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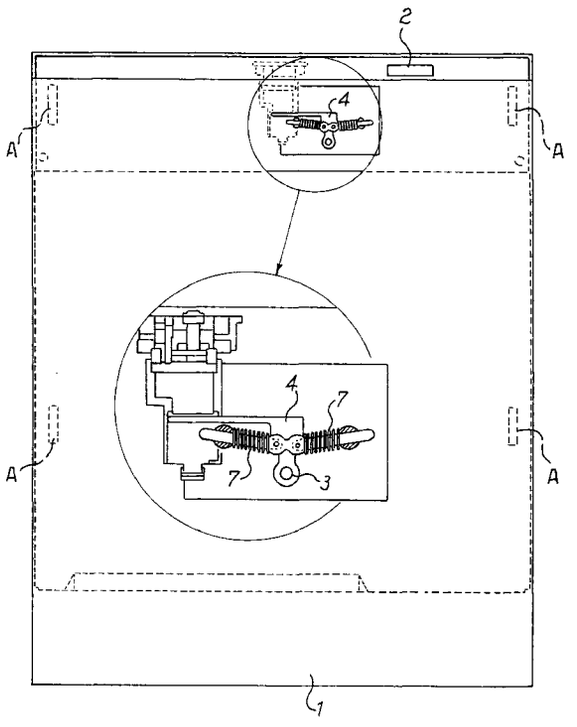
(54) Domestic appliance provided with a device for vertically shifting a decorative panel applied to the door

(57) A domestic appliance with a door provided with a decorative panel (1) having coupling members capable of allowing the vertical sliding thereof along the door further comprises a device which, when the door is closed, allows to lock the sliding of the panel (1) alternately between an upper and a lower position. This is achieved through a peg fastened on the rear side of the panel (1) and inserted in an eyelet (3) provided in a movable member (4) fastened on the door and elastically pushed by a pair of opposite springs (7). The device can be simply operated by a vertical push in the direction of the desired sliding and may also provide for the locking of the door latch when the panel is in the lower position.

Fig.1



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Description

The present invention relates to built-in domestic appliances having the door lined with a decorative panel, and in particular to domestic appliances provided with a device capable of allowing the vertical sliding of such a panel between two predetermined positions along the door in the closed position.

This type of decorative panel is known to be used to camouflage a built-in appliance, typically a dishwasher, so that it blends with the kitchen furniture. This is achieved by applying to its door, by various means, a panel having the same appearance of the other doors. In this way there is no visible element allowing to distinguish the appliance from the other members which make up the kitchen, its controls being accessible only when the door is open. However, this solution, though fully satisfactory from the aesthetical point of view, has the drawback that it is not possible to check the operating cycle of the machine, e.g. checking which washing phase has been reached or detecting possible visual indications. Moreover, it is not possible to modify the cycle without stopping the operation of the machine due to the opening of the door.

Actually, devices for mounting the decorative panel which also allow a vertical sliding thereof along the door are known from some time. However, this sliding consists of a lifting and/or moving away which results from the opening of the door, with the purpose of preventing the interference of the panel with the plinth of the furniture while avoiding the modification of the plinth and/or the mounting of complicated hinge systems. These devices anyway result in the complete covering of the door when it is in the closed position, thus giving rise to the aforementioned drawbacks. Examples of such devices are disclosed in German patents DE-2.937.404 and DE-3.304.142, and in patent applications EP-0162028 and EP-0520963.

A partial overcoming of the aforementioned drawbacks is achieved by the mounting device disclosed in the Italian application n.MI95U000363, in the applicant's name. The device disclosed in said application allows to close the door while retaining the decorative panel in a lower position, whereby the upper portion of the door remains accessible. In this way it is possible to locate in said upper portion the control switchboard, which is thus accessible and visible also when the door is closed. Furthermore, it is then possible to raise the panel so as to hide the door completely, without interfering with the machine operation.

However, though being effective and of simple construction, also the aforementioned device has some limits of use. In fact, once the panel has been raised to the upper position it is not possible to lower it without opening the door. Since the lowering of the panel is possible only while the door is open, it results that the vertical sliding of the panel is not completely independent from the open or closed position of the door on which it is mounted. Moreover, the lowering requires the simultaneous operation of two pushbuttons located on the sides of the door and is therefore not very easy.

Therefore the object of the present invention is to provide a domestic appliance provided with a device for sliding the panel suitable to overcome the aforementioned drawbacks.

This object is achieved by means of a domestic appliance having the features disclosed in claim 1.

The main advantage of the domestic appliance with a sliding device according to the present invention is the possibility of selecting the panel position at any time, so as to cover the door completely or to leave the controls in view for a subsequent check of the cycle and/or a possible change thereof, with no need to open the door. Therefore, the position can be repeatedly changed during the operating cycle without interfering therewith.

A further advantage of the present device is the use of the opening handle of the door as sliding control so that the aesthetical function of the decorative panel is not affected in any way, since no member of the sliding device is visible when the door is in the closed position.

Still another advantage stems from the extreme operating simplicity of the sliding device, whereby it is possible to raise or lower the panel with a single hand and in a single movement.

These and other advantages and features of the domestic appliance according to the present invention will be evident to those skilled in the art from the following detailed description of an embodiment thereof, with reference to the attached drawings, wherein:

Fig. 1 is a schematic front view showing the door of the domestic appliance with the panel in the lower position, and an enlarged detail of the sliding device shown in through-view;
Figs.2, 3 and 4 are schematic front partially through-views of the sliding device according to the invention, which correspond to the panel in the upper, intermediate, and lower position, respectively;
Figs.5 and 6 are schematic side through-views showing a further safety mechanism which may be combined with the sliding device, the latter being in the upper and lower position, respectively; and
Fig.7 is schematic top plan view, partially in section, showing the detail of a member for mounting the panel onto the door.

Figures 1 to 4 schematically show a sliding device arranged between the door of a built-in domestic appliance, typically a dishwasher, and the rear of a decorative panel 1 coupled to the door through mounting members, hereinafter described, engaged in corresponding seats provided in the door. In particular, an easy and balanced sliding of panel 1 is ensured by four members A for the coupling to the door, both at the top and bottom and both along the right side and the left side (Figure 1). Thus the following description, referred to the right

mounting members (when looking at the panel from the front), applies mirror-like to the left members.

The shifting of panel 1 from the upper position of Figure 2 to the lower position of Figure 4 is directly controlled through the opening handle of the door, in the way described further on. Once it has been released, panel 1 slides downwards for a short length so as to make accessible the upper portion of switchboard 2 where the cycle display and the control unit, possibly of the push-pull type, are located. It should be noted that the travel of panel 1 may be either the shortest travel required for the access to the controls and such as to allow anyway the opening of door 2 even when panel 1 is in the lower position, or a longer travel such as to make visible a higher portion of switchboard 2.

The device allowing the vertical sliding of panel 1 between the two aforementioned positions comprises a plate (not shown) fastened on the rear of panel 1 through a plurality of screws, and a spring mechanism mounted on the door, in particular in a recess provided in the upper portion of the door or in switchboard 2. Such a recess has a depth sufficient to house the whole sliding device so as to allow the mounting of panel 1 on the door with the smallest clearance sufficient for the vertical sliding.

The plate integral with panel 1 has a horizontal cylindrical peg which is inserted in an eyelet 3 provided at the lower end of a L-shaped member 4. Said member 4 is connected to a pair of rods 5 hinged thereto through pins 6 and symmetrically arranged with respect to a vertical axis passing through the center of eyelet 3. Each rod 5 has inserted thereon a spring 7 between pin 6 and a horizontal supporting peg 8, having provided therein a transversal hole wherein rod 5 is introduced so as to axially slide therethrough.

When panel 1 is in the upper position shown in Figure 2, said position is kept by virtue of the push of springs 7 which, through rods 5 and pins 6, support member 4. This in turn supports in eyelet 3 the peg of the supporting plate fastened to panel 1. The maximum weight of panel 1 which the spring mechanism can bear depends upon the push angle β between the axis of rod 5 and the straight line joining the centers of pegs 8, as well as upon the push of springs 7. By varying these parameters, it is possible to choose the extent of the downward push required to go beyond the supporting limit of the mechanism and cause the lowering of panel 1.

In fact, in order to lower panel 1, it is sufficient to overcome the vertical component of the push of springs 7 (besides the frictions of the device) until the intermediate dead-point represented in Figure 3 is reached. Beyond this position, the lowering of the panel is further helped by the vertical component of the push of springs 7, which by then push member 4 downwards.

Once the lowering has ended, the upper portion of switchboard 2 is accessible (Figure 1). The push angle α of rods 5 in the lowered position of the panel is minimized in order to be able to bring panel 1 back to the upper position by pulling it upwards without an excessive effort. In fact, since angle α is small, the dead-point is quickly reached (Figure 3) beyond which the push of springs 7 helps the user in raising the panel.

Figures 5 and 6 shows a further safety mechanism capable of interacting with the real sliding device in order to prevent the door opening when panel 1 is in the lower position. This may be useful if the plinth at the base of the door is not enough hollow to house panel 1 in the lower position when the door is opened. Thus a possible interference and possible damages are prevented, which may result from the user forgetting the need of raising panel 1 before opening the door. Such a mechanism may also act as safety in order to prevent children, which are not enough strong and/or tall to raise panel 1 in the upper position, from opening the door.

The mechanism comprises a lever 9 rotatable in the vertical plane around a pin 10 having thereon arranged a spring (not shown) which tends to keep the lever inner end 9a lifted. In this position (Figure 6), latch 11 which keeps the door closed is prevented from rotating when the user pulls the handle to open it. The opening is possible only when end 4a of member 4 pushes upwards the outer end 9b of lever 9 so as to rotate it (clockwise in Figure 5) and accordingly allow the rotation of latch 11.

End 4a protrudes from the recess through a slit provided in the left side wall but, with a different shaping of member 4, it could also protrude through a hole in the upper or lower wall. End 4a is inserted into the slit through a notch (not shown) provided in switchboard 2 in order to allow the passage of end 4a when panel 1 is mounted on the door in the lower position (i.e. the position of Figure 4).

With regard to this, Figure 7 shows that the coupling of panel 1 to switchboard 2 (member A at the top right in Figure 1) is carried out by means of pegs 12 having the same shape as the pegs disclosed in the aforementioned patent application n.MI95U000363. In fact, peg 12 has an ogive tip which extends at the rear in a cylindrical body having its section reduced by a sinking groove along a plane parallel to a vertical diametral plane, so that a vertical tooth is provided at the rear of the tip. As mentioned above, peg 12 is inserted into a seat, provided in switchboard 2, having a vertically extended rectangular shape. The height of such a seat, combined with the aforementioned device for vertical sliding, defines the sliding travel of panel 1 on the door (indicatively ranging from 15-20 mm to 40-50 mm).

A horizontal cylindrical latch 13, of a known type, having its inner end provided with a vertical ledge protrudes within the seat of peg 12. The coupling of peg 12 takes place by axial sliding of latch 13 in its own seat against the action of a spring 14, which prevents the subsequent uncoupling which is possible only by using a specific key.

Thus the objects are fully achieved of maintaining the aesthetic functionality of panel 1, since the sliding

device is not visible, while allowing the vision of the control switchboard and of the display every time it is required without interfering with the working cycle of the machine. This is achieved by a simple movement which may be done with a single hand.

The herein described and illustrated embodiment of the domestic appliance with sliding device according to the present invention is obviously just an example liable to several modifications. In particular, the shape of member 4 and/or eyelet 3 and/or rods 5 may be quite changed and the device itself may be modified as long as it maintains the functionality of vertical sliding of the panel between two alternate positions. For example, eyelet 3 may be provided above pins 6 or member 4 may slide not quite vertically.

Claims

1. A domestic appliance with a door provided with a decorative panel (1) having at least a pair of coupling members fastened onto the rear side of said panel (1) and engaged in corresponding seats formed in the front side of said door so as to allow the vertical sliding of the panel (1), characterized in that it further comprises a device arranged between the door and the rear side of the panel (1), said device being capable, when the door is closed, of locking the sliding of the panel (1) alternately between an upper and a lower position through the interaction of a first member integral with the panel (1) and a second member integral with the door and elastically pushed in a vertical direction, said device being operable through a vertical push in the direction of the desired sliding.

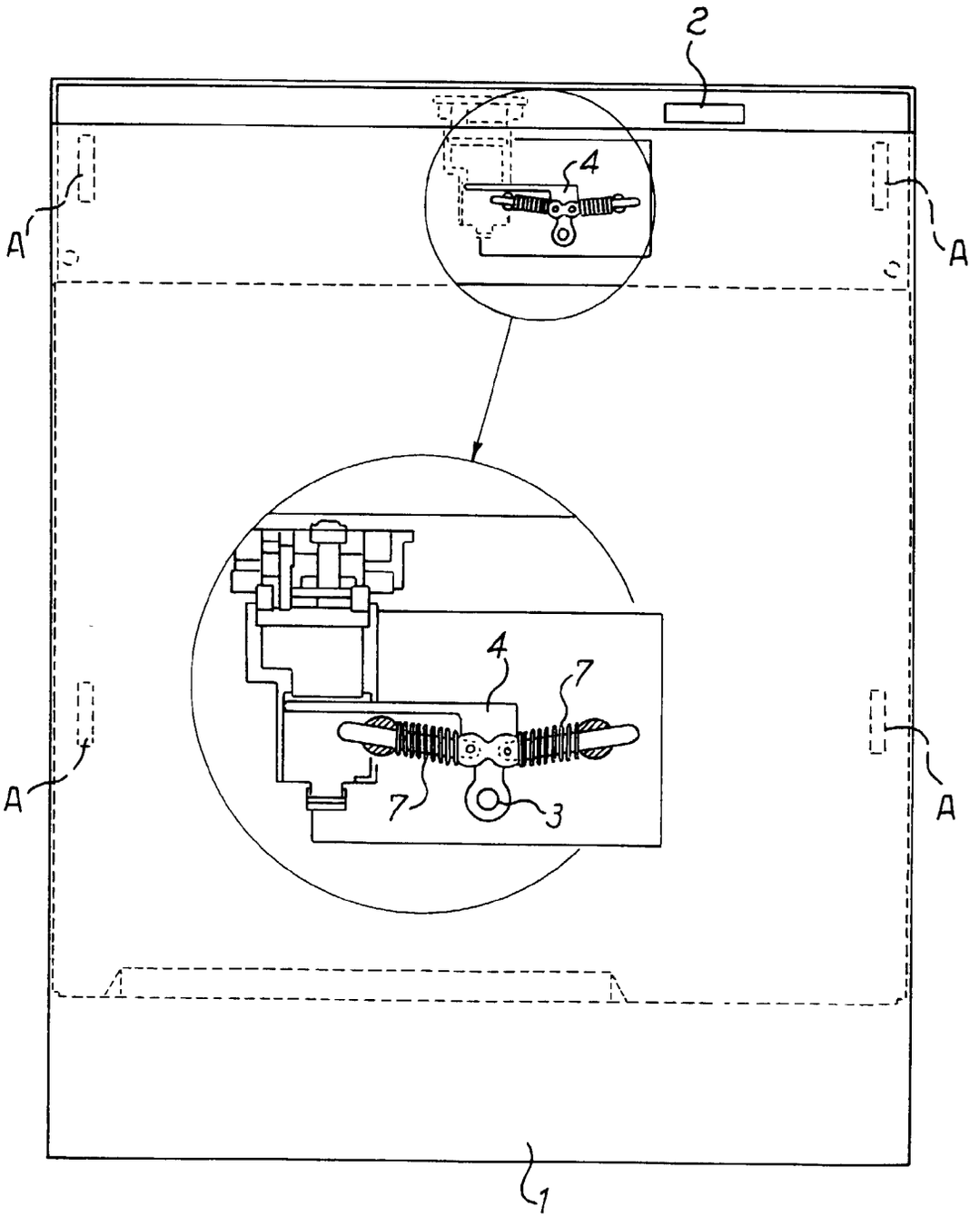
2. A domestic appliance according to claim 1, characterized in that the device comprises a horizontal peg fastened on the rear side of the panel (1) and inserted into an eyelet (3) provided in a movable member (4) connected to a pair of rods (5) hinged thereto through pins (6) and symmetrically arranged with respect to an axis passing through the center of said eyelet (3), each rod (5) having thereon inserted a spring (7) between the pin (6) and a supporting horizontal peg (8) having provided therein a transversal hole wherein the rod (5) is introduced so as to be capable of axially sliding therethrough.

3. A domestic appliance according to claim 2, characterized in that the centers of the two supporting pegs (8) are horizontally aligned and the two rods (5) are identical.

4. A domestic appliance according to one or more of claims 1-3, characterized in that it further comprises a movable stop member elastically pushed in such a position as to prevent the door opening and in that the movable member (4) is capable of shifting said stop member to a position of door unlocking when the panel (1) reaches the upper position.

5. A domestic appliance according to claim 4 when dependent on claim 2 or 3, characterized in that the movable member (4) is substantially L-shaped with an end (4a) capable of interacting with an end (9b) of a rotatable lever (9) so as to make it rotate from a locking position of a door latch (11) to an unlocking position of said latch (11).

Fig.1



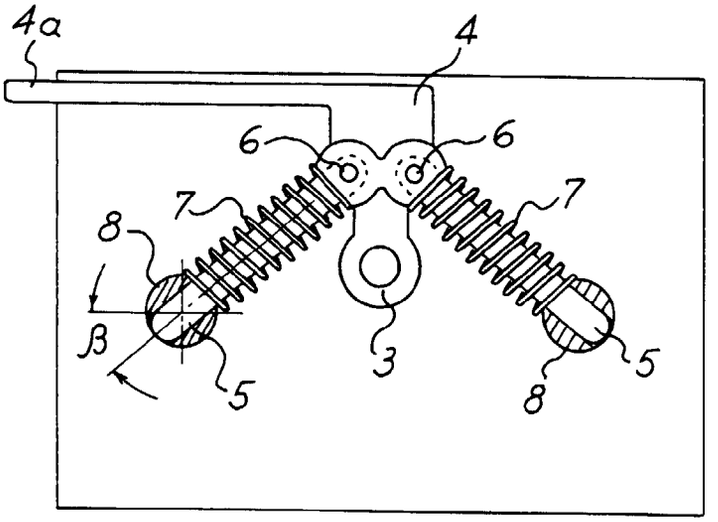


Fig.2

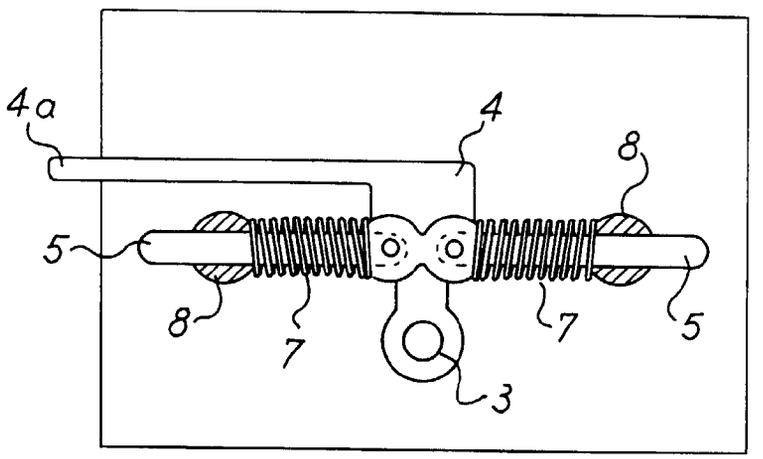


Fig.3

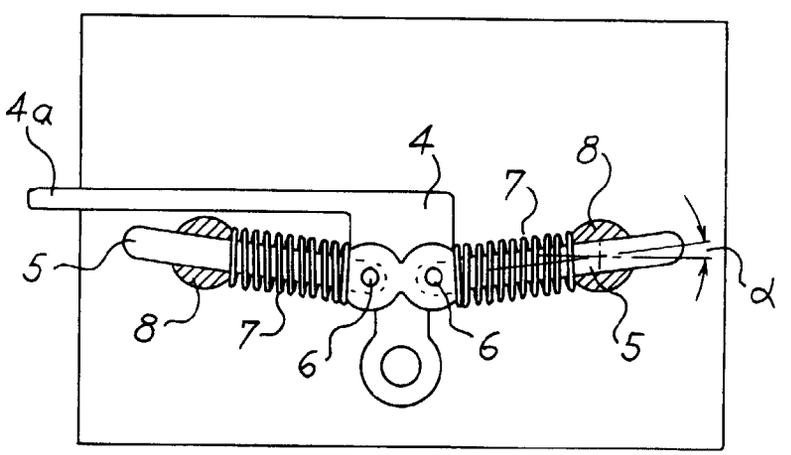


Fig.4

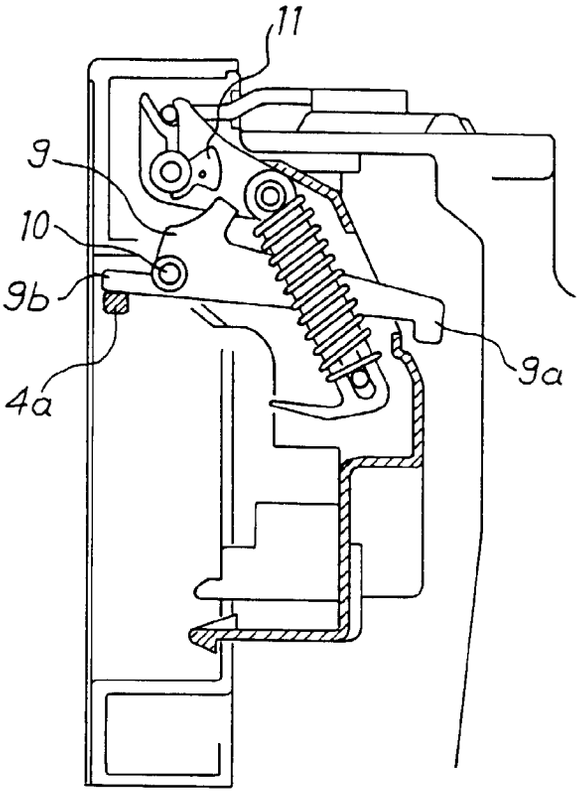


Fig.5

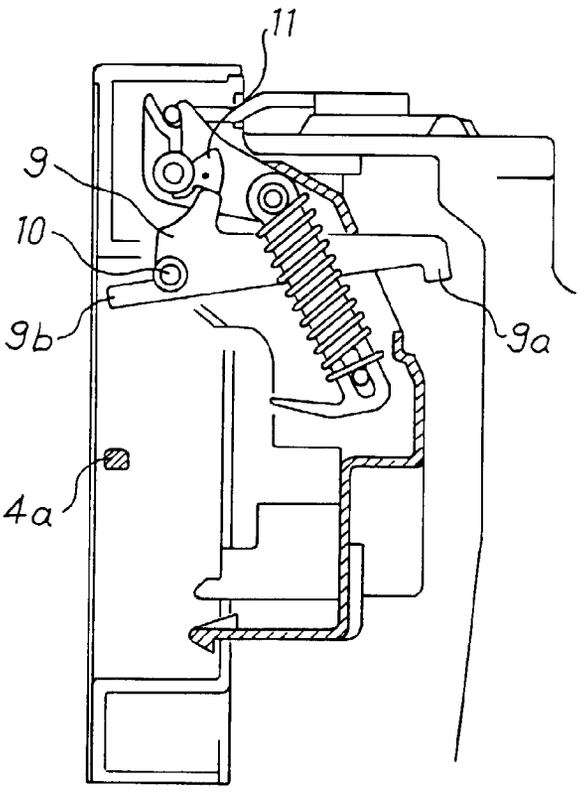
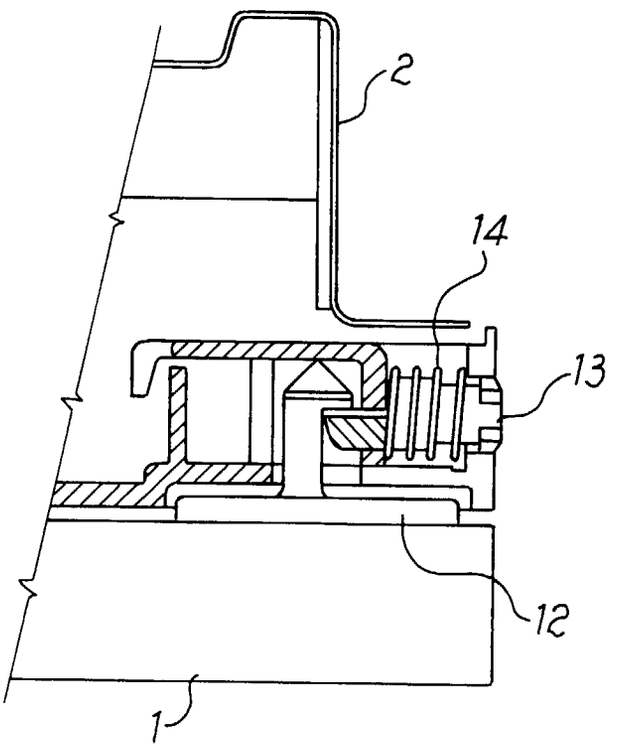


Fig.6

Fig.7



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EUROPEAN SEARCH REPORT

Application Number
EP 98 83 0232

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
D,A	EP 0 520 963 A (SMEG SPA) 30 December 1992 * the whole document * ---	1	A47L15/42
A	GB 2 238 576 A (ZANUSSI A SPA INDUSTRIE) 5 June 1991 * the whole document * ---	1	
A	US 5 365 959 A (FAVARO DANIELE) 22 November 1994 * the whole document * -----	1	

TECHNICAL FIELDS SEARCHED (Int.Cl.6)

A47L

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	7 August 1998	Madsen, P

CATEGORY OF CITED DOCUMENTS

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