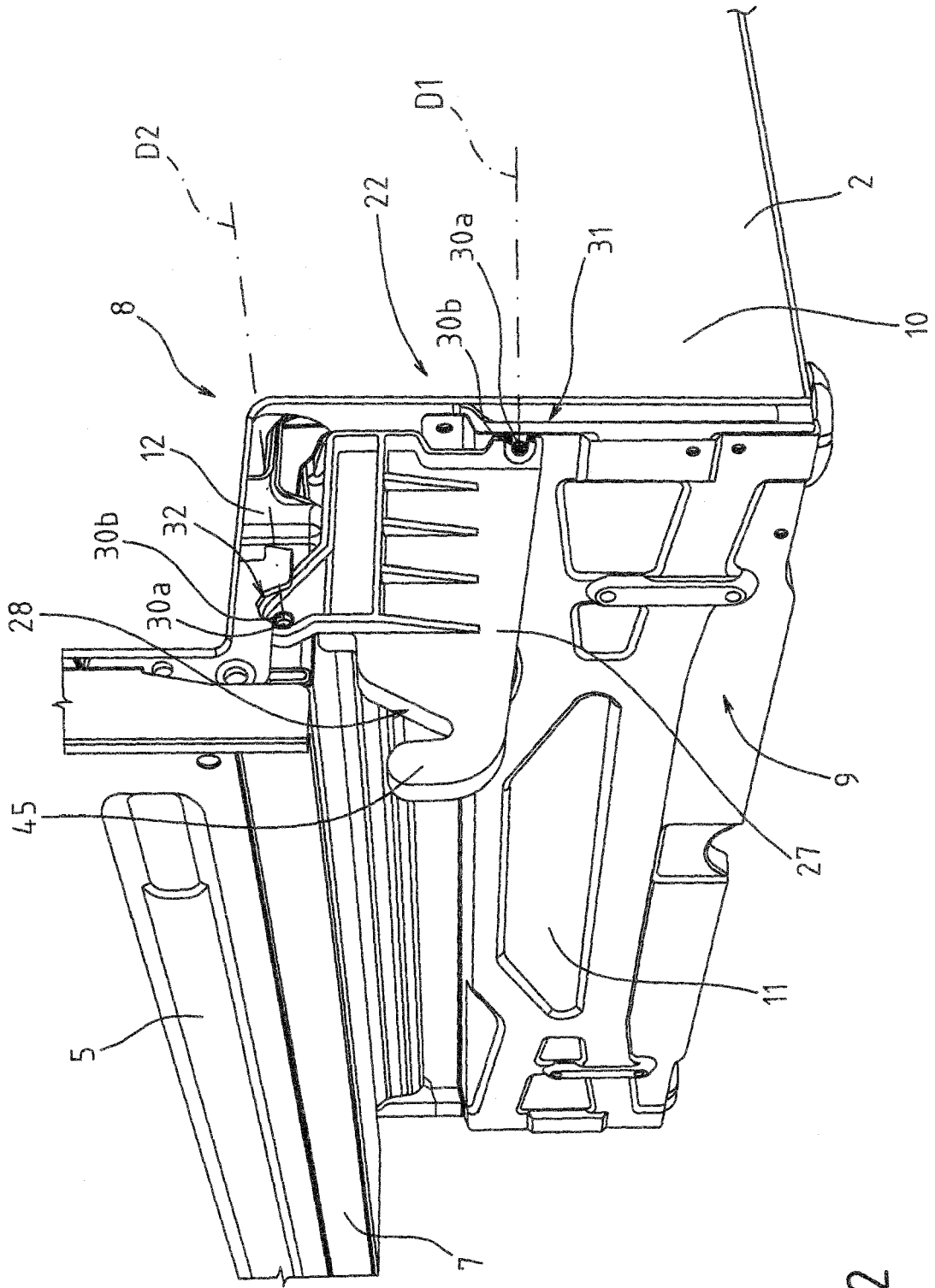


Fig.2



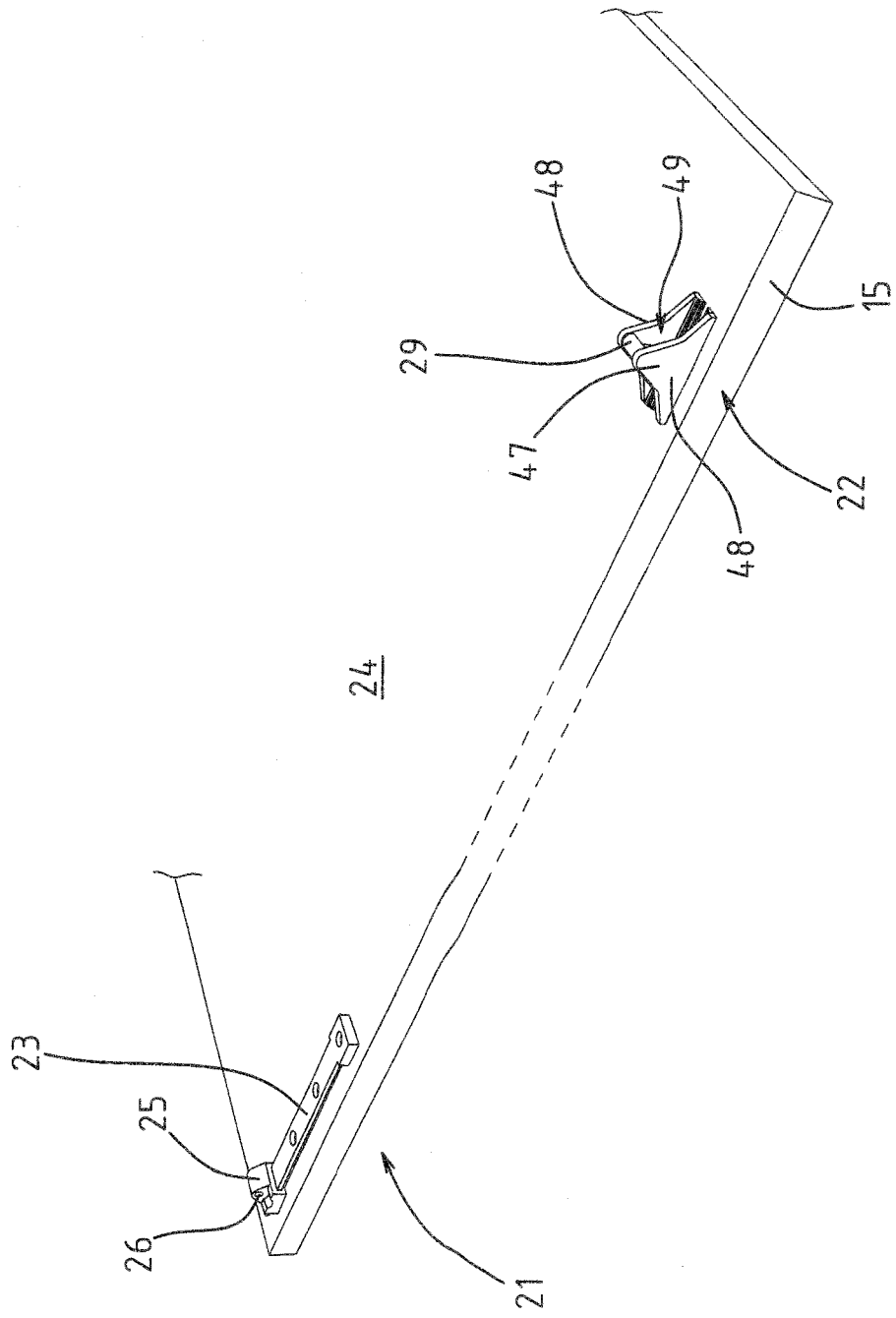
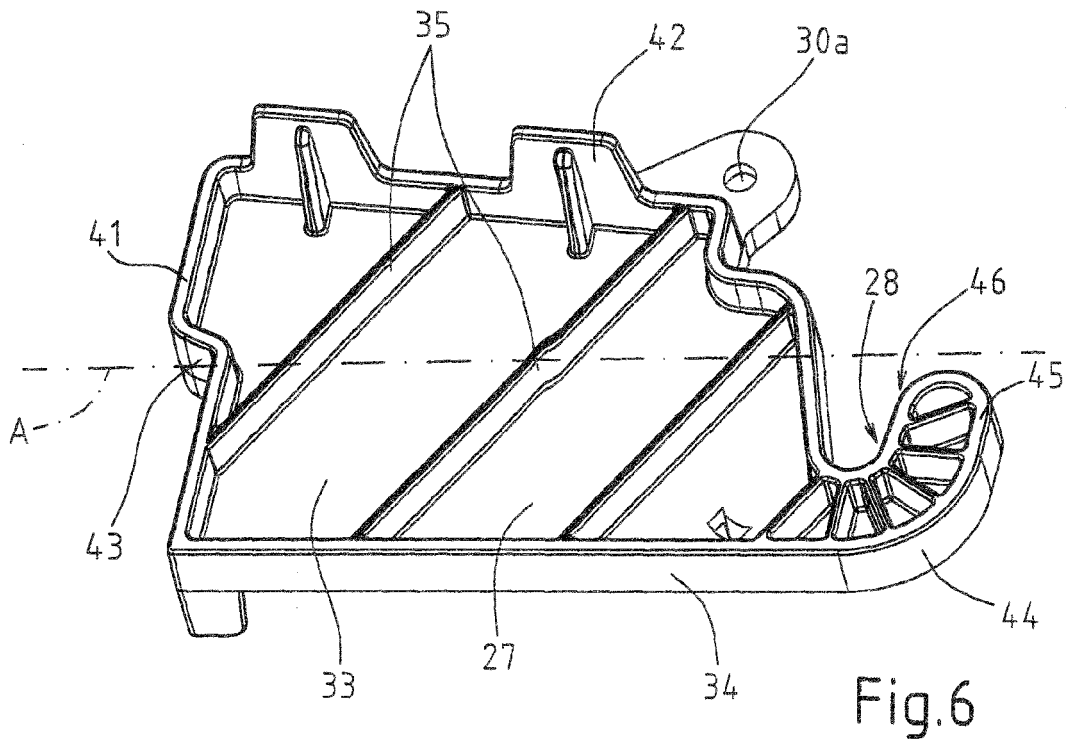
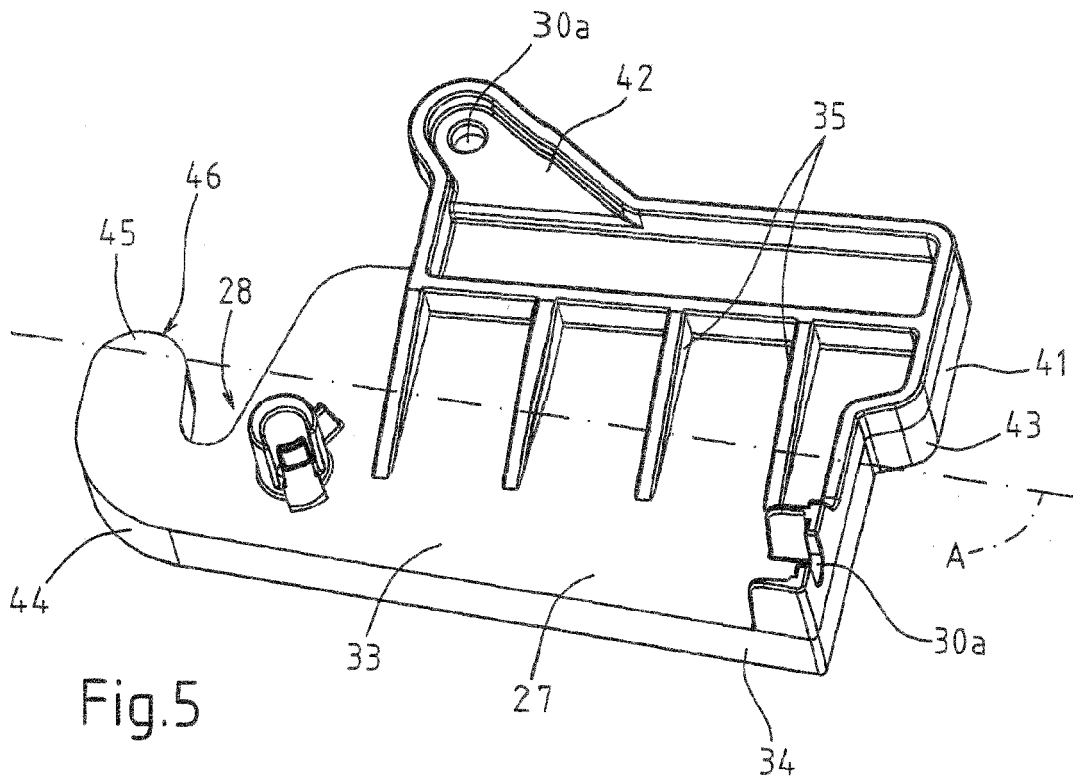


Fig.4







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			A47L
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 11 July 2008	Examiner Lopez Vega, Javier
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**ANNEX TO THE EUROPEAN SEARCH REPORT  
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11-07-2008

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